

3M™ Wrist Strap and Footwear Tester 740

User's Guide



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SAFETY INFORMATION

Explanation of Signal Word Consequences



WARNING

Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury and/or property damage.



CAUTION

Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury and/or property damage.

NOTICE

Indicates a potentially hazardous situation, which, if not avoided, may result in property damage.



WARNING

To reduce the risks associated with environmental contamination:

- When working with the automated equipment, always observe safety precautions as recommended by equipment manufacturer and your company's practices.



CAUTION

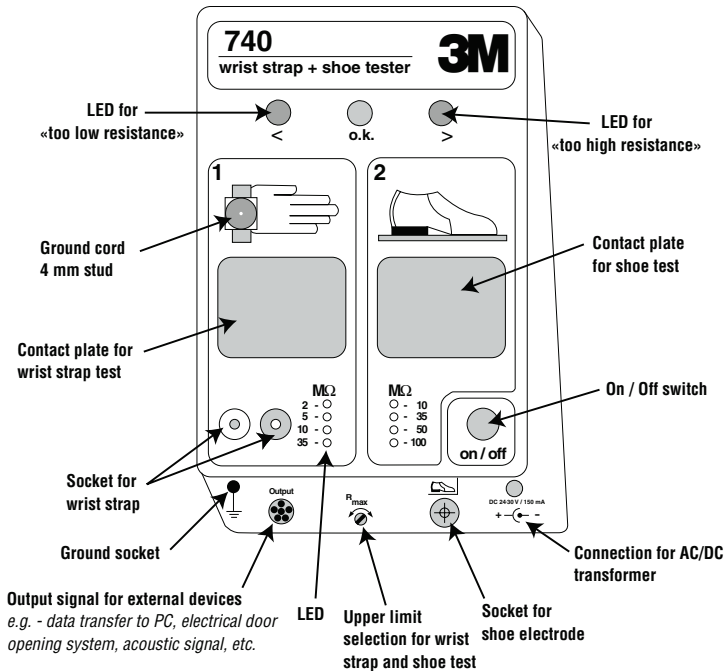
To reduce the risks associated with environmental contamination:

- Dispose of the monitor in accordance with local, state, and federal regulations.

NOTICE

To reduce the risks associated with property damage:

- Periodically check that the indicator is functioning properly.



1.0 General

Personnel grounding devices such as wrist straps and conductive footwear are the primary method to minimize charge generation on the human body. They must be able to drain this charge as rapidly as it is generated. For this reason, it is important to test wrist straps and conductive footwear on a regular basis to ensure they are functioning properly and that the test results can be recorded.

2.0 Description

The 3M™ Wrist Strap and Footwear Tester 740 is an electronic test instrument that is easy to operate and is designed to be wall-mounted. An AC/DC transformer is supplied. The Wrist Strap and Footwear Tester 740 switches off automatically after non-use for approximately 30 minutes.

The unit consists of two measurement circuits with an open circuit test voltage of 14V for wrist strap and shoe test applications. For wrist strap and footwear testing,

a minimum threshold resistance of 750 k Ω is set internally. The desired maximum allowable resistance level can be selected separately for each measurement. If the resistance of the tested wrist strap or footwear is within the selected range, the green “o.k.”- LED will illuminate. The red “>” - LED alerts the operator that the resistance of the tested device is under 750 k Ω . The red “>”- LED indicates that the selected maximum resistance is exceeded.

The 3M™ Wrist Strap and Footwear Tester 740 can be connected to external devices such as computers (for data recording), electrical door opening systems, or other logic driven components.

The Wrist Strap and Footwear Tester 740 consists of:

- Base unit
- Data output connector plug
- Wall mounting kit, 3M™ Dual Lock™ Fastening System and template
- Cover for wrist strap plug-in jack
- AC/DC transformer
- Ground cord

Accessories:

3M™ Shoe Electrode 741 (to be ordered separately)

3.0 Operation

Connect the AC/DC transformer (24-30VDC, 150mA) to the Wrist Strap and Footwear Tester 740.

Note: If you notice a delay in the response time of the LED illumination please connect the ground cord supplied to the ground socket of the Wrist Strap and Footwear Tester.

Please ensure proper earth ground connection!

Switch the unit on. All LEDs will flash for approximately 1 second to check their function. Select the desired upper maximum resistance level for both the wrist strap and shoe test by using a small screw driver.

The Shoe Electrode 741 must be connected if footwear testing is required.

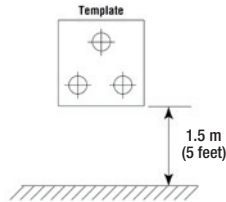
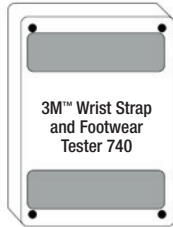


4.0 Wall Mounting

The enclosed 3M™ Dual Lock™ Fastening Discs must be screwed to the wall using the attached template approximately 1.5 m (5 feet) above the floor. Drill three holes of 5 mm (0.2 in.) diameter at marked locations. Make sure the area on the Wrist Strap and Footwear Tester 740 in which the Dual Lock Fastening

Strips are placed in a free of dust and dirt. Attach the 3M™ Dual Lock™ Fastening Strips to the rear of the 3M™ Wrist Strap and Footwear Tester 740 to the bottom and top in parallel; see drawing for locations.

For securing on the wall, press the Wrist Strap and Footwear Tester 740 firmly against the discs. For removal of the Wrist Strap and Footwear Tester 740, lift the top corners with both hands.



5.0 Wrist Strap Test

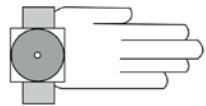
Put the wrist band on with ground cord attached and insert the ground cord into the wrist strap plug-in jack. Depress the metal contact plate and hold it. One of the indicator-LEDs will illuminate.

An illuminated green LED indicates that the wrist strap performs within the resistance range of 750 k Ω to the upper selected value of 2, 5, 10 or 35 M Ω . If a red “<”-LED is on, the current limiting resistor in the ground cord is bypassed and the cord has to be replaced. The red “>”-LED indicates that the selected resistance range is exceeded. Check to see if the high resistance is in the cord, the wrist band or in the contact between wrist band and the operator’s skin. To check the resistance of the ground cord, leave the plug end of the ground cord attached to the tester and disconnect the snap end from the wrist band. Connect ground cord snap to the stud in the hand symbol or press it onto the contact plate and depress the plate until one of the LEDs is illuminated.

If the green LED illuminates now, the ground cord can be used.

If the red “>”- LED is lit, replace the ground cord.

In some cases, high contact resistance between the skin and wrist band will cause the tester to show a red “>” - LED condition. This resistance may be caused by dry skin



or the presence of hair in the wrist area. The use of a skin lotion is recommended to solve this problem.

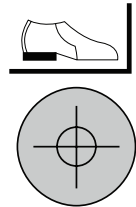
If a red “>”- LED condition still exists, replace the wrist band. or the presence of hair in the wrist area. The use of a skin lotion is recommended to solve this problem.

If a red “>”- LED condition still exists, replace the wrist band.

6.0 Shoe test

The 3M™ Shoe Electrode 741 must be connected to the 3M™ Wrist Strap and Footwear Tester 740 shoe jack.

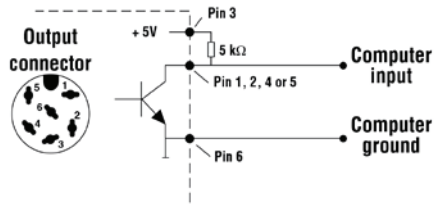
Switch the Wrist Strap and Footwear Tester 740 on. Stand on the applied shoe electrode. If you are using shoe straps with a 1 M Ω resistor on both feet to be tested with the 741, you have to test the straps one after the other, to avoid a red “too low” - indication. Care must be taken not to put the non-tested foot on ESD - protective flooring to avoid a bypass to ground. Press the metal contact plate for shoe test until one of the indicator - LEDs lights up. The green LED indicates that the resistance of the person through the footwear is in the range between 750 k Ω and the desired upper maximum level (10, 35, 50 or 100 M Ω).



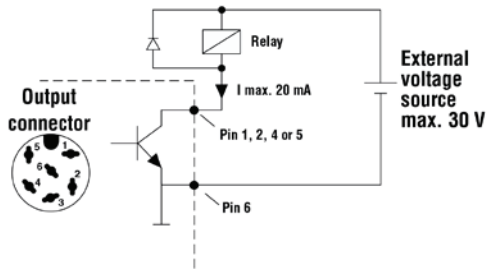
7.0 Data Output Connector

If you are going to use the data output connector you must follow a test sequence. Test the wrist strap first and then the shoe. **If this sequence is not strictly kept, the output at the pins described on page 9 will be incorrect.**

The 3M™ Wrist Strap and Footwear Tester 740 will provide digital signals (high/low) while testing the personnel grounding devices. These digital signals can be used for data recording (Example 1) and authorization control equipment such as electrical door opening systems (Example 2). The output of the Wrist Strap and Footwear Tester 740 will give you permanently +5V at pin 3 and DC-return at pin 6. The remaining pins 1, 2, 4 and 5 (open collector) will be high (max. +30V/20mA have to be provided externally) or low (DC-return) while pressing on the contact plates either for wrist strap or shoe tests. The chart on page 9 shows all of the possible test results and the corresponding output levels.



Example 1: Output connection for use with a computer

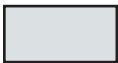


Example 2: Output connection for use with a controlling device

Data output connector pin status when testing wrist strap/shoe

	Power up:	Test result 1:		Test result 2:		Test result 3:		Test result 4:	
		wrist wrap o.k.	shoe o.k.	wrist wrap not o.k.	shoe o.k.	wrist wrap o.k.	shoe not o.k.	wrist wrap not o.k.	shoe not o.k.
pin 1	hi	hi	hi	lo	hi	hi	lo	lo	lo
pin 2	hi	hi	hi	hi	lo	hi	lo	hi	lo
pin 3	hi	hi	hi	hi	hi	hi	hi	hi	hi
pin 4	hi	hi	lo	hi	hi	hi	hi	hi	hi
pin 5	hi	lo	lo	hi	lo	lo	hi	hi	hi

The sequence for testing must be wrist strap test first and then the shoe test.



Shaded pin indicators will read “hi” if the sequence is reversed or only the shoe tests are performed.

Data Output Connector



- pin 1, 2, 4, 5 - high or low
- pin 3 - + 5 V
- pin 6 - DC-return

8.0 Specifications

Dimension of base unit	14 cm W x 5.5 cm H x 19 cm L (5.5" W x 2.14" H x 7.5" L)
Weight	15.5 ozs. (438 g)
Power supply	External AC/DC transformer, 24-30VDC/150mA
Accuracy	± 10% of 2, 5, 10, 35 and 50 MΩ-ranges ± 20% of 100 MΩ-range
Output	Open collector at pin 1, 2, 4, 5 (max. 30V/20 mA) DC-return at pin 6, + 5V at pin 3
Voltage	14VDC (open circuit)

9.0 Calibration Procedure

The following procedure can be used to determine if the 3M™ Wrist Strap and Footwear Tester 740 operates within its specifications.

Please note: The tester has no adjustable components.

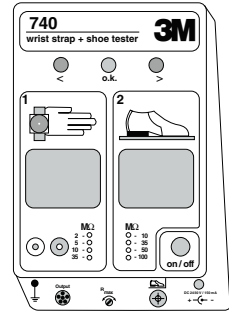
Equipment needed:

Resistors: 750 k Ω - 120 M Ω , tolerance \pm 1%

2 leads: as required to connect the reference resistor

Calibration of wrist strap test circuit

Connect the reference resistor to the Wrist Strap and Footwear Tester 740 as shown in the figure below. Switch the Wrist Strap and Footwear Tester 740 unit on. Select the 2 M Ω -range and use the reference resistors as indicated in the test table and press contact plate A.



The LEDs will indicate as shown below if the Wrist Strap and Footwear Tester 740 performs within specifications. Repeat this procedure for 5, 10 and 35 M Ω -ranges.

Reference Resistor	Resistance Range Settings	LED Indication
750 k Ω 900 k Ω 1.8 M Ω > 2.2 M Ω	2 M Ω - range	Red Green Green Red
4.5 M Ω > 5.5 M Ω	5 M Ω - range	Green Red
9.0 M Ω > 11.0 M Ω	10 M Ω - range	Green Red
31.5 M Ω > 38.5 M Ω	35 M Ω - range	Green Red

* The 750 k Ω threshold is approximate for that range and could vary slightly. Actual threshold resistances are not listed.

Regulatory Information

To reduce the risks associated with environmental contamination from the device: At the end of service life, dispose of the unit in accordance with federal, state and local requirements.

WEEE Statement

The following information is only for EU-members States: The mark shown to the right is in compliance with Waste Electrical and Electronic Equipment Directive 2002/96/EC (WEEE). The mark indicates the requirement NOT to dispose the equipment as unsorted municipal waste, but use the return and collection systems according to local law.

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78-9100-6761-6B JHA