



## TOS1

## Transformer Ohmmeter Standard

## USER MANUAL

## Notice

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# Introduction

## 1.1 Receipt of product

Prior to operation, check for loosened hardware or damage incurred during transit. If these conditions are found, a safety hazard is likely. DO NOT attempt to operate equipment. Please contact Megger as soon as possible.

## 1.2 Product Overview

The TOS1 is a unit designed to be used with ohmmeters as a high accuracy reference resistance standard. This unique standard provides resistance measurements across a wide range for use when calibrating ohmmeters. The standard is designed for use as a laboratory calibration standard, or as a portable check standard for field resistance verification of any ohmmeter.

## 1.3 Control, input, output

a. Quick Start Guide

b. Calibration reference

c. Power input

85-264 VAC, 47-63 Hz, 250 VA MAX

d. Power on indicator

e. Ground

f. Resistance Selector Switch

Enables different resistance/current values for ohmmeter verification

g. Overtemp! Indicator

Indicates if the ohmmeter exceeds 55C temperature limit

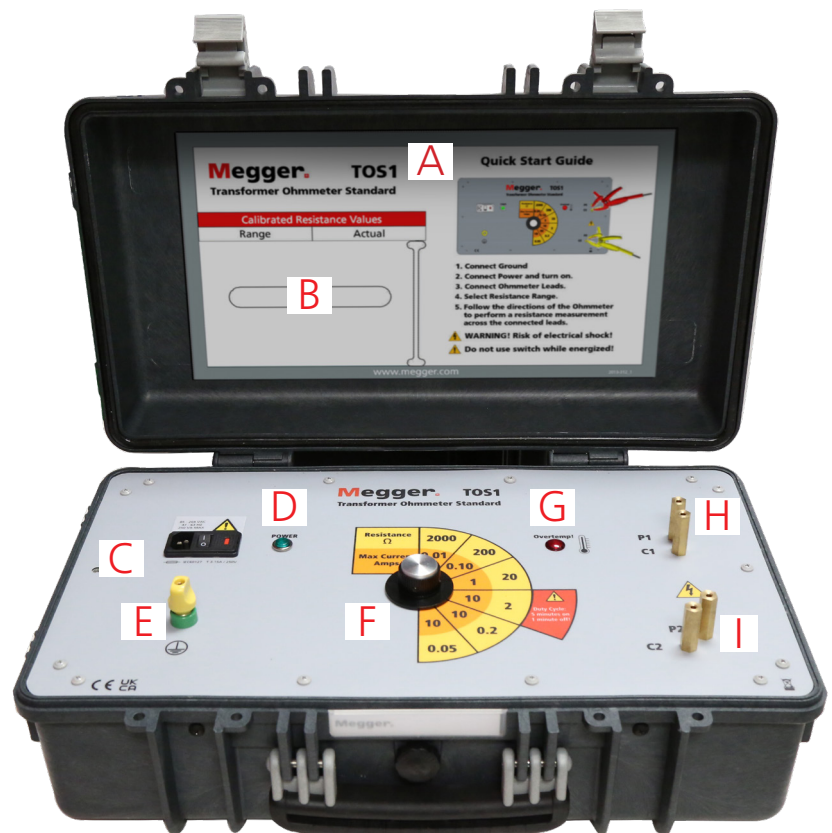
h. P1/C1

Terminal for first (output) ohmmeter lead.

i. P2/C2

Terminal for second (return) ohmmeter lead.

P/C = potential/current



## 1.4 Data sheet and Accessories

Use the ordering information table below to confirm that all included accessories were delivered with your TOS1

ORDERING INFORMATION			
Item (Qty)	Cat. No.	Included Accessories	
TOS1	TOS1	AC Power Adapter Kit	2009-874
		Ground Cable	2001-GH14-15

## 2.1 Responsible User

Only qualified and trained operators should operate the TOS1. Operator must read and understand this entire Instruction Manual prior to operating the equipment. Operator must follow the instructions of this Instruction Manual and attend the equipment while the equipment is in use. In the event of equipment malfunction, the unit should immediately be deenergized and returned to Megger for repair. The Safety precautions herein are not intended to replace your Company's Safety Procedures. Refer to IEEE 510 - 1983, IEEE Recommended Practices for Safety in High-Voltage and High-Power Testing, for additional information.

## 2.2 Symbols



### Caution

Caution, possibility of electric shock



### Warning

Warning, refer to User Manual

## 2.3 General Precautions



The TOS1 and the ohmmeter should both be considered sources of instantaneously lethal levels of electrical energy.

### Observe the following safety precautions:

- Observe all safety warnings on the equipment. They identify areas of immediate hazard that could result in injury or death.
- Use this equipment only for the purposes described in this manual. Observe strictly the Warning and Caution information provided in this manual
- Treat all terminals of the TOS1 and high voltage power equipment systems as potential electric shock hazards. Use all practical safety precautions to prevent contact with energized parts of the equipment and related circuits.
- Use suitable barriers, barricades, or warnings to keep persons not directly involved with the work away from test activities.
- Never connect the test equipment to energized equipment.
- Do not use in an explosive atmosphere.
- Use the grounding and connection procedures recommended in the Ohm meter manual. The ground connection must be the first made and the last removed. Any interruption of the grounding connection can create an electrical shock hazard.
- Personnel using heart pacemakers should obtain expert advice on the possible risks before operating this equipment or being close to the equipment during operation

# Specifications

## SPECIFICATIONS

<b>Input Power</b>	90-250 V AC, 47-63 Hz, 250 VA MAX
<b>Dimensions</b>	216 H x 546 W x 330 D mm
<b>Weight</b>	26.5 lbs
<b>Storage Temperature</b>	-10°C to 50°C
<b>Operating Temperature</b>	10°C to 30°C
<b>Safety</b>	IEC 61010
<b>Vibe/Drop/Shock</b>	MIL-STD-810G
<b>Max Excitation Voltage</b>	100 V DC
<b>Max Excitation Current</b>	10 A DC

<b>Resistance</b>	<b>Max Excitation Current</b>	<b>Resistance</b>	<b>Max Excitation Current</b>
2000.00 Ω	0.01 A (10mA)	2.00 Ω	10.00 A
200.00 Ω	0.10 A (100mA)	0.20 Ω (200 mΩ)	10.00 A
20.00 Ω	1.00 A	0.05 Ω (50 mΩ)	10.00 A

### 4.1 Site preparation

Choose a location that meets the following conditions:

- The location is as dry as possible
- There is no flammable material stored in the vicinity
- The test area is adequately ventilated
- The test area is flat surface
- Be sure all equipment is de-energized. Erect suitable safety barriers to protect the operator from traffic hazards and to prevent intrusion by unauthorized personnel. User provided Warning lights are recommended
- Verify that the Local station ground is intact and has impedance continuity to earth

### 4.2 Connecting to the TOS1

See Appendix for instrument specific connections

Connections should be made in the order listed below:

1. Turn off the ohmmeter intended to measure the TOS1
2. Connect leads to the ohmmeter
3. Place the TOS1 in an upright position on a flat surface and open the lid
4. Connect provided power cable
  - a. to wall outlet
  - b. TOS1
5. Connection provided ground cable
  - a. to suitable earth ground
  - b. to TOS1
6. Connect ohmmeter leads to TOS1
  - a. Connect H1 (or equivalent) to TOS1 P1/C1
  - b. Connect H2 (or equivalent) to TOS1 P2/C2

For Kelvin leads, connect potential to P and Current to C. For non-Kelvin leads, connect clamp across both terminals.

## Operation



Before changing resistance values, ensure the ohmmeter is not applying current to the TOS1

1. Turn on the TOS1 using the power inlet switch
  - a. Green power light should come on
2. If the Overtemp! Indicator is illuminated, leave the TOS1 powered on and provide time for the temperature within to reduce to acceptable levels
3. Use the resistance selector switch to select the desired resistance value to be measured by the ohmmeter
4. Following the manual for the ohmmeter, turn on the ohmmeter and execute a single phase resistance measurement.



Do not exceed the measurement current or duty cycle indicated on the overlay for the selected resistance value.



Do not change resistance values while current is being applied to the TOS1.

5. Following the manual for the ohmmeter, turn off the ohmmeter
6. Turn off the TOS1 using the power inlet switch



## 6.1 Troubleshooting

The Troubleshooting Guide is arranged to help you evaluate the reasons for TOS1 malfunction. The possible test set malfunctions and causes are listed below. Electronic circuit repairs should not be attempted in the field. Refer to Repair section.

- Unit not powering on (green power indicator not illuminated)
  - Disconnect the power cord from the TOS1 and check the fuse located within the power inlet switch
  - Check that the power cord is securely connected to wall outlet
  - Check that power cord is securely connected to TOS1
  - Ensure the power inlet switch is in the 1 (On) position
  - Check that the wall outlet has power
  - Disconnect the power cord from the TOS1 and check continuity of the power cord
  
- Overtemp! Light indicator on
  - Leave unit on. Overtemp! Light will go off once unit has cooled down
  
- Unexpected resistance values
  - Check that the resistance selector switch is in the correct position
  - Check that the correct leads from the ohmmeter are connected to P1/C1 and P2/C2
  - Check that the ohmmeter is sourcing current less than or equal to the maximum current allowable for resistance selector switch position
  - Check that the duty cycle has not been exceeded

## 6.2 Maintenance

Maintenance should be performed only by qualified persons familiar with the hazards involved with highvoltage test equipment. Read and understand Sections 1, 2, 3, 4, and 5 before performing any service.

The TOS1 requires only periodic inspection. Inspect all hardware items to ensure all are in good condition.

The TOS1 may be cleaned periodically. In so doing, do not allow water to penetrate panel holes. An all-purpose, household spray cleaner can be used to clean the panel. Polish with a soft, dry cloth. Clean the cables and mating panel receptacles with isopropyl or denatured alcohol applied with a clean cloth.

## 6.3 Calibration

A complete performance and calibration check should be recommended at least once every year. This will ensure that the TOS1 is functioning properly over the entire measurement range. The TOS1 calibration is performed on each new or repaired unit before sending it to a customer.

## Service

### 6.4 Repairs

Any service or repair of this equipment should be performed only by qualified persons who are aware of electrical hazards and the necessary precautions required to prevent injury.

Megger offers a complete Repair and Calibration Service and recommends that its customers take advantage of this service for routine maintenance or in the event of any equipment malfunction.

In the event Service is required, contact your Megger representative for a product Return Authorization (RA) number and shipping instructions.

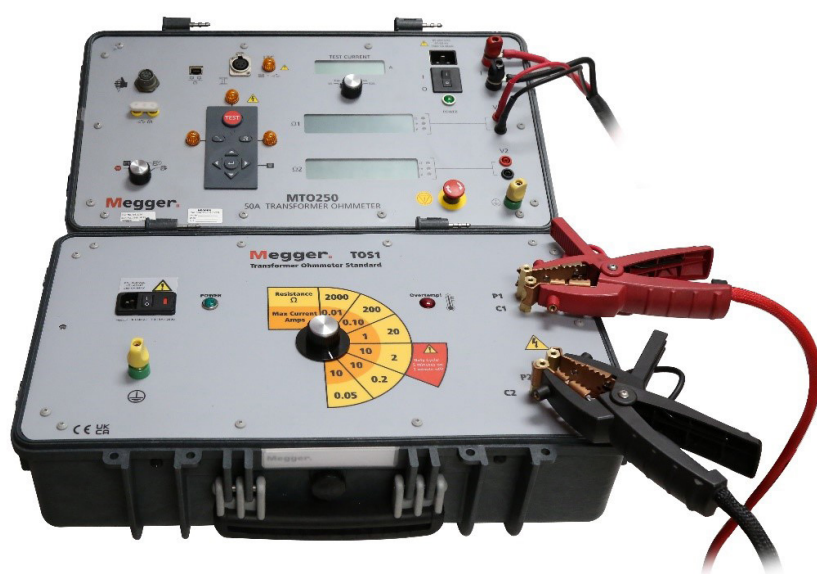
Ship the product prepaid and insured and marked for the attention of the Megger Repair Department. Please indicate all pertinent information, including catalog number, serial number, and problem symptoms.

## A.1 MTO 210/250

### Non Kelvin Leads

1. Connect I+ clamp to C1
2. Connection I- clamp to C2
3. Connect V1+ clamp to P1
4. Connect V1- clamp to P2

### Kelvin Leads



1. Connect I+/V+ clamp to C1/P1, respectively. Note P indicated on potential side of kelvin lead
2. Connect I-/V- clamp to C2/P2, respectively. Note P indicated on potential side of kelvin lead

## Appendix A

### A.2 MTO 300/3xx



1. Connect H1 clamp to C1/P1, respectively. Note P indicated on potential side of kelvin clamp
2. Connect H2 clamp to C2/P2, respectively. Note P indicated on potential side of kelvin lead

### A.3 MWA 300/3xx



1. Connect H1 clamp to C1/P1, respectively. Note P indicated on potential side of kelvin clamp
2. Connect H2 clamp to C2/P2, respectively. Note P indicated on potential side of kelvin lead

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