

# TRM-20/TRM-40

*transformer resistance meters*



**Vanguard Instruments Company, Inc.**  
[www.vanguard-instruments.com](http://www.vanguard-instruments.com)

# TRM-20/TRM-40

## transformer resistance meters



The TRM-20 and TRM-40 are Vanguard Instruments' third generation transformer winding resistance meters. The TRM line is designed specifically to measure DC resistance values of transformer windings, rotating machine windings, or any dc resistance of an inductive device.

The TRM line features dual resistance-reading input channels that can measure two winding resistances simultaneously (primary and secondary windings of a transformer).

Both the TRM-20 and TRM-40 can provide a fast and stable reading of very large transformers by utilizing a 60Vdc power supply. The TRM-20 is capable of outputting a selectable test current from 1A to 20A while the TRM-40's test current is selectable from 1A to 40A.

Since the TRM-20 and TRM-40 can accurately measure resistance values from 1 micro-ohm to 500 Ohms (up to 2,000 Ohms for the TRM-20), they can be used as micro-ohm meters to measure EHV circuit breaker contact resistance, or for any low resistance measuring application.

If the transformer winding resistance temperature is available at the time of testing, the TRM can calculate the equivalent resistance value at any temperature value. This useful feature allows the user to compare the field readings against the factory test resistance values. A special test mode allows the TRM to collect data automatically for up to 90 minutes (at 60-second sampling interval) or 45 minutes (at 30 second sampling interval). Test data is recorded with a time stamp.

All test results can be printed on a 2.5" wide thermal printer. Test record header information including the company, substation name, transformer information can also be entered using the 16-key key pad.

The TRM-20 and TRM-40 can automatically demagnetize the inductive device under test, eliminating the manual task of demagnetizing the transformer core after a resistance test.

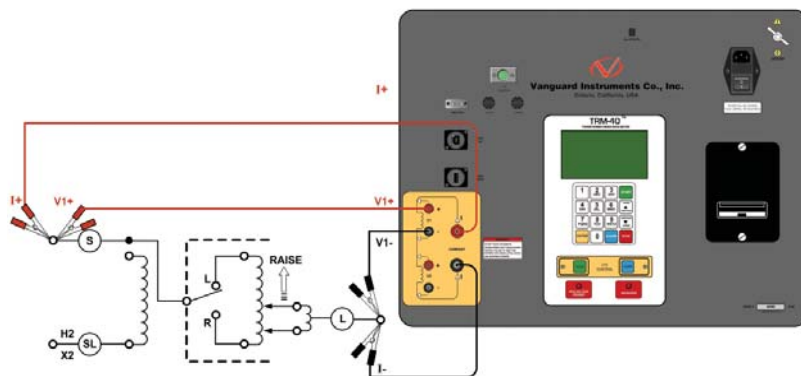
The TRM can also be computer-controlled via the unit's RS-232C, USB, or Bluetooth interface.

The TRM also has a "make-before-break" test mode that can be used to test the load tap changer (LTC) or voltage regulator test sequence. The TRM produces a "Dynamic-Resistance" graph of the LTC or voltage regulator contact under operation. An opened contact can be detected visually from this resistance chart. The TRM's built-in LTC/Voltage regulator can be used to change the LTC/Voltage regulator tap position from the TRM front panel.

### outstanding features

- Auto discharge circuit for operator safety
- Demagnetizes transformer after test
- Selectable test current from 1A to 20A (TRM-20) or 40A (TRM-40)
- Computer control via RS-232C, USB, Bluetooth interface
- Built-in thermal printer

### TRM-20/40 connections



### ordering information

Part number **TRM-20**

TRM-20, cables, software

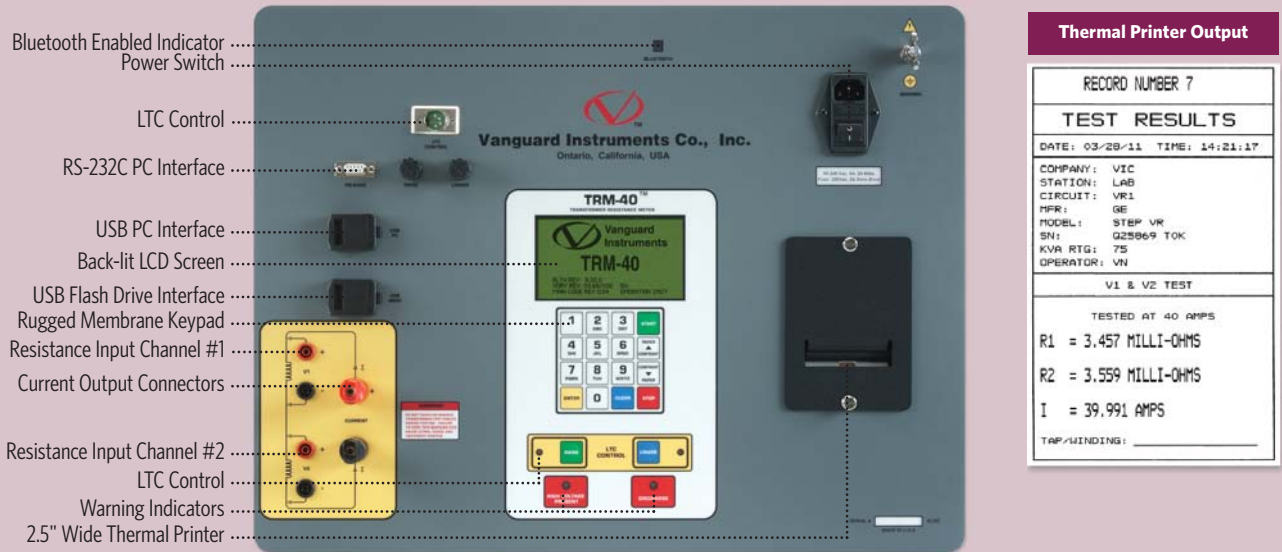
Part number **TRM-40**

TRM-40, cables, software

Part number **TP3**

2.5-inch wide thermal printer paper

# TRM-20/40 Controls & Indicators



## User Interface

The TRM features a back-lit graphic LCD screen (128 x 64 pixels) that is clearly viewable in both bright sunlight and low-light levels. An alphanumeric keypad is used to enter test information and to operate the unit.

## Computer Interface

The TRM can be connected to a PC via the unit's RS-232C, USB, or Bluetooth interface. The included Windows®-based Transformer Winding Resistance Analyzer (TWRA) software can be used to retrieve test records (stored in the TRM or on a USB Flash drive) or to run tests from the PC. Test records are automatically exported to PDF, Excel, and XML formats.

## Safety Features

The TRM automatically dissipates the energy stored in the transformer at the end of each test. The discharge circuit will continue to work even if the TRM power supply is lost.

## Test Record Storage

The TRM can store up to 256 static test records (111 readings per record) and 120 dynamic test records internally. For external test record storage, the TRM features a USB Flash drive interface port. Up to 999 test records can be stored on a connected USB Flash drive.

## TRM-20/40 specifications

<b>type</b>	portable transformer winding resistance meter
<b>physical specifications</b>	21"W x 17"H x 9" D (53 cm x 43 cm x 24 cm); Weight: 33 lbs (15.4 kg)
<b>operating voltage</b>	100 – 240 Vac, 50/60 Hz
<b>resistance reading range</b>	<b>TRM-20:</b> 1 micro-ohm – 2000 ohms; <b>TRM-40:</b> 1 micro-ohm – 500 ohms
<b>accuracy</b>	1 – 19,999 micro-ohms: ±0.5% reading, ±1 count; 20 – 999 milli-ohms: ±1% reading, ±1 count; 1 – 2000 ohms: ±1.5% reading, ±1 count
<b>test current</b>	<b>TRM-20:</b> 1A – 20A in 1A increments; <b>TRM-40:</b> 1A – 40A in 1A increments
<b>test voltage</b>	60Vdc charging, 18V DC max during measurement
<b>resistance channels</b>	two static resistance reading channels
<b>display</b>	back-lit LCD Screen (128 x 64 pixels); viewable in bright sunlight and low-light levels
<b>printer</b>	built-in 2.5-inch wide thermal printer
<b>internal data storage</b>	256 static test records (each can contain up to 111 readings) and 120 dynamic test records
<b>external data storage</b>	up to 999 test records on external USB Flash drive.
<b>computer interfaces</b>	RS-232C, USB, and Bluetooth
<b>safety</b>	designed to meet UL 61010A-1 and CAN/CSA C22.2 No. 1010.1-92 standards
<b>environment</b>	Operating: -10°C to +50°C (+15°F to +122°F); Storage: -30°C to +70°C (-22°F to +158°F)
<b>humidity</b>	90% RH @ 40°C (104°F) non-condensing
<b>altitude</b>	2,000 m (6,562 ft) to full safety specifications
<b>cables</b>	one 50-foot current cable set, two 50-foot resistance sense cable set, one LTC control cable, one ground cable, one power cord, One RS-232C cable, one USB cable
<b>options</b>	shipping case
<b>warranty</b>	one year on parts and labor

**NOTE:** the above specifications are valid at nominal voltage and ambient temperature of +25°C (+77°F). Specifications are subject to change without notice.



## Instruments designed and developed by the hearts and minds of utility electricians around the world

Vanguard Instruments Company, (VIC), was founded in 1991. Currently, our 28,000 square-foot facility houses Administration, Design & Engineering, and Manufacturing operations. From its inception, VIC's vision was, and is to develop and manufacture innovative test equipment for use in testing substation EHV circuit breakers and other electrical apparatus.

The first VIC product was a computerized circuitbreaker analyzer, which was a resounding success. It became the forerunner of an entire series of circuitbreaker test equipment. Since its beginning, VIC's product line has expanded to include microcomputer-based, precision micro-ohmmeters, single and three phase transformer winding turns-ratio testers, transformer winding-resistance meters, mega-ohm resistance meters, and a variety of other electrical utility maintenance support products.

VIC's performance-oriented products are well suited for the utility industry. They are rugged, reliable, accurate, user friendly, and most are computer controlled. Computer control, with innovative programming, provides many automated testing functions. VIC's instruments eliminate tedious and time-consuming operations, while providing fast, complex, test-result calculations. Errors are reduced and the need to memorize long sequences of procedural steps is eliminated. Every VIC instrument is competitively priced and is covered by a liberal warranty.



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