

TRM-20/40

transformer resistance meters



Vanguard Instruments
A DOBLE COMPANY





TRM-20/40

transformer resistance meters

Product Overview

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 a 60-second sampling interval (10, 15, 20, and 30 second sampling rates are also available. Duration will vary accordingly). 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 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.

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 alpha-numeric 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.

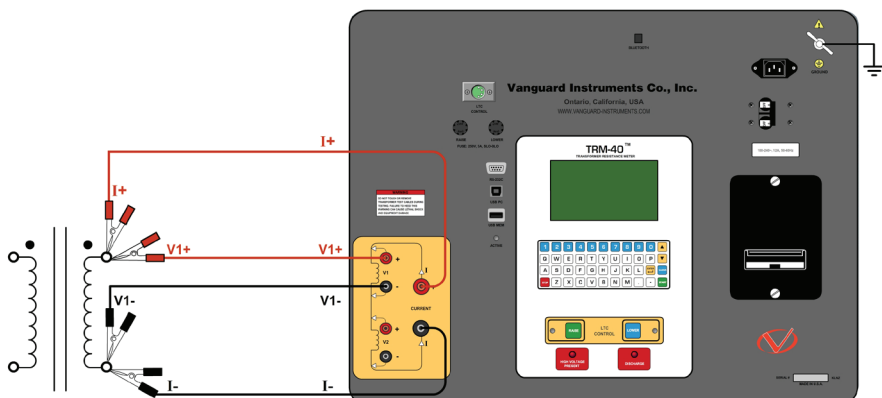
outstanding features

- 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 2.5" wide thermal printer

ordering information

Part No.	Description
9007-UC	TRM-20, cables, and PC software
9061-UC	TRM-40, cables, and PC software
TP3-CS	TP3 thermal printer paper (36 rolls)

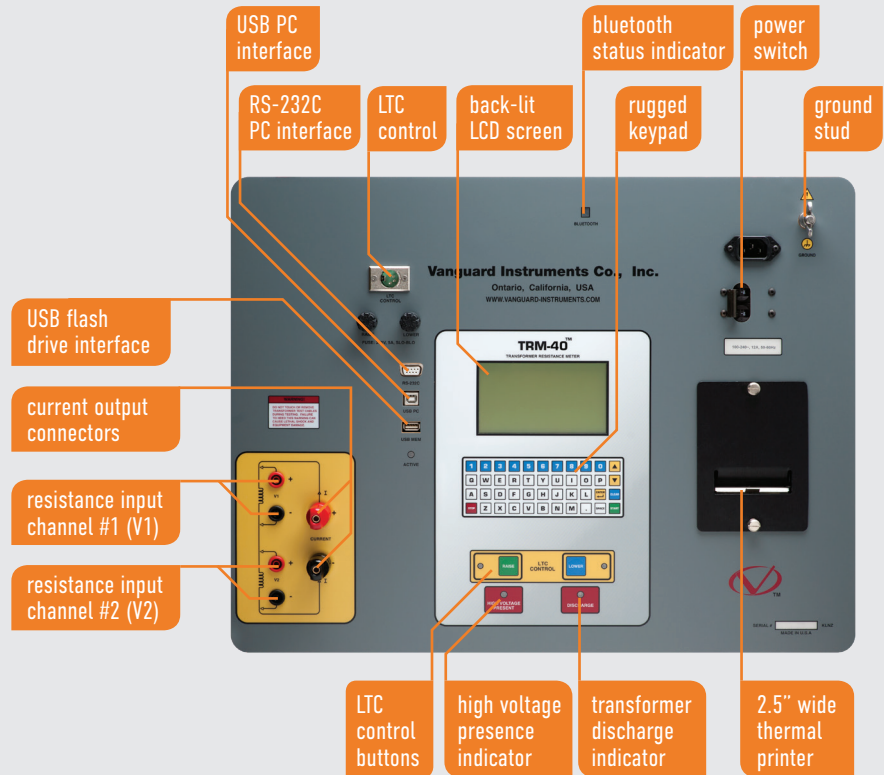
TRM-20/40 connections



Thermal Printer Output

RECORD NUMBER 7	
TEST RESULTS	
DATE: 01/28/15	TIME: 14:21:17
COMPANY: VIC	STATION: LAB
CIRCUIT: VR1	MFR: GE
MODEL: STEP VR	SN: Q25869 TOK
KVA RTG: 75	OPERATOR:
V1 & V2 TEST	
TESTED AT 40 AMPS	
R1 = 3.457 MILLI-OHMS	
R2 = 3.559 MILLI-OHMS	
I = 39.991 AMPS	
TAP/WINDING: _____	

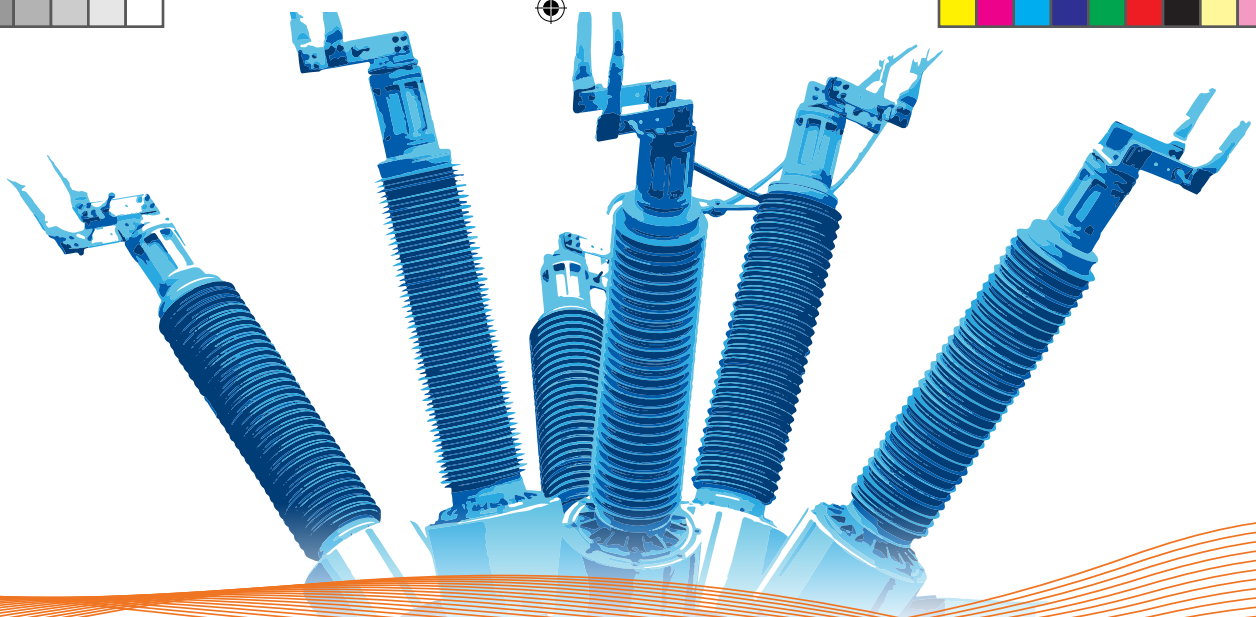
TRM-20/40 Features



TRM-20/40 technical specifications

physical specifications	Dimensions: 21" W x 17" H x 9" D (53 cm x 43 cm x 24 cm) Weight: 33 lbs. (15.4 Kg)	input power	100 – 240 Vac, 50/60 Hz
resistance reading range	TRM-20: 1 micro-ohm – 2,000 ohms TRM-40: 1 micro-ohm – 500 ohms	test currents	TRM-20: 1A – 25A in 1A increments TRM-40: 1A – 40A in 1A increments
accuracy	1 – 19,999 micro-ohms: ±0.5% reading, ±1 count 20 – 999 milliohms: ±1% reading, ±1 count 1 – 2,000 ohms: ±1.5% reading, ±1 count	resistance channels	two static resistance reading channels
display	back-lit LCD screen (128 x 64 pixels) viewable in bright sunlight and low-light levels	test voltage	60 Vdc charging, 18 Vdc max during measurement
printer	built-in 2.5" wide thermal printer	ac current input	clamp-on current sensor, 1 – 20 A
pc software	Windows®-based software is included with purchase price	computer interfaces	one RS-232C port, one USB port, one USB flash drive port, bluetooth
internal test record storage	256 static test records (each can contain up to 111 readings) and 120 dynamic test records	load tap changer contact	designed to meet IEC 61010 (1995), UL 61010-a, and CAS-C22.2 standards
external data storage	up to 999 test records on external USB flash drive (drive not included)	safety	designed to meet UL 61010A-1 and CAN/CSA C22.2 No. 1010.1-92 standards
temperature	Operating: -10°C to +50°C (+15°F to +122°F) Storage: -30°C to +70°C (-22°F to +158°F)	humidity	90% RH @ 40°C (104°F) non-condensing
cables	50' (15.24m) current cable set, two 50' (15.24m) sense cable sets, LTC control cable, ground cable, power cord, RS-232C cable, USB cable	altitude	2,000 m (6,562 ft) to full safety specifications
options	shipping case	warranty	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.

Founded in 1991 and located in Ontario, California, USA, Vanguard Instruments™ offers a wide range of diagnostic test equipment that accurately and efficiently measures the health of critical substation equipment, such as transformers, circuit breakers, and protective relays.

Our first product was a computerized, extra high voltage (EHV) circuit breaker analyzer, which became the forerunner of an entire line of EHV circuit breaker test equipment. Over the years, our portfolio has grown tremendously 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 application-specific products.

Our instruments are rugged, reliable, accurate, and user friendly. They eliminate tedious and time-consuming operations, while providing fast, complex test-result calculations. Using our equipment helps reduce errors and eliminates the need to memorize long sequences of procedural steps.

In 2017, Vanguard Instruments became a part of Doble Engineering Company, an energy industry leader in hardware, software, and services that diagnose and monitor the health of critical assets.



Vanguard Instruments

A DOBLE COMPANY



1520 S. Hellman Avenue
Ontario, California 91761, USA
Phone 909-923-9390 • Fax 909-923-9391

www.vanguard-instruments.com

Revision D. March 16, 2018

© Copyright 2018 Doble Engineering Company