

LTCA-40TM

Load Tap Changer Analyzer



Vanguard Instruments Company



LTCA-40™

The LTCA-40 is Vanguard's winding resistance meter and load tap changer contact analyzer. The LTCA-40 is designed to accurately measure the winding resistance of highly inductive power transformers. The unit's triple resistance-reading input channels can measure three winding resistances simultaneously, and four-wire (Kelvin) connections provide high accuracy and require no lead compensation. A special feature of this device is its ability to measure and graph the resistance trace of a transformer LTC or voltage regulator contact during operation. One resistance input channel is dedicated to this feature. The LTCA-40 provides stable resistance readings of very large transformers by utilizing a 60 Vdc power supply capable of outputting a test current up to 40 Amperes.

Resistance Reading Features

Three resistance-reading channels can measure resistance from 1 micro-ohm to 500 ohms, and the test current is programmable (1A, 5A, 10A, 40A). The LTCA-40 can also be used to measure EHV circuit-breaker contact resistance, motor winding resistance or any low resistance. If the transformer winding temperature is entered, the LTCA-40 can calculate the equivalent resistance value of the winding material (aluminum or copper) at any standard reference temperature. Also, a special test mode can run a test for up to 45 minutes while saving resistance readings at one-minute intervals.

Dynamic Resistance Test Features

One resistance reading channel is dedicated to dynamic resistance testing. This test can monitor the LTC voltage regulator contact resistance during operation. A resistance graph, plotting resistance over time, can be printed on the built-in thermal printer and is very useful for detecting LTC voltage regulator contact problems.

AC Motor Current Monitoring Feature

One AC current monitoring channel is dedicated to monitoring the LTC voltage regulator motor current during operation. The motor current is also printed on the resistance graph and can help detect LTC voltage regulator motor problems. An AC clamp-on current sensor is provided with the LTCA-40.

Built-in Safety Features

At the end of each test, the LTCA-40 automatically dissipates the stored energy in the transformer. This discharge circuit will continue to work even if the supply voltage is lost.

User Interface

The LTCA-40 features a back-lit LCD screen (64 x 128 dot graphic) that is viewable in both bright sunlight and low-light levels. A rugged, alpha-numeric, membrane keypad is used to control the unit.

Built-in Thermal Printer

The built-in 4.5-inch wide thermal printer can print the breaker contact analysis results in both tabular and graphic formats.

Internal Test Record Storage

The LTCA-40 can store 128 static test records (48 tests per record) and 11 dynamic resistance test records in Flash EEPROM. Test records can be recalled locally or transferred to a PC via the available interfaces (RS-232C port, USB port, USB Flash drive port).

USB Flash Drive Interface and Computer Interface

A built-in USB Flash drive interface provides a convenient method for transferring test records to or from a USB Flash drive. Test records can also be transferred directly to a PC via the RS-232C or USB interface ports. If using a USB Flash drive, test records stored in the LTCA-40's internal memory can be transferred to the drive, and then the supplied PC software can be used to view the test records stored on the drive. Up to 999 test records can be stored on a USB Flash drive.

Transformer Load Tap Changer Control

Transformer tap positions can be changed remotely using the unit's built-in transformer load tap changer. This remote-controlled tap changer feature eliminates the need to manually change a transformer's step-up and step-down taps.

SPECIFICATIONS

TYPE	Load tap changer analyzer
PHYSICAL SPECIFICATIONS	25"W x 8.5"H x 20"D (63.5 cm x 21.6 cm x 50 cm); Weight: 46 lbs (20 kg)
OPERATING VOLTAGE	100 – 240 Vac, 50/60 Hz
RESISTANCE READING RANGE	1 micro-ohm – 500 ohms
ACCURACY	1 – 19,999 micro-ohms: $\pm 0.5\%$ reading, ± 1 count; 20 – 999 milli-ohms: $\pm 1\%$ reading, ± 1 count; 1 – 500 ohms: $\pm 1.5\%$ reading, ± 1 count
RESISTANCE CHANNELS	Three static resistance reading channels, One dynamic resistance channel
TEST VOLTAGE	60 Vdc max
TEST CURRENTS	1 ampere, 5 amperes, 10 amperes, 40 amperes
AC CURRENT INPUT	Clamp-on current sensor, 1 – 20 amperes
DISPLAY	Back-lit LCD Screen (64 x 128 dot graphic); viewable in bright sunlight and low-light levels
PRINTER	4.5-inch wide thermal printer
EXTERNAL DATA STORAGE	One USB Flash drive interface port; stores up to 999 test records on a USB Flash drive (not included)
COMPUTER INTERFACES	One RS-232C port, One USB port
INTERNAL TEST RECORD STORAGE	Stores up to 128 static resistance test records (48 tests per record) and 11 dynamic resistance test records
LOAD TAP CHANGER CONTACT	240 Vac, 1A
SAFETY	Designed to meet UL 61010A-1 and CAN/CSA C22.2 No. 1010.1-92 standards
ENVIRONMENT	Operating: -10°C to 50°C (15°F to $+122^{\circ}\text{F}$); Storage: -30°C to 70°C (-22°F to $+158^{\circ}\text{F}$)
CABLES	(1) 50-foot current cable set, (3) 50-foot resistance cable sets, (1) ground cable, (1) USB cable, (1) RS-232C cable, (1) LTC cable, power cord, cable bag
OPTIONS	Transportation Case
WARRANTY	One year on parts and labor

Specifications are valid at nominal voltage and ambient temperature of $+25^{\circ}\text{C}$ ($+77^{\circ}\text{F}$). Specifications are subject to change without notice.

Load Tap Changer Analyzer

Accurately measure winding resistances of highly inductive power transformers

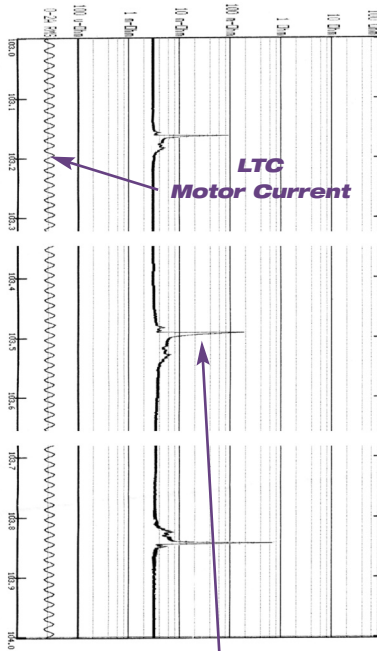
▲ Thermal Printer Output

RECORD NUMBER 5
TEST RESULTS
DATE: 05/23/08 TIME: 11:19:08
COMPANY: VANGUARD INSTRUMENTS
STATION:
CIRCUIT:
MR:
MODEL:
SN:
KVA RTG:
OPERATOR:

V1 LTC TEST
TESTED AT 40 AMPS

RESISTANCE PLOT

MARKERS AT 100 ms INTERVALS



Typical LTC Contact Resistance Plot

Ordering Information

LTCA-40™ Load Tap Changer Analyzer

LTCA-40™, Cable, Software

Part No: LTCA-40

LTCA-40™ Shipping Case

Part No: LTCA-40 S2 Case

50-ft Test Cable

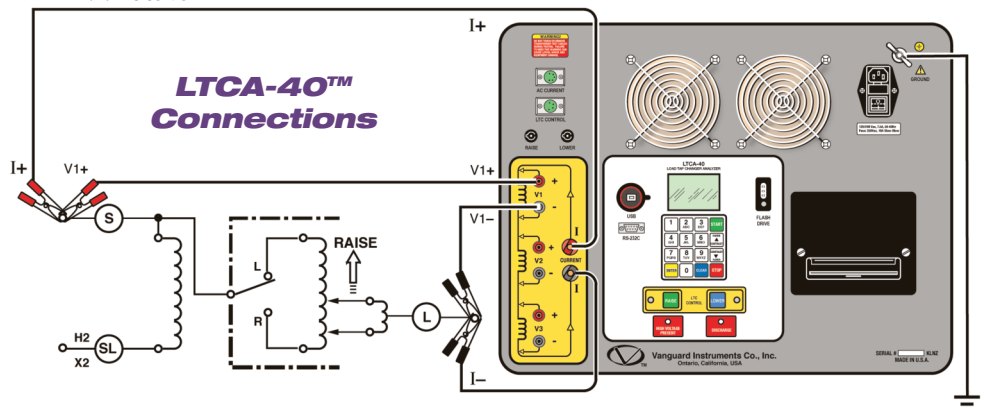
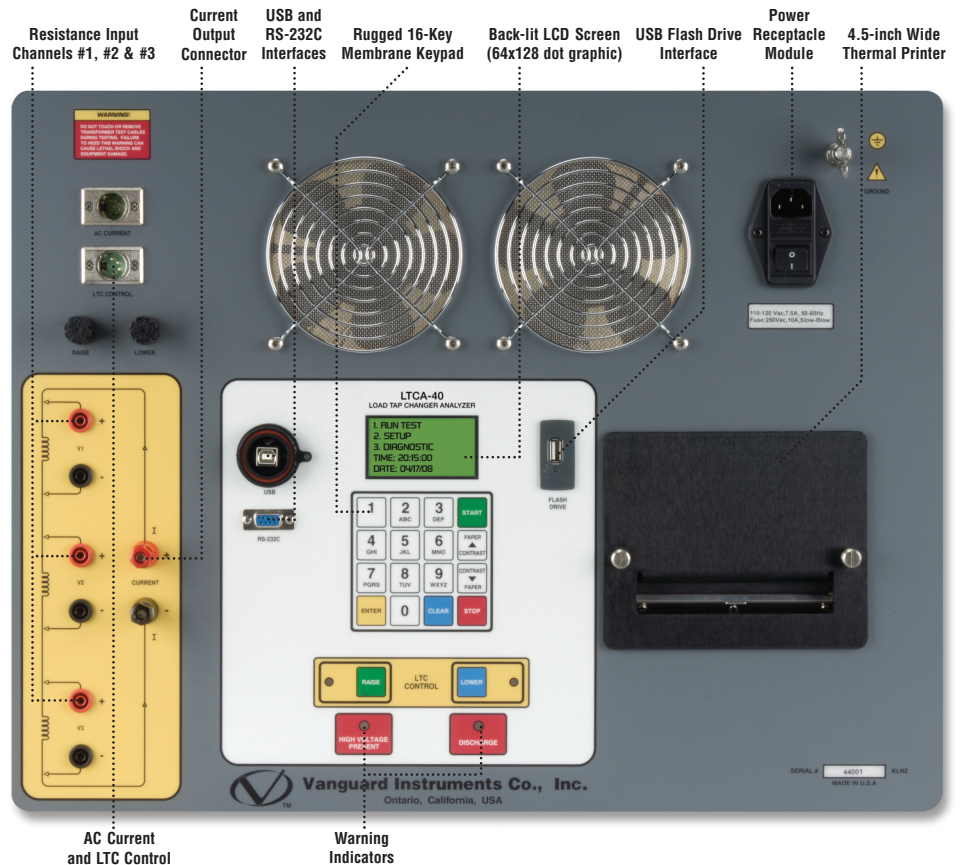
Part No: LTCA-40 Test Cable

4.5-inch Printer Paper

Part No: Paper TP4

FEATURES

- Auto discharge circuit for operator safety
- Three static resistance reading channels, one dynamic resistance channel
- Digital resistance reading from 1 micro-ohm to 500 ohms
- Calculates equivalent resistance value at reference temperature
- Stores 128 total static test records (48 tests per record) and 11 dynamic test records
- Built-in 4.5-inch wide thermal printer



Vanguard Instruments Company
Reliability Through Instrumentation

Vanguard Instruments Company, Inc.

Vanguard Instruments Co., (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 circuit-breaker analyzer, which was a resounding success. It became the forerunner of an entire series of circuit-breaker 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, winding-resistance meters, transformer tap-changing controllers, megaohm 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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