

# EZCT-10

current transformer test set



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



# EZCT-10

## current transformer test set

### Product Overview

The EZCT-10 is a microprocessor-based, current-transformer test set. This rugged and portable test set can perform the current transformer (CT) excitation, CT current-ratio, and winding polarity tests. Current transformers can be tested in their field-mounted configuration, eliminating the need to remove bushings or current transformers from the host equipment.

The EZCT-10 uses a heavy-duty transformer to perform the CT excitation test. It is capable of outputting 50 Vac at 10A and 200 Vac at 10A.

### Excitation Test

The CT excitation test is performed using the ANSI/IEEE C57.13.1, IEC 60044-1 test method. The EZCT-10 applies an AC variable test voltage (up to 1,200 Vac) to the CT's secondary windings. The EZCT-10 records and displays the test voltage and excitation current applied to the current transformer during the excitation test. Once tests are completed, up to 10 excitation curves and knee-point voltages of the tests can be plotted on the built-in thermal printer. ANSI 10/50, IEC 60044, IEC 61869, IEEE-30, and IEEE-45 knee point voltages are also calculated and printed on the test report.

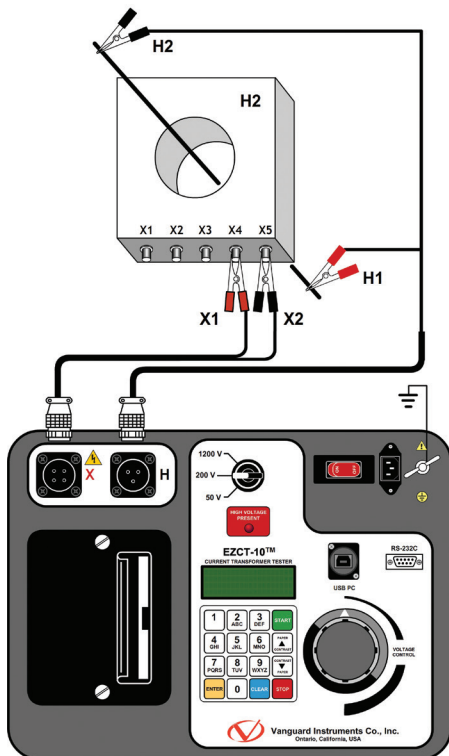
### Internal Test Record Storage

The EZCT-10 can store up to 128 current-transformer test records in Flash EEPROM. Each test record may contain up to 10 excitation curves, polarity, and current-ratio test data sets. Test records can be recalled and printed on the built-in thermal printer.

### Computer Interface

The EZCT-10 can be used as a stand-alone unit or can be computer-controlled via the built-in RS-232C or USB interfaces. Windows®-based Current Transformer Analysis software is provided with each EZCT-10. This software can be used to retrieve test records from the EZCT-10 and can also be used to run CT tests from the PC. Tabulated test records can be exported in PDF, Excel, and XML formats for further analysis.

### EZCT-10 connections



### CT Ratio and Polarity Tests

The EZCT-10 determines the CT current-ratio using the ANSI/IEEE C57.12.90 measurement method. A test voltage is applied on the CT's X terminals and the induced voltage is measured across the CT's H1 and H2 terminals. The current-ratio is displayed on the screen and stored in memory. The current-ratio measuring range is from 0.8 to 5,000. Winding polarity is displayed as a "+" sign (in-phase) or "-" sign (out-of-phase) and is annotated with the phase angle in degrees.

### User Interface

The EZCT-10 features a back-lit LCD screen (4 lines by 20 characters) that is viewable in both bright sunlight and low-light levels. A rugged, alpha-numeric, membrane keypad is used to enter test information and to control the unit's functions, and a voltage control knob is used to control the variable test voltage output. The test voltage range (50V at 10A, 200V at 10A, 1,200V at 1.5A) is selected with a switch on the control panel.

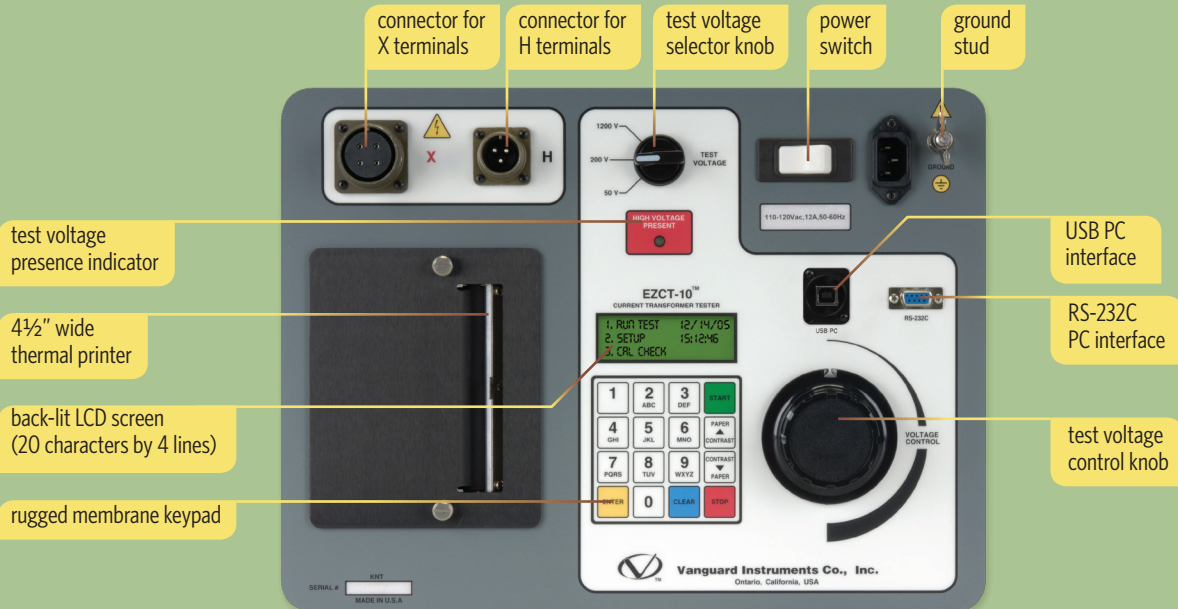
### Built-in Thermal Printer

A built-in 4½" wide thermal printer can print the current transformer test report and plot the excitation curves.






















### ordering information

Part No.	Description
9045-UC	110V EZCT-10, cables, and PC software
9046-UC	220V EZCT-10, cables, and PC software
9045-SC	EZCT-10 shipping case
TP4-CS	TP4 thermal printer paper (24 rolls)

# EZCT-10 Features



## EZCT-10 technical specifications

 <b>physical specifications</b>	<b>Dimensions:</b> 17"W x 12½"H x 12" D (42.7 cm x 32 cm x 26.9 cm) <b>Weight:</b> 55 lbs. (25 Kg)	 <b>input power</b>	100 – 120 Vac or 200 – 240 Vac (factory pre-set), 50/60 Hz
 <b>measuring method</b>	IEC 60044-1, IEC 61869, ANSI/IEEE C5713.1, and ANSI/IEEE C5712.90	 <b>current ratio range</b>	0.8 – 99: ±0.5%, 100 – 999: ±1.0%, 1,000 – 5,000: ±2%
 <b>output test voltages</b>	<b>0 – 50 Vac</b> @ 10A max; <b>0 – 200 Vac</b> @ 10A max; <b>0 – 1200 Vac</b> @ 1.5A max (5 min on, 10 min off)	 <b>current reading range</b>	0 – 10 A, accuracy: ±1.0% of reading, ±0.02A
 <b>voltage reading range</b>	0 – 1,250 Vac accuracy: ±1.0% of reading, ±0.5 volt	 <b>phase angle measurement</b>	0 – 360 degrees accuracy: ±1.0 degree
 <b>display</b>	back-lit LCD screen (20 characters by 4 lines) viewable in bright sunlight and low-light levels	 <b>computer interfaces</b>	one RS-232C port, one USB port
 <b>printer</b>	built-in 4½" wide thermal printer	 <b>internal test header storage</b>	stores 10 test header records
 <b>pc software</b>	Windows®-based CT analysis software is included with purchase price	 <b>safety</b>	designed to meet UL 61010A-1 and CAN/CSA C22.2 No. 1010.1-92 standards
 <b>internal test record storage</b>	stores 128 test records. Each test record may contain up to 10 excitation and ratio data sets	 <b>humidity</b>	90% RH @ 40°C (104°F) non-condensing
 <b>temperature</b>	<b>Operating:</b> -10°C to +50°C (+15°F to +122°F) <b>Storage:</b> -30°C to +70°C (-22°F to +158°F)	 <b>altitude</b>	2,000 m (6,562 ft) to full safety specifications
 <b>cables</b>	one 20-foot (6.10m) X cable set, one 35-foot (10.69m) H cable set, power cord, RS-232C cable, USB cable, cable carrying bag	 <b>warranty</b>	one year on parts and labor
 <b>options</b>	shipping case		

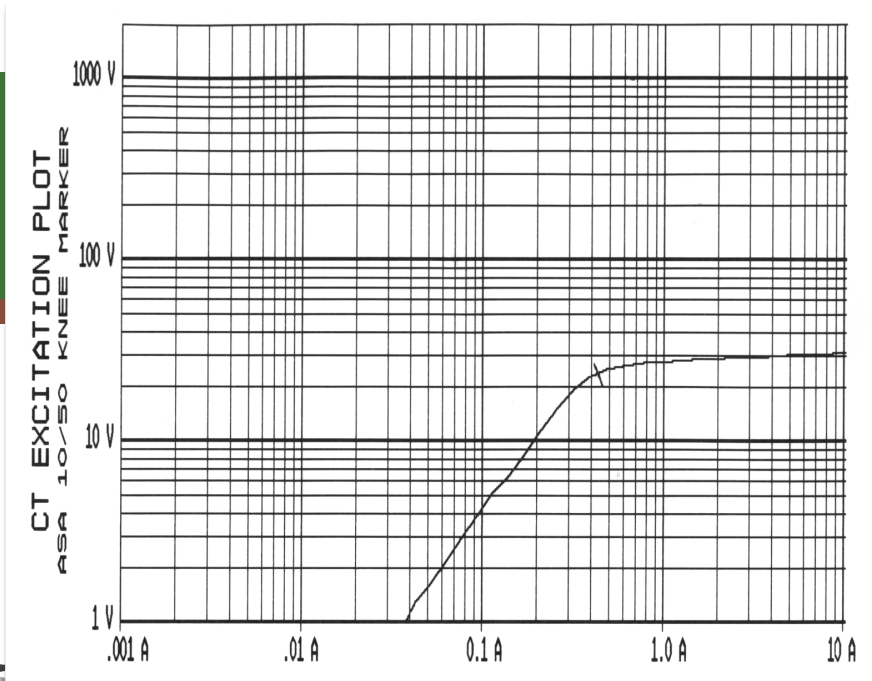
**NOTE :** the above specifications are valid at nominal voltage and ambient temperature of +25°C (+77°F). Specifications are subject to change without notice.



REC NUMBER 1	
CT EXCITATION TEST RESULTS	
DATE: 01/09/15	TIME: 08:53:45
COMPANY: VANGUARD INSTRUMENTS	
STATION: LAB	
CIRCUIT: NA	
MFR: VIC	
MODEL: CT	
S/N: 94169	
COMMENTS:	
OPERATOR:	
TEST NUMBER: 1	
ASA 10/50 V <sub>kp</sub> :	23.8 VOLTS
ASA 10/50 I <sub>kp</sub> :	0.426 AMPS
IEEE 30° V <sub>kp</sub> :	22.4 VOLTS
IEEE 30° I <sub>kp</sub> :	0.372 AMPS
IEEE 45° V <sub>kp</sub> :	18.9 VOLTS
IEEE 45° I <sub>kp</sub> :	0.304 AMPS
NAMEPLATE RATIO:	40.000
MEASURED RATIO:	40.041
PERCENT ERROR:	0.10 %
POLARITY:	IN PHASE
PHASE ANGLE:	+ 0.0 DEG
EXCITATION V <sub>WTG</sub> :	9.7 VOLTS
EXCITATION CUR:	0.184 AMPS

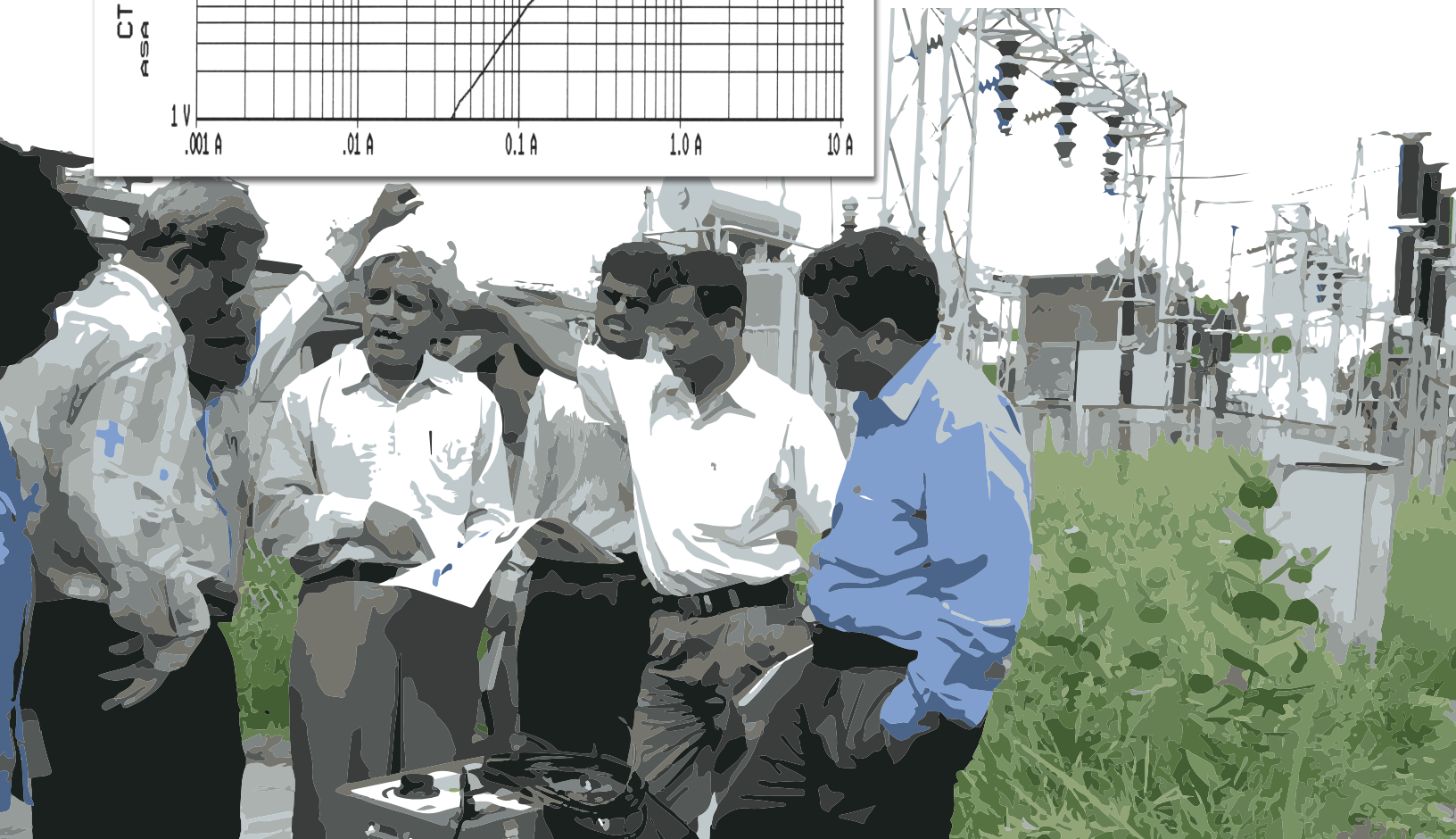
## thermal printer test report output

The current transformer test report can be quickly printed in the field on the EZCT-10's built-in thermal printer without the need to connect the unit to a PC.



## thermal printer graph output

The EZCT-10's built-in thermal printer can also print the excitation curves in the field without the need to connect the unit to a PC.



# EZCT Software

The EZCT-10 comes with the Vanguard EZCT PC software. The EZCT software can be used to test a current transformer directly from a PC, create and transfer test plans, retrieve test records from the EZCT-10, and export test records in PDF, Excel, and XML formats for further analysis.

The latest version of the EZCT software can always be downloaded free from the Vanguard web site at [www.vanguard-instruments.com](http://www.vanguard-instruments.com). Please note that you will need to create a free account on our site in order to download software or firmware.

**Test Plan**

Company: Vanguard Instruments Co Inc      Model: RCA 3000.5RM  
 Station: Shop      SN: \_\_\_\_\_  
 Circuit: \_\_\_\_\_      Operator: \_\_\_\_\_  
 Mfr: ABB      Comments: \_\_\_\_\_

Knee Point Marker: IEEE 30 deg      Ratio Test:       Excitation Test:

	Nameplate Ratio	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Excitation Voltage	Test Note
X1-X5:	3000 / 5	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	1200	
X1-X4:	2500 / 5	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	1200	
X1-X3:	2200 / 5	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	1200	
X1-X2:	1000 / 5	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	200	
X2-X5:	2000 / 5	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	1200	
X2-X4:	1500 / 5	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	1200	
X2-X3:	1200 / 5	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	1200	
X3-X5:	800 / 5	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	200	
X3-X4:	300 / 5	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	200	
X4-X5:	500 / 5	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	200	

Cancel      Save

## desktop printer output from EZCT software



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FILENAME: EZCT10 10A test.tst-ezct      MFR: VIC DATE: 01/09/15 08:53:45      MODEL: CT COMPANY: VANGUARD INSTRUMENTS      SN: 94169 STATION: LAB      OPERATOR: _____ CIRCUIT: NA      COMMENTS: _____		TEST # 1: TEST NOTES: KNEE TYPE: IEC 10/50 FREQUENCY: 60 Hz			
IEEE 30	IEEE 45	IEC 10/50	NP-RATIO: 40/1.0	Ex V[Volts]: 9.700	Phase Angle: 0.00°
Vkp[Volts]: 22.37	Vkp[Volts]: 18.96	Vkp[Volts]: 23.81	M-RATIO: 40.041	Ex I[Amps]: 0.184	In Phase
Ikp[Amps]: 0.3730	Ikp[Amps]: 0.3054	Ikp[Amps]: 0.4273	% ERROR: 0.101		

**CT Excitation Plot**

**CT DATA POINTS**

POINT	CUR (A)	VTG (V)	Z (OHM)	POINT	CUR (A)	VTG (V)	Z (OHM)
1	0.0222	0.30	13.51	17	0.5792	26.20	45.23
2	0.0298	0.60	20.13	18	0.7556	27.20	36.00
3	0.0372	1.00	26.88	19	0.8824	27.50	31.17
4	0.0422	1.30	30.81	20	1.0888	28.10	25.81
5	0.0496	1.60	32.26	21	1.3920	28.50	20.47
6	0.0646	2.30	35.60	22	1.7376	28.80	16.57
7	0.0744	2.90	38.98	23	2.1378	29.10	13.61
8	0.0918	3.90	42.48	24	2.6326	29.40	11.17
9	0.1118	5.20	46.51	25	3.6842	29.70	8.06
10	0.1366	6.50	47.58	26	4.6960	30.10	6.41
11	0.1690	8.70	51.48	27	6.2312	30.40	4.88
12	0.2062	11.60	56.26	28	8.3802	30.70	3.66
13	0.2534	15.20	59.98	29	10.1154	31.00	3.06
14	0.3156	19.70	62.42				
15	0.3778	22.60	59.82				
16	0.4722	24.90	52.73				

**GRAPH POINTS**

POINT	CUR (A)	VTG (V)	Z (OHM)	POINT	CUR (A)	VTG (V)	Z (OHM)
1	0.0100	0.14	13.51	12	2.0000	29.00	14.50
2	0.0200	0.27	13.51	13	4.0000	29.82	7.46
3	0.0400	1.17	29.20	14	5.0000	30.15	6.03
4	0.0500	1.62	32.37	15	8.0000	30.65	3.83
5	0.0800	3.22	40.27	16	10.0000	30.98	3.10
6	0.1000	4.43	44.33				
7	0.2000	11.12	55.58				
8	0.4000	23.14	57.85				
9	0.5000	25.24	50.48				
10	0.8000	27.31	34.13				
11	1.0000	27.84	27.84				



## 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 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, 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.



### **Vanguard Instruments Company, Inc.**

1520 S. Hellman Avenue • Ontario, California 91761, USA  
**Phone** 909-923-9390 • **Fax** 909-923-9391  
[www.vanguard-instruments.com](http://www.vanguard-instruments.com)

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