

EZCT S2A

current transformer test set



Vanguard Instruments Company, Inc.

www.vanguard-instruments.com



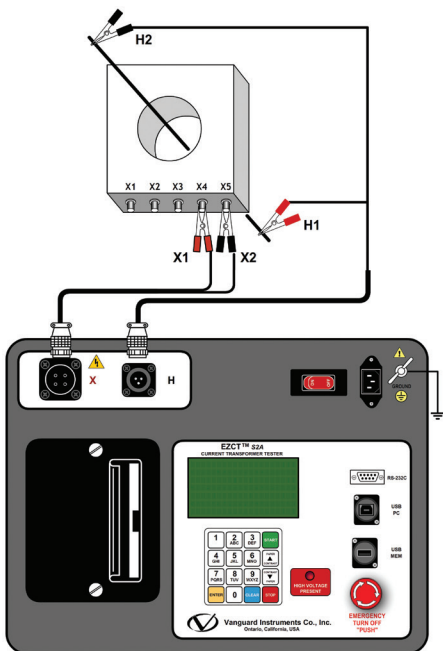
EZCT S2A

current transformer test set

Product Overview

The EZCT S2A is Vanguard's third-generation, micro-processor-based, current transformer test set. The EZCT S2A can perform the current transformer (CT) excitation, CT current-ratio, and winding polarity tests automatically. The EZCT S2A automatically raises and lowers the excitation test voltage without any operator intervention. With up to 1500 Vac excitation test voltage available, the EZCT S2A can easily perform excitation tests on very large CT's.

EZCT S2A connections



Excitation Test

The CT excitation test is performed using the ANSI/IEEE C57.13.1, IEC 60044-1 test method. The test voltage range for the CT excitation test (50 Vac, 250 Vac, 500 Vac, or 1500 Vac) can be selected, and then the test voltage is raised and lowered automatically by the EZCT S2A. The test voltage and current data are collected and stored in the unit's internal memory. Up to 10 CT excitation and current-ratio tests can be stored in one test record. ANSI 10/50, IEC 60044, IEC 61869, IEEE-30, and IEEE-45 knee point voltages are also calculated and printed on the test report. Once the test is completed, test results can be printed and excitation curves can be plotted on the built-in 4.5-inch wide thermal printer.

CT Ratio and Polarity Tests

The EZCT S2A determines the CT current-ratio using the ANSI/IEEE C57.12.90 measurement method. A test voltage is applied to the CT's secondary terminals and the induced voltage is measured through the CT's H1 and H2 terminals. The CT current-ratio and polarity are displayed on the screen and stored in memory. The current-ratio measuring range is from 0.8 to 5,000. The CT winding polarity is displayed as a "+" sign (in-phase) or a "-" sign (out-of-phase) and is annotated with the phase angle in degrees.

User Interface

The EZCT S2A features a back-lit LCD screen (240 x 128 pixels) 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

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

Computer Interface

The EZCT S2A 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 S2A. This software can be used to retrieve test records from the EZCT S2A, create test plans, download test plans to the EZCT S2A, and can also be used to run CT tests from the PC. Tabulated test records can be exported in PDF, Excel, and XML formats.

Internal Test Record Storage

The EZCT S2A can store up to 140 test records in Flash EEPROM. Each test record may contain up to 10 excitation curves, current-ratio readings, and winding polarity readings. Test records can be recalled and printed on the built-in thermal printer.

External Data Storage

The EZCT S2A features a standard USB Flash drive interface that makes it very convenient to store and transfer test records and test plans. By plugging in a USB Flash drive, you can quickly transfer your test records and test plans between a computer and the EZCT S2A without the need to connect the unit to the computer.

Internal Test Plan Storage

The EZCT S2A can store up to 128 CT test plans in Flash EEPROM. A test plan defines the excitation test voltage and current selection, CT nameplate ratio, and CT winding terminal connection instructions for each test. Up to 10 test definitions can be stored in each test plan. The use of a test plan greatly simplifies the CT testing process since it also provides instructions for making the proper CT cable connections. Test plans can be created on the EZCT S2A itself or created on a PC and downloaded to the EZCT S2A via the unit's built-in RS-232C or USB port.

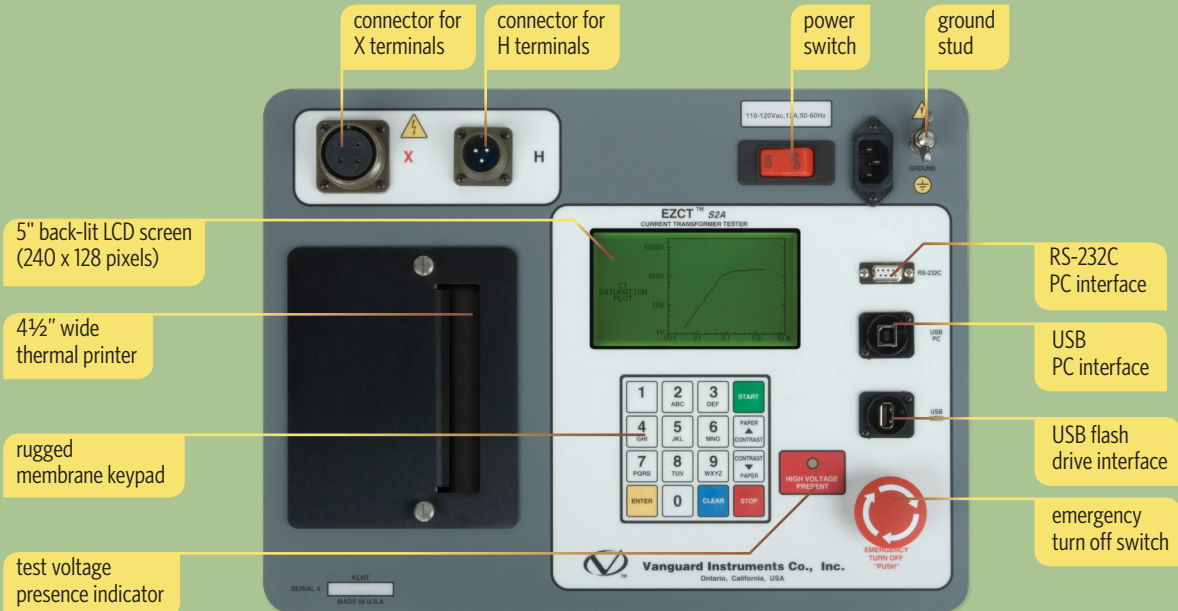
Test Record Header Information

The test record header information can include the company name, substation name, circuit ID, manufacturer, CT serial number, operator's name, and test record comments. In addition to the test record header, a 20-character test description for each test in the record can also be entered.






















ordering information

Part No.	Description
9047-UC	110V EZCT S2A, cables, and PC software
9048-UC	220V EZCT S2A, cables, and PC software
9047-CS	EZCT S2A shipping case
TP4-CS	TP4 thermal printer paper (24 rolls)

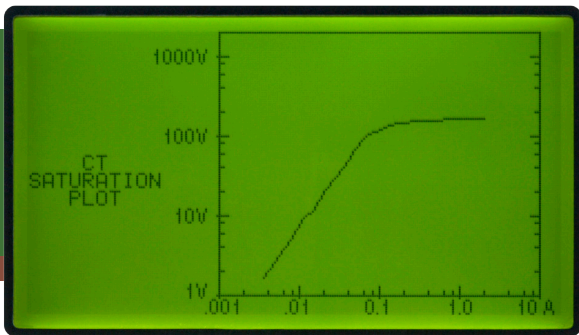
EZCT S2A Features



EZCT S2A technical specifications

 physical specifications	Dimensions: 17"W x 12½"H x 12" D (42.7 cm x 32 cm x 26.9 cm) Weight: 48 lbs. (21 Kg)	 input power	100 – 120 Vac or 200 – 240 Vac (factory pre-set), 50/60 Hz
 measuring method	IEC 60044-1, IEC 61869, ANSI/IEEE C5713.1, and ANSI/IEEE C5712.90	 current ratio range	0.8 – 999: ±0.1%, 1000 – 1999: ±0.3%, 2,000 – 5,000: ±1%
 output test voltages	0 – 50 Vac @ 10A max; 0 – 250 Vac @ 10A max; 0 – 500 Vac @ 5A max; 0 – 1,500 Vac @ 1.2A max		
 voltage reading range	0 – 2,200 Vac accuracy: ±1.0% of reading, ±1 volt	 current reading range	0 – 10 A, accuracy: ±1.0% of reading, ±0.02A
 display	5" back-lit LCD screen (240 x 128 pixels) viewable in bright sunlight and low-light levels	 phase angle measurement	0 – 360 degrees accuracy: ±1.0 degree
 printer	built-in 4½" wide thermal printer	 computer interfaces	one RS-232C port, one USB port
 pc software	Windows®-based CT analysis software is included with purchase price		
 internal test record storage	stores 140 test records. Each test record may contain up to 10 sets of excitation and ratio data		
 internal test plan storage	stores 128 test plans. Each test plan can store 10 excitation test voltage and current settings	 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	two 20-foot (6.10m) X cable sets, one 35-foot (10.69m) H cable set, power cord, RS-232C cable, USB cable, cable carrying bag	 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.

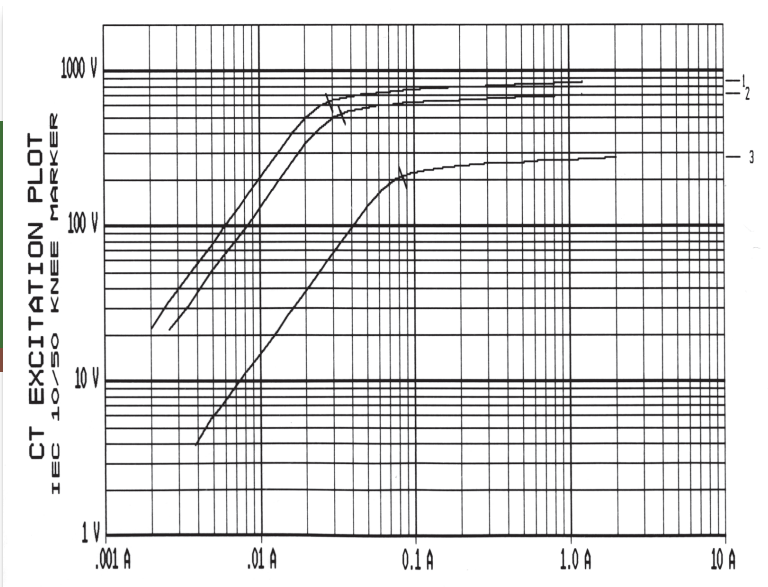


typical test results screen

RECORD NUMBER 1	
CT EXCITATION TEST RESULTS	
DATE: 01/10/15	TIME: 14:18:06
COMPANY: VANGUARD INSTRUMENTS	
STATION: LAB	
CIRCUIT: N/A	
MFR: ABB	
MODEL: CT NO 4905B60A01	
S/N: 19945280	
COMMENTS:	
OPERATOR:	
TEST NUMBER: 1	
TESTED TAP: X1-X5	
TST NOTE:	
TEST VTG RANGE:	1500 V
TEST CUR RANGE:	1.2 A
IEC 10/50 V _{kp} :	641.8 VOLTS
IEC 10/50 I _{kp} :	0.0286 AMPS
IEEE 300 V _{kp} :	597.5 VOLTS
IEEE 300 I _{kp} :	0.0244 AMPS
IEEE 450 V _{kp} :	490.9 VOLTS
IEEE 450 I _{kp} :	0.0192 AMPS
NAME PLATE RATIO:	600:1
MEASURED RATIO:	599.63
PERCENT ERROR:	0.06 %
POLARITY:	IN PHASE
PHASE ANGLE:	0.020
EXCITATION VTG:	401.0 VOLTS
EXCITATION CUR:	0.0162 AMPS
TEST NUMBER: 2	
TESTED TAP: X1-X4	
TST NOTE:	
TEST VTG RANGE:	1500 V
TEST CUR RANGE:	1.2 A
IEC 10/50 V _{kp} :	533.5 VOLTS
IEC 10/50 I _{kp} :	0.0344 AMPS
IEEE 300 V _{kp} :	496.6 VOLTS
IEEE 300 I _{kp} :	0.0296 AMPS
IEEE 450 V _{kp} :	402.6 VOLTS
IEEE 450 I _{kp} :	0.0230 AMPS
NAME PLATE RATIO:	500:1
MEASURED RATIO:	499.91
PERCENT ERROR:	0.02 %
POLARITY:	IN PHASE
PHASE ANGLE:	0.060
EXCITATION VTG:	339.3 VOLTS
EXCITATION CUR:	0.0198 AMPS

thermal printer test report output

The current transformer test report can be quickly printed in the field on the EZCT S2A's built-in thermal printer without the need to connect the unit to a PC.



thermal printer graph output

The EZCT S2A'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-2000 Software

The EZCT S2A comes with the Vanguard EZCT-2000 PC software. The EZCT-2000 software can be used to test a current transformer directly from a PC, create and transfer test plans, retrieve test records from the EZCT S2A, and export test records in Excel format for further analysis.

The latest version of the EZCT-2000 software can always be downloaded free from the Vanguard web site at 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

Select device type test plan: EZCT-2000 EZCT-S2 EZCT-2000B

Company: Vanguard Instruments Co Inc Model: PCA 3000 SPM
 Station: Shop SN: _____
 Circuit: _____ Operator: _____
 Mfr: ABB Comments: _____

Knee Point Marker: IEEE 30 deg

Nameplate Ratio	Ratio Test	Excitation Test	Winding Res Test	Excitation Voltage	Excitation Current	Current Ratio Error Calculation	Test Note
X1->5: 3000 / 5	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	500	2	Edit	
X1->4: 2500 / 5	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	250	2	Edit	
X1->3: 2200 / 5	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	250	2	Edit	
X1->2: 1000 / 5	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	250	2	Edit	
X2->5: 2000 / 5	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	250	2	Edit	
X2->4: 1500 / 5	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	250	2	Edit	
X2->3: 1200 / 5	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	250	2	Edit	
X3->5: 800 / 5	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	250	2	Edit	
X3->4: 300 / 5	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	250	2	Edit	
X4->5: 500 / 5	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	250	2	Edit	

Run Insulation Test Run Burden Test
 500V 1.000V Test Current - 1A Test Current - 5A

Cancel Save

Application Setup

Default Print Orientation: Landscape Portrait
 Communications: Use USB port COM Port: COM1

Localization: Frequency: 60 Hz Date Format: [US]MM/DD/YY

Report Logo: c:\Vanguard\EZCT-2000\report_logo.bmp
 Image Size (1000 x 100 pixels) BMP file only

Summary Page Display: Order Tap
 1 X1->2
 2 X1->3
 3 X1->4
 4 X1->5
 5 X2->3
 6 X2->4
 7 X2->5
 8 X3->4
 9 X3->5
 10 X4->5

Test Record Path: c:\Vanguard\EZCT-2000\Test Records\From Vi
 Test Plan Path: c:\Vanguard\EZCT-2000\Tests

Auto Export: Excel PDF

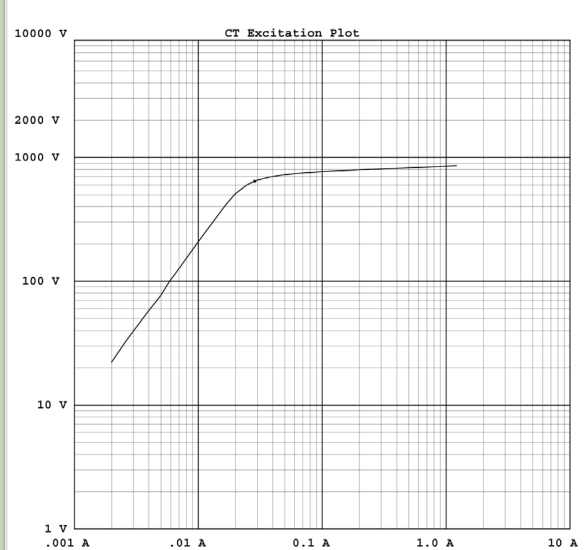
OK Cancel

desktop printer output from EZCT-2000 software



FILENAME: EZCT-S2A Shot-041012-001.ts	MFR: ABB	TEST # 1: X1-X5
DATE: 01/10/15 14:18:06	MODEL: CT NO 4905B60A01	TEST NOTES:
COMPANY: VANGUARD INSTRUMENTS	SN: 19945280	KNEE TYPE: IEC 10/50
STATION: LAB	OPERATOR: VN	FREQUENCY: 60 Hz
CIRCUIT: NA	COMMENTS: PINETOPS NC USA	

IEEE 30	IEEE 45	IEC 10/50	NP-RATIO: 600/1.0	Ex V [Volts]: 401.000	Phase Angle: 0.02°
Vkp [Volts]: 597.52	Vkp [Volts]: 490.92	Vkp [Volts]: 641.84	M-RATIO: 599.626	Ex I [Amps]: 0.016	In Phase
Ikp [Amps]: 0.0244	Ikp [Amps]: 0.0192	Ikp [Amps]: 0.0286	% ERROR: 0.0623		



CT DATA POINTS

POINT	CUR (A)	VTG (V)	Z (OHM)	POINT	CUR (A)	VTG (V)	Z (OHM)
1	0.0020	22.24	11120.00	17	0.0576	736.36	12784.03
2	0.0026	32.68	12569.23	18	0.0710	750.88	10575.77
3	0.0032	43.12	13475.00	19	0.0854	760.04	8899.77
4	0.0038	54.48	14336.84	20	0.1100	772.40	7021.82
5	0.0050	77.12	15424.00	21	0.1456	783.68	5382.42
6	0.0058	98.48	16979.31	22	0.1658	788.52	4755.85
7	0.0072	131.56	18272.22	23	0.2048	796.04	3886.91
8	0.0086	168.76	19623.26	24	0.2466	802.48	3254.18
9	0.0108	231.68	21451.85	25	0.2924	808.40	2764.71
10	0.0134	308.52	23023.88	26	0.3524	814.32	2310.78
11	0.0164	405.80	24743.90	27	0.4482	822.36	1834.81
12	0.0198	506.32	25571.72	28	0.5362	828.28	1544.72
13	0.0248	603.60	24338.71	29	0.6652	835.80	1256.46
14	0.0300	655.76	21858.67	30	0.8012	842.28	1051.27
15	0.0370	692.84	18725.41	31	0.9942	849.80	854.76
16	0.0458	717.56	15667.25	32	1.2110	857.32	707.94

GRAPH POINTS

POINT	CUR (A)	VTG (V)	Z (OHM)	POINT	CUR (A)	VTG (V)	Z (OHM)
1	0.0010	11.10	11100.00	12	0.2000	795.10	3975.50
2	0.0020	22.20	11100.00	13	0.4000	818.30	2045.75
3	0.0040	58.30	14575.00	14	0.5000	825.80	1651.60
4	0.0050	77.10	15420.00	15	0.8000	842.20	1052.75
5	0.0080	152.80	19100.00	16	1.0000	850.00	850.00
6	0.0100	208.80	20880.00				
7	0.0200	510.20	25510.00				
8	0.0400	701.30	17532.50				
9	0.0500	724.20	14484.00				
10	0.0800	756.60	9457.50				
11	0.1000	767.40	7674.00				



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

Revision B. April 11, 2017