EZCT-2000C

current transformer test set

Vanguard Instruments Company, Inc.
www.vanguard-instruments.com
Excitation Test
The CT excitation test is performed using the ANSI/IEEE C57.13.1 test method. Test voltage ranges from 50, 300, 500, 1200 and 2000 Vac can be selected for the excitation test. The test voltage is raised and lowered automatically by the EZCT-2000C. The excitation test voltage and current data is collected and stored in the unit’s internal memory. Knee point voltages (ANSI 10/50, IEC 60044, IEEE-30, IEEE-45) are calculated and printed on the test report. All of the test leads can be connected to the CT output terminals (X1, X2, X3, X4 and X5), and there is no lead switching required during testing. This convenient arrangement allows for testing any of the 10 possible combinations of X1 to X5. Up to 10 excitation tests can be stored in one record. Once the test is completed, the test report and CT excitation curves can be printed on the built-in thermal printer.

CT Winding Insulation Resistance Test Feature
The EZCT-2000C offers an IR test feature that can also measure the insulation resistance of the CT’s secondary windings using a test voltage up to 1000 Vdc. The DC winding resistance reading range is from 2 to 500 Mega-ohms. The insulation resistance test results are displayed and printed on the report.

Ratio and Polarity Tests
The CT current-ratio is determined using the ANSI/IEEE C57.12.90 measurement method. A test voltage is applied on any two terminals (X1 to X5) of the CT, and the induced voltage is measured through the H1 and H2 terminals of the CT. The CT current-ratio is displayed and also stored in memory. The current-ratio is measured 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. The CT current ratio error and phase displacement is also calculated based on the CT burden (or rated power) and rated current.

Demagnetization
The EZCT-2000C Plus automatically demagnetizes the CT under test when performing an excitation test.

Winding Resistance Test
The EZCT-2000C can measure the DC resistance of transformer windings from 100 micro-ohms to 10 ohms.

CT Burden Test
The EZCT-2000C can measure the CT’s actual connected burden by injecting a 1A or 5A test current into the load. The CT burden measurements (Voltage, current, Cos φ, and burden impedance) are displayed on the screen and printed on the test report. This important test verifies the actual CT measured burden before putting the CT in service, thus avoiding any potential configuration conflicts.

Current Ratio and Phase Error Tables
As part of the tabulated test results, the EZCT-2000C can also print the current ratio and current phase error tables.

Current Source
The EZCT-2000C offers a programmable current source (0-20A, 0-15Vac) that can be used to verify CT loads. The on-time timer and output current are displayed on the LCD screen.

Product Overview
The EZCT-2000C is Vanguard’s third-generation microprocessor-based current transformer test set. Designed specifically for CT testing, the EZCT-2000C has the following outstanding features that can greatly increase productivity and save time during the commissioning stage:

- Performs CT excitation, current-ratio, polarity, and phase angle tests
- Measures insulation resistance and winding resistance of the CT secondary windings
- Measures the CT’s load burden
- Standalone or computer-controlled via USB or Bluetooth wireless interface

The EZCT-2000C’s test leads can be connected to all the CT output terminals, and the complete CT test can be performed automatically without any operator intervention.

ordering information

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9101-UC</td>
<td>110V EZCT-2000C, cables, and PC software</td>
</tr>
<tr>
<td>9102-UC</td>
<td>220V EZCT-2000C, cables, and PC software</td>
</tr>
<tr>
<td>9101-SC</td>
<td>EZCT-2000C shipping case</td>
</tr>
<tr>
<td>TP4-CS</td>
<td>TP4 thermal printer paper (24 rolls)</td>
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</tbody>
</table>
EZCT-2000C Controls & Indicators

**Test Record Header Information**
Test record header information, including the company, substation name, circuit ID, manufacturer, mode, CT serial number, and the operator’s name, can be stored with each record. In addition to the test record header, a 20-character test description for each test in the record (10 tests per record) can also be entered.

**User Interface and Display**
The EZCT-2000C features a back-lit LCD screen (240 x 128 pixels) that is clearly viewable in both bright sunlight and low-light levels. A “QWERTY”-style membrane keypad is used to enter test information and to control the unit’s functions.

**Computer Interface**
The EZCT-2000C Plus can be used as a stand-alone unit or can be computer-controlled. It can be connected to a PC via the USB port or wirelessly via Bluetooth. In computer-controlled mode, using the included CT Analysis Software, test records can be downloaded from the unit’s memory, or CT tests can be run from the PC. Test plans can also be created with the provided software. A test plan defines the various test parameters (test voltage, current range, nameplate ratios, etc.) and can be used to quickly perform tests. Additionally, tabulated test records are automatically exported to PDF, Excel, and XML formats for further analysis.

**Built-in Thermal Printer**
A built-in 4½” wide thermal printer can print the current transformer test report and plot the excitation curves.

**Internal Test Record Storage**
The EZCT-2000C can store up to 140 test records in Flash EEPROM. Each record may contain up to 10 excitation curves, burden test reports, current ratio readings, and polarity and DC resistance readings. Test records can be recalled and printed on the built-in thermal printer. They can also be transferred to a PC using the USB port, wirelessly via Bluetooth, or via the USB Flash drive interface port.

**External Data Storage**
The EZCT-2000C features a USB Flash drive interface that makes it very convenient to store and transfer test records and test plans. By using a USB Flash drive, test records and test plans can be quickly transferred between a computer and the EZCT-2000C without the need to connect the unit to the computer.

**Android App**
The EZCT-2000C can also be controlled wirelessly via the Bluetooth interface using the provided EZCT-2000 Android app. The full-featured EZCT-2000 app can be used to perform tests, create test plans, and transfer test records.
**EZCT-2000C thermal printer output**

**CT Excitation Test Results**

**Record Number 1**

- **Date:** 01/07/15
- **Time:** 10:04:09
- **Company:**
- **Station:**
- **Circuit:**
- **Model:**
- **Comments:**
- **Operation:**

**Test Number:** 1

- **Tested Tap:** HL-HE
- **Test Note:**
- **Test Voltage Range:** 300 V
- **Test Current Range:** 0 - 0.04 A
- **Winding RMS:** 21.21 ± 0.01 ohms
- **IEC 10-50 Vpk:** 243.5 V
- **IEC 10-50 Ipk:** 0.0556 A
- **IEC 10-50 Vpk:** 198.0 V
- **IEC 10-50 Ipk:** 0.0786 A
- **IEC 45° Vpk:** 195.7 V
- **IEC 45° Ipk:** 0.0797 A

**Name Plate Ratio:** 100.0 ± 0.5

**Percent Error:** 0.02%

**Phase Angle:** 0.04°

**Excitation Voltage:** 98.2 V

**Excitation Current:** 0.0386 A

**Current Ratio Error Table**

<table>
<thead>
<tr>
<th>Current Range</th>
<th>0%</th>
<th>20%</th>
<th>40%</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 A</td>
<td>-0.02%</td>
<td>-0.02%</td>
<td>-0.02%</td>
</tr>
<tr>
<td>5 A</td>
<td>-0.02%</td>
<td>-0.02%</td>
<td>-0.02%</td>
</tr>
<tr>
<td>2.5 A</td>
<td>-0.02%</td>
<td>-0.02%</td>
<td>-0.02%</td>
</tr>
<tr>
<td>1.25 A</td>
<td>-0.02%</td>
<td>-0.02%</td>
<td>-0.02%</td>
</tr>
<tr>
<td>0.63 A</td>
<td>-0.02%</td>
<td>-0.02%</td>
<td>-0.02%</td>
</tr>
</tbody>
</table>

**Current Phase Error Table**

<table>
<thead>
<tr>
<th>Current Range</th>
<th>0%</th>
<th>20%</th>
<th>40%</th>
</tr>
</thead>
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<tr>
<td>10 A</td>
<td>-0.02%</td>
<td>-0.02%</td>
<td>-0.02%</td>
</tr>
<tr>
<td>5 A</td>
<td>-0.02%</td>
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</tr>
<tr>
<td>0.63 A</td>
<td>-0.02%</td>
<td>-0.02%</td>
<td>-0.02%</td>
</tr>
</tbody>
</table>

**Burden Test Results**

- **Positive Current:** 4.97 A
- **Positive Voltage:** 297.4 V
- **Impedance:** 1.07 ohms

- **Burden:** 26.959 VA
- **Cos α:** 1.00

**Insulation Resistance Test Results**

- **Voltage:** 500 V
- **Current:** 9.85 micro-Amps
- **Resistance:** 101.27 meg-ohms

**EZCT-2000C desktop printer output**
## EZCT-2000C technical specifications

<table>
<thead>
<tr>
<th>physical specifications</th>
<th>Dimensions: 19”W x 13”H x 16”D (48.3 cm x 33 cm x 40.1 cm)</th>
<th>Weight: 73 lbs. (33.1 Kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>measuring method</td>
<td>ANSI/IEEE C57.12.90 and ANSI/IEEE C57.13.1 standards</td>
<td></td>
</tr>
<tr>
<td>output test voltages</td>
<td>0 – 50 Vac @ 10A max, 0 – 300 Vac @ 10A max, 0 – 500 Vac @ 5A max, 0 – 1200 Vac @ 1.2A max, 0 – 2000 Vac @ 1A max</td>
<td></td>
</tr>
<tr>
<td>resistance reading range</td>
<td>100 micro-ohms – 30 ohms; accuracy: 2% of reading ±1 count, ±10 micro-ohms</td>
<td></td>
</tr>
<tr>
<td>voltage reading range</td>
<td>0 – 2,200 Vac accuracy: ±1% of reading, ±1 volt</td>
<td></td>
</tr>
<tr>
<td>display</td>
<td>back-lit LCD screen (240 x 128 pixels) viewable in bright sunlight and low-light levels</td>
<td></td>
</tr>
<tr>
<td>printer</td>
<td>built-in 4½” wide thermal printer</td>
<td></td>
</tr>
<tr>
<td>pc software</td>
<td>Windows®-based CT analysis software is included with purchase price</td>
<td></td>
</tr>
<tr>
<td>internal test record storage</td>
<td>stores 140 test records. Each test record may contain up to 10 sets of excitation, resistance and ratio data</td>
<td></td>
</tr>
<tr>
<td>internal test plan storage</td>
<td>stores 128 test plans. Each test plan can store 10 excitation test voltage and current settings</td>
<td></td>
</tr>
<tr>
<td>temperature</td>
<td>Operating: -20°C to +50°C (+15°F to +122°F)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Storage: -30°C to +70°C (-22°F to +158°F)</td>
<td></td>
</tr>
<tr>
<td>cables</td>
<td>One 20-foot (6.10m) cable set (X1-X5), one 35-foot (10.69m) H cable set, current source cables, insulation test cables, power cord, ground cable, USB cable. A transportation case is included with the purchase price</td>
<td></td>
</tr>
<tr>
<td>altitude</td>
<td>2,000 m (6,562 ft) to full safety specifications</td>
<td></td>
</tr>
<tr>
<td>safety</td>
<td>designed to meet UL 61010A-1 and CAN/CSA C22.2 No. 1010.1-92 standards</td>
<td></td>
</tr>
<tr>
<td>warranty</td>
<td>one year on parts and labor</td>
<td></td>
</tr>
</tbody>
</table>

**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 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.