

# CT-3500 S2

*digital circuit breaker analyzer*



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

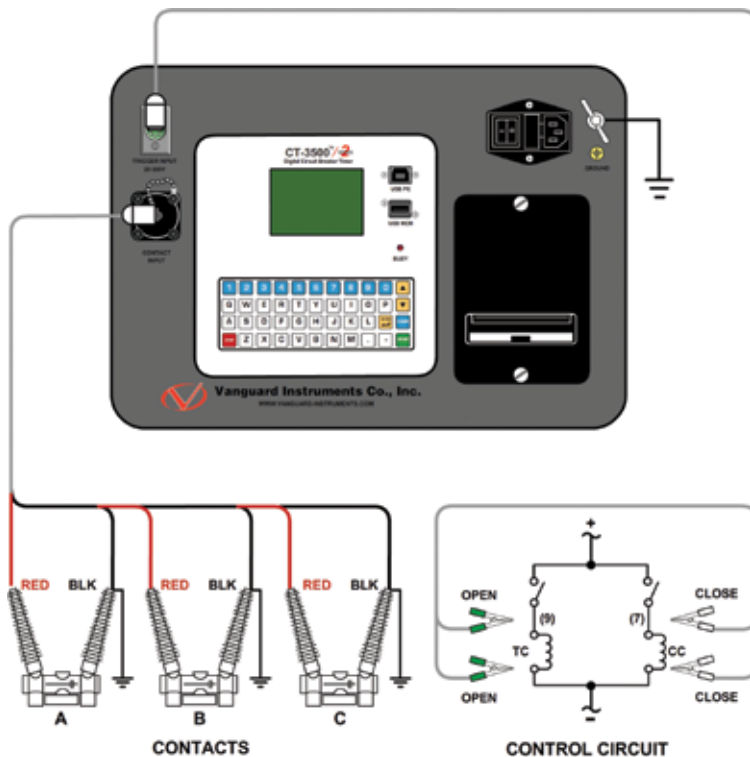
# CT-3500 S2

## digital circuit breaker analyzer



The CT-3500 S2 is Vanguard's second generation, stand-alone, digital, microprocessor-controlled, circuit-breaker timer. It measures the elapsed time from the instant a breaker coil is energized to the instant of opening or closing of a circuit-breaker's dry contacts. In addition to timing a breaker's contact response time, the CT-3500 S2 can also time relays or other switching functions that use an initiating trigger voltage (30-300 Volts DC or AC). The timer-triggering voltage starts three independent electronic timers. Each timer is individually stopped by its respective dry-contact closing or opening. The CT-3500 can fully analyze the timing of all circuit breaker operations (Open, Close, Open - Close, and Close - Open). Timing results are displayed in milli-seconds and cycles on the unit's back-lit LCD screen and can be printed on the built-in 2.5-inch wide thermal printer.

### CT-3500 S2 connections



### ordering information

Part number <b>CT-3500 S2</b>	CT-3500 S2, cables, and PC software
Part number <b>CT-3500S2-CASE</b>	CT-3500 S2 shipping case
Part number <b>Paper-TP3</b>	Thermal printer paper

### Contact Timing Inputs

The CT-3500 S2 features three dry-contact, timer-channel monitoring inputs. The dry-contact channel power supply is fuse-protected. All inputs are shunted to ground until the instant a test is initiated. All contact timing inputs are protected against static discharge. A contact self-test cable-mode is also available for testing cables or connections to the breaker.

### User Interface

The CT-3500 S2 features a back-lit LCD screen (128 x 64 pixels) that is viewable in both bright sunlight and low-light levels. A rugged, 44-key, "QWERTY" membrane keypad is used to control the unit and input data. The unit's built-in 2.5-inch wide thermal printer can be used to print test reports.

### Internal Test Record Storage

The CT-3500 S2 can store up to 128 test records in Flash EEPROM. Test records can be retrieved and printed on the built-in thermal printer, or they can be transferred to a PC via the unit's USB interface. The USB interface can also be used for diagnostic testing and for updating firmware. The CT-3500 S2 also features a USB Flash drive interface that can be used to store test records on an external USB Flash drive.

A Windows®-based Circuit Breaker Analysis application is provided with each unit and can be used to transfer test records to a PC. Test records can also be reviewed, printed or exported in Excel, PDF, and XML formats for further analysis.

# CT-3500 S2 Controls & Indicators



Trigger Input Connector

Back-lit LCD Screen

Contact Input Connector

Rugged membrane keypad

USB PC Interface

USB Flash Drive Interface

2.5" Wide Thermal Printer

## CT-3500 S2 specifications

<b>type</b>	portable digital circuit-breaker analyzer
<b>physical specifications</b>	16"W x 7"H x 13" D (40.6 cm x 17.4 cm x 33 cm); Weight: 14 lbs. (6.4 Kg)
<b>input power</b>	100 – 240 Vac, 50/60 Hz
<b>dry-contact inputs</b>	3 channels
<b>trigger input voltage</b>	open/close: 30 – 300 V, DC or peak AC
<b>breaker operations</b>	Open, Close, Open-Close, Close-Open
<b>timing resolution</b>	±0.1 millisecond; accuracy: 0.05% of reading ±0.1 ms
<b>display</b>	back-lit LCD screen (128 x 64 pixels); viewable in bright sunlight and low light conditions
<b>keypad</b>	rugged, 44-key "QWERTY" membrane keypad
<b>printer</b>	built-in 2.5-inch wide thermal printer
<b>internal test record storage</b>	stores up to 128 timing records
<b>computer interface</b>	one USB PC interface, one USB Flash drive interface
<b>pc software</b>	Windows® based Breaker Analysis software included with purchase price
<b>safety</b>	designed to meet IEC61010 (1995), UL61010A-1, CSA-C22.2 standards
<b>environment</b>	Operating: -10°C to +50°C (+15°F to +122°F); Storage: -30°C to +70°C (-22°F to +158°F)
<b>humidity</b>	90% RH @ 40°C (104°F) non-condensing
<b>altitude</b>	2,000 m (6,562 ft) to full safety specifications
<b>cables</b>	furnished with full set of test leads (including 20-foot contact leads and 30-foot contact lead extensions)
<b>options</b>	transportation case
<b>warranty</b>	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.

## CT-3500 S2 thermal printer output

TEST RESULTS			
DATE: 04/16/12		TIME: 06:50:23	
COMPANY:	VIC		
STATION:	LAB1		
CIRCUIT:			
MFR:			
MODEL:	CT3500 S2		
S/N:			
KVA RATING:			
OPERATOR:			
NOTES: _____			
TEST: OPEN			
CONTACT OPEN TIME			
CH	TIME (ms)	CYCLE 50 Hz	BOUNCE (ms)
A	15.80	0.79	0.00
B	15.90	0.79	0.00
C	15.80	0.79	0.00
DELTA TIME (ms) =			0.10



## 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 circuitbreaker analyzer, which was a resounding success. It became the forerunner of an entire series of circuitbreaker 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.



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