

# CT-3500 S2

digital circuit breaker analyzer



**Vanguard Instruments**  
A DOBLE COMPANY



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## digital circuit breaker analyzer



### Product Overview

The CT-3500 S2 is Vanguard's second generation, stand-alone, digital, microprocessorcontrolled, 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.

### 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

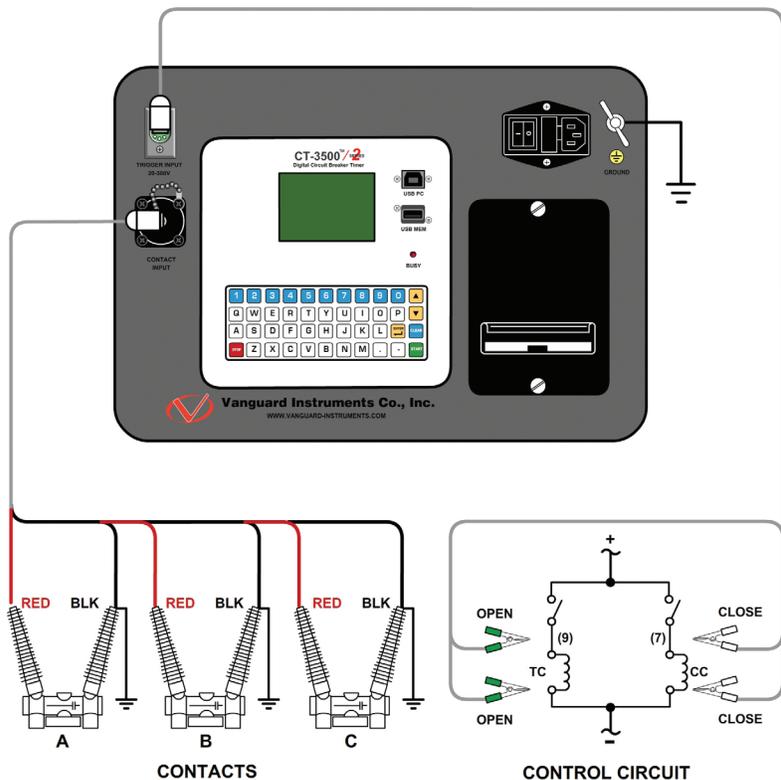
The CT-3500 S2 can store up to 128 test records in Flash EEPROM. Test records can be retrieved and printed on the built-in thermal printer, or they can be transferred to a PC via the unit's USB interface. The USB interface can also be used for diagnostic testing and for updating firmware. The CT-3500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

### ordering information

Part No.	Description
9002-UC	CT-3500 S2, cables, and PC software
9002-SC	CT-3500 S2 shipping case
TP3-CS	TP3 thermal printer paper (36 rolls)

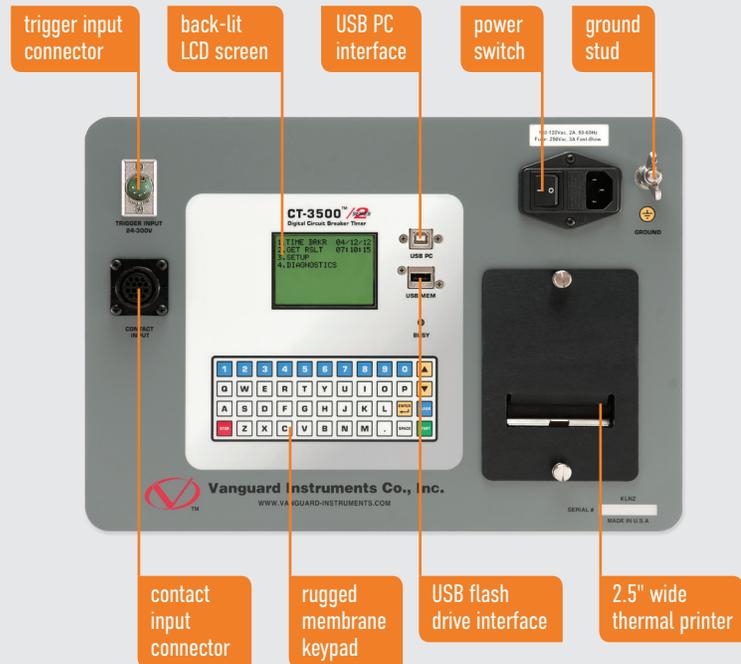
### CT-3500 S2 connections



## Thermal Printer Output

TEST RESULTS			
DATE: 01/16/15		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	CYCLE	BOUNCE
	(ms)	50 Hz	(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

## CT-3500 S2 Features



## CT-3500 S2 technical specifications

<b>physical specifications</b>	<b>Dimensions:</b> 16"W x 7"H x 13" D (40.6 cm x 17.4 cm x 33 cm) <b>Weight:</b> 14 lbs. (6.4 Kg)	<b>input voltage</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 ms; 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 levels	<b>printer</b>	built-in 2½" wide thermal printer
<b>keypad</b>	rugged, 44-key "QWERTY"-style membrane keypad	<b>internal test record storage</b>	stores up to 128 timing records
<b>pc software</b>	Windows® based Breaker Analysis software included with purchase price	<b>computer interfaces</b>	one USB PC interface, one USB flash drive interface
<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>safety</b>	designed to meet IEC61010 (1995), UL61010A-1, CSA-C22.2 standards
<b>altitude</b>	2,000 m (6,562 ft) to full safety specifications	<b>humidity</b>	90% RH @ 40°C (104°F) non-condensing
<b>cables</b>	furnished with full set of test leads (including 20-foot (6.10m) contact leads and 30-foot (9.14m) contact lead extensions)	<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.



## Instruments designed and developed by the hearts and minds of utility electricians around the world.

Founded in 1991 and located in Ontario, California, USA, Vanguard Instruments™ offers a wide range of diagnostic test equipment that accurately and efficiently measures the health of critical substation equipment, such as transformers, circuit breakers, and protective relays.

Our first product was a computerized, extra high voltage (EHV) circuit breaker analyzer, which became the forerunner of an entire line of EHV circuit breaker test equipment. Over the years, our portfolio has grown tremendously 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 application-specific products.

Our instruments are rugged, reliable, accurate, and user friendly. They eliminate tedious and time-consuming operations, while providing fast, complex test-result calculations. Using our equipment helps reduce errors and eliminates the need to memorize long sequences of procedural steps.

In 2017, Vanguard Instruments became a part of Doble Engineering Company, an energy industry leader in hardware, software, and services that diagnose and monitor the health of critical assets.



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