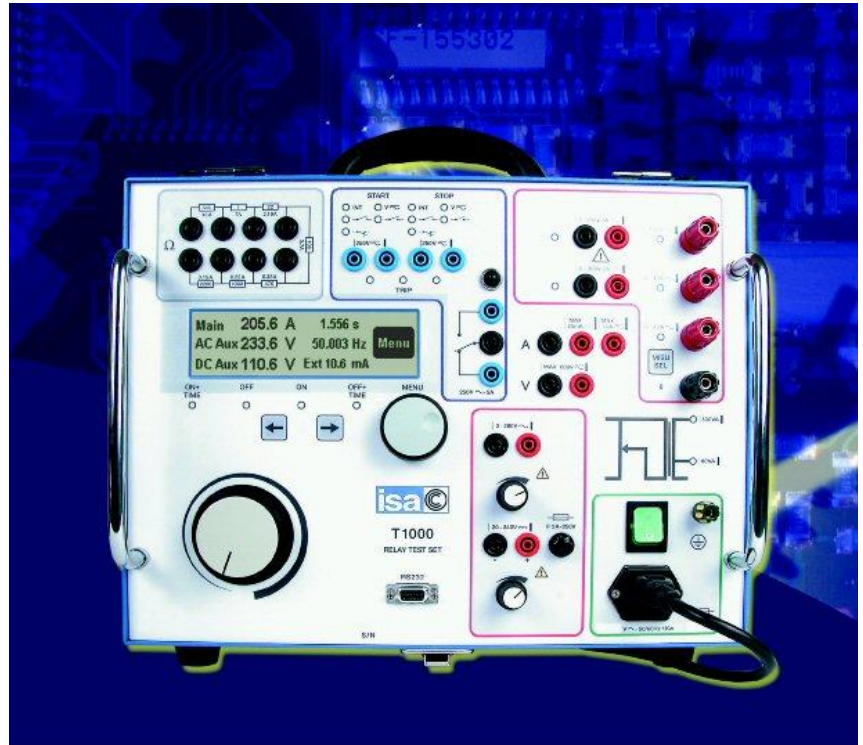


T1000

Secondary Current Relay Test Set

The T1000 Secondary Current Relay test instrument is the testing engineers “Swiss army knife”. It comprises a host of electrical testing functions all integrated into one stand alone, portable test instrument. It’s wide array of electrical testing applications include relays, transducers, transformers, MCB’s, reclosers, etc.

The T1000 has a large, backlit graphical display and control layout that provides an easy and intuitive user interface. In addition, powerful metering functions include waveform display and measurement functions such as current, voltage, time, Z, R, X, S, P, Q.



The T1000 has 3 independent Output Generators that can be used during testing:

- **Main High Power** generator that outputs either AC Current, AC Voltage, or DC Voltage
- **Auxiliary Amplifier drive AC Voltage** generator with phase shifting and/or variable frequency output, that can be synchronized to the main generator, mains or other input.

- **Auxiliary DC Voltage** generator that produces a DC output that can be used for example for powering up a relay during testing.

A standard communication port allows the T1000 to be connected to a standard PC for downloading of test results and setup configuration settings.

Two or more T1000 units can be connected and synchronized to form a basic 3 phase test setup.



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Relays That Can Be Tested with the T1000

Features Include:

- Microprocessor controlled, secondary relay test set.
- 3 output generators in one integrated system.
- Phase shifting and variable frequency output.
- High Power output up to 250 Amps.
- Powerful metering functionality.
- Compact and Portable (less than 45 lbs!).
- Oscilloscope functions of current and voltage.
- Memory storage of test results and configuration settings.
- Large easy to use, menu driven, graphical display.

Applications

The primary application of the T1000 is for the secondary testing of protection relays. These relays include single phase relays and 3 phase relays that can be tested one phase at a time, including those that require phase shifting and/or frequency variation. Other common applications include the testing of many types of transducers, CT's, VT's, MCB's and reclosers. There are certainly many other applications that the versatile T1000 can also accommodate and these include but are not limited to the plotting of excitation curves and polarity test, complex impedance and burden measurements, etc.

Relay Type	IEEE No.
Distance*	21
Synchronizing	25
Over/Under-Voltage	27-59
Power, Varmetric or Wattmetric	32-92
Under Current	37
Reverse Phase Current	46
Instantaneous Overcurrent	50
Ground Fault	50N
Timed Overcurrent	51
Power Factor	55
Directional Overcurrent	67
Directional Ground Fault	67N
Automatic Reclose	79
Frequency	81
Frequency Rate of Change	81
Motor Protection	86
Differential**	87
Directional Voltage	91
Tripping Relay	94
Voltage Regulation	
Thermal	
Timers	
* Three T1000 are necessary	
**Differential Circuit	



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Outputs

Main Generator

The main generator has three outputs: current, AC voltage and DC voltage. The following tables apply to the separate usage of these outputs. It is possible to use them at the same time, provided the total maximum load is not exceeded.

A.C. Current Outputs

Range A AC	Current Output A	Maximum Power VA	Load Time s	Recovery Time min
100	30	300	Steady	-
	100	800	60	15
	250	1000	1	5
40	12	300	Steady	-
	40	800	60	15
10	5	400	Steady	-
	10	800	60	15

A.C. Voltage Output

Range V AC	Voltage Output V	Maximum Power VA	Load Time min	Recovery Time min
250	250	500	Steady	-
	250	750	10	45

D.C. Voltage Output

Range V DC	Voltage Output V	Maximum Power W	Load Time min	Recovery Time min
300	300	300	Steady	-
	300	500	10	45

Other Features of the Main Generator

- Zero crossing control. Main AC outputs are generated and stopped as the output waveform crosses zero
- High resolution adjustment control
- Overload alarm message & thermal protection

Auxiliary AC Voltage Output

Phase Angle Shifting

- Ability to phase shift the auxiliary AC voltage output with respect to the main current voltage.
- Phase angle adjustment with the multi-function knob.
- Phase angle range is from 0° to 360°.
- Adjustment resolution is 1°

Frequency Generator & Frequency R.O.C.

- Ability to change the frequency of the auxiliary AC voltage output
- Frequency Range is from 40 Hz to 500 Hz
- Frequency Adjustment is 1 mHz
- Rate of Change is 1 mHz/s to 99.99 Hz/s

Auxiliary A.C. Voltage Output

Range V	Maximum Power VA
62.50	40
125	40
250	40

- The auxiliary AC voltage output is isolated from the main AC current and voltage.
- The range selection is software driven by the multi-function knob and LCD display.
- Auxiliary voltage power is 30VA, continuous duty, at full range, 40VA for 1 minute.

Auxiliary DC Voltage Output

- DC Voltage Range: 20V....130V or 20V....240V
- DC Voltage Power: 90 W at full range, continuous duty, with a current limit of 0.9 A @ 130 V and 0.45 A @ 240 V.



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Input/Measurements

The following outputs are displayed simultaneously on the LCD:

Timer

The electronic digital timer has automatic contact status sensing capabilities that can detect a change in status of either dry (potential free) contacts or wetted (under voltage) contacts. It is possible to test automatic reclosers (up to 99 reclosers).

Display Options: Seconds or cycles

Seconds: Range-0.000-99999.9s.

Accuracy- 1ms.

Periods: Range- 0.0-4999995 cycles at 50Hz or 0.0-5999994 cycles at 60Hz. **Accuracy-**0.1 cycles

Current Measurement

Ranges: Internal range 0.00-250.0 A

Accuracy: Internal Range is 1% and the External Range is 1% for AC and DC.

Measurement Method: True RMS on AC and average for DC

Max current/External Input: 10A for AC & DC

Voltage Measurement

Range: 0.00-600.0V

Accuracy: 1% for AC and DC

Measurement Method: True RMS on AC and average for DC

Max input voltage: 600V AC & DC

Angle & Frequency Measurement

Measurement	Range	Resolution	Accuracy
Phase	0-360	1°	1° ± digit
Frequency	40.000-499.999	1 mHz	±(0.1% + 1 mHz)

Other Measurements

Measurement	Unit
Active Power, $P= I*V* \cos(\phi)$	W
Reactive Power, $Q= I*V \sin(\phi)$	VAr
Apparent Power, $S= I*V$	VA
Impedance, $Z= V/I$	Ohm, °
Active Impedance Component, $R=Z* \cos(\phi)$	Ohm
Reactive Impedance Component, $X=Z* \sin(\phi)$	Ohm

Set of Resistors

These internal resistors are used for the testing of low impedance relays.

Resistor Ohm	Power (W)	Max Current (A)
0.5	50	10
1	50	7
22	50	2.15
470	50	0.33
1000	50	0.22
2200	50	0.15

General Specifications

Power Supply

Mains Supply: 115-230V ± 15%; 50-60 Hz

Maximum Supply Current: 5A/10A

Serial Interface

RS232 Serial Interface, baud rate 57600

Weight & Dimensions

15" (W) X 12" (D) X 9.5" (H); 42lbs

Standard Accessories

Mains cable, User Manual, Spare fuses (T10A)

Optional Software

Software X.PRO 1000 with serial cable



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