

Thermocouple Simulators

Designed for ultra-precise T/C simulation allowing calibration of virtually any T/C system, any thermocouple material, any temperature—in the field with standards lab accuracy.

EXCLUSIVELY
DESIGNED WITH
"ZERO OUTPUT Z"



ADVANTAGES

	TSC	ETS
<p>➤ Zero Output Impedance Readout being calibrated sees only the output of the GR instrument...even when T/C remains connected.</p>	X	X
<p>➤ Battery Operation</p>		X
<p>➤ High Accuracy Voltage/Current Source (1V and 10V FR) in addition to T/C simulation.</p>	X	
<p>➤ Basic Accuracy of $\pm 1/4^{\circ}\text{C}$</p>	X	X
<p>➤ Designed for Calibration of Analog Meters As well as digital meters. (Unit provides built-in "run-up" capability)</p>		X
<p>➤ Temperature Measurement Capability*</p>	X	X
<p>➤ Built-in Cold Junction Compensation Provided No ice bath required.</p>	X	X

*TSC require additional external equipment.

- Specifically engineered for the test, analysis, calibration and troubleshooting of thermocouple readouts, datalogging systems, etc.
- For use with all thermocouple types (standard models for E, J, K, T, R/S, all others on option).

MODELS AVAILABLE

MODEL TSC-47UR: The finest and most versatile instrument of its type available anywhere outside of a primary standards laboratory. Designed for use as a portable standard and as a constant voltage/current source as well as thermocouple simulator.

MODEL ETS-15: Same accuracy and "Zero output Z" performance as TSC Series relative to T/C simulation. Differs from TSC units in that it is truly portable with internal batteries. It also provides built-in run-up pot, control circuit and temperature measurement capability. Does not offer 10V F.S. voltage source performance.

THERMOCOUPLE SIMULATION

These instruments simulate all thermocouple types—E, J, K, R, S, T, B, N, etc.—internally referenced-junction-compensated to 0°C . Connection to the thermocouple system to be tested is through the use of specially designed THERMOCLIPS™ (see Table II). Output is dialed in voltage on thumbwheel-decade switches. Any reference tables can be used—DIN, NBS, etc.

BATTERY OPERATION (ETS-15)

Instrument will operate for approximately 8 hours on a full charge under normal conditions and recharge within 10 hours. Units are fully operative during the charge cycle. Trickle charging takes place as long as unit is plugged in, whether it is turned ON or OFF.



Innovators and manufacturers of ultra-precision test instruments used as laboratory standards and for critical process monitoring.

OPERATION

1. THERMOCOUPLE SIMULATION WITH ZERO OUTPUT IMPEDANCE.

Appropriate Thermoclips are clipped into the system. Since output impedance is "zero" there is no need to disrupt system wiring. After temperature-equivalent voltage is dialed, this known signal is used to calibrate or troubleshoot scanners, linearizers or readouts.

SPECIFICATIONS—TABLE I

	Model TSC-47UR	Model ETS-15
Number of Decades	7	5
Resolution	0.1 μ V or 1.0 μ V ⁽¹⁾	1.0 μ V
Range(s), full scale DC	\pm 1.0V and 10.0V	\pm 100.0mV
Accuracy of voltage setting @ +25°C	\pm 0.0015% ⁽²⁾	\pm 10.0 μ V
Noise and ripple (peak) exclusive of random transients. DC to 10kHz	2ppm or 15.0 μ V ⁽³⁾	20.0 μ V ⁽³⁾
Output voltage T.C. (ppm/°C)	\pm 0.7 typ./ \pm 1.5 max.	\pm 1 typ./ \pm 2 max.
Output voltage stability @ +25°C	\pm 5 ppm/24 hrs \pm 15 ppm/year	\pm 7ppm/24hrs \pm 20 ppm/year
Accuracy of thermocouple simulation	\pm 1/4°C ⁽⁴⁾	
Maximum load current	30mA	
Line regulation (105-125VAC)	\pm 0.5 ppm	
Load regulation (no load to full load)	1 ppm \pm 1.0 μ V peak	
Isolation (floating output)	Either terminal can be grounded/guarded up to 500V with respect to ground. Leakage approx. 10 $^9\Omega$, less than 20pF.	
Typical output impedance	50 $\mu\Omega$	
Input power	115V, 60Hz (Specify 220V, 50 Hz operation is desired)	

(1) Dependent upon range. (2) \pm 5 μ V. (3) Whichever is greater. (4) Providing that output of thermocouple simulated is \geq 40 μ V/°C, accuracy of simulation of noble metals with outputs \geq 10mV/°C is 1.5°C (except for Type S).

THERMOCLIPS™—TABLE II

A single pair of Thermoclips is supplied as standard equipment for each of the thermocouple types listed below. Please specify choice when ordering. Additional pairs of Thermoclips, as well as Thermoclips manufactured of other materials, are available on special order.

Type	Thermocouple Material
E	Chromel/Constantan
J	Iron/Constantan
K	Chromel/Alumel
R	Platinum/Platinum 13% Rhodium (simulated)
S	Platinum/Platinum 10% Rhodium (simulated)
T	Copper/Constantan



General Resistance

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