RX1032/RX1000

PRECISION TEMPERATURE AND VOLTAGE MEASUREMENTS FOR HARSH ENVIRONMENTS

VTI Instruments

OVERVIEW

The RX1032 instrument combines precision thermocouple-based temperature measurements with a ruggedized enclosure; the RX1000 instrument offers the same precision and resilience for voltage measurements. Both are based on the popular EX1000 series, the most advanced, full-featured data acquisition solutions available on the market today. Both units can offer superior measurement accuracy and repeatability by implementing fully integrated signal conditioning and advanced cold junction compensation (CJC). Military-grade connectors ensure more secure power connections. Thermocouple and voltage sensor inputs are routed through a protected entry to a screw terminal panel to allow for faster and easier connectivity. The rugged construction of the enclosure allows mounting instruments on test pylons, in test cells, or in other harsh environments.

SCALABLE FOR HIGHSPEED SYNCHRONIZED DATA ACQUISITION

The RX10XX family supports easy integration and synchronization of multiple devices through industry-standard IEEE-1588 implementation. Multiple instruments can easily be distributed and placed extremely close to the measurement points of interest, reducing the length of analog cable, minimizing errors induced by noisy environments. All measurement data is returned with IEEE-1588 timestamp codes; typical accuracies of <200µsec ensure that acquired data is tightly coordinated across the entire object under test.

FEATURES

- 32-Channel Thermocouple/Voltage Measurement Systems
- Advanced CJC Implementation
- 1000 Sample/Sec/Channel Scan Rate
- Precise Distributed Measurement
- Synchronization with IEEE-1588
- Rugged Design
- Broad Operating Temperature Range
- IP65 Environmental Rating
- Ethernet Connectivity via LXI Open
- Industry Standard
- IVI-COM, IVI-C, LabVIEW® Driver Support

APPLICATIONS

- Large Scale Engine Test
- Harsh Environment
- Health Monitoring
- HALT / HASS
- Rocket Motor Reliability
- Wind Tunnel Test

COLD JUNCTION COMPENSATION

The heart of any truly accurate thermocouple measurement system is the CJC implementation. The RX1032 instrument combines multiple precision thermistors, a significant thermal mass, and careful parts placement to provide world-class measurement performance.

General Specifications

CHANNELS

Channels	32 differential thermocouple or voltage inputs
Channel types	Thermocouple inputs: j, k, t, e, s, r, b, n (RX1032 only)
Sampling rate	1000 samples/sec/channel maximum
Temperature resolution	<0.1°C
Temperature accuracy	See thermocouple accuracy table
Temperature noise, peak-to-peak	0.08°Cpp typical (J, K, T, E)

PROGRAMMABLE FILTERS

Bessel (2 pole)	4Hz, 15Hz, 40Hz, 100Hz, 500Hz (-3db cutoff frequency)
Butterworth (1 pole)	1000 Hz (-3db cutoff frequency)

COMMON MODE REJECTION RATIO

4 Hz filter	DC: 100db minimum; (50/60)Hz: 140db typical, 120db minimum
1 KHz filter	DC: 100db minimum; (50/60)Hz: 100db typical, 80db minimum

VOLTAGE	±10.0V	±1.0V	±0.1V	±0.067V	±0.01V
Voltage Resolution	300µV	30µV	3.0µV	2.0µV	0.3µV
Voltage Accuracy ± (% of reading + offset)	± (0.025% + 500µV)	± (0.025% + 50µV)	± (0.025% + 10µV)	± (0.025% + 50µV)	± (0.050% + 10µV)
Voltage Offset Stability	± 20µV/°C typical	± 10µV/°C typical	± 5µV/°C typical	± 2µV/°C typical	± 2µV/°C typical
Voltage Offset Stability	Voltage Input channels (all ranges) ± 25ppm/°C (typical)		Thermocouple input channels ± 5ppm/°C (typical)		
Input Impedance	40MΩ differential				
Common Mode Input Range	± 10µV				
Voltage Input Range	±0.01 V	±0.067	±0.1 V	±1.0 V	±10.0 V

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RX1032/RX1000 Specifications

LXI SPECIFICATIONS

Clock specifications	
Clock oscillator accuracy	±50ppm
Synchronization accuracy	Reports "synchronized" when < ±200µs of the 1588 master clock
Timestamp	
Accuracy	As good as time synchronization down to 50µs
Resolution	25µs

IEEE 1588- BASED TRIGGER TIMING

Alarm	
Trigger time accuracy	As good as time synchronization down to 50µs
Time to trigger delay	50µs
Receive lan (0-7) event	
Trigger time accuracy	As good as time synchronization down to 50µs
Time to trigger delay	
Future timestamp	50µs typical
Past/zero timestamp	1 ms maximum

HARDWARE TRIGGER TIMING

LXI trigger bus	
Time to trigger delay	55µs typical dio bus
Dio bus	
Time to trigger delay	57µs typical

ENVIRONMENTAL SPECIFICATIONS

Temperature	
Operating	-40°C to +71°C (reduced accuracy), 0°C to +50°C (full accuracy)
Humidity	IP 65 rated enclosure, 5% to 95%
Altitude	Up to 4600m
Shock and vibration	Conforms to mil-prf-28800f
Random vibration	30 min per axis, 10-500Hz mil-prf-28800f class 2
Sinusoidal	5 To 55Hz resonance search per mil-prf-28800f class 2, each axis
Shock	30g/axis, 11ms half sine pulse per mil-prf-28800f class 2

GENERAL

Input protection	15V Zener protection
Transducer screw terminal	M3 x 6mm (pan head phillips)
Instrument connection	10/100 base-t input connector screw terminal
Power	Input input voltage DC, 18-36V DC
Dimensions (h x w x d)	125mm x 238mm x 249mm; 4.92" X 9.05" X 9.45"
Weight	5.3Kg; 11lbs.

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RX1032 Only Specifications

	Type E, J, K, N & T		
Typical	±0.6°C	±0.6°C	±0.4°C
Max	±1.0°C	±1.0°C	±0.6°C
Type R & S			
Typical	±0.88°C	±2.12°C	±0.48°C
Max	±1.40°C	±3.72°C	±0.80°C
Type B			
Typical	±1.76°C	±4.24°C	±0.96°C
Max	±2.80°C	±7.44°C	±1.60°C

Note: Typical is based on 2σ & Max is based on 4σ

Conditions
- After 1 hour warmup period and temperature stable for 1 hour after any temperature change.
- Accuracy does not include accuracy of thermocouple or thermocouple wiring.
- Maximum temperature rate of change between any operating temperature is 0.5 °C/min.
- Guaranteed maximum limits are two times (2x) the typical values.
- 7 days, ±5 °C from last calibration.
- -20 °C to +30 °C, 1 year from full calibration.
- Exclusive of thermocouple errors.
- Exclusive of noise.
- Common mode voltage = 0.
- Self calibration is not applicable.

Temperature rate of change
- Nominal - 0.33 °C/min
- Max - 1.33 °C/min

Specification contained within this document are subject to change without notice. Revision 20200612.

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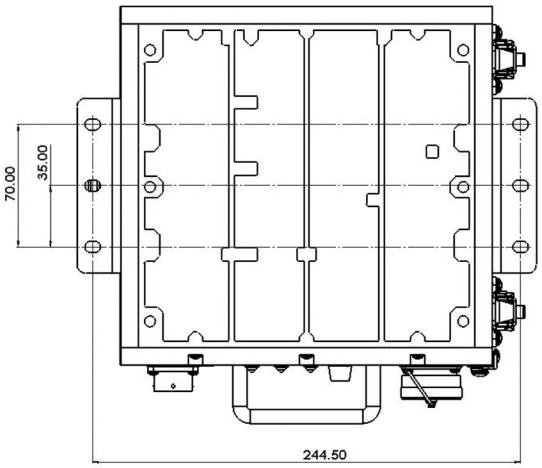
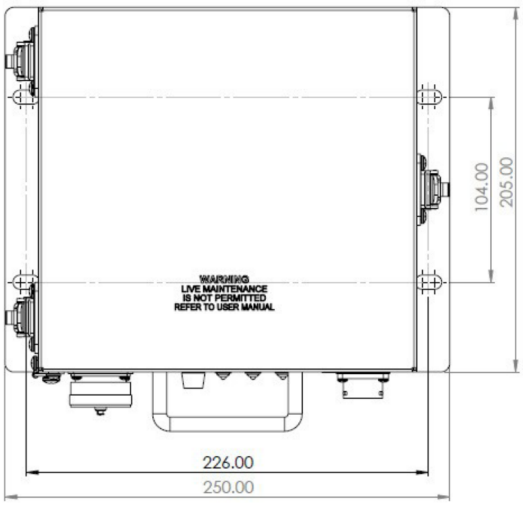
Ordering Information

Models	Configuration
RX1032	Ruggedized 32-Channel Thermocouple Instrument
RX1000	Ruggedized 32-Channel Voltage Instrument
Accessories	
27-0673-315	Power Connector, MIL-C-26482-1
27-0926-008I	Ethernet Connector, IP67, RJ-45
41-0604-012	Mounting Angle Bracket with screws
41-0604-013	Cable Mounting Bracket with screws

Dimensions



RX-10XX chassis mounting dimensions (in mm)



Vibration/shock isolator mounting dimensions (in mm)

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