



ProDAQ LXI Instruments

ProDAQ 6151

Isolated Precision Thermocouple LXI Instrument (Model 6151-AA: Thermocouple)

OVERVIEW

The ProDAQ 6151 is an LXI instrument designed for 16-channel isolated precision thermocouple measurements. It supports many common thermocouple types, namely types J, K, N, C, T and E. Each channel is isolated from both the chassis and all other channels.

The ProDAQ 6151 provides an easy to use, cost effective and scalable solution for the most demanding thermocouple measurement applications. As a standalone LXI instrument it can be directly connected to your network and operated either through the integrated web pages or integrated to your data acquisition application using the VISA I/O library. Measurement data can be read from the instrument or directly streamed to one or several servers. Multiple devices can be synchronized via the IEEE1588 precision time protocol. The unit is equipped with a redundant power supply and two Ethernet ports.

FEATURES

Analog Inputs: Each channel of the ProDAQ 6151 employs a 24-bit Sigma-Delta ADC to provide the highest possible measurement accuracy. Each channel is isolated from any other and also from the chassis, with a working isolation voltage up to 300VDC. This allows any channel not only to float to different voltage potentials but also eliminates the possibility of ground loop error. Each channel is protected against overvoltage, both short-term transient spikes as well as constant DC voltages up to $\pm 30V$. An EMI filter is included per channel to reduce the possibility of error due to high frequency conducted noise. This filter also acts as an Anti-alias filter for the Sigma-Delta ADC.

Simultaneous Sampling: The ProDAQ 6151 has a dedicated ADC per channel. This allows for true simultaneous sampling of all channels. The scan rate can be varied from 1 S/s to 1000 S/s, with a resolution of 1Hz.

Cold Junction Compensation: One of the keys to making precise thermocouple measurements is the accuracy of the Cold Junction Compensation. The ProDAQ 6151 is equipped with a dedicated temperature sensor per channel which is measured, along with the thermocouple input, during every scan. The sensor is thermally bonded to the cold junction in order to provide the most accurate and fastest response to changes in the cold junction temperature.

Open Thermocouple Detection: Each channel is equipped with open thermocouple detection functionality. It provides immediate indication in the event of a broken thermocouple, both in software and by a LED on the instruments front panel.

Analog Outputs: Each channel is equipped with 2 buffered analog outputs, ranging from 0V to +10V, with a level designed to cover the required temperature range for each thermocouple.

Features & Benefits

- ▶ **19", 1U** solution for **16 Thermocouple Channels**
- ▶ **Support** for all **common thermocouple** types
- ▶ **Channel Isolation** up to **300 VDC** (channel to channel and channel to ground)
- ▶ **CJC Sensor** per channel
- ▶ **24-Bit Sigma Delta** ADC per channel
- ▶ **Two Analog Outputs** per channel, 0V to +10V
- ▶ **Simultaneous Sampling** of all channels
- ▶ **Open Thermocouple Detection** and **Indication** for all channels



ProDAQ 6151 Isolated Precision Thermocouple Input LXI Instrument

Various Mounting Options: The ProDAQ 6151 comes in a 1U high unit suitable for rack mount in a standard 19" rack if used with the ProDAQ 5725 Rack-Mount kit. The ProDAQ 6151 can also be desktop mounted using the ProDAQ 5726 Stackable Tabletop Feet Set.

SPECIFICATIONS (Model 6151-AA only)

General	
Number of signal channels	16
Isolation	300 VDC (Channel to channel, channel to outputs and channel to chassis)
Isolated Analog Output	Two per Channel, $\pm 10\text{V}$, Filtered, Buffered, Short Circuit Protected
Noise, at Analog output	$<100\mu\text{V}_{\text{rms}}$
ADC Resolution	24-bit
ADC Sampling Rates	1 to 1000 Samples per second, 1Hz Resolution
EMI Filtering	Yes, per channel
Channel Input Protection	Yes, $\pm 30\text{V}$, max. input current 10mA, max. 3A $<10\text{ms}$.
Input Impedance	$\geq 1\text{M}\Omega$
Common Mode Rejection Ratio	$\geq 80\text{dB}$
Linearizer	In built Linearizer through software
Calibration	Factory calibrated. Software calibration (zero and gain)
Response Time	$<100\text{ms}$ at 1kSPS
Input Range ability	Min and Max range configurable
Turn Down ratio	20:1
Thermocouple Measurement	
Thermocouple Types	J, K, N, C, T, E
Temperature Span	Type J: $-200\text{ }^{\circ}\text{C}$ to $+700\text{ }^{\circ}\text{C}$ Type K: $-200\text{ }^{\circ}\text{C}$ to $+1200\text{ }^{\circ}\text{C}$ Type N: $-200\text{ }^{\circ}\text{C}$ to $+1250\text{ }^{\circ}\text{C}$ Type C: $0\text{ }^{\circ}\text{C}$ to $+2300\text{ }^{\circ}\text{C}$ Type T: $0\text{ }^{\circ}\text{C}$ to $+400\text{ }^{\circ}\text{C}$ Type E: $0\text{ }^{\circ}\text{C}$ to $+700\text{ }^{\circ}\text{C}$
Temperature Accuracy	Type J: $\leq \pm(0.6\text{ }^{\circ}\text{C} + 0.05\% \text{ Span})\text{ }^{\circ}\text{C}$ Type K: $\leq \pm(0.5\text{ }^{\circ}\text{C} + 0.05\% \text{ Span})\text{ }^{\circ}\text{C}$ Type N: $\leq \pm(0.5\text{ }^{\circ}\text{C} + 0.05\% \text{ Span})\text{ }^{\circ}\text{C}$ Type C: $\leq \pm(1.0\text{ }^{\circ}\text{C} + 0.05\% \text{ Span})\text{ }^{\circ}\text{C}$ Type T: $\leq \pm(0.5\text{ }^{\circ}\text{C} + 0.05\% \text{ Span})\text{ }^{\circ}\text{C}$ Type E: $\leq \pm(0.5\text{ }^{\circ}\text{C} + 0.05\% \text{ Span})\text{ }^{\circ}\text{C}$
Cold Junct Compensation	Per channel, accuracy $\pm 0.5\text{ }^{\circ}\text{C}$
Temperature Stability	$\leq 50\text{ppm}/^{\circ}\text{C}$
Open TC Detection	Yes, per channel
Open TC Indication	Yes, per channel, Front Panel LED and Software
Filtering	Low pass, 100Hz FIR filter @ 1kSPS, 14 taps, scales proportionally with sampling rate
Analog Output	
Analog Output Voltage	0V to $+10\text{V}$
Number of analog outputs	2 per channel
Output resistance	$\leq 1\Omega$
Control Interface	
Physical Interface	Two redundant network ports, 10/100/1000 Base-TX
Software Interface	SCPI over VXI-11 protocol (VISA), TCP/IP, Web Interface

Ordering Information

- **6151-AA** LXI Isolated Precision Thermocouple Instrument, 16 Channel

Related Products:

- **5725** Rack-Mount Kit
- **5726** Stackable Tabletop Feet Set

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Operating System Support Windows 10

Environmental

Temperature 5 °C to +50 °C (operational)
-40 °C to +70 °C (storage only)

Humidity 5% - 95% (non-condensing)

Size 425 mm x 330 mm x 43.5 mm (excl. connectors)

Weight 5 kg

Power Supply

Input Two redundant inputs, 85 - 264V AC, 47 - 63 Hz each

Power 40W typical

BLOCK DIAGRAM (Model 6151-AA only)

