USB Thermocouple/µV Data Acquisition Adapter

- **4(+1) analog input channels**
- **Ratiometric Measurements**
- **Windows 10/11, Linux, 32/64 bit**

Features

- **4 Thermocouple/µV channels**
- **RTD channel for cold-junction measurement**
- **DAQ section isolated from USB**
- **High Retention USB connector**

Applications

- **Temperature measurements**
- **Microvolt measurements**
- **MQTT Publisher**

Overview

The TEC-7220 is a four channel Thermocouple/µV amplifier and data acquisition unit. It uses an isolated, ratiometric sigma-delta converter for precise measurements.

The software application on the computer can be developed in Python, LabView, C, C++, or any other compatible programming language supporting standard libraries.
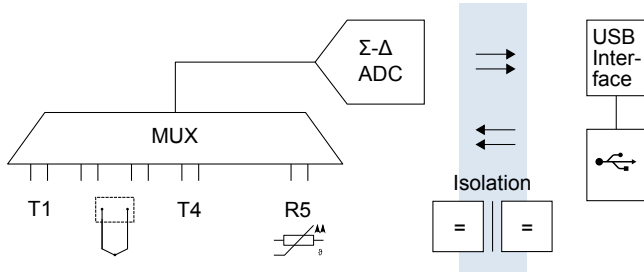
The LabDash brower-based interface is available for interactive setup, operation and observation.

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TEC Architecture

The TEC-7220 multiplexes 4 differential bridge channels (B1-4) and a RTD channel (R5) onto a sigma-delta analog-to-digital converter. In order to reduce noise, this analog part is galvanically isolated from the digital part, which consists of a controller with USB-2.0 interface.

Compatible Sensors

Due to a 3.3V bridge supply nearmost any resistive bridge sensor may be connected to the TEC-7220 without exceeding the sensor specifications. Passive bridge sensors specified for a 5V supply also work with the 3.3 V bridge supply.

## Bridge Channel Connections
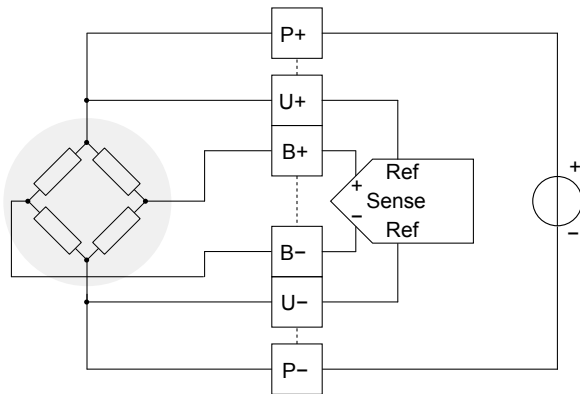
In ratiometric measurements, the noise effects of the bridge supply voltage P are removed by using the ratio of B/U for the measurement.
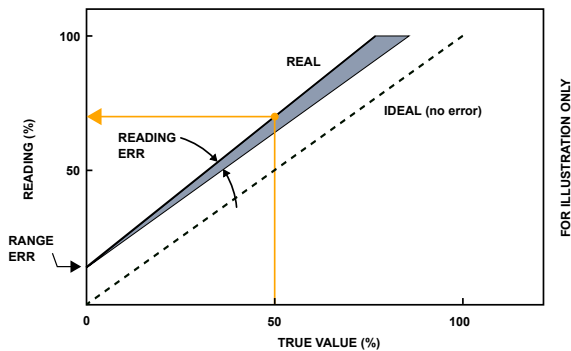
RTD Channel Connection
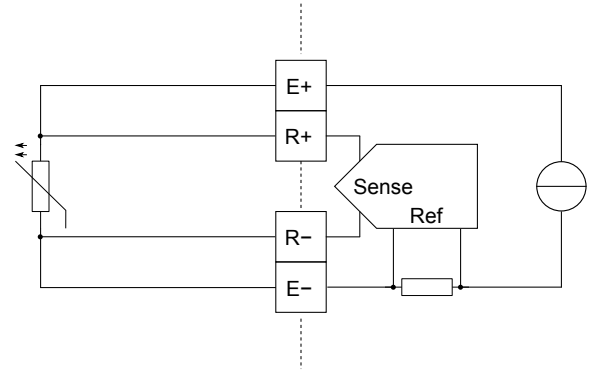
In resistive temperature measurements, the noise effects of the excitation current flowing through the E terminals is removed by using the ratio of the voltage drops from the Sense and Reference resistors for the measurement.

LabDash Browser-Based Interface
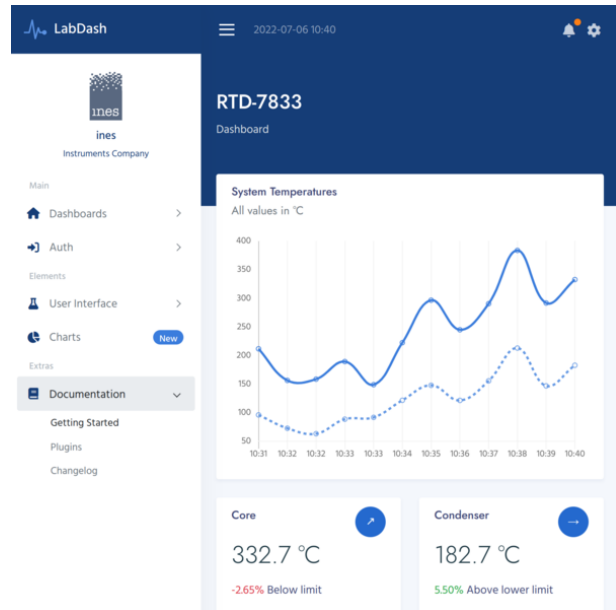
Measurement Uncertainty

The accuracy specifications for the device are expressed in the form: (% of reading + % of range) which match the dominate sources of error, gain and offset. The reading error term is from inaccuracies such as amplifier gains, divider ratios or internal reference voltages. The range error term is from inaccuracies such as amplifier offsets, leakage current effects and thermocouple effects. Total measurement error is the sum of the readings and range errors.

Spezifications

Isolation (USB to Analog)

Creepage distance (PCB design)**:** ≥ 3.2 mm
Bleeder Resistor: 2.2 MΩ, 0.5 W, 1 kV
Isolation Voltage (Optocouplers)**:** 2.5kV rms AC, 60 seconds

Connectors

USB Interface: USB 2.0 Type-B
Analog Signals: D-SUB-25S (Socket) UNC-4/40

Environmental and Physical

Size (excluding connectors)**:** 111 mm L x 76 mm W x 29 mm H
Weight: 160 g
Operating ambient temperature: 0 … 50°C
Storage temperature: -20 … 80°C
Relative humidity: 5 … 95%, noncondensing
USB connector: Extraction force ≥ 15N, Mating force ≤ 35N

Ordering Information

TEC-7220 - Instrument, USB cable (1m), Software Download Card

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