

# KiDAQ Module 5521A

## Measurement module for thermocouples



### Description

KiDAQ is a general purpose data acquisition system to measure more than 20 different analog and digital signal types. The wide selection of signal conditioning and data acquisition modules enables perfectly fitted system configurations, exactly to the customer's requirements. All modules are available in the KiDAQ housing options Rack, Portable and DIN Rail which allows the use in different applications and environments.

### Key features

- **8 analog input signals**  
For thermocouples (types B,E,J,K,L,N,R,S,T,U) and voltage
- **Dynamic linearization**
- **A/D conversion**  
100 Sps sampling rate per channel, 24 Bit resolution
- **Galvanic isolation**  
Channel to channel to power supply and to interface isolation voltage 500 VDC



### Technical data

#### Analog inputs

|                       |   |
|-----------------------|---|
| Number                | 8   |
| Input connector types | Terminal strip, 2x10 pole, color blue (5521A__A1) / Miniature thermocouple connector type K, color green, IEC (5521A__T1) / Miniature thermocouple connector type K, color yellow, ANSI (5521A__T2) |
| Accuracy              | 0.01 % typical<br>0.025 % in controlled environment <sup>1</sup><br>0.05 % in industrial area <sup>2</sup>  |
| Linearity error       | 0.01 % of the final value typical   |
| Repeatability         | 0.003 % typical (within 24 h)   |
| Input resistance      | >10 MΩ  |
| Isolation voltage     | 100 VDC permanent channel to channel<br>500 VDC channels to power supply to interface <sup>3</sup>  |

| Measurement voltage   | Range                          | Frequency range (-3 dB) [Hz] | Max. deviation | Resolution |
|-----------------------|--------------------------------|------------------------------|----------------|------------|
|                       | ±80 mV                         | 0 ... 100                    | ±10 µV         | 10 nV      |
| Long term drift       | <1 µV / 24 h; <10 µV / 8 000 h |                              |                |            |
| Temperature influence | on zero                        |                              | on sensitivity |            |
|                       | <2 µV / 10 K                   |                              | <0.02 % / 10 K |            |
| Signal-noise-ratio    | >100 dB at 100 Hz              |                              |                |            |

<sup>1</sup> according EN 61326: 2006, appendix B

<sup>2</sup> according EN 61326: 2006, appendix A

<sup>3</sup> noise pulses up to 1000 VDC, permanent up to 250 VDC

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| Measurement thermocouple  | Type  | Adjusted with cold junction compensation | Not adjusted. with a random CJC terminal |
|---|---|--|--|
| Deviation in the relevant input range   | <b>Type B</b><br>(400 °C to 1 820 °C)<br>(752 °F to 3 308 °F)         | < ±1.5 °C<br>< ±2.7 °F                   | < ±2.5 °C<br>< ±4.5 °F                   |
|   | <b>Type E, J, K</b><br>(-100 °C to 1 000 °C)<br>(-148 °F to 1 832 °F) | < ±0.5 °C<br>< ±0.9 °F                   | < ±1 °C<br>< ±1.8 °F                     |
|   | <b>Type E</b><br>(-270 °C to 1 000 °C)<br>(-454 °F to 1 832 °F)       | < ±0.8 °C<br>< ±1.44 °F                  | < ±1 °C<br>< ±1.8 °F                     |
|   | <b>Type K</b><br>(-270 °C to 1 372 °C)<br>(-454 °F to 2 502 °F)       | < ±0.8 °C<br>< ±1.44 °F                  | < ±1 °C<br>< ±1.8 °F                     |
|   | <b>Type L</b><br>(-200 °C to 900 °C)<br>(-328 °F to 1 652 °F)         | < ±0.5 °C<br>< ±0.9 °F                   | < ±1 °C<br>< ±1.8 °F                     |
|   | <b>Type N</b><br>(-100 °C to 1 000 °C)<br>(-148 °F to 1 832 °F)       | < ±0.5 °C<br>< ±0.9 °F                   | < ±1 °C<br>< ±1.8 °F                     |
|   | <b>Type N</b><br>(-270 °C to 1 300 °C)<br>(-454 °F to 2 372 °F)       | < ±0.8 °C<br>< ±1.44 °F                  | < ±1 °C<br>< ±1.8 °F                     |
|   | <b>Type R, S</b><br>(-50 °C to 1 768 °C)<br>(-58 °F to 3 214 °F)      | < ±1 °C<br>< ±1.8 °F                     | < ±1.5 °C<br>< ±2.7 °F                   |
|   | <b>Type T, U</b><br>(-100 °C to 400 °C)<br>(-148 °F to 752 °F)        | < ±0.5 °C<br>< ±0.9 °F                   | < ±1 °C<br>< ±1.8 °F                     |
|   | <b>Type T</b><br>(-270 °C to 400 °C)<br>(-454 °F to 752 °F)           | < ±0.8 °C<br>< ±1.44 °F                  | < ±1 °C<br>< ±1.8 °F                     |
| The specifications are valid with activated mains rejection 50 Hz resp. 60 Hz |   |  |  |

|  |  |                |
|--|--|----------------|
| Long term drift                        | <0.025 °C / 24 h; <0.05 °C / 8 000 h<br><0.045 °F / 24 h; <0.09 °F / 8 000 h |                |
| Temperature influence (Type K)         | on zero  | on sensitivity |
|  | <0.05 °C / 10 K<br><0.09 °C / 10 K   | <0.02 % / 10 K |
| Uncertainty cold junction compensation | <0.3 °C / 0.5 °F   |                |

**Analog digital conversion**

|                   |   |
|-------------------|---|
| Resolution        | 24 bit  |
| Sample rate       | 100 Sps per channel   |
| Conversion method | Sigma-Delta   |
| Digital filter    | IIR, low pass, Butterworth 4 <sup>th</sup> order, 0.1 Hz up to 10 Hz in steps 1, 2, 5 |
| Averaging         | configurable or automated according the selected data rate                            |

Further technical data please refer to data sheet “KiDAQ System Datasheet” 003-335e.

**Warm up time**

All declarations are valid after a warm up time of 45 minutes.

**Required accessory for Type 5521A\_A1**

- Cold Junction Compensation  
Connection terminal for 4 thermocouples, thermal embedded Pt1000 temperature sensor 2 terminals each module required (8 thermocouples)

**Type**  
5582A2

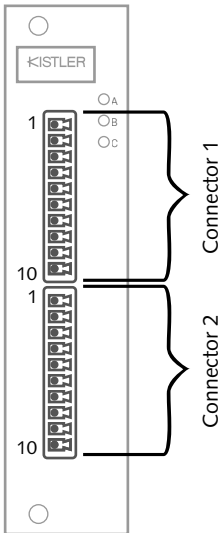


The Cold Junction Compensation will not be factory-adjusted in combination with the module 5521A. Because of a random exchangeability, the maximum deviation is higher than with an adjusted combination with the cold junction compensation terminal.

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**Pin assignment**

Terminal strip, 2x10 pole, color blue (5521A\_\_A1)



| Pin No. | Function           |
|---------|--------------------|
| 1       | CJC+               |
| 2       | CJC-               |
| 3       | A <sub>in</sub> 1+ |
| 4       | A <sub>in</sub> 1- |
| 5       | A <sub>in</sub> 2+ |
| 6       | A <sub>in</sub> 2- |
| 7       | A <sub>in</sub> 3+ |
| 8       | A <sub>in</sub> 3- |
| 9       | A <sub>in</sub> 4+ |
| 10      | A <sub>in</sub> 4- |

| Measurement  | Pin assignment |
|--------------|----------------|
| Voltage      |                |
| Thermocouple |                |

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**Block diagram**

