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FLUKE®
Calibration

# 1586A Super-DAQ
## Precision Temperature Scanner

## Extended Specifications

The 1586A Super-DAQ is the most accurate and flexible temperature data acquisition system on the market. It scans and records temperature, dc voltage, dc current, and resistance for up to 40 input channels and scan speeds as fast as 10 channels per second. The Super-DAQ can be configured for use as a multi-channel data logger in the factory or as a precision reference thermometer for benchtop sensor calibration in the lab.

- Measure thermocouples, PRTs, thermistors, dc voltage, dc current, and resistance
- Best-in-class temperature measurement accuracy:
  - PRTs: ± 0.005 °C (using external DAQ-STAQ Multiplexer)
  - Thermocouples: ± 0.5 °C (using High-Capacity Module and internal CJC)
  - Thermistors: ± 0.002 °C
- Input Channels: Up to 40 isolated universal inputs
- Flexible configuration: Internal High-Capacity Module and/or DAQ-STAQ Multiplexer
- Selectable scan speed: Up to 10 channels per second
- Four modes of operation: Scan, Monitor, Measure, Digital Multimeter (DMM)
- Real-time color trending: Chart up to four channels simultaneously
- Automated sensor calibration: Control Fluke Calibration temperature sources such as dry-wells or micro-baths for automated calibration routines
- Data storage: Records up to 20 MB of data and setup files to internal non-volatile memory or to an external USB drive. Transfer data to a PC using the USB drive or LAN connection and view data in Microsoft® Excel
- Data security: Administrator and user profiles for protecting settings and ensuring test traceability
- Mx + B scaling and channel offset zero function
- Alarms: Two independent, user-defined alarms for each channel indicate when an upper or lower range has been exceeded

# 1586A Super-DAQ at a glance

Color display with channel status indicators. Chart up to 4 channels simultaneously.

Back lit main function keys—always know the mode of operation and recording status.

**Front panel**

Five-way binding post for reference thermometers. Also measures dc voltage, dc current, and resistance.

Memory management—for downloading and moving data and setup files.

Measure/DMM function for quick measurements and recording with minimal setup.

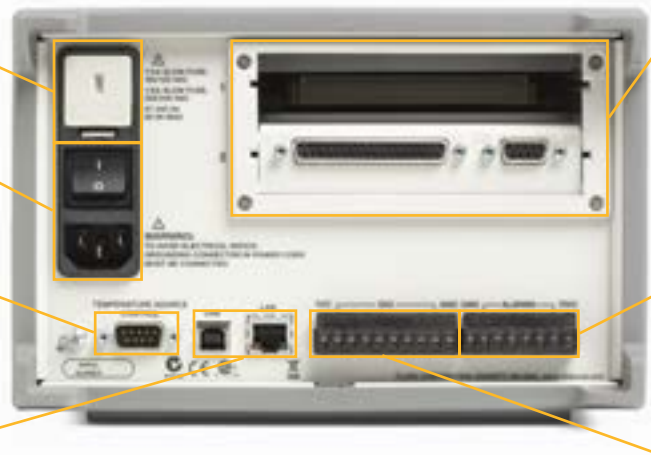
USB support for easy transfer of data and setup files.

Function soft keys support fast setup and operation.

Navigation keys for fast selection of information.

Standby key turns the display and keypad off—eliminates warm-up time.

**Back panel**



Line voltage and fuse selector.

Two rear panel slots can be configured for the internal High-Capacity Module or the external DAQ-STAQ Multiplexer—or one of each.

Power switch and line cord connector.

Dedicated connector for control of Fluke Calibration dry-wells or temperature baths for automated tests.

Digital external alarm trigger outputs.

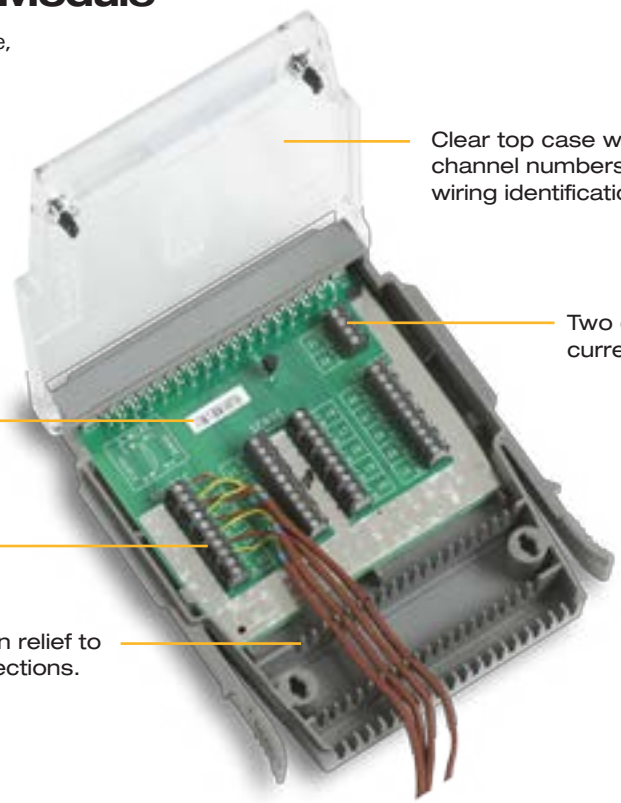
USB and Ethernet ports used for remote operation.

Totalizer and Digital I/O input ports.

# 1586A modules at a glance

## 1586-2586 High-Capacity Module

Universal input channels designed to measure temperature, resistance, dc voltage, and dc current for data acquisition applications on the factory floor where channel count and scan speed are important.



Clear top case with embedded channel numbers for easy wiring identification.

Two dedicated dc current channels.

Electronic ID with serial number and calibration date reports to the 1586A Super-DAQ.

Twenty 2-wire or ten 3-, or 4-wire connections.

Built-in cable strain relief to help secure connections.

## 1586-2588 DAQ-STAQ Multiplexer

Designed for high-accuracy measurements in secondary temperature calibration labs. Easily connect/disconnect thermocouples, PRTs, and thermistors.

Twenty mini-jack thermocouple inputs and up to ten four-wire, gold-plated PRT/thermistor connectors.

# 1586A Super-DAQ general specifications

| General | |
|---|---|
| Maximum input | 50 V |
| Offset voltage | <2 µV |
| 3-wire internal resistance mismatch | <50 mΩ |
| Basic CJC accuracy | 0.25 °C |

| | | |
|---|---|---|
| **Mains Voltage** | 100 V Setting | 90 V to 110 V |
| | 120 V Setting | 108 V to 132 V |
| | 220 V Setting | 198 V to 242 V |
| | 240 V Setting | 216 V to 264 V |
| **Frequency** | 47 Hz to 440 Hz | |
| **Power Consumption** | 36 VA peak (24 W average) | |
| **Environment Temperature** | Operating | 0 °C to 50 °C |
| | Full accuracy | 18 °C to 28 °C |
| | Storage | −20 °C to 70 °C |
| **Warm-up** | 1 hour to full accuracy specifications | |
| **Relative Humidity (non-condensing)** | Operating | 0 °C to 30 °C <80 %<br>30 °C to 50 °C <50 % |
| | Storage | −20 °C to 70 °C <95 % |
| **Altitude** | Operating | 2,000 m |
| | Storage | 12,000 m |
| **Vibration and Shock** | Complies with MIL-PRF-28800F Class 3 | |
| **Channel Capacity** | Total analog channels | 45 |
| | Voltage/resistance channels | 41 |
| | Current channels | 5 |
| | Digital I/O | 8 bits |
| | Totalizer | 1 |
| | Alarm outputs | 6 |
| | Trigger input | 1 |
| **Input Protection** | 50 V all functions, terminals and ranges | |
| **Math Channels** | Number of channels | 20 |
| | Operations | sum, difference, multiply, divide, polynomial, power, square root, reciprocal, exponential, logarithm, absolute value, average, maximum, minimum |
| **Triggers** | Interval, external (trigger input), alarm, remote (bus), manual, automated test | |
| **Memory** | Scan data RAM | 75,000 readings with timestamp |
| | Data/Setup flash memory | 20 MB |
| **USB Host Port** | Connector type | Type A |
| | Function | Memory |
| | File system | FAT32 |
| | Memory capacity | 32 GB |
| **USB Device Port** | Connector type | Type B |
| | Class | Instrument |
| | Function | Control and data transfer |
| | Command protocol | SCPI |

| | | |
|---|---|---|
| **LAN** | Function | Control and data transfer |
| | Network protocols | Ethernet 10/100, TCP/IP |
| | Command protocol | SCPI |
| **RS-232** | Connector | D-sub 9 pin (DE-9) |
| | Baud rates | 1200, 2400, 4800, 9600, 19200, 38400 |
| | Function | Temperature source control output |
| **Dimensions** | Height | 150 mm |
| | Width | 245 mm |
| | Depth | 385 mm |
| | Weight | 6 kg (typical configuration) |
| | Shipping weight | 9.5 kg (typical configuration) |
| **Conformity** | CE, CSA, IEC 61010 3rd edition | |

# 1586-2586 High-Capacity Module specifications

| **General** | |
|---|---|
| Maximum input | 50 V |
| Offset voltage | <2 µV |
| 3-wire internal resistance mismatch | <50 mΩ |
| Basic CJC accuracy | 0.6 °C |

# 1586-2588 DAQ-STAQ Multiplexer specifications

| **General** | |
|---|---|
| Maximum input | 50 V |
| Offset voltage | <2 µV |
| 3-wire internal resistance mismatch | <50 mΩ |
| Basic CJC accuracy | 0.25 °C |

# Measurement specifications

Accuracy specifications generally apply with medium and slow sample rates (unless otherwise noted), after a warm-up time of 1 hour, and within an environment temperature range of 18 °C to 28 °C, and may depend on the channel. The confidence level for accuracy specifications is 95% within one year of calibration.

| | | |
|---|---|---|
| **Scan rate** | Fast | 10 channels per second max (0.1 seconds per channel) |
| | Medium | 1 channel per second (1 second per channel) |
| | Slow | 4 seconds per channel |
| **Display resolution** | 4 ½ to 6 ½ digits, depending on function and Sample Rate (see Measurement Characteristics tables below to find the display resolution of temperature readings) | |
| **PRT/RTD** | | |
| **Temperature range** | −200 °C to 1200 °C (depending on the sensor) | |
| **Resistance range** | 0 Ω to 4 kΩ | |
| **Offset compensation** | 0 Ω to 400 Ω, 4-wire | automatic current reversal |
| | 400 Ω to 4000 Ω or 3-wire | none |
| **Source current reversal interval (0 Ω to 400 Ω range)** | Fast sample rate | 2 ms |
| | Medium sample rate | 250 ms |
| | Slow sample rate | 250 ms |
| **Maximum lead resistance (4-wire Ω)** | 2.5% of range per lead for 400 Ω and 4 kΩ ranges. | |

## PRT/RTD resistance accuracy

Accuracy is given as % of measurement or ohms, whichever is greater. Basic accuracy is for 4-wire PRT/RTD. When using 3-wire PRT/RTD add 0.013 Ω to the accuracy specification for internal resistance mismatch and voltage offset if using Channel 1, or add 0.05 Ω if using channels x01 through x20. If the environment temperature is outside the specified range, multiply the temperature coefficient numbers by the temperature deviation and add to the accuracy specification.

| Range | Sample Rate | DAQ-STAQ Multiplexer and Channel 1 | High-Capacity Module | T.C./ °C Outside 18 °C to 28 °C |
|---|---|---|---|---|
| 0 Ω to 400 Ω | Slow | 0.002 % or 0.0008 Ω | 0.003 % or 0.003 Ω | 0.0001 % or 0.0008 Ω |
| | Medium | 0.002 % or 0.002 Ω | 0.003 % or 0.003 Ω | 0.0001 % or 0.0008 Ω |
| | Fast | 0.002 % or 0.005 Ω | 0.003 % or 0.006 Ω | 0.0001 % or 0.0008 Ω |
| 400 Ω to 4 kΩ | Slow | 0.004 % or 0.06 Ω | 0.006 % or 0.06 Ω | 0.0001 % or 0.008 Ω |
| | Medium | 0.004 % or 0.1 Ω | 0.006 % or 0.1 Ω | 0.0001 % or 0.008 Ω |
| | Fast | 0.004 % or 0.18 Ω | 0.006 % or 0.18 Ω | 0.0001 % or 0.008 Ω |

## PRT/RTD temperature accuracy

Accuracy is for 4-wire 100 Ω nominal PRT/RTD. When using 3-wire PRT/RTD add 0.039 °C to the accuracy specification for internal resistance mismatch and voltage offset if using Channel 1, or add 0.15 °C if using channels x01 through x20. If the environment temperature is outside the specified range, multiply the temperature coefficient number by the temperature deviation and add to the accuracy specification. Linear interpolation may be used between points in the table. Specifications do not include sensor accuracy. The practical range of temperature measurement depends on the sensor and characterization.

| Sample Rate | Temperature | DAQ-STAQ Multiplexer and Channel 1 | High-Capacity Module | T.C./ °C Outside 18 °C to 28 °C |
|---|---|---|---|---|
| Slow | –200 °C<br>0 °C<br>300 °C<br>600 °C | 0.002 °C<br>0.005 °C<br>0.012 °C<br>0.02 °C | 0.008 °C<br>0.008 °C<br>0.018 °C<br>0.03 °C | 0.002 °C<br>0.003 °C<br>0.006 °C<br>0.01 °C |
| Medium | –200 °C<br>0 °C<br>300 °C<br>600 °C | 0.005 °C<br>0.005 °C<br>0.012 °C<br>0.02 °C | 0.008 °C<br>0.008 °C<br>0.018 °C<br>0.03 °C | 0.002 °C<br>0.003 °C<br>0.006 °C<br>0.01 °C |
| Fast | –200 °C<br>0 °C<br>300 °C<br>600 °C | 0.013 °C<br>0.013 °C<br>0.014 °C<br>0.02 °C | 0.015 °C<br>0.015 °C<br>0.018 °C<br>0.03 °C | 0.002 °C<br>0.003 °C<br>0.006 °C<br>0.01 °C |

## PRT/RTD measurement characteristics

| Range | Temperature Display Resolution | | Source Current |
|---|---|---|---|
| | Slow / Medium Sample Rate | Fast Sample Rate | |
| 0 Ω to 400 Ω | 0.001 °C | 0.01 °C | ±1 mA |
| 400 Ω to 4 kΩ | 0.001 °C | 0.01 °C | 0.1 mA |

| Thermistor | |
|---|---|
| Temperature range | –200 °C to 400 °C (depending on the sensor) |
| Resistance range | 0 Ω to 1 MΩ |

## Thermistor resistance accuracy

Accuracy is given as ± (% of measurement + Ω). The basic accuracy specification is for 4-wire thermistor, slow sample rate. When using medium or fast sample rate, add the number given in the table to the accuracy specification. If the environment temperature is outside the specified range, multiply the temperature coefficient numbers by the temperature deviation and add to the accuracy specification. For 2-wire thermistor add 0.02 Ω internal resistance if using Channel 1 or 1.5 Ω if using channels x01 through x20, and add external lead wire resistance.

| Range | Slow Sample Rate | Medium Sample Rate | Fast Sample Rate | T.C./ °C Outside 18 °C to 28 °C |
|---|---|---|---|---|
| 0 Ω to 2.2 kΩ | 0.004 % + 0.2 Ω | add 0.3 Ω | add 1 Ω | 0.0005 % + 0.05 Ω |
| 2.1 kΩ to 98 kΩ | 0.004 % + 0.5 Ω | add 0.5 Ω | add 1.3 Ω | 0.0005 % + 0.1 Ω |
| 95 kΩ to 1 MΩ | 0.015 % + 5 Ω | add 5 Ω | add 13 Ω | 0.001 % + 2 Ω |

## Thermistor temperature accuracy

Accuracy specifications are for 4-wire thermistor. When using 2-wire thermistor, add the number given in the table to the specification for internal resistance. If the environment temperature is outside the specified range, increase the accuracy specification by 25% for every 1 °C outside the specified environment temperature range. Specifications do not include sensor accuracy. The practical range of temperature measurement depends on the sensor.

| Range | Accuracy 2.2 kΩ Thermistor | | | |
|---|---|---|---|---|
| | Slow Sample Rate | Medium Sample Rate | Fast Sample Rate | 2-wire |
| −40 °C | 0.001 °C | 0.001 °C | 0.01 °C | add 0.001 °C |
| 0 °C | 0.003 °C | 0.004 °C | 0.01 °C | add 0.004 °C |
| 25 °C | 0.006 °C | 0.011 °C | 0.02 °C | add 0.016 °C |
| 50 °C | 0.008 °C | 0.018 °C | 0.04 °C | add 0.05 °C |
| 100 °C | 0.047 °C | 0.114 °C | 0.28 °C | add 0.34 °C |
| 150 °C | 0.23 °C | 0.56 °C | 1.34 °C | add 1.7 °C |

| Range | Accuracy 5 kΩ Thermistor | | | |
|---|---|---|---|---|
| | Slow Sample Rate | Medium Sample Rate | Fast Sample Rate | 2-wire |
| −40 °C | 0.003 °C | 0.004 °C | 0.01 °C | add 0.001 °C |
| 0 °C | 0.002 °C | 0.002 °C | 0.01 °C | add 0.002 °C |
| 25 °C | 0.004 °C | 0.006 °C | 0.01 °C | add 0.007 °C |
| 50 °C | 0.005 °C | 0.009 °C | 0.02 °C | add 0.022 °C |
| 100 °C | 0.022 °C | 0.052 °C | 0.13 °C | add 0.16 °C |
| 150 °C | 0.096 °C | 0.24 °C | 0.57 °C | add 0.7 °C |

| Range | Accuracy 10 kΩ Thermistor | | | |
|---|---|---|---|---|
| | Slow Sample Rate | Medium Sample Rate | Fast Sample Rate | 2-wire |
| −40 °C | 0.003 °C | 0.004 °C | 0.01 °C | add 0.001 °C |
| 0 °C | 0.002 °C | 0.002 °C | 0.01 °C | add 0.002 °C |
| 25 °C | 0.003 °C | 0.004 °C | 0.01 °C | add 0.004 °C |
| 50 °C | 0.005 °C | 0.009 °C | 0.02 °C | add 0.011 °C |
| 100 °C | 0.011 °C | 0.024 °C | 0.06 °C | add 0.067 °C |
| 150 °C | 0.04 °C | 0.098 °C | 0.24 °C | add 0.29 °C |

## Thermistor measurement characteristics

| Range | Temperature Display Resolution | | Source Current |
|---|---|---|---|
| | Slow / Medium Sample Rate | Fast Sample Rate | |
| 0 Ω to 2.2 kΩ | 0.0001 °C | 0.001 °C | 10 µA |
| 2.1 kΩ to 98 kΩ | 0.0001 °C | 0.001 °C | 10 µA |
| 95 kΩ to 1 MΩ | 0.0001 °C | 0.001 °C | 1 µA |

| Thermocouple | |
|---|---|
| Temperature range | –200 °C to 2315 °C (depending on the sensor) |
| Voltage range | –15 mV to 100 mV |

## Thermocouple voltage accuracy

Accuracy is given as ± (|% of measurement| + µV). Basic accuracy specification is for medium or slow sample rate. When using a fast sample rate add the number given in the table to the accuracy specification. If the environment temperature is outside the specified range, multiply the temperature coefficient numbers by the temperature deviation and add to the accuracy specification.

| Range | Accuracy Channel 1 | Ch. x01 – x20 | Fast Sample Rate | T.C./ °C Outside 18 °C to 28 °C |
|---|---|---|---|---|
| –15 mV to 100 mV | 0.004 % + 4 µV | add 2 µV | add 1 µV | 0.0005 % + 0.0005 mV |

## Thermocouple reference junction accuracy

| Module | CJC Accuracy | T.C./ °C Outside 18 °C to 28 °C |
|---|---|---|
| DAQ-STAQ Multiplexer | 0.25 °C | 0.02 °C |
| High-Capacity Module | 0.6 °C | 0.05 °C |

## Thermocouple temperature accuracy

Accuracy specifications apply using medium or slow sample rate. When using fast sample rate, increase the accuracy specification by 25%. If the environment temperature is outside the specified range, increase the accuracy specification by 12% for every 1 °C outside the specified environment temperature range. Accuracy with fixed/external CJC does not include the accuracy of the reference junction temperature. Linear interpolation may be used between points in the table. Specifications do not include sensor accuracy. The practical range of temperature measurement depends on the sensor.

| Type (Range) | Temperature | Accuracy | | | |
|---|---|---|---|---|---|
| | | Fixed / External CJC | | Internal CJC | |
| | | Channel 1 | Ch. x01 – x20 | DAQ-STAQ Multiplexer | High-Capacity Module |
| K<br>−270 °C to<br>1372 °C | −200 °C<br>0 °C<br>1000 °C | 0.28 °C<br>0.10 °C<br>0.14 °C | 0.41 °C<br>0.15 °C<br>0.20 °C | 0.76 °C<br>0.29 °C<br>0.32 °C | 1.60 °C<br>0.62 °C<br>0.64 °C |
| T<br>−270 °C to<br>400 °C | −200 °C<br>0 °C<br>200 °C<br>400 °C | 0.27 °C<br>0.10 °C<br>0.08 °C<br>0.08 °C | 0.40 °C<br>0.15 °C<br>0.12 °C<br>0.11 °C | 0.76 °C<br>0.30 °C<br>0.23 °C<br>0.20 °C | 1.60 °C<br>0.65 °C<br>0.47 °C<br>0.41 °C |
| R<br>−50 °C to<br>1768 °C | 0 °C<br>300 °C<br>1200 °C<br>1600 °C | 0.76 °C<br>0.42 °C<br>0.33 °C<br>0.34 °C | 1.13 °C<br>0.63 °C<br>0.47 °C<br>0.49 °C | 1.16 °C<br>0.64 °C<br>0.48 °C<br>0.50 °C | 1.28 °C<br>0.71 °C<br>0.52 °C<br>0.54 °C |
| S<br>−50 °C to<br>1768 °C | 0 °C<br>300 °C<br>1200 °C<br>1600 °C | 0.74 °C<br>0.45 °C<br>0.37 °C<br>0.39 °C | 1.11 °C<br>0.67 °C<br>0.54 °C<br>0.56 °C | 1.14 °C<br>0.68 °C<br>0.55 °C<br>0.57 °C | 1.26 °C<br>0.76 °C<br>0.60 °C<br>0.63 °C |
| J<br>−210 °C to<br>1200 °C | −200 °C<br>0 °C<br>1000 °C | 0.20 °C<br>0.08 °C<br>0.11 °C | 0.29 °C<br>0.12 °C<br>0.14 °C | 0.65 °C<br>0.28 °C<br>0.25 °C | 1.41 °C<br>0.61 °C<br>0.53 °C |
| N<br>−270 °C to<br>1300 °C | −200 °C<br>0 °C<br>500 °C<br>1000 °C | 0.42 °C<br>0.15 °C<br>0.12 °C<br>0.14 °C | 0.62 °C<br>0.23 °C<br>0.17 °C<br>0.19 °C | 0.90 °C<br>0.34 °C<br>0.24 °C<br>0.26 °C | 1.69 °C<br>0.64 °C<br>0.44 °C<br>0.45 °C |
| E<br>−270 °C to<br>1000 °C | −200 °C<br>0 °C<br>300 °C<br>700 °C | 0.17 °C<br>0.07 °C<br>0.06 °C<br>0.08 °C | 0.25 °C<br>0.10 °C<br>0.09 °C<br>0.10 °C | 0.64 °C<br>0.27 °C<br>0.21 °C<br>0.21 °C | 1.42 °C<br>0.61 °C<br>0.46 °C<br>0.45 °C |
| B<br>100 °C to<br>1820 °C | 300 °C<br>600 °C<br>1200 °C<br>1600 °C | 1.32 °C<br>0.68 °C<br>0.41 °C<br>0.38 °C | 1.97 °C<br>1.02 °C<br>0.60 °C<br>0.55 °C | 1.97 °C<br>1.02 °C<br>0.60 °C<br>0.55 °C | 1.97 °C<br>1.02 °C<br>0.60 °C<br>0.55 °C |
| C<br>0 °C to<br>2315 °C | 600 °C<br>1200 °C<br>2000 °C | 0.23 °C<br>0.28 °C<br>0.44 °C | 0.33 °C<br>0.40 °C<br>0.60 °C | 0.37 °C<br>0.45 °C<br>0.66 °C | 0.54 °C<br>0.63 °C<br>0.91 °C |
| D<br>0 °C to<br>2315 °C | 600 °C<br>1200 °C<br>2000 °C | 0.22 °C<br>0.26 °C<br>0.39 °C | 0.32 °C<br>0.36 °C<br>0.53 °C | 0.34 °C<br>0.39 °C<br>0.56 °C | 0.44 °C<br>0.49 °C<br>0.69 °C |
| G<br>0 °C to<br>2315 °C | 600 °C<br>1200 °C<br>2000 °C | 0.24 °C<br>0.22 °C<br>0.33 °C | 0.36 °C<br>0.32 °C<br>0.46 °C | 0.36 °C<br>0.32 °C<br>0.46 °C | 0.36 °C<br>0.33 °C<br>0.46 °C |
| L<br>−200 °C to<br>900 °C | −200 °C<br>0 °C<br>800 °C | 0.13 °C<br>0.08 °C<br>0.09 °C | 0.19 °C<br>0.12 °C<br>0.12 °C | 0.45 °C<br>0.28 °C<br>0.23 °C | 0.99 °C<br>0.62 °C<br>0.48 °C |
| M<br>−50 °C to<br>1410 °C | 0 °C<br>500 °C<br>1000 °C | 0.11 °C<br>0.10 °C<br>0.10 °C | 0.16 °C<br>0.15 °C<br>0.14 °C | 0.30 °C<br>0.25 °C<br>0.21 °C | 0.64 °C<br>0.51 °C<br>0.41 °C |
| U<br>−200 °C to<br>600 °C | −200 °C<br>0 °C<br>400 °C | 0.25 °C<br>0.10 °C<br>0.08 °C | 0.37 °C<br>0.15 °C<br>0.11 °C | 0.71 °C<br>0.30 °C<br>0.20 °C | 1.48 °C<br>0.63 °C<br>0.40 °C |
| W<br>0 °C to<br>2315 °C | 600 °C<br>1200 °C<br>2000 °C | 0.24 °C<br>0.22 °C<br>0.33 °C | 0.36 °C<br>0.32 °C<br>0.46 °C | 0.36 °C<br>0.32 °C<br>0.46 °C | 0.36 °C<br>0.33 °C<br>0.46 °C |

## Thermocouple measurement characteristics

| Range | Temperature Display Resolution | |
|---|---|---|
| | Slow / Medium Sample Rate | Fast Sample Rate |
| −270 °C to 2315 °C | 0.01 °C | 0.1 °C |

| DC voltage | |
|---|---|
| Maximum input | 50 V on any range |
| Common mode rejection | 140 dB at 50 Hz or 60 Hz (1 kΩ unbalance in LOW lead) ± 50 V peak maximum |
| Normal mode rejection | 55 dB for power line frequency ± 0.1 %, ± 120 % of range peak maximum |
| A/D linearity | 2 ppm of measurement + 1 ppm of range |
| Input bias current | 30 pA at 25 °C |

## DC voltage accuracy

Accuracy is given as ± (% measurement + % of range). Basic accuracy specification is for Channel 1, medium or slow sample rate. For channels x01 through x20 or when using Fast sample rate, add the numbers given in the table to the accuracy specification. If the environment temperature is outside the specified range, multiply the temperature coefficient numbers by the temperature deviation and add to the accuracy specification.

| Range | Accuracy Channel 1 | Ch. x01 – x20 | Fast Sample Rate | T.C./ °C Outside 18 °C to 28 °C |
|---|---|---|---|---|
| ±100 mV | 0.0037 % + 0.0035 % | add 2 µV | add 0.0008 % of range | 0.0005 % + 0.0005 % |
| ±1 V | 0.0025 % + 0.0007 % | add 2 µV | add 0.0008 % of range | 0.0005 % + 0.0001 % |
| ±10 V | 0.0024 % + 0.0005 % | – | add 0.0008 % of range | 0.0005 % + 0.0001 % |
| ±50 V | 0.0038 % + 0.0012 % | – | add 0.0008 % of range | 0.0005 % + 0.0001 % |

## DC voltage input characteristics

| Range | Resolution | | Input Impedance |
|---|---|---|---|
| | Slow / Medium | Fast | |
| ±100 mV | 0.1 µV | 1 µV | 10 GΩ [1] |
| ±1 V | 1 µV | 10 µV | 10 GΩ [1] |
| ±10 V | 10 µV | 100 µV | 10 GΩ [1] |
| ±50 V | 100 µV | 1 mV | 10 MΩ ±1 % |

[1] Input beyond ±12 V is clamped. The clamp current is up to 3 mA.

| DC current | |
|---|---|
| Input protection | 0.15 A resettable PTC |

## DC current accuracy

Accuracy is given as ± (% measurement + % of range). Basic accuracy specification is for medium or slow sample rate. When using a fast sample rate, add the number given in the table to the accuracy specification. If the environment temperature is outside the specified range, multiply the temperature coefficient numbers by the temperature deviation and add to the accuracy specification.

| Range | Accuracy | Fast Sample Rate | T.C./ °C Outside 18 °C to 28 °C |
|---|---|---|---|
| ±100 µA | 0.015 % + 0.0035 % | add 0.0008 % of range | 0.002 % + 0.001 % |
| ±1 mA | 0.015 % + 0.0011 % | add 0.0008 % of range | 0.002 % + 0.001 % |
| ±10 mA | 0.015 % + 0.0035 % | add 0.0008 % of range | 0.002 % + 0.001 % |
| ±100 mA | 0.015 % + 0.0035 % | add 0.0008 % of range | 0.002 % + 0.001 % |

## DC current input characteristics

| Range | Resolution | | Burden Voltage |
|---|---|---|---|
| | Slow / Medium | Fast | |
| ±100 µA | 0.1 nA | 1 nA | <1 mV |
| ±1 mA | 1 nA | 10 nA | <1 mV |
| ±10 mA | 10 nA | 100 nA | <1 mV |
| ±100 mA | 100 nA | 1 µA | <1 mV |

| Resistance | |
|---|---|
| Max. lead resistance (4-wire ohms) | 10 Ω per lead for 100 Ω and 1 kΩ ranges. 1 kΩ per lead on all other ranges |

## Resistance accuracy

Accuracy is given as ± (% measurement + % of range). Basic accuracy specification is for 4-wire resistance, medium or slow sample rate. For 2-wire resistance add 0.02 Ω internal resistance if using Channel 1, or 1.5 Ω if using channels x01 through x20, and add external lead wire resistance. When using fast sample rate, add the numbers given in the table to the accuracy specification. If the environment temperature is outside the specified range, multiply the temperature coefficient numbers by the temperature deviation and add to the accuracy specification.

| Range | Accuracy | Fast Sample Rate | T.C./ °C Outside 18 °C to 28 °C |
|---|---|---|---|
| 100 Ω | 0.004 % + 0.0035 % | add 0.001 % of range | 0.0001 % + 0.0005 % |
| 1 kΩ | 0.003 % + 0.001 % | add 0.001 % of range | 0.0001 % + 0.0001 % |
| 10 kΩ | 0.004 % + 0.001 % | add 0.001 % of range | 0.0001 % + 0.0001 % |
| 100 kΩ | 0.004 % + 0.001 % | add 0.001 % of range | 0.0001 % + 0.0001 % |
| 1 MΩ | 0.006 % + 0.001 % | add 0.002 % of reading plus 0.0008 % of range | 0.0005 % + 0.0002 % |
| 10 MΩ | 0.015 % + 0.001 % | add 0.002 % of reading plus 0.0008 % of range | 0.001 % + 0.0004 % |
| 100 MΩ | 0.8 % + 0.01 % | add 0.001 % of range | 0.05 % + 0.002 % |

## Resistance input characteristics

| Range | Resolution | | Source Current (open-circuit voltage) |
|---|---|---|---|
| | Slow / Medium | Fast | |
| 100 Ω | 0.1 mΩ | 1 mΩ | 1 mA (4 V) |
| 1 kΩ | 1 mΩ | 10 mΩ | 1 mA (4 V) |
| 10 kΩ | 10 mΩ | 100 mΩ | 100 µA (6 V) |
| 100 kΩ | 100 mΩ | 1 Ω | 100 µA (12 V) |
| 1 MΩ | 1 Ω | 10 Ω | 10 µA (12 V) |
| 10 MΩ | 10 Ω | 100 Ω | 1 µA (12 V) |
| 100 MΩ | 100 Ω | 1 kΩ | 0.1 µA (12 V) |

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## Ordering information

### 1586A Super-DAQ Precision Temperature Scanner

### Super-DAQ and DAQ-STAQ Multiplexer

| | |
|---|---|
| **1586A/1DS** | Super-DAQ, 1 DAQ-STAQ Multiplexer |
| **1586A/1DS/C** | Super-DAQ, 1 DAQ-STAQ Multiplexer, Accredited Calibration |
| **1586A/2DS** | Super-DAQ, 2 DAQ-STAQ Multiplexers |
| **1586A/2DS/C** | Super-DAQ, 2 DAQ-STAQ Multiplexers, Accredited Calibration |

### Super-DAQ and High-Capacity Module

| | |
|---|---|
| **1586A/1HC** | Super-DAQ, 1 High-Capacity Module |
| **1586A/1HC/C** | Super-DAQ, 1 High-Capacity Module, Accredited Calibration |
| **1586A/2HC** | Super-DAQ, 2 High-Capacity Modules |
| **1586A/2HC/C** | Super-DAQ, 2 High-Capacity Modules, Accredited Calibration |

### Super-DAQ, High-Capacity Module, and DAQ-STAQ Multiplexer

| | |
|---|---|
| **1586A/DS-HC** | Super-DAQ, 1 High-Capacity Module, 1 DAQ-STAQ Multiplexer |
| **1586A/DSHC/C** | Super-DAQ, 1 High-Capacity Module, 1 DAQ-STAQ Multiplexer, Accredited Calibration |

### Accessories

| | |
|---|---|
| **1586-2586** | High-Capacity Module without Relay Card |
| **1586-2586-KIT** | High-Capacity Module with Relay Card |
| **1586-2588** | DAQ-STAQ Multiplexer without Adapter Card |
| **1586-2588-KIT** | DAQ-STAQ Multiplexer, Adapter Card, Interface Cable |
| **1586-2588-CBL** | DAQ-STAQ Multiplexer Interface Cable |
| **Y1586S** | Rack Mount Kit, Single (half rack) |
| **Y1586D** | Rack Mount Kit, Dual (full rack) |
| **1586-CASE** | Super-DAQ Carrying Case (mainframe and internal modules) |
| **1586/DS-CASE** | Super-DAQ/DAQ-STAQ Carrying Case (mainframe and external module) |

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