

A technician in a blue lab coat is shown in profile, focused on operating a Fluke 1586A Super-DAQ Precision Temperature Scanner. The device is a rugged, handheld unit with a color touchscreen and a numeric keypad. It is connected to various cables and is placed on a blue metal cart. In the background, there is a large piece of industrial equipment, also branded with the Fluke logo, and a control panel with a gauge and a power switch. The overall scene is a professional laboratory or industrial environment.

FLUKE®

Calibration

1586A Super-DAQ Precision Temperature Scanner

**The most accurate and flexible temperature
data acquisition system on the market**

1586A Super-DAQ Precision Temperature Scanner

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.

The 1586A is ideal for applications such as thermal mapping, temperature validation, process sensor calibration, heat-treat furnace testing, process monitoring, quality control testing, and more. These applications are found in various industries including pharmaceutical, biotechnology, food processing, aerospace, and automotive.



There are six key features that set the Super-DAQ apart from other products in its class:

- 1 Best temperature measurement accuracy
- 2 Flexible configuration for the factory or benchtop
- 3 Multiple modes of operation
- 4 Real-time graphing in color
- 5 Data portability and security
- 6 Automated sensor calibration

1 Best temperature measurement accuracy

The 1586A Super-DAQ reads PRTs, thermocouples, and thermistors with best-in-class accuracy:

- PRTs $\pm 0.005\text{ }^{\circ}\text{C}$
(using the external DAQ-STAQ Multiplexer)
- Thermocouples: $\pm 0.5\text{ }^{\circ}\text{C}$
(using the High-Capacity Module and internal CJC)
- Thermistors: $\pm 0.002\text{ }^{\circ}\text{C}$
- Current reversal minimizes thermoelectric effects improving PRT/RTD measurement accuracy
- Automatic internal reference junction compensation improves thermocouple measurement accuracy

- Accurately measure scalable transducers such as temperature and pressure transmitters using $Mx + B$ gain and offset calculations for each channel
- Temperature sensor characterizations include ITS-90, CVD, Polynomial, PT385, and PT392
- Probe library stores up to 100 sensor profiles simplifying setup
- 6-1/2 digit display resolution for dc voltage, dc current, and resistance

2 Flexible configuration for the factory or benchtop

For factory applications such as temperature validation, the Super-DAQ is configured with the internal High-Capacity Module. Connecting thermocouples or RTDs to input terminals can be time consuming—especially if you're using many sensors of the same type for one job, and then switching to a different sensor type for another job. The internal High-Capacity Module allows you to pre-configure multiple input modules and simply exchange one module for another depending on your test requirements. Recall a stored test setup to make the changeover even faster. And if you prefer, you can always measure a variety of different input types at the same time in a single High-Capacity Module, including thermocouples, RTDs, voltage, resistance, or current.

To simplify applications such as temperature uniformity testing, the Align Channels feature allows you to automatically “zero” offsets between sensors relative to a designated reference channel.

An $Mx + B$ offset is stored for each channel and an indicator let's you know that an offset has been applied.

The Super-DAQ includes 20 math channels and 15 different mathematical operations that can be applied to measured results. Combining calculated results of multiple math channels lets you compute complex operations such as F_0 calculations.

For a calibration lab where accuracy is of primary importance, the Super-DAQ is best configured with a DAQ-STAQ Multiplexer. The external DAQ-STAQ features mini-jack thermocouple terminals—each with its own reference junction sensor—and patented mini-DWF, gold-plated input terminals, which accept bare wire, spade lug, or mini-banana-plug probe terminations. Easily connect and disconnect PRTs, thermistors, and thermocouples for benchtop temperature calibration. It can be stacked on the 1586A to reduce footprint in busy labs. Having the flexibility to configure the Super-DAQ for factory or lab use reduces your equipment needs and cost.



1586-2586 High-Capacity Module

Universal input channels accepts 2-, 3-, or 4-wire connections 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.



1586-2588 DAQ-STAQ Multiplexer

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

3 Multiple modes of operation

The Super-DAQ can operate in four modes that let you scan, monitor, measure, or function as a digital multimeter from a single instrument.

Sequentially scan through channels based on a user defined test. Depending on your application, select a fast, medium, or slow scan rate. With scan speeds as fast as 10 channels per second, you can collect data on all 40 channels in less than four seconds. Easily capture time-stamped measurements and correlate related events. Scans can be initiated through six different trigger types to include: external trigger, time interval, remote SCPI command, alarm trigger, manual trigger, and an automated test trigger.

Monitor any single channel during a scan, without interrupting the scan. Measure and record data on a single channel without pre-configuring a test file. In DMM mode, use the front panel channel like a familiar benchtop digital multimeter to quickly measure dc voltage, dc current, or 2-wire and 4-wire resistance.

Function keys are backlit so that you always know the mode of operation and recording status.



Scan, monitor, measure, and DMM function keys on the front panel.

4 Real-time graphing in color

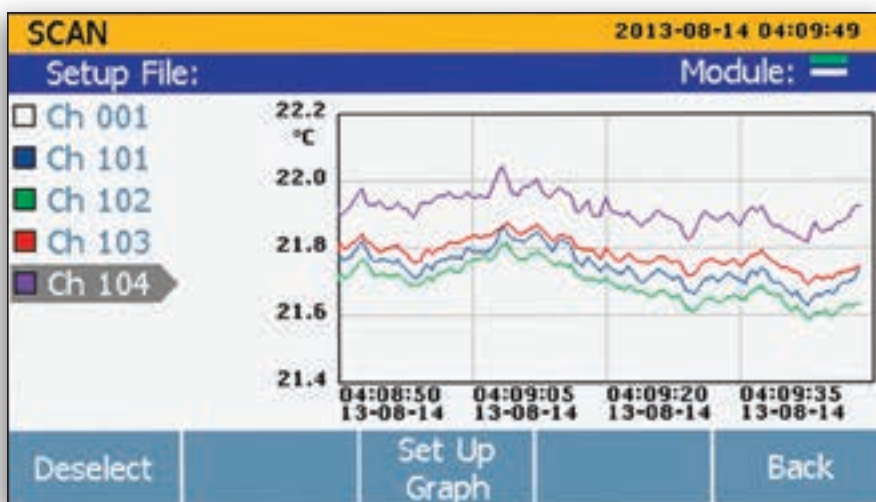
Most data acquisition systems only let you view data on one channel. But now, the Super-DAQ lets you view real-time data for all channels in table format or chart up to four channels in color at the same time. You can quickly see the current process state at-a-glance, or easily verify that your channels have been connected and configured properly.

You can zoom in or out to see data of interest and monitor trends. A history mode lets you scroll through collected data within a scan file—all without a PC and expensive software. Switch between chart view and table view to see measurement data and statistics, including average,

standard deviation, minimum, maximum, peak-to-peak, and rate of change.

Not only does the Super-DAQ include a rich graphical display, but you can also select between nine different languages including English, Chinese, French, German, Japanese, Korean, Portuguese, Spanish, or Russian.

Each channel can be assigned two independent alarms which indicate when either an upper (HI) or lower (LO) range has been exceeded. If an alarm trips, the out-of-range condition is indicated on the display. Alarms can also be assigned to any of the six TTL outputs for control of external devices.



The 1586A Super-DAQ graphing real time data from four input channels.

5 Data portability and security

The Super-DAQ includes 20 MB of internal memory that can store over 75,000 time-stamped readings. Data and setup files can be easily moved to a PC for analysis using a USB flashdrive or over a network using the LAN interface connection.

The Super-DAQ also includes two levels of data security to prevent unauthorized users from tampering with or forging test data or setup files. This security feature is especially important to industries that are regulated by government agencies where data traceability is required.



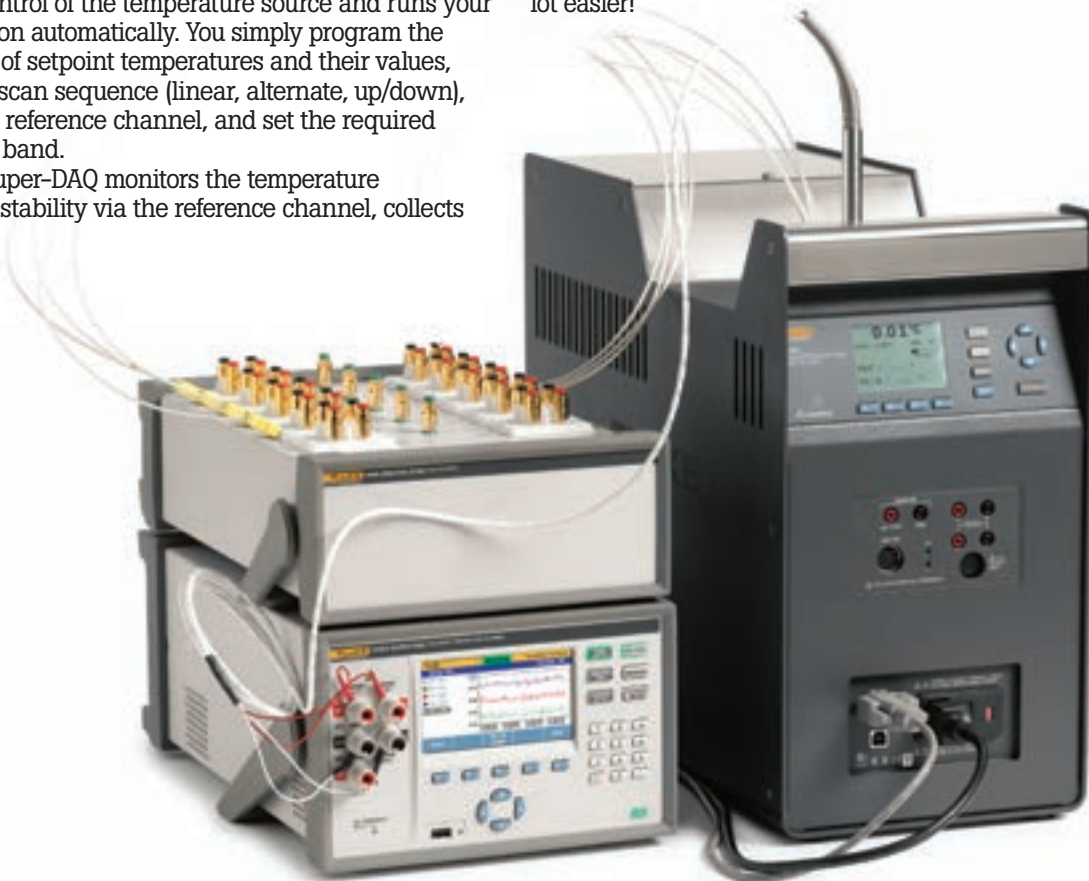
Easily transfer Super-DAQ data and setup files using a USB flash drive.

6 Automated sensor calibration

With the Automated Test feature, you can automate sensor calibration without a PC and software. When connected to a Fluke Calibration drywell or fluid bath via the RS-232 interface, the Super-DAQ takes control of the temperature source and runs your calibration automatically. You simply program the number of setpoint temperatures and their values, select a scan sequence (linear, alternate, up/down), assign a reference channel, and set the required stability band.

The Super-DAQ monitors the temperature source's stability via the reference channel, collects

the data once stabilized, and then advances to the next setpoint temperature. After you configure and start the test, you can walk away to work on other things. The Super-DAQ just made your day a whole lot easier!



1586A configured with a DAQ-STAQ and 9190A Ultra-Cool Field Metrology Well for automated sensor calibration.

Temperature accuracy, 1586A with High-Capacity Module¹

PRTs and Thermistors (4-wire)

| | Temperature Range | Temperature Resolution | Temperature Accuracy | Resistance Accuracy | Excitation Current |
|----------------------------|--|------------------------|---|----------------------------------|----------------------------|
| PRT/RTD (100 Ω nominal) | -200 °C to 1200 °C (depending on the sensor) | 0.001 °C | 0.008 °C at -200 °C 0.008 °C at 0 °C 0.018 °C at 300 °C | 0.003 % or 0.003 Ω (0 to 400 Ω) | 1 mA with current reversal |
| Thermistor (10 KΩ nominal) | -200 °C to 400 °C (depending on the sensor) | 0.0001 °C | 0.002 °C at 0 °C 0.009 °C at 50 °C 0.024 °C at 100 °C | 0.004 % + 0.5 Ω (600 Ω to 35 kΩ) | 10 μA |

Thermocouples

| | Temperature Range | Temperature Resolution | Temperature Accuracy (int CJC) | Temperature Accuracy (ext CJC) | Voltage Accuracy |
|---------------------|--------------------|------------------------|---|---|--|
| Thermocouple Type K | -270 °C to 1372 °C | 0.01 °C | 0.62 °C at 0 °C 0.64 °C at 1000 °C | 0.15 °C at 0 °C 0.20 °C at 1000 °C | 0.004 % + 4 μV ch. 1 0.004 % + 6 μV ch. x01-x20 |
| Thermocouple Type T | -270 °C to 400 °C | 0.01 °C | 0.65 °C at 0 °C 0.47 °C at 200 °C | 0.15 °C at 0 °C 0.12 °C at 200 °C | 0.004 % + 4 μV ch. 1 0.004 % + 6 μV ch. x01-x20 |
| Thermocouple Type S | -50 °C to 1768 °C | 0.01 °C | 0.76 °C at 300 °C 0.60 °C at 1200 °C | 0.67 °C at 300 °C 0.54 °C at 1200 °C | 0.004 % + 4 μV ch. 1 0.004 % + 6 μV ch. x01-x20 |

Temperature accuracy, 1586A with DAQ-STAQ Multiplexer¹

PRTs and Thermistors (4-wire)

| | Temperature Range | Temperature Resolution | Temperature Accuracy | Resistance Accuracy | Excitation Current |
|----------------------------|--|------------------------|---|---------------------|----------------------------|
| PRT/RTD (100 Ω nominal) | -200 °C to 1200 °C (depending on the sensor) | 0.001 °C | 0.005 °C at -200 °C 0.005 °C at 0 °C 0.012 °C at 300 °C | 0.002 % or 0.008 Ω | 1 mA with current reversal |
| Thermistor (10 KΩ nominal) | -200 °C to 400 °C (depending on the sensor) | 0.0001 °C | 0.002 °C at 0 °C 0.009 °C at 50 °C 0.024 °C at 100 °C | 0.004 % + 0.5 Ω | 10 μA |

Thermocouples

| | Temperature Range | Temperature Resolution | Temperature Accuracy (int CJC) | Temperature Accuracy (ext CJC) | Voltage Accuracy |
|---------------------|--------------------|------------------------|---|---|--|
| Thermocouple Type K | -270 °C to 1372 °C | 0.01 °C | 0.29 °C at 0 °C 0.32 °C at 1000 °C | 0.15 °C at 0 °C 0.20 °C at 1000 °C | 0.004 % + 4 μV ch. 1 0.004 % + 6 μV ch. x01-x20 |
| Thermocouple Type T | -270 °C to 400 °C | 0.01 °C | 0.30 °C at 0 °C 0.23 °C at 200 °C | 0.15 °C at 0 °C 0.12 °C at 200 °C | 0.004 % + 4 μV ch. 1 0.004 % + 6 μV ch. x01-x20 |
| Thermocouple Type S | -50 °C to 1768 °C | 0.01 °C | 0.68 °C at 300 °C 0.55 °C at 1200 °C | 0.67 °C at 300 °C 0.54 °C at 1200 °C | 0.004 % + 4 μV ch. 1 0.004 % + 6 μV ch. x01-x20 |

¹ Accuracy specifications apply using medium sample rate (1 second per channel). Please consult the 1586A Super-DAQ Extended Specifications for additional specifications at slow (4 seconds per channel), fast (0.1 seconds per channel) sample rates and for other thermocouple types (R, J, N, E, B, C, D, G, L M, U, W).

DC Voltage (medium or slow sample rate)

| Range | Accuracy Channel 1 | Ch. X01 - x20 ² | Fast Sample Rate | Resolution | Input Impedance |
|----------|---------------------|----------------------------|-----------------------|------------|-----------------|
| ± 100 mV | 0.0037 % + 0.0035 % | add 2 μV | add 0.0008 % of range | 0.1 μV | 10 GΩ [1] |
| ± 50 V | 0.0038 % + 0.0012 % | - | add 0.0008 % of range | 1 mV | 10 MΩ ± 1 % |

² Ch. x01 - x20 refers to slot number and channels 1 - 20 for either module type.

DC Current (medium or slow sample rate)

| Range | Accuracy | Fast Sample Rate | Resolution | Burden Voltage |
|----------|--------------------|-----------------------|------------|----------------|
| ± 100 μA | 0.015 % + 0.0035 % | add 0.0008 % of range | 0.1 nA | < 1 mV |
| ± 10 mA | 0.015 % + 0.0035 % | add 0.0008 % of range | 10 nA | < 1 mV |
| ± 100 mA | 0.015 % + 0.0035 % | add 0.0008 % of range | 100 nA | < 1 mV |

Resistance (medium or slow sample rate, 4-wire resistance)³

| Range | Accuracy | Fast Sample Rate | Resolution | Source Current |
|-------|--------------------|----------------------|------------|----------------|
| 100 Ω | 0.004 % + 0.0035 % | add 0.001 % of range | 0.1 mΩ | 1 mA |
| 10 kΩ | 0.004 % + 0.001 % | add 0.001 % of range | 10 mΩ | 100 μA |
| 10 MΩ | 0.015 % + 0.001 % | add 0.01 % of range | 1 kΩ | 0.1 μA |

³ For 2-wire resistance add 0.02 Ω internal resistance if using Channel 1, or 1.5 Ω if using channels x01 - x20, and add external lead wire resistance.

General specifications

| | | |
|--|--|---|
| Channel capacity | Total analog channels | 45 |
| | Voltage/resistance channels | 41 |
| | Current channels | 5 |
| | Digital I/O | 1 (8-bit TTL) |
| | Totalizer | 1 |
| | Alarm outputs | 6 |
| | Trigger input | 1 |
| Sample rate | Fast: 10 channels per second (0.1 seconds per channel) | |
| | Medium: 1 channel per second (1 second per channel) | |
| | Slow: 4 seconds per channel | |
| Display resolution | 6 1/2 digits | |
| Input Module options | 2 rear panel slots ('x' designates slot 1 or slot 2 below). Can be configured for 2 High-Capacity Modules, 2 DAQ-STAQ Multiplexers, or one of each | |
| Internal High-Capacity Module configuration | 20 channels per module (x01 - x20) 2 dedicated current channels (x21 - x22) (3- and 4-wire connections require 2 channels) | |
| External DAQ-STAQ Multiplexer configuration | 10 PRT/thermistor channels (maximum) 20 mini-jack thermocouple channels (maximum) | |
| Math channels | 20 channels | |
| | 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 |
| | Internal memory | 20 MB |
| Standard interfaces | USB host, USB device, Ethernet 10/100 LAN, RS-232 temperature source control for automated temperature data collection from Fluke Calibration drywells and baths | |
| Mains voltage | 100 V setting: 90, to 100 V; 120 V setting: 108, to 132 V; 220 V setting: 198, to 242 V; 240 V setting: 216, to 264 V | |
| Mains frequency | 47 Hz to 440 Hz | |
| Input protection | 50 V all functions, terminals and ranges | |
| Dimensions | Height x Width x Depth | 150 mm x 245 mm x 385 mm (5.9 in x 9.6 in x 15.2 in) |
| | Weight | 6 kg (13.2 lb) — typical configuration |
| | Shipping Weight | 9.5 kg (20.9 lb) — typical configuration |
| Conformity | CE, CSA, IEC 61010 3rd edition | |

Ordering information

| Models | Description |
|--|---|
| 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 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, 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 |
| 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 Multiplexer Carrying Case (Mainframe and External Module) |



1586A/1HC



1586A/1DS



1586A/1DS-HC

Fluke Calibration. Precision, performance, confidence.™

| | | | | | |
|------------|----|-------------|----------|------|----------|
| Electrical | RF | Temperature | Pressure | Flow | Software |
|------------|----|-------------|----------|------|----------|

Fluke Calibration
PO Box 9090, Everett, WA 98206 U.S.A.

Fluke Europe B.V.
PO Box 1186, 5602 BD
Eindhoven, The Netherlands

For more information call:
In the U.S.A. (877) 355-3225 or
Fax (425) 446-5116
In Europe/M-East/Africa +31 (0) 40
2675 200 or Fax +31 (0) 40 2675 222
In Canada (800)-36-FLUKE or
Fax (905) 890-6866

S J ELECTRONICS
POWER • TEST & MEASUREMENT

0800 583 4455
www.sjelectronics.co.uk
sales@sjelectronics.co.uk

©2013 Fluke Calibration.
Specifications subject to change without notice.
Printed in U.S.A. 10/2013 6000791B_EN
Pub-ID 12126-eng

Modification of this document is not permitted
without written permission from Fluke Calibration.