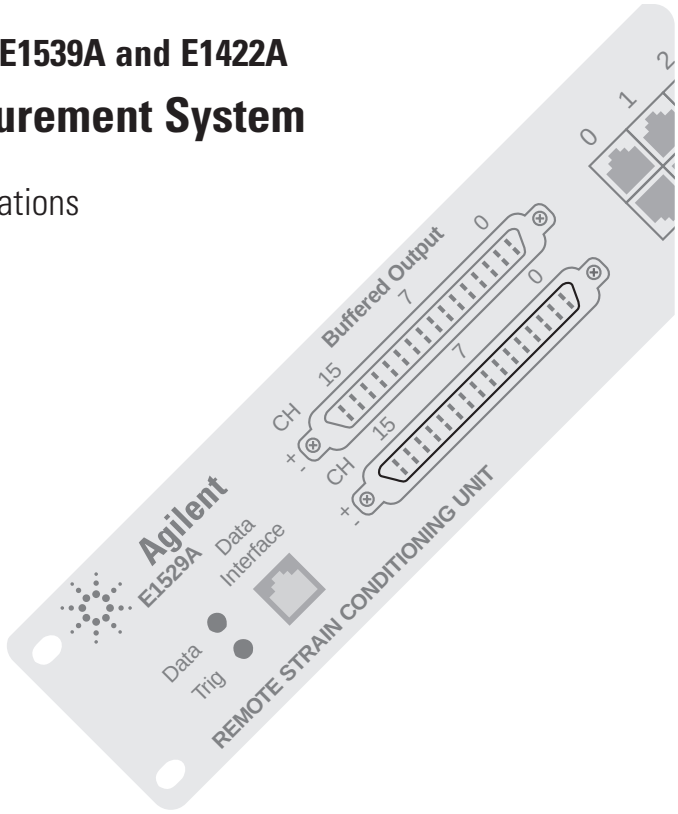
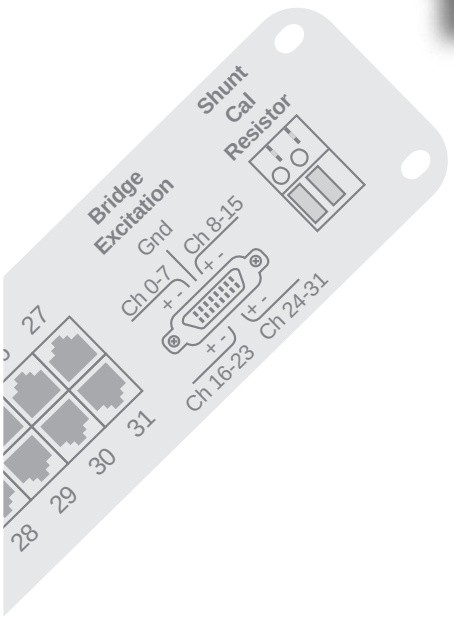
Agilent E1529A, E1539A and E1422A

Strain Measurement System

Technical Specifications





- **Airframe structural and fatigue test**
- **Rocket and satellite structural test**
- **Wind tunnel flight load test**

Remote Strain Conditioning Unit for Stress and Fatigue Testing

The Agilent E1529A Remote Strain Conditioning Unit simplifies stress and fatigue testing of large mechanical structures such as airframes and launch vehicles. The strain conditioning unit along with remotely-located data acquisition system provide high-quality static or dynamic strain measurements.

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General

Agilent E1529A outputs:	Single static output from 32:1 multiplexer 32 individually buffered dynamic outputs	
Bridge completion:	120Ω, 350Ω and user installed, program selectable	
Bridge configurations:	Full, half, and quarter	
Remote operation:	330m (1000 ft) from multiiplexed output 100m (300 ft) from buffered outputs	
Bridge excitation:	User-supplied excitation in 8-channel banks	
Linearization:	Mx+b on all channels	
Calibration:	Internal self-calibration source 50 kΩ and user-installed shunt calibration resistor, program selectable	
Measurement rate:	25 kSa/s via multiplexed output, up to 196 kSa/s dynamic	
Static (multiplexed) outputs:	Gain (E1529A only)	32V per V
	Gain (E1529A + E1422A)	5000V per V
Resolution (1 LSB of E1422A)	0.06 µV (subject to RMS noise limits)	
Recommended measurement products:	Note: Companion products listed below are VXI-based. Twelve measurement module slots are typically available in systems using any one of Agilent's available 13-slot VXI mainframes.	
Static strain measurements	E1422A Remote Channel DAC Module plus up to eight E1529A SCP	
Dynamic strain measurements	E1432A 16-Channel 51.2 kSa/s Digitizer E1433A 8-Channel 196 kSa/s Digitizer	

Bridge Specifications

Completion resistors:	
Values	120Ω/350Ω ± 0.05%, ±5 ppm/°C TC
Power	0.125W up to 125 °C
Shunt cal resistor:	50 kΩ ±0.1%, ±25 ppm/°C TC
Quarter bridge offset:	3 µstrain (±2 µV), ±4 °C of tare cal
Excitation sense:	
Gain accuracy	±0.01% of reading
Offset	<1 mV

Strain Measurement

Measurement range (µ∈)		
(Quarter bridge, ±5V excitation)	Resolution (µ∈)	RMS noise (µ∈)
±200,000	6.1	0.4
±50,000	1.5	0.4
±12,500	0.4	0.4
±3,125	0.1	0.4 (noise can be reduced by averaging)
System accuracy:	Note: After CAL routine, 1 hour warm-up, ±1 °C	
Voltage offset:	<2 µV	
Gain error:	<0.015% of reading	
RMS Noise:	<1 µV rms	
CMRR:	>100 dB, DC-10 MHz (common mode range ± 10V)	
Drift: Note: drift errors can be removed by running CAL routine	Offset drift:	<1 µV/°C <1 µV/month
	Gain drift:	<30 ppm/°C

Dynamic outputs:

Gain:	32V per V ±0.1% of reading
Offset:	<250 µV
Bandwidth:	>100 kHz
Equivalent input noise (E.I.N.):	<20 nV/$\sqrt{\text{Hz}}$

Quarter Bridge Bending Errors: (5 V Excitation, GF=2)

με	Error (με)
-50,000	160
-40,000	90
-30,000	45
-20,000	20
-10,000	8
0	1
10,000	8
20,000	20
30,000	45
40,000	90
50,000	160

Half Bridge Bending Errors: (5 V Excitation, GF=2)

με	Error (με)
-50,000	28
-40,000	23
-30,000	17
-20,000	12
-10,000	6
0	0.5
10,000	6
20,000	12
30,000	17
40,000	23
50,000	28

Full Bridge Bending Errors : (5 V Excitation, GF=2)

με	Error (με)
-50,000	28
-40,000	22
-30,000	17
-20,000	11
-10,000	6
0	0.3
10,000	6
20,000	11
30,000	17
40,000	22
50,000	28

Mechanical

Height:	4.45 cm (1.75 in)
Width:	49.53 cm (19.5 in)
Weight:	1.8 Kg (4 lbs)

Power Requirements

Line voltage:	90-264 Vac
Line frequency:	47-440 Hz
Input power:	8W

Environmental

Temperature:	-5 °C to +55 °C
Humidity:	5 to 85% R.H.
Altitude:	10,000 ft operating 30,000 ft non-operating

Warranty

E1529A:	1 year return to Agilent

Related Agilent Literature

E1529A Overview,
Pub. No. 5968-0432E

E1432A Technical Specifications,
Pub. No. 5965-7193E

E1432A/33A/34A Product Overview,
Pub. No. 5966-3062E

Test System and VXI Products
Data Book, Pub. No. 5966-2812E

On the Web, please go to
www.agilent.com/find/data_acq
for more information about Agilent Technologies data acquisition products.

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