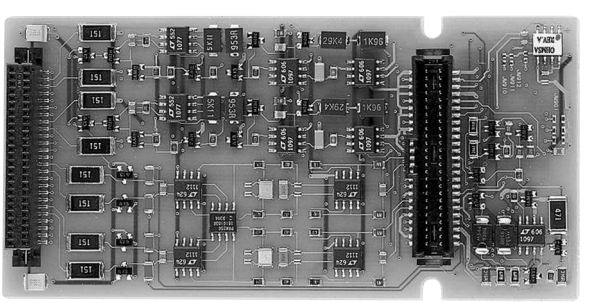
Agilent E1518A
4-Wire Resistance Measurement SCP

Data Sheet

- **Four channels of 4-wire Ohms measurement**
- **Programmable current level on each source channel**
- **x16 gain and 10 Hz filter on each input channel**



Agilent E1518A

Description

The Agilent E1518A 4-Wire Resistance Measurement SCP provides four programmable current source channels (with input over-voltage protection) for excitation. Each current source can be programmed to provide either 30 µA or 433 µA.

The E1518A also has four channels of analog input with x16 gain and 10 Hz, 2-pole, low-pass filters for measuring the voltage across the resistor.

The engineering conversion to Ohms or temperature is done automatically at the full scanning rate in the base VXI module.

Use the E1518A with the following VXI modules:

Model	Description
E1413C	64-Channel Scanning A/D Converter
E1415A	Algorithmic Closed Loop Controller
E1419A	Multifunction Measurement and Control Module

Refer to the Agilent Technologies Website for recent product updates, if applicable.

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Product Specifications

These specifications for the E1518A reflect the combined performance of the scanning A/D and the E1518A SCP.

Measurement Ranges

DC Volts: ± 3.9 mV to ± 1 V Full Scale

Temperature:

- **Thermocouples:** - 200 to + 1700 °C
- **Thermistors:** - 80 to + 160 °C
- **RTD's:** - 200 to + 850 °C

Resistance full scale ranges (Ω): 8, 32, 128, 512, 2K, 8K, 32K

Input Characteristics

Maximum input voltage (normal mode plus common mode):

- **Operating** < ± 16 V peak
- **Damage level:** > ± 42 V peak

Maximum common mode voltage:

- **Operating:** < ± 16 V peak
- **Damage level:** > ± 42 V peak

Common mode rejection:

- **0 to 60 Hz:** –100 dB

Input impedance: > 100 MΩ differential

Maximum Tare Cal Offset

Maximum tare cal offset depends on A/D range and SCP gain.

A/D Range ±V F. Scale	Maximum Offset
16	0.20009
4	0.05007
1	0.01317
0.25	0.00349
0.0625	0.00112

Current Source

Minimum: 30.5 µA ± 9 nA

Maximum: 488.3 µA ± 60 nA

Resistance Measurements

Range FS	Current Amplitude	A/D Range	Maximum Resolution
32.77 kΩ:	30.518 µA	16 Vdc	1 Ω
8.192 kΩ:	30.518 µA	4 Vdc	.25 Ω
2.048 kΩ:	30.518 µA	1 Vdc	.0625 Ω
2.048 kΩ:	488.28 µA	16 Vdc	.0625 Ω
512 Ω:	488.28 µA	4 Vdc	.0156 Ω
128 Ω:	488.28 µA	1 Vdc	.0039 Ω
32 Ω:	488.28 µA	0.25 Vdc	.0009 Ω

Resistance Accuracy

Any input SCP/Most sensitive range. Four-wire connections.

MIN Current Source: ± [0.035% of rdg]

MAX Current Source: ± [0.02% of rdg]

Measurement Accuracy dc Volts

For autorange, add .02% of reading for input voltages > ±4 V.

Accuracy — Gain x16

Range ± V FS	Linearity % of Reading:	Offset Error:	Noise 3σ:	Noise* 3σ:
0.0039:	0.01	3.8 μV	3.4 μV	2.9 μV
0.0156:	0.01	4.2 μV	4.4 μV	3.8 μV
0.0625:	0.01	4.9 μV	7.5 μV	6.3 μV
0.25:	0.01	8 μV	28 μV	23 μV
1:	0.01	31 μV	113 μV	64 μV

* A/D filter ON (min sample period ≥ 145 μs: ≤ 100 Hz scan rate 64 ch).

Temperature coefficients: *add tempco error to above table*

Gain: 15 ppm/°C (after *CAL)

Offset:

0-30 °C: 0.16 μV/°C

30-40 °C: 0.18 μV/°C

40-55 °C: 0.39 μV/°C

Temperature Measurement Accuracy

The following temperature accuracy specifications include instrument and firmware linearization errors. The linearization algorithm used is based on the ITS-90 transducer curves. Add your transducer accuracy to determine total measurement error.

Thermistors*

2252 Ω

0 to 30 °C:	30 to 70 °C:	70 to 80 °C:	80 to 100 °C:
0.006 °C	0.013 °C	0.010 °C	0.014 °C

5 kΩ

0 to 30 °C:	30 to 70 °C:	70 to 85 °C:
0.012 °C	0.014 °C	0.019 °C

5 kΩ Reference

–10 to 65 °C:	65 to 85 °C:
0.012 °C	0.013 °C

10 kΩ

0 to 30 °C:	30 to 60 °C:	60 to 90 °C:	90 to 115 °C:
0.015 °C	0.016 °C	0.018 °C	0.022 °C

RTDs *

100 Ω

–200 to 75 °C:	75 to 300 °C:	300 to 600 °C:	600 to 970 °C:
0.08 °C	0.21 °C	0.27 °C	0.37 °C

100 Ω Reference

–125 to 70 °C:
0.145 °C

Current Requirements (Amps)

5 V max	24 V max	-24 V max
0.01	0.033	0.039

Ordering Information

Description	Product No.
4-Wire Resistance Measurement SCP	E1518A

Related Literature

2000 Test System and VXI Catalog CD-ROM,
Agilent Pub. No. 5980-0308E (detailed specifications for VXI products)

2000 Test System and VXI Catalog,
Agilent Pub. No. 5980-0307E (overview of VXI products)

1998 Test System and VXI Products Data Book,
Agilent Pub. No. 5966-2812E

Online

Internet access for Agilent product information, services and support
www.agilent.com/find/tmdir

VXI product information
www.agilent.com/find/vxi

Defense Electronics Applications
www.agilent.com/find/defense_ATE

Agilent Technologies VXI Channel Partners
www.agilent.com/find/vxichanpart

Agilent Technologies' HP VEE Application Website
www.agilent.com/find/vee

Agilent Technologies Data Acquisition and Control Website
www.agilent.com/find/data_acq

Agilent Technologies Instrument Driver Downloads
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