



Time Electronics
Calibration, Test and Measurement

Extended Specifications

5025C Series 2 Multifunction Calibrator

Revision: 2310-2

Time Electronics Ltd

Unit 5, TON Business Park, 2-8 Morley Road,
Tonbridge, Kent, TN9 1RA, United Kingdom.

T: +44 (0) 1732 355993 | F: +44 (0) 1732 350198
mail@timeelectronics.co.uk | www.timeelectronics.com

5025C Series 2 Specifications

1. Specifications are stated as \pm ppm or % of output + floor, unless otherwise indicated.
2. Specifications apply at 23 °C \pm 5 °C.
3. For temperatures outside this range add 0.2 x specification per °C.
4. Specifications include stability, linearity, and traceability of external standards used for calibration.

DC Voltage

| Range | Uncertainty 1 Year | Resolution | Output Resistance | Max. Burden |
|----------------------|----------------------|-------------|-------------------|-------------|
| 0 to 20 mV | 15 ppm + 3 μ V | 0.1 μ V | 10 Ω | |
| 20 to 200 mV | 15 ppm + 4 μ V | 1 μ V | 10 Ω | |
| 0.2 to 2 V | 15 ppm + 15 μ V | 1 μ V | 0.1 Ω | 20 mA |
| 2 to 20 V | 15 ppm + 75 μ V | 10 μ V | 0.1 Ω | 20 mA |
| 20 to 200 V | 15 ppm + 500 μ V | 100 μ V | 0.25 Ω | 10 mA |
| 200 to 1010 V | 25 ppm + 1.5 mV | 1 mV | 1 Ω | 1 mA |
| Hi Drive Mode | | | | |
| 20 to 200 V | 50 ppm + 15 mV | 1 mV | <5 Ω | 20 mA |
| 200 to 1050 V | 150 ppm + 30 mV | 10 mV | <10 Ω | 10 mA |

Maximum capacitance 1000 pF.
1 % of full scale overrange, except for function limits.

DC Current

| Range | Uncertainty 1 Year | Resolution | Compliance Voltage | Max. Inductance |
|------------------|----------------------|------------|--------------------|-----------------|
| 0 to 200 μ A | 80 ppm + 15 nA | 0.1 nA | 10 V | 50 μ H |
| 0.2 to 2 mA | 60 ppm + 40 nA | 1 nA | 10 V | 50 μ H |
| 2 to 20 mA | 60 ppm + 200 nA | 10 nA | 10 V | 50 μ H |
| 20 to 200 mA | 60 ppm + 2 μ A | 100 nA | 10 V | 30 μ H |
| 0.2 to 2 A | 150 ppm + 70 μ A | 1 μ A | 4 V | 5 μ H |
| 2 to 22 A | 250 ppm + 1 mA | 10 μ A | 4 V | 2 μ H |

For full accuracy the 2 A and 20 A ranges compliance is limited to 2.2 V. For settling and stabilisation, see notes.
1 % of full scale overrange, except for function limits.

DC Power

| Voltage Range | Uncertainty 1 Year | Resolution | Output Resistance | Max. Burden |
|---------------|-----------------------|-------------|--------------------|----------------|
| 2 to 20 mV | 100 ppm + 10 μ V | 1 μ V | 10 Ω | |
| 20 to 200 mV | 100 ppm + 25 μ V | 1 μ V | 10 Ω | |
| 0.2 to 2 V | 100 ppm + 50 μ V | 10 μ V | 0.1 Ω | 20 mA |
| 2 to 20 V | 100 ppm + 500 μ V | 100 μ V | 0.1 Ω | 20 mA |
| 20 to 200 V | 200 ppm + 10 mV | 1 mV | <5 Ω | 20 mA |
| 200 to 1050 V | 500 ppm + 50 mV | 10 mV | <10 Ω | 10 mA |
| Current Range | Uncertainty 1 Year | Resolution | Compliance Voltage | Max Inductance |
| 0.2 to 2 A | 500 ppm + 500 μ A | 100 μ A | 4 V | 200 μ H |
| 2 to 22 A | 650 ppm + 5 mA | 1 mA | 4 V | 150 μ H |

Simultaneous output of voltage and current. Output displayed in Watts or VA. Specification applies with low terminals isolated.
Additional current errors apply for use with common low terminals, see notes.

To calculate the total power uncertainty, use the following formula: $\sqrt{V_{spec}^2 + I_{spec}^2}$

Resistance

| 2-Wire Variable | | | |
|-----------------------|---------------|-------------------------|-------------|
| Range | Resolution | Uncertainty 1 Year | Max. Rating |
| 1 to 20 Ω | 1 Ω | 100 ppm + 15 m Ω | 0.1 W |
| 20 to 100 Ω | 10 m Ω | | 0.1 W |
| 100 to 1000 Ω | 1 m Ω | | 0.1 W |
| 1 to 10 k Ω | 10 m Ω | 200 ppm + 25 m Ω | 0.1 W |
| 10 to 100 k Ω | 1 Ω | 100 ppm + 1 Ω | 0.1 W |
| 0.1 to 1 M Ω | 10 Ω | 100 ppm + 10 Ω | 0.1 W |
| 1 to 10 M Ω | 100 Ω | 200 ppm + 100 Ω | 200 V |
| 10 to 100 M Ω | 1 k Ω | 0.1 % + 10 k Ω | 200 V |
| 0.1 to 1.1 G Ω | 1 k Ω | 1 % + 1 M Ω | 200 V |

| 4-Wire Decade | | | |
|----------------------|--------------------|-----------------|-------------|
| Nominal Value | Uncertainty 1 Year | Resolution | Max. Rating |
| 0.000 00 Ω | \pm 5 m Ω | 10 $\mu\Omega$ | 0.1 W |
| 1.000 00 Ω | \pm 5 m Ω | 10 $\mu\Omega$ | 0.1 W |
| 10.000 0 Ω | \pm 5 m Ω | 100 $\mu\Omega$ | 0.1 W |
| 100.000 0 Ω | 80 ppm | 100 $\mu\Omega$ | 0.1 W |
| 1.000 000 k Ω | 35 ppm | 1 m Ω | 0.1 W |
| 10.000 00 k Ω | 30 ppm | 10 m Ω | 0.1 W |
| 100.000 0 k Ω | 30 ppm | 100 m Ω | 0.1 W |

Specifications do not include external lead resistance. 4-wire Decade specifications apply to the displayed value.

AC Voltage

| Range | Frequency | Uncertainty 1 Year | Resolution | Output Resistance | Max. Burden |
|---------------|--------------------|----------------------|-------------|-------------------|-------------|
| 1 to 20 mV | 20 Hz to 40 Hz | 0.10 % + 40 μ V | 1 μ V | 10 Ω | 20 mA |
| | 40 Hz to 2 kHz | 0.02 % + 30 μ V | | | |
| | 2 kHz to 20 kHz | 0.05 % + 30 μ V | | | |
| | 20 kHz to 100 kHz | 0.10 % + 40 μ V | | 50 Ω | |
| | 100 kHz to 300 kHz | 0.10 % + 75 μ V | | | |
| | 300 kHz to 500 kHz | 1.00 % + 125 μ V | | | |
| 20 to 200 mV | 20 Hz to 40 Hz | 0.10 % + 60 μ V | 1 μ V | 10 Ω | 20 mA |
| | 40 Hz to 2 kHz | 0.02 % + 30 μ V | | | |
| | 2 kHz to 20 kHz | 0.05 % + 30 μ V | | | |
| | 20 kHz to 100 kHz | 0.10 % + 100 μ V | | 50 Ω | |
| | 100 kHz to 300 kHz | 0.10 % + 375 μ V | | | |
| | 300 kHz to 500 kHz | 1.00 % + 1.25 mV | | | |
| 0.2 to 2 V | 20 Hz to 40 Hz | 0.10 % + 60 μ V | 10 μ V | < 0.1 Ω | 20 mA |
| | 40 Hz to 2 kHz | 0.02 % + 50 μ V | | < 0.5 Ω | |
| | 2 kHz to 20 kHz | 0.05 % + 75 μ V | | | |
| | 20 kHz to 100 kHz | 0.10 % + 150 μ V | | | |
| | 100 kHz to 300 kHz | 0.10 % + 3.75 mV | | | |
| | 300 kHz to 1 MHz | 1.00 % + 10 mV | | | |
| 2 to 20 V | 20 Hz to 40 Hz | 0.10 % + 600 μ V | 100 μ V | < 5 Ω | 20 mA |
| | 40 Hz to 2 kHz | 0.02 % + 500 μ V | | < 0.5 Ω | |
| | 2 kHz to 20 kHz | 0.05 % + 750 μ V | | | |
| | 20 kHz to 100 kHz | 0.15 % + 1.5 mV | | | |
| 20 to 200 V | 40 Hz to 1 kHz | 0.03 % + 3 mV | 1 mV | < 5 Ω | 20 mA |
| 200 to 1050 V | 40 Hz to 1 kHz | 0.05 % + 20 mV | 10 mV | < 10 Ω | 10 mA |

Frequency accuracy 0.01 %. Frequency resolution 1 Hz. 1 % of full scale overrange, except for function limits. Additional noise floor uncertainties apply to settings below 5 mV, see notes.

AC Current

| Range | Frequency | Uncertainty 1 Year | Resolution | Compliance Voltage (RMS) | Max. Inductance |
|-------------------|-----------------|----------------------|-------------|--------------------------|-----------------|
| 10 to 200 μ A | 20 Hz to 40 Hz | 0.10 % + 150 nA | 10 nA | 8 V | 50 μ H |
| | 40 Hz to 2 kHz | 0.05 % + 150 nA | | | |
| | 2 kHz to 5 kHz | 0.10 % + 150 nA | | | |
| 0.2 to 2 mA | 20 Hz to 40 Hz | 0.10 % + 150 nA | 10 nA | 8 V | 50 μ H |
| | 40 Hz to 2 kHz | 0.05 % + 150 nA | | | |
| | 2 kHz to 5 kHz | 0.10 % + 200 nA | | | |
| 2 to 20 mA | 20 Hz to 40 Hz | 0.10 % + 2 μ A | 100 nA | 8 V | 50 μ H |
| | 40 Hz to 2 kHz | 0.05 % + 2 μ A | | | |
| | 2 kHz to 5 kHz | 0.10 % + 2.5 μ A | | | |
| 20 to 200 mA | 20 Hz to 40 Hz | 0.10 % + 20 μ A | 1 μ A | 8 V | 30 μ H |
| | 40 Hz to 2 kHz | 0.05 % + 20 μ A | | | |
| | 2 kHz to 5 kHz | 0.10 % + 25 μ A | | | |
| 0.2 to 2 A | 20 Hz to 40 Hz | 0.10 % + 100 μ A | 10 μ A | 3 V | 200 μ H |
| | 40 Hz to 500 Hz | 0.05 % + 100 μ A | | | |
| 2 to 22 A | 20 Hz to 40 Hz | 0.15 % + 3 mA | 100 μ A | 3 V | 150 μ H |
| | 40 Hz to 500 Hz | 0.10 % + 3 mA | | | |

For full accuracy the 2 A and 20 A ranges compliance is limited to 2.2 V. 1 % of full scale overrange, except for function limits.

AC Power

| Voltage Ranges | Frequency | Uncertainty 1 Year | Resolution | Max. Burden |
|----------------|--------------|----------------------|--------------------|-------------|
| 2 to 20 mV | 40 to 500 Hz | 0.10 % + 150 μ V | 1 μ V | 10 Ω |
| 20 to 200 mV | | 0.05 % + 150 μ V | 1 μ V | |
| 0.2 to 2 V | | 0.05 % + 100 μ V | 10 μ V | 20 mA |
| 2 to 20 V | | 0.05 % + 500 μ V | 100 μ V | 20 mA |
| 20 to 200 V | | 0.10 % + 3 mV | 1 mV | 20 mA |
| 200 to 1050 V | | 0.10 % + 20 mV | 10 mV | 10 mA |
| Current Ranges | | Frequency | Uncertainty 1 Year | Resolution |
| 0.2 to 2 A | 40 to 500 Hz | 0.1 % + 1.5 mA | 10 μ A | 3 V |
| 2 to 22 A | | 0.1 % + 15 mA | 100 μ A | |

Frequency accuracy 0.02 %. Maximum Inductance: 2 A range 200 μ H, 20 A range 150 μ H. Specification applies with low terminals isolated. High terminals must not be connected. Additional current errors apply for use with common low terminals, see notes. Additional noise floor uncertainties apply to settings below 5 mV, see notes.

AC Power

| Phase Angle | Frequency | Uncertainty 1 Year | Resolution |
|--------------|---------------|--------------------|------------|
| ± 90 ° | 40 to 100 Hz | 0.25 ° | 0.1 ° |
| | 100 to 500 Hz | 1.0 ° | 0.1 ° |
| Power Factor | Frequency | Resolution | |
| 0.00 to 1.00 | 40 to 500 Hz | 0.01 | |

Accredited measurements are not available for phase angle or power factor.

To calculate the total power uncertainty, use the following formulas:

$$\text{Power Specification (\%)} = \sqrt{V_{\text{spec}}^2 + I_{\text{spec}}^2 + PC^2}$$

Where V_{spec} and I_{spec} is the voltage and current accuracy expressed in %. PC is a Phase Correction derived from a formula given as:

$$\text{Phase Correction (\%)} = 100 \left(1 - \frac{\cos(\text{Phase} + P_{\text{spec}})}{\cos \text{Phase}} \right)$$

Phase Correction Table

| Phase Watts | Power Factor | Uncertainty 1 Year | |
|-------------|--------------|--------------------|---------------|
| | | 40 to 100 Hz | 100 to 500 Hz |
| 0 ° | 1.00 | 0.00 % | 0.02 % |
| 10 ° | 0.99 | 0.08 % | 0.32 % |
| 20 ° | 0.94 | 0.16 % | 0.65 % |
| 30 ° | 0.87 | 0.25 % | 1.02 % |
| 40 ° | 0.77 | 0.37 % | 1.48 % |
| 50 ° | 0.64 | 0.52 % | 2.10 % |
| 60 ° | 0.50 | 0.76 % | 3.04 % |
| 70 ° | 0.34 | 1.20 % | 4.81 % |
| 80 ° | 0.17 | 2.48 % | 9.91 % |

Capacitance

| Nominal Value | Frequency | Uncertainty 1 Year | Resolution | Max. Voltage |
|---------------|-----------|--------------------|------------|--------------|
| 1 nF | 1 kHz | 0.2 % + 10 pF | 0.1 pF | 25 V |
| 10 nF | 1 kHz | 0.2 % + 10 pF | 1 pF | 25 V |
| 20 nF | 1 kHz | 0.2 % + 10 pF | 1 pF | 25 V |
| 50 nF | 1 kHz | 0.2 % + 10 pF | 1 pF | 25 V |
| 100 nF | 1 kHz | 0.2 % | 10 pF | 25 V |
| 200 nF | 1 kHz | 0.2 % | 10 pF | 25 V |
| 500 nF | 1 kHz | 0.2 % | 10 pF | 25 V |
| 1 µF | 1 kHz | 0.2 % | 100 pF | 25 V |
| 10 µF | 1 kHz | 0.5 % | 1 nF | 25 V |
| 20 µF | 1 kHz | 0.5 % | 1 nF | 25 V |
| 50 µF | 1 kHz | 0.5 % | 1 nF | 25 V |
| 100 µF | 1 kHz | 0.5 % | 10 nF | 25 V |

Specifications apply to the displayed value, calibrated at the output terminals and does not include residual lead capacitance. Specifications are based on 4 wire sinusoidal measurement technique.

Inductance

| Nominal Value | Uncertainty 1 Year | Resolution | Frequency | Test Voltage | |
|---------------|--------------------|------------|-----------|--------------|--------|
| 1.000 0 mH | 0.2 % + 5 µH | 0.1 µH | 1 kHz | 50 mV | |
| 1.900 0 mH | 0.2 % + 5 µH | 0.1 µH | | 100 mV | |
| 5.000 0 mH | 0.2 % + 5 µH | 0.1 µH | | 200 mV | |
| 10.000 mH | 0.2 % + 5 µH | 1 µH | | 300 mV | |
| 19.000 mH | 1 % | 1 µH | | 400 mV | |
| 50.000 mH | 1 % | 1 µH | | 600 mV | |
| 100.00 mH | 1 % | 10 µH | | 600 mV | |
| 190.00 mH | 1 % | 10 µH | | 700 mV | |
| 500.00 mH | 1 % | 10 µH | | 700 mV | |
| 1.000 0 H | 1 % | 100 µH | | 700 mV | |
| 10.000 0 H | 2 % | 100 µH | | 100 Hz | 700 mV |

Specifications apply to the displayed value, calibrated at the output terminals and does not include residual lead inductance. Specifications are based on 4 wire sinusoidal measurement technique at the test voltage specified. For full accuracy, the 5025's warmup period is extended to 4 hours and apply at 23 °C ± 1 °C.

Conductance

| Nominal Value | Uncertainty 1 Year | Resolution |
|---------------|--------------------|--------------|
| 1.000 00 S | 1.51 % | 0.000 01 S |
| 100.000 mS | 0.16 % | 0.001 mS |
| 10.000 00 mS | 250 ppm | 0.000 01 mS |
| 1.000 000 mS | 115 ppm | 0.000 001 mS |
| 100.000 0 µS | 203 ppm | 0.000 1 µS |
| 10.000 00 µS | 110 ppm | 0.000 01 µS |
| 1.000 00 µS | 110 ppm | 0.000 01 µS |
| 100.000 nS | 210 ppm | 0.001 nS |
| 10.000 0 nS | 0.11 % | 0.000 1 nS |
| 1.000 00 nS | 1.1 % | 0.000 01 nS |

2 wire only. Does not include external lead conductance. Conductance is a mathematical calculation of the resistance function and therefore does not require calibration.

Thermocouple Simulation

| Type | Range °C | Uncertainty 1 Year | Type | Range °C | Uncertainty 1 Year |
|------|--------------|--------------------|------|--------------|--------------------|
| J | -210 to -150 | ± 0.15 °C | K | -200 to 0 | ± 0.20 °C |
| | -150 to 370 | ± 0.09 °C | | 0 to 480 | ± 0.10 °C |
| | 370 to 1200 | ± 0.10 °C | | 480 to 1372 | ± 0.15 °C |
| E | -200 to -150 | ± 0.15 °C | N | -200 to -150 | ± 0.35 °C |
| | -150 to 0 | ± 0.10 °C | | -150 to 320 | ± 0.20 °C |
| | 0 to 280 | ± 0.05 °C | | 320 to 580 | ± 0.10 °C |
| | 280 to 1000 | ± 0.07 °C | | 580 to 1300 | ± 0.15 °C |
| T | -200 to 100 | ± 0.2 °C | S | -50 to 270 | ± 0.7 °C |
| | 100 to 400 | ± 0.09 °C | | 270 to 1768 | ± 0.4 °C |
| R | -50 to 50 | ± 0.90 °C | B | 300 to 410 | ± 2.0 °C |
| | 50 to 450 | ± 0.50 °C | | 410 to 610 | ± 1.5 °C |
| | 450 to 1680 | ± 0.35 °C | | 610 to 1370 | ± 1.0 °C |
| | 1680 to 1768 | ± 0.50 °C | | 1370 to 1820 | ± 0.5 °C |
| U | -200 to 100 | ± 0.25 °C | C | 0 to 1750 | ± 0.30 °C |
| | 100 to 600 | ± 0.1 °C | | 1750 to 2315 | ± 0.50 °C |
| L | -200 to 900 | ± 0.2 °C | | | |

Resolution 0.1 °C. Selectable units: °C, °F and °K. Switchable CJ reference: Internal, Manual and OFF. Additional errors apply for Internal and Manual CJ reference modes. Internal CJ reference mode accuracy ± 0.5 °C and applies to ambient changes less than ± 1 °C.

The accuracy of the thermocouple simulation is determined by the accuracy of the 20 and 200 mV DC ranges using tables published in EN 60584-1:2013 (ITS-90). Type U & L based on tables published in DIN 43710 (ITPS68). Type C based on tables published in ASTM E230/E230M-12 (ITS-90). Accredited measurements are not available for Types B, U, C, L & the internal CJ reference.

RTD Simulation

| Range | Uncertainty 1 Year | Resolution |
|---------------|--------------------|------------|
| Pt100 | | |
| -180 to 50 °C | ± 0.07 °C | 0.01 °C |
| 50 to 250 °C | 100 ppm + 0.07 °C | |
| 250 to 850 °C | 100 ppm + 0.10 °C | |
| Pt200 | | |
| -180 to 50 °C | ± 0.05 °C | 0.01 °C |
| 50 to 250 °C | 100 ppm + 0.05 °C | |
| 250 to 850 °C | 100 ppm + 0.08 °C | |
| Pt500 | | |
| -180 to 50 °C | ± 0.04 °C | 0.01 °C |
| 50 to 250 °C | 100 ppm + 0.04 °C | |
| 250 to 850 °C | 400 ppm + 0.3 °C | 1 °C |
| Pt1000 | | |
| -180 to 0 °C | ± 0.05 °C | 0.01 °C |
| 0 to 850 °C | 400 ppm + 0.3 °C | 1 °C |

2-wire output calibrated at the output terminals. Specifications do not include external lead resistance. The accuracy of the RTD simulation function is determined using tables published in IEC 60751(ITS-90, alpha = 0.00385). Accredited measurements are not available for Pt200, Pt500, & Pt1000.

Digital Frequency

| Range | Resolution | Uncertainty 1 Year |
|-----------------|------------|--------------------|
| 0.1 Hz to 1 kHz | 0.01 Hz | 20 ppm |
| 1 kHz to 1 MHz | 1 Hz | |
| 1 MHz to 10 MHz | 10 Hz | |

Digital Period

| Range | Resolution | Uncertainty 1 Year |
|----------------|--------------------------------|--------------------|
| 100 ns to 10 s | Fixed Values 1,2,5 Sequence | 20 ppm |

Square wave output. Amplitude approximately 2 Vp-p. Period is a mathematical calculation of the Frequency function and therefore does not require calibration.

Turn Coil Ranges

| Range | Frequency | Uncertainty 1 Year | Resolution | Compliance Voltage | Max. Inductance |
|-------------------|-----------------|--------------------|------------|--------------------|-----------------|
| 2 A x1 | DC | 0.05 % + 500 µA | 100 µA | 4 V | 200 µH |
| | 20 Hz to 40 Hz | 0.10 % + 100 µA | 10 µA | 3 V RMS | |
| | 40 Hz to 100 Hz | 0.05 % + 100 µA | | | |
| 2 A x5 (10 A) | DC | 0.05 % + 500 µA | 1 mA | 4 V | |
| | 20 Hz to 40 Hz | 0.10 % + 100 µA | 100 µA | 3 V RMS | |
| | 40 Hz to 100 Hz | 0.05 % + 100 µA | | | |
| 2 A x50 (100 A) | DC | 0.05 % + 500 µA | 10 mA | 4 V | |
| | 20 Hz to 40 Hz | 0.10 % + 100 µA | 1 mA | 3 V RMS | |
| | 40 Hz to 100 Hz | 0.05 % + 100 µA | | | |
| 20 A x1 | DC | 0.065 % + 5 mA | 1 mA | 4 V | 150 µH |
| | 20 Hz to 40 Hz | 0.15 % + 3 mA | 100 µA | 3 V RMS | |
| | 40 Hz to 100 Hz | 0.10 % + 3 mA | | | |
| 20 A x5 (100 A) | DC | 0.065 % + 5 mA | 10 mA | 4 V | |
| | 20 Hz to 40 Hz | 0.15 % + 3 mA | 1 mA | 3 V RMS | |
| | 40 Hz to 100 Hz | 0.10 % + 3 mA | | | |
| 20 A x50 (1000 A) | DC | 0.065 % + 5 mA | 100 mA | 4 V | |
| | 20 Hz to 40 Hz | 0.15 % + 3 mA | 10 mA | 3 V RMS | |
| | 40 Hz to 100 Hz | 0.10 % + 3 mA | | | |

The turn coil ranges are a mathematical calculation of the DCI Power and ACI current functions and therefore do not require calibration. 1 % of full scale overrange, except for function limits. The uncertainty refers to the output terminals and does not include clamp coil accuracy.

Oscilloscope Calibration Option

Amplitude

| Range | Uncertainty 1 Year | | Resolution |
|--------------------|--------------------|--------------------|------------|
| | DC Signal | Square Wave Signal | |
| 2 to 200 mV (1 MΩ) | 0.20 % + 10 uV | 0.25 % + 20 uV | 10 μV |
| 0.2 to 20 V (1 MΩ) | 0.05 % + 25 uV | 0.25 % + 50 uV | 1 mV |
| 20 to 200 V (1 MΩ) | 0.05 % + 10 mV | 0.25 % + 20 mV | 10 mV |
| 1 to 200 mV (50 Ω) | 0.25 % + 20 uV | 0.25 % + 40 uV | 100 μV |
| 0.2 to 2 V (50 Ω) | 0.25 % + 20 uV | 0.25 % + 40 uV | 1 mV |

Selectable DC and 1 kHz square wave signal.
The square wave signal is a chopped DC voltage, and the accuracy applies to the top line measurement relative to ground.
Calibration is performed using the DC signal.

Frequency

| Range | Resolution | Uncertainty 1 Year |
|------------------|----------------|--------------------|
| 0.1 Hz to 10 MHz | Fixed values | 0.1 ppm |
| 20, 50, 100 MHz | 1,2,5 sequence | 20 ppm |

Period

| Range | Resolution | Uncertainty 1 Year |
|----------------|----------------|--------------------|
| 100 ns to 10 s | Fixed values | 0.1 ppm |
| 50, 20, 10 ns | 1,2,5 sequence | 20 ppm |

Deviation function is not available. 1.5 Vpk-pk - 0.1 Hz to 100 kHz. 1 Vpk-pk - 100 kHz to 100 MHz (sine wave at 100 MHz).
Period is a mathematical calculation of the Frequency function and therefore does not require calibration.

Duty Cycle

| |
|--|
| 3 frequencies, 100 Hz, 1 kHz, 10 kHz. Duty cycle settable from 0 to 100 % Setting resolution 0.01 % at 100 Hz, 0.1 % at 1 kHz, 1 % at 10 kHz Deviation function is not available. |
|--|

Fast Rise

| Into 50 Ω Load | Uncertainty 1 Year |
|----------------|--------------------|
| 400 ps | ± 150 ps |

Accredited measurements are not available for Duty Cycle and Fast Rise. Fast Rise specifications apply to the displayed value.

Levelled Sinewave

Amplitude Ranges: 0.35, 0.4, 0.5, 0.6, 1, 1.5, 2, 2.5, 3 and 3.5 Vp-p. Deviation ± 5 % except for function limits.

| Amplitude Ranges (50 Ω) | 0.35 to 3.5 Vp-p | | | |
|-------------------------------|-------------------|-----------------|----------------|------------------|
| Reference Low Frequency Range | 50 kHz | 50 to 100 kHz | 100 to 300 kHz | 300 to 1000 kHz |
| Absolute Uncertainty 1 Year | 0.5 % + 400 μVp-p | 1 % + 400 μVp-p | 1 % + 10 mVp-p | 1.5 % + 35 mVp-p |

Low Frequency Accuracy 100 ppm. Resolution 0.1 kHz. Settling time up to 10 seconds.

| Amplitude Ranges (50 Ω) | 0.35 to 1.5 Vp-p | | | |
|-----------------------------|------------------|------------------|------------------|--------------|
| High Frequency Range | 10 to 199.9 MHz | 200 to 499.9 MHz | 500 to 999.9 MHz | 1 to 2.2 GHz |
| Accuracy relative to 50 kHz | 1.5 % | 2.5 % | 4 % | 5 % |
| Absolute Uncertainty 1 Year | 3 % | 4 % | 5.5 % | 6.5 % |

| Amplitude Ranges (50 Ω) | 2, 2.5, 3 Vp-p | | | |
|-----------------------------|-----------------|------------------|------------------|--------------|
| High Frequency Range | 10 to 199.9 MHz | 200 to 499.9 MHz | 500 to 999.9 MHz | 1 to 1.6 GHz |
| Accuracy relative to 50 kHz | 1.5 % | 2.5 % | 4 % | 5 % |
| Absolute Uncertainty 1 Year | 3 % | 4 % | 5.5 % | 6.5 % |

| Amplitude Range (50 Ω) | 3.5 Vp-p | | | |
|-----------------------------|-----------------|------------------|------------------|--------------|
| High Frequency Range | 10 to 199.9 MHz | 200 to 499.9 MHz | 500 to 999.9 MHz | 1 to 1.3 GHz |
| Accuracy relative to 50 kHz | 1.5 % | 2.5 % | 4 % | 5 % |
| Absolute Uncertainty 1 Year | 3 % | 4 % | 5.5 % | 6.5 % |

High Frequency accuracy 50 ppm, resolution 0.1 MHz.

The Levelled Sweep option is calibrated with the SMA to BNC lead supplied. Any additional losses or gains must be accounted for.
Accredited measurements are not available for levelled sinewave amplitude.

General Specifications

| | |
|------------------------------|--|
| Mains Voltage | 100 to 260 V AC 50/60 Hz. |
| Fuse Ratings | 3.15 A anti-surge. |
| Power Consumption | 120 W typical, 200 W Max. |
| Operating Temperature | 10 to 40 °C. |
| Storage Temperature | -10 to 50 °C. |
| Operating Humidity | < 80 %. |
| Altitude | 0 to 3 km. Non-operating 3 to 12 km. |
| Warm Up Time | 1 hour to full accuracy, except where noted. |
| Dimensions | Width 447 mm, Height 152 mm, Depth 470 mm. |
| Weight | 16.5 kg. |
| Interfaces | RS-232, GPIB & USB (via RS232 adaptor). |
| Command Set | Standard SCPI. |

Notes

Absolute Uncertainties

Specified at a 95 % confidence level, coverage factor k=2.

Overrange and Function Limits

These are the minimum and maximum values for the function. Where stated, over or under these values cannot be set.

Mathematical Functions

These functions are mathematical calculations performed by the instrument's internal processors and have been designed and validated by Time Electronics. Calibration of these functions can be performed upon request.

Accredited Measurements

Certain functions or ranges are indicated as 'accredited measurements not available'. On an accredited calibration certificate, these measurements will be marked as 'not accredited' or will not be included. Traceable measurements can be provided upon request. For further information please contact Time Electronics.

Power Function Information and Additional Uncertainties

Additional AC and DC current errors for use with common low terminals: 2 A Ranges: 500 ppm + 800 µA. 22 A Range: 0.25 % + 50 mA. Calibration is performed as separate voltage and current measurements.

Output Resistance and Loading

The output resistance of the 20 and 200 mV ranges is 10 Ω. This must be considered when loads of 100 kΩ or less are being driven. A 100 kΩ load will result in a 0.01% error.

The normal (non-Hi Drive) DC high voltage ranges have been designed to operate with loads of 10 MΩ. Driving loads below 1 MΩ on the 200 V range and 4 MΩ on the 1000 V will result in additional errors:

200 V range, 20 kΩ to 1 MΩ: add $\left(\frac{0.05}{\text{Load (k}\Omega\text{)}}\right)$ % of output. For example, a load of 50 kΩ will result in an uncertainty of 25 ppm + 500 µV.

1000 V range, 1 to 4 MΩ: add $\left(\frac{10}{\text{Load (k}\Omega\text{)}}\right)$ % of output. For example, a load of 2 MΩ will result in an uncertainty of 75 ppm + 1.5 mV.

Noise Information and Additional Uncertainties

Additional ACV noise floor uncertainties apply between 1 and 5 mV: 20 Hz to 20 kHz, add 20 µV. 20 kHz to 300 kHz, add 50 µV. DC specifications apply between 0.1 and 1 Hz bandwidth.

Settling and Stabilisation

DC Current 2 A Range: Full accuracy applies after the momentary setting of full scale allowing for thermal stabilisation throughout the range. Settling time 30 seconds.

2 Wire Resistance: Specifications apply after 15 seconds of settling time. Above 1 MΩ the settling time increases to 30 seconds.

For further information about settling and stabilisation please contact Time Electronics.

Due to continuous development Time Electronics reserves the right to change specifications without prior notice.