FLUKE®
Calibration

5560A/5550A/5540A

2G/1G/600M Scope Calibration Options

Product Specifications

November 2023 Rev. 4, 11/24 (English)

Specifications

The performance specifications describe the complete instrumental uncertainty of the Product. The specifications include stability, temperature, and humidity; within specified limits, linearity, line and load regulation, and the reference standard measurement uncertainty. The product specifications are provided at a level of confidence of 99 %, k=2.58, normally distributed. In some cases, additional specifications with a level of confidence of 95 %, k=2, normally distributed are also listed. Fluke Calibration guarantees product performance to the 99 % level of confidence.

Specifications are valid after a Product warm-up period of 30 minutes, or twice the time that the Product has been turned off.

Plane of reference for all specifications is at the end of the Fluke Calibration supplied output cable. Part number 5587423 55X0A-4401,OUTPUT CABLE, N TO BNC CABLE.

General Specifications

For General Specifications see the 5560A, 5550A or 5540A Product Specifications.

DCV Specifications

DCV Specifications ±(% of Output + Floor)							
Impedance	**99 % Confidence Level**			**95 % Confidence Level**			**Floor**
	90 d	**1 y**	**2 y**	**90 d**	**1 y**	**2 y**	
50 Ω	0.25	0.25	0.30	0.19	0.19	0.23	40 µV
1 MΩ	0.05	0.05	0.06	0.04	0.04	0.05	40 µV

ACV Specifications

Selectable positive or negative, zero referenced square wave.

ACV Specifications ±(% of Output + Floor)							
Impedance	**99 % Confidence Level**			**95 % Confidence Level**			**Floor**
	90 d	**1 y**	**2 y**	**90 d**	**1 y**	**2 y**	
50 Ω	0.25	0.25	0.30	0.19	0.19	0.23	40 µV
1 MΩ [1]	0.10	0.10	0.12	0.08	0.08	0.09	40 µV
[1] For frequencies below 40.01 Hz and above 1 kHz multiply gain specification by 2.5.							

Frequency 2-Year Absolute Uncertainty, internal reference	±(2.5 µHz/Hz of setting)

Volt Characteristics

		DCV		ACV [1]	
		50 Ω	**1 MΩ**	**50 Ω**	**1 MΩ**
Amplitude Range		0 V to ±6.6 V	0 V to ±120 V	1 mV p-p to ±6.6 V p-p	±1 mV p-p to ±120 V p-p
Amplitude Resolution	0 mV to 50 mV	1 µV			
	50.01 mV to 500 mV	10 µV			
	500.1 mV to 6.6 V	100 µV			
	6.601 V to 15 V	1 mV			
	12.01 V to 120 V	10 mV			
Amplitude Sequence		1-2-5 or 1-2-4			
Aberrations (within 4 µs from 50 % of leading/trailing edge)				<(1.0 % of output + 100 µV)[2]	
Frequency Range				10 Hz to 10 kHz	

[1] Selectable positive or negative, zero referenced square wave.
[2] 2 % of output for amplitudes >15V p-p.

Leveled Sine Specifications

Minimum output 5 mV p-p.

Models			Max Output	Frequency (Hz)	Flatness relative to 50 kH, ± (% Output + Floor) [1]							VSWR
					99 % Confidence Level			95 % Confidence Level			Floor	
					90 d	1 y	2 y	90 d	1 y	2 y		
2 G	1 G	600 M	5.5 V p-p	50 k to 10 M	1.5	1.5	1.8	1.2	1.2	1.4	100 µV	1.1:1
				10 M to 600 M	3.0	3.0	3.6	2.3	2.3	2.8	100 µV	1.2:1 [2]
		-	3.5 V p-p	600 M to 1100 M	4.0	4.0	4.8	3.1	3.1	3.7	100 µV	1.25:1
	-	-		1100 M to 2100 M	5.0	5.0	6.0	3.9	3.9	4.7	100 µV	1.35:1 [3]

[1] Flatness specifications apply at oscilloscope bandwidth.
[2] Up to 550 MHz. 1.24:1 above 550 MHz.
[3] Up to 2000 MHz.1.4:1 above 2000 MHz.

Absolute specifications @ 50 kHz, ± (% Output + Floor)							VSWR
99 % Confidence Level			**95 % Confidence Level**			**Floor**	
90 d	**1 y**	**2 y**	**90 d**	**1 y**	**2 y**		
2.0	2.0	2.4	1.6	1.6	1.9	300 µV	1.1:1

Frequency 2-Year Absolute Uncertainty	±2.5 µHz/Hz of setting

Leveled Sine Characteristics

Amplitude Resolution	≥3 digits	
Frequency Resolution	10 kHz [1]	
Phase Noise at 1000 MHz, internal ref [2]	**Offset from Carrier**	**dBc/Hz**
	100 Hz	-70
	1 kHz	-93
	10 kHz	-97
	100 kHz	-105
	1 MHz	-123
Harmonic Distortion	≤-40 dBc	

[1] 1 kHz below 1 MHz.
[2] 600 MHz for 600 M.

Edge Specifications into 50 Ω

Rise Time	≤175 ps	
Leading Edge Aberrations [1]	Within 3 ns from 50 % rising edge	<4.0 % of output
	3 ns to 30 ns	<2 % of output
	After 30 ns	<1 % of output

[1] Applies for Edge amplitudes =>60 mVpp Into VSWR < =1.2:1, 10 GHz BW. Edge aberration measurements are made with a Tektronix MSO6XB.

Edge Operating Characteristics

Amplitude Range (p-p)	5.0 mV to 2.5 V
Resolution	≥3 digits
Adjustment Range	±10 % around each sequence value (indicated below)
Sequence Values	5 mV, 10 mV, 25 mV, 50 mV, 60 mV, 80 mV, 100 mV, 200 mV, 250 mV, 300 mV, 500 mV, 600 mV, 1 V, 2.5 V
Frequency Range	900 Hz to 10 MHz
Jitter (rms), edge to trigger	<5 ps
Duty Cycle	45 % to 55 %

Time Marker Specifications

Cardinal Period 2-year Absolute Uncertainty, internal reference	+- 2.5 µHz/Hz [1]

[1] ±10 µH/Hz within 10 % of the cardinal periods and at 25 ns. Unspecified for > 10 %. For Spike ≥25 ms, period accuracy is specified at cardinal periods only.

Time Marker Operational Characteristics

Time Marker Characteristics	5 s to 500 µs	400 µs to 100 ns	50 to 20 ns	10 ns	5 ns to 500 ps [1]
Wave Shape	spike, square, or 20 %-pulse	spike, square, or 20 %-pulse	spike or square	square or sine	sine
Jitter (rms) within 10 % of cardinal periods	<1 ppm [2]	<150 ps [3]	<15 ps	<15 ps	<5 ps
Cardinal Period Sequence	5-2-1 or 4-2-1				
Adjustment Range	Continuous 5 s to 476.2 ps. Wave shapes are available at least ±10 % around cardinal periods indicated				
Period Resolution	≥4 digits				
Output Level into 50 Ω	>1 V p-p				
Rise time of Square and 20 %-pulse	<1.5 ns				

[1] Minimum cardinal period of 1 ns for 1G Option, 2 ns for 600M Option.
[2] For spike above 25 ms, 2 ppm
[3] For spike wave shape, 300 ps

Wave Generator Specifications

Wave Generator Specifications ±(% of Output + Floor)							
Frequency	**99 % Confidence Level**			**95 % Confidence Level**			**Floor**
	90 d	**1 y**	**2 y**	**90 d**	**1 y**	**2 y**	
10 Hz to 10 kHz	3.0	3.0	3.6	2.3	2.3	2.8	100 µV

Frequency 2-Year Absolute Uncertainty, internal reference	±2.5 µHz/Hz of setting

Wave Generator Characteristics

Waveforms	Sine Wave, Square Wave, and Triangle Wave
Amplitude Range	into 1 MΩ: 1 mV to 120 V p-p
	into 50 Ω: 1 mV to 6.6 V p-p
Amplitude Sequence	1-2-5 or 1-2-4
DC Offset Range	0 % to ± 50 % of p-p amplitude
Frequency Range	10 Hz to 100 kHz
Frequency Resolution	≥4 digits

Pulse Generator Specifications

Pulse Width 2-year uncertainty	±2 ns
Pulse Period 2-year uncertainty	±2.5 µs/s

Pulse Generator Characteristics

Waveform	Positive pulse into 50 Ω
Rise/fall times	<2 ns
Available Amplitudes	2.5 V, 1 V, 250 mV, 100 mV, 25 mV, 10 mV
Pulse Width Range	4 ns to 500 ns
Pulse Period Range	22 ms to 200 ns

Oscilloscope Input Resistance Measurement Specifications

Scope Input Selected	50 Ω	1 MΩ
Measurement Range	40 Ω to 60 Ω	500 kΩ to 1.5 MΩ
2-year Uncertainty	0.10 %	0.10 % [1]
[1] 0.3% for relative humidity >70 %		

Oscilloscope Input Capacitance Measurement Specifications

Scope Input Selected	1 MΩ
Measurement Range	5 pF to 50 pF
2-year Uncertainty	±(5 % of input + 0.5 pF) [1]
[1] Measurement made within 30 minutes of capacitance zero offset.	

Overload Characteristics

Source Voltage	'On' Current Indication	'Off' Current Indication	Maximum Time Limit DC or AC (1 kHz)
5 V to 9 V	100 mA to 180 mA	10 mA	1 s to 60 s

Trigger Signal Characteristics (Pulse Function)

Pulse Period	Division Ratio	Amplitude into 50 Ω (p-p)	Rise Time
22 ms to 200 ns	off/1/10/100	≥ 1 V	≤1 ns

Trigger Signal Characteristics (Time Marker Function)

Time Marker Period	Division Ratio	Amplitude into 50 Ω (p-p)	Rise Time
5 s to 35 ms	off/1	≥1 V	≤1 ns
34.99 ms to 750 ns	off/1/10/100	≥1 V	≤1 ns
749.9 to 7.5 ns	off/10/100	≥1 V	≤1 ns
7.499 to 1.819 ns	off/100	≥1 V	≤1 ns
1.818 ns to 476.2 ps	off/128	≥1 V	≤1 ns

Trigger Signal Characteristics (Edge Function)

Edge Signal Frequency	Division Ratio	Amplitude into 50 Ω (p-p)	Rise Time	Nominal Lead Time
900 Hz to 10 MHz	off/1	≥1 V	≤1 ns	50 ns

Trigger Signal Characteristics (AC Voltage Function)

Voltage Function Frequency	Division Ratio	Amplitude into 50 Ω (p-p)	Rise Time
10 Hz to 10 kHz	off/1	≥1 V	≤1 ns

TV Trigger Signal Characteristics

Trigger Signal Type	Parameters
Field Formats	Selectable NTSC, SECAM, PAL, PAL-M
Polarity	Selectable inverted or non-inverted video
Amplitude into 50 Ω (p-p)	Adjustable 0 V p-p to 1.5 V p-p into 50 Ω load
Line Marker	Selectable Line Video Marker

External Reference Characteristics

With REF CLK set to ext, the frequency uncertainty of AC Frequencies and Marker Periods are the uncertainty of the external 10 MHz. External reference must be a square or pulse signal with a positive peak voltage between 3 V and 5 V and frequency within ±20 μHz/Hz of 10 MHz.