

Section 2
Specifications

GENERAL	
HEIGHT	3.5 in (89 mm)
WIDTH	16.75 in (425 mm)
DEPTH	14.0 in (356 mm)
WEIGHT	35 lb (15.9 kg)
SHIPPING WEIGHT	41 lb (18.6 kg)
OPERATING TEMPERATURE	0 to 50° C
POWER	110, 120, 220, 240 Vac ±10% 50-60 Hz, 100 VA typ
MINIMUM PULSE WIDTH	50 ns
MAXIMUM PULSE WIDTH	CW
MINIMUM PULSE PROFILE	15 ns
MINIMUM PRF	1 Hz (0 Hz for pulse profile)
MINIMUM OFF TIME	200 ns (will count CW)
MINIMUM ON/OFF RATIO	15 dB
RESOLUTION	1 kHz to 1 GHz
GATE TIME	1 ms to 1 μ s (dependent upon resolution)

PULSE PERIOD

ACCURACY	±(20 ns + time base error x PW)
DISPLAY RESOLUTION	3 digits, floating point, 10 ns maximum (Special function available for 10 ns)
RESOLUTION TO GPIB	10 ns
MIN/MAX PULSE PERIOD	10 ns / 9.99 s
MEASUREMENT POINTS	3 to 6 dB below peak

TIME BASE	
CRYSTAL FREQUENCY	10 MHz (TCXO)
STABILITY:	$\pm 1 \times 10^{-7}$ mo
AGING RATE	
SHORT TERM	$\pm 1 \times 10^{-7}$ RMS for one second averaging time
TEMPERATURE	$\pm 1 \times 10^{-7}$ over the range 0 to 50° C
LINE VARIATION	±10% change in line voltage produces frequency shift $< 1 \times 10^{-7}$
WARM-UP TIME	None required
OUTPUT FREQUENCIES	10 MHz, square wave, 1 V peak-to-peak minimum into 50 ohms
EXTERNAL TIME BASE	Requires 10 MHz, 1 V peak-to-peak minimum into 300 ohm
PHASE NOISE	-95 dBc/Hz at 10 Hz from carrier

PULSE WIDTH

ACCURACY	±(20 ns + time base error x PW)
DISPLAY RESOLUTION	3 digits, floating point, 10 ns maximum (Special function available for 10 ns on all measurements)
RESOLUTION TO GPIB	10 ns
MIN/MAX PULSE WIDTH	50 ns / 9.99 s
MEASUREMENT POINTS	3 to 6 dB below peak

Specifications subject to change without notice.



BAND 1 (OPTION)	
MINIMUM FREQUENCY	300 MHz
MAXIMUM FREQUENCY	1 GHz
SENSITIVITY	-15 dBm
CONNECTOR	BNC
MAXIMUM INPUT	+7 dBm peak
DAMAGE LEVEL	+27 dBm peak
AMPLITUDE DISCRIMINATION	10 dB when signals are separated by >100 MHz
MAXIMUM VIDEO VIDEO FREQUENCY <300 MHz VIDEO FREQUENCY >300 MHz SL FREQUENCY >300 MHz	MV = SL - [10 LOG (300 MHz/FV) ⁴] -20 dBm MV = SL - 20 dB
MAXIMUM FM/CHIRP	Carrier frequency cannot be <300 MHz or >1000 MHz.
GATE ERROR	GE = (± 0.07) / (GW)
DISTORTION ERROR	DE = (± 0.03) / (PW - 3 X 10 ⁻⁸ seconds)
AVERAGING JITTER	AJ = $\pm 2 \times \sqrt{[RES / ((GW)(AVE))]}$
FREQUENCY LIMITS	N/A
CENTER FREQUENCY	N/A



BAND 2	BAND 3 (OPTION)
950 MHz	26.5 GHz
18 GHz (585) / 26.5 GHz (588)	110 GHz
-20 dBm (950 MHz to 12.4 GHz) -15 dBm (12.4 to 18 GHz) -10 dBm (18 to 26.5 GHz)	26.5 to 60 GHz -20 dBm (-25 dBm typ.) 60 to 110 GHz -15 dBm (-20 dBm typ.)
Precision N (585) / APC 3.5 (588)	Kwik Jack (accepts 890 cabling kit)
+7 dBm peak	+5 dBm peak
+40 dBm peak (10 watts)	+10 dBm peak
10 dB if separated ≥ 50 MHz, if <10 dB, will count one signal accurately if separated by >200 MHz.	20 dB when signals are separated by >100 MHz
MV = SL -20 dB	MV = 15 mV peak-to-peak max
MV is the maximum video amplitude in dBm. SL is the input signal level in dBm. FV is the frequency component of the video in Hz.	
20 MHz peak to peak	Auto Mode: 20 MHz peak to peak Center Frequency Mode: 150 MHz peak to peak
Measured Frequency is a function of Average Frequency and Geometric Center Frequency when FM / chirp is greater than 150 MHz and nonsymmetrical.	
GE = $(\pm 0.01) / (GW)$	GE = $(\pm 0.03) / (GW)$
GE is the gate error in Hz. GW in seconds is the logical AND of inhibit and pulse width -3×10^{-9} seconds	
DE = $(\pm 0.03) / (PW - 3 \times 10^{-9} \text{ seconds})$	DE = $(\pm 0.02) / (PW) - 3 \times 10^{-9} \text{ seconds}$
DE is distortion error in Hz. PW is pulse width in seconds.	
AJ = $\pm \sqrt{[RES / ((GW)(AVE))]}$	AJ = $\pm 2 \times \sqrt{[RES / ((GW)(AVE))]}$
AJ is the RMS averaging jitter in Hz. RES is the specified instrument resolution in Hz. (This is true up to 1 MHz resolution. Above 1 MHz resolution RES is 10^6 Hz.) GW in seconds is the logical AND of inhibit and pulse width -3×10^{-9} seconds. AVE is the number of specified count averages.	
Instrument will ignore signals outside of frequency limits. 10 MHz resolution, ± 50 MHz accuracy. Unwanted signals must be greater than 200 MHz from either limit and 50 MHz from desired signal.	N/A
Will lock on signals ± 40 MHz from the entered frequency at sensitivity 10 MHz resolution	Instrument assumes any signals present to be in the range ± 2 GHz from the specified center frequency and calculates the harmonic number based on this assumption



BAND 1(OPTION)

ACQUISITION TIME (PULSE)

$$AQ = 1 \text{ PRF} + 50 \times 10^{-4} \text{ seconds}$$

ACQUISITION TIME (CW)

$$AQ = 1 \text{ PRF} + 50 \times 10^{-4} \text{ seconds}$$

TOTAL ACCURACY (PULSE)

$$ACC = \pm GE \pm DE \pm AJ \pm \text{Time Base Error}$$

TOTAL ACCURACY (CW)

$$ACC = \text{Time Base Error} \pm 1 \text{ count}^*$$

* (Based on measurement average)

MEASUREMENT TIME

$$MT = [(4)(PP)] / [(GW)(RES)]$$

**BAND 2****BAND 3 (OPTION)**

(Freq Limits): $AQ = [FH] [(4 \times 10^{-12}) + (4 \times 10^{-8} / PRF)] + 60 / PRF + [(2 \times 10^{-5})(PP)] / GW + .1$
 (Center Freq): $AQ = 72 / PRF + [(2 \times 10^{-5})(PP)] / GW + .1$

(Automatic): $AQ = 70 / PRF + [(6 \times 10^{-3})(PP)] / GW + 0.2$
 (Center Freq): $AQ = 70 / PRF + [(8 \times 10^{-4})(PP)] / GW + 0.2$
 $AQ = 70 / PRF + 0.2$

(Freq Limits): $AQ = [FH] [(4 \times 10^{-12}) + (4 \times 10^{-8} / PRF)] + 60 / PRF + .1$
 (Center Freq): $AQ = 72 / PRF + .1$

AQ is the acquisition time in seconds. FH is the difference between frequency limit high and frequency limit low in Hz. PRF is the specified instrument PRF in Hz. PP is the period of the input signal in seconds. GW in seconds is the logical AND of inhibit and pulse width - 3×10^{-8} seconds.

$ACC = \pm GE \pm DE \pm AJ \pm \text{Time Base Error}$

$ACC = \pm GE \pm DE \pm AJ \pm \text{Time Base Error}$

$ACC = \text{Time Base Error} \pm 1 \text{ count} *$
 *(Based on measurement average)

$ACC = \text{Time Base Error} \pm N^2 \text{ counts}$
 $N = \text{Freq} / 20 \text{ GHz}$
 (Based on measurement averaging)

$MT = (PP) / [(GW)(RES)]$

$MT = [(4)(PP)] / [(GW)(RES)]$

MT is the measurement time in seconds. GW in seconds is the logical AND of inhibit and pulse width - 3×10^{-8} seconds. PP is the period of the input signal in seconds. RES is the specified instrument resolution in Hz. (This is true up to 1 MHz resolution. Above 1 MHz resolution RES is 10^6 Hz.)