SPECIFICATION

Introduction

This section includes electrical, physical, environmental, and safety characteristics of this instrument. Changes to this specification, due to options are listed in the Options section.

ELECTRICAL CHARACTERISTICS

The following tables of electrical characteristics and features apply to the 494/494P Spectrum Analyzer after a 30-minute warmup, except as noted. The Performance Requirement column defines some characteristics in quantitative terms and in limit form. The Supplemental column explains performance requirements or provides performance information. Statements in this column are not considered to be guaranteed performance and are not ordinarily supported by a performance check procedure. Procedure to verify performance requirements are provided in the Performance section of the service manual.

The instrument microprocessor performs an internal calibration check each time power is turned on and verifies that the instrument frequency and amplitude performance is as specified. An operation or functional check procedure, which does not require external test equipment or technical expertise, is provided in the operators instructions to satisfy most incoming inspections and help familiarize the operator with the capabilities of the instrument.

Verification of Tolerance Values

Compliance tests of specified limits, listed in the Performance Requirement column, shall be performed after sufficient warmup time and preliminary preparation (such as front panel adjustments). Measurement shall be made by instruments that do not affect the values measured. Measurement tolerance of test equipment should be negligible in comparison to the specified tolerance and when not negligible, the error of the measuring device shall be added to the tolerance specified.

Table 2-1
FREQUENCY RELATED CHARACTERISTICS

Characteristic	Performance Requirement	Supplemental Information
Center Frequency Range (internal mixer)		10 kHz to 21 GHz. Tuned by the front panel knob or front panel Data Entry keyboard.
Accuracy (after the front panel CAL has been performed)		Accuracy of the center frequency is a function of the accuracy to which the center frequency is set between sweeps (covered by CF accuracy specification), and the amount of center frequency drift during a sweep. Center frequency drift can be significant during the first 30 min. after turn-on, or after a change in ambient temperature.
Bands 1 & 5-12 with Span/Div ≥200 kHz, and Bands 2-4, with Span/Div ≥100 kHz	±[(20% of Span/Div or Resoln Bandwidth, whichever is greater) + (CF × ref freq error) + (N × 15 kHz)]	Refer to "IF Frequency, LO Range, and Harmonic Number" specification for value of N. The 1st LO is unlocked in these spans. When the center frequency is changed within a band, a settling time of 1 s/GHz change in center frequency, divided by N should be allowed.
Bands 1 & 5-12 with Span/Div ≤200 kHz and bands 2-4 with Span/Div ≤100 kHz	±[(20% of Span/Div or Resoln Bandwidth, whichever is greater) + (CF × ref freq error) + (2N + 25 Hz)]	The 1st LO is phase locked in these spans

Table 2-1 (cont)

Characteristic	Performance Requirement	Supplemental Information
CF Drift (constant ambient temperature and fixed center frequncy) After 30 minute warmup: Bands 1 & 5-12 with Span/Div ≥200 kHz, and Bands 2-4 with Span/Div ≥100 kHz		Since the center frequency is corrected before each sweep the only error observed is during sweep time. ≤(25 kHz)N per minute of sweep time
Bands 1 & 5-12 with Span/Div ≤200 kHz Bands 2-4 with Span/Div ≤100 kHz		≤150 Hz per minute of sweep time
After 1 hour warmup: Bands 1 & 5-12 with Span/Div ≥200 kHz and Bands 2-4 with Span/Div ≥100 kHz		≤(5 kHz) N per minute of sweep time
Bands 1 & 5-12 with Span/Div ≤200 kHz and Bands 2-4 with Span/Div ≤100 kHz	≤50 Hz per minute of sweep time	
Readout Resolution		At least 10% of Span/Div
Signal Counter Accuracy	±[(Counter frequency × frequency reference error) + (10 + 2N)Hz + 1 LSD]	
Sensitivity	Signal level at center screen must 20 dB or more above the average noise level and within 60 dB of the Reference Level	
Readout Resolution		1 Hz through 1 GHz, selectable with COUNT RESOLN control
Reference Frequency Error Aging Rate		1×10^{-7} for first six months then less than 1×10^{-7} per year
Accuracy during warmup at 25°C (ambient) and 30 minutes after power on		Within 5×10^{-8} of the frequency after 24 hours
Temperature sensitivity		Within 2×10^{-8} over the instrument operating range of −15°C to −55°C, referenced to −25°C
Residual FM (short term) after 1 hour warmup: Bands 1 & 5-12 with Span/Div ≥200 kHz, and bands 2-4 with Span/Div ≥100 kHz	≤(7 kHz)N total excursion in 20 ms	
Bands 1 & 5-12 with Span/Div ≤200 kHz Bands 2-4 with Span/Div ≤100 kHz	≤(10+2N)Hz total excursion in 20 ms	

Table 2-1 (cont)

Characteristic	Performance Requirement	Supplemental Information
"Static" Resolution Bandwidth (6 dB down)	30 Hz then 100 Hz to 1 MHz in decade steps plus an AUTO position. Resolution bandwidth is within 20% of the selected bandwidth.	In AUTO position the bandwidth is automatically selected by an internal computer whose output depends on the setting of the SPAN/DIV, TIME/DIV, Vertical Display, and Video Filter selectors. When the RESOLUTION BANDWIDTH and TIME/DIV selectors are set to AUTO the microcomputer selects the optimum resolution for the SPAN/DIV settings.
Shape Factor (60 dB/6 dB)	7.5:1 or less, and 15:1 or less for 30 Hz resolution bandwidth.	
Noise Sidebands	At least −75 dBc at 30 times the resolution offset (−70 dBc for resolution bandwidths ≤100 Hz).	
Video Filter		
Narrow		Reduces video bandwidth to approximately 1/300 of the selected resolution bandwidth and 1/100 for 30 Hz bandwidth.
Wide		Reduces video bandwidth to approximatery 1/30 of the selected resolution bandwidth and 1/10 for 30 Hz bandwidth.
Pulse Stretcher Fall-time		30 μs/div (±50%)
Frequency Span/Div Range—in a 1-2-5 sequence with the SPAN/DIV control, or by two significant digits from the Data Entry keyboard		Two additional positions provide full band (MAX Span) display or 0 Hz (Zero Span) display.
Accuracy/Linearity	Within 5%, of the selected Span/Div over the center 8 divisions of a 10 division display.	

Band	Narrow Span/Div	Wide Span/Div
1-3 (0-7.1 GHz)	50 Hz	200 MHz
4-5 (5.4-21 GHz)	50 Hz	500 MHz
6 (18-26 GHz)	50 Hz	1 GHz
7 9 (26-90 GHz)	50 Hz	2 GHz
10 (75-140 GHz	50 Hz	5 GHz
11-12 (110-325 GHz)	50 Hz	10 GHz

Table 2-1 (cont)

Characteristic	Performance Requirement		Supplemental Information
[a]Frequency Response Coaxial (direct) Input	About the mid-point (mean) between two extremes	Referenced to 100 MHz	Frequency response is measured with 10 dB of RF attenuation and Peaking optimized for each center frequency setting, when applicable. Response includes the effect of input vswr, mixing mode (N), gain variation, pre-selector, and mixer. Digital storage typically increases errors by −0.5%. Display flatness is typically 1 dB greater than frequency response. Refer to Rackmount/Benchtop data (Option 30, 31, and 32) in the Options section for variance.
Band 1 50 kHz-1.8 GHz 10 kHz-1.8 GHz	±1.5 dB ±2.0	±2.5 dB ±3.0 dB	
Band 2 1.7 5.5 GHz	±2.5 dB	±3.5 dB	
Band 3 3.0-7.1 GHz	±2.5 dB	±3.5 dB	
Band 4 5.4-18.0 GHz	±3.5 dB	±4.5 dB	
Band 5 15.0-21.0 GHz	±5.0 dB	±6.5 dB	
External Tektronix High Performance Waveguide Mixers			
Band 6 18.0-26 GHz	±3.0 dB	±6.0 dB	
Band 7 26.0-40.0 GHz	±3.0 dB	±6.0 dB	
Band 8 33.0-60.0 GHz	±3.0 dB	±6.0 dB	
Band 9 50.0-90.0 GHz			Typically ±3 dB over any 5 GHz bandwidth
Band 10 75.0-140.0 GHz			Typically ±3 dB over any 5 GHz bandwidth
Band 11 110-220 GHz			Typically ±3 dB over any 5 GHz bandwidth
Band 12 170-325 GHz			Typically ±3 dB over any 5 GHz bandwidth

[a]Refer to "Verification of Tolerance Limits" at the beginning of this specification.

Table 2-2
IF Frequency, LO Range, and Harmonic Number (N)

Band and Freq Range	LO Range and Harmonic (N)	1st IF (MHz)
1 (0—1.8 GHz)	2072-3872 (1−)	2072
2 (1.7—5.5 GHz)	2529-6329 (1−)	829
3 (3.0—7.1 GHz)	2171-6271 (1+)	829
4 (5.4—18.0 GHz)	2072-6276 (3−)	829
5 (15—21 GHz)	4309-6309 (3+)	2072
6 (18—26 GHz)	2655-4071 (6−)	2072
7 (26—40 GHz)	2443-3793 (10+)	2072
8 (33—60 GHz)	3792-5790 (10+)	2072
9 (50—90 GHz)	3195-5862 (15+)	2072
10 (75—140 GHz)	3170-6000 (23+)	2072
11 (110—220 GHz)	2917-5790 (37+)	2072
12 (170—325 GHz)	2998-5841 (56+)	2072

Table 2-3
AMPLITUDE RELATED CHARACTERISTICS

Characteristic	Performance Requirement	Supplemental Information
Vertical Display Modes		10 dB/Div, 2 dB/Div, and linear. Any integer between 1-15 dB/Div can also be selected with the Data Entry keyboard.
Reference Level (full screen) Range		−117 dBm to −40 dBm: +40 dBm includes 10 dB of IF gain reduction. +30 dBm is the maximum safe input for log mode. In LIN mode, range is 50 nV/Div to 2 V/Div, 1 W maximum safe input
Steps		In the 10 dB/DIV display mode, steps are 10 dB for the coarse mode and 1 dB for the FINE mode. In the 2 dB/DIV mode, steps are 1 dB for coarse and 0.25 dB for FINE. When the dB/Div is set through the Data Entry keyboard, the coarse steps correspond to the display mode. The FINE steps are 1 dB when the mode is 5 dB/Div or more and 0.25 dB/Div for display modes of 4 dB/Div or less (referred to as ΔA mode). In LIN mode the steps are in equivalent 1 dB increments for FINE and in a 1-2-5 Volts/Div sequence for coarse.

Table 2-3 (cont)

Characteristic	Performance Requirement	Supplemental Information
Accuracy		Accuracy is a function of RF attenuation, IF gain, resolution bandwidth, display mode, calibrating source (i.e., internal calibrator), frequency band and response. Refer to accuracies of these characteristics. When the CAL button is activated the processor runs a calibrating routine, which if completed, reduces the REF LEVEL error between different resolution bandwidths. Also, if the instrument ambient temperature is changed after a calibration is run, the REF LEVEL error typically can change ±0.05 dB/°C but may increase to ±0.15 dB/°C with some instrument settings. The input RF attenuator steps 10 dB for reference level changes above 30 dBm (−20 dBm when MIN NOISE is active) unless the MIN RF ATTEN setting is greater than zero. The IF gain increases 10 dB for each 10 dB reference level change below −30 dBm (−20 dBm for MIN NOISE mode).
Display Dynamic Range		80 dB maximum, for log mode, and 8 divisions linear
Accuracy	±1.0 dB/10 dB to a maximum cumulative error of ±2.0 dB over 80 dB range ±0.4 dB/2 dB to a maximum cumulative error of ±1.0 dB over 16 dB range LIN mode is ±5% of full scale	
RF Attenuator Range		0-60 dB in 10 dB steps
Accuracy *Dc to 4 GHz	Within 0.3 dB/10 dB to a maximum of 0.7 dB over the 60 dB range	
4 GHz to 18 GHz	Within 0.5 dB/10 dB to a maximum of 1.4 dB over the 60 dB range	
IF Gain Range		87 dB of gain increase, 10 dB of gain decrease (MIN NOISE activated), in 10 dB and 1 dB steps.
Accuracy	Gain steps are monotonic (same direction) with the following limits: Within 0.2 dB/dB to a maximum of 0.5 dB/9 dB, except at the decade transistions of 19 to −20 dBm, −29 to −30 dBm, −39 to −40 dBm, −49 to −50 dBm, and −59 to −60 dBm: where an additional 0.5 dB can occur, for a total of 1.0 dB per decade. Maximum deviation over the 97 dB range is within ±2 dB.	

Table 2-3 (cont)

Characteristic	Performance Requirement	Supplemental Information
Gain Variation between Resolution Bandwidths: (after CAL routine has been run)		Measured at −20 dBm MIN DISTORTION mode
With respect to 1 MHz filter	Less than ±0.4 dB	
Between any two filters	Less than 0.8 dB	
Differential Amplitude Measurement		ΔA mode provides differential measurements in 0.25 dB increments.
Range		0 dB above to 48 dB below the reference level established when the ΔA mode was activated. DO NOT USE ΔA mode above +30 dBm reference level.
Accuracy		dB Difference / Steps / Error: 0.25 / 1 / 0.15 dB; 2 / 8 / 0.4 dB; 10 / 40 / 1.0 dB; 50 / 200 / 2.0 dB
Spurious Responses Residual (no input signal), referenced to mixer input, and fundamental mixing for bands 1-3.	−100 dBm or less	
Intermodulation products 50 kHz to 1.8 GHz (Band 1 and 1.8 to 21.0 GHz for Bands 2-4)	At least −70 dBc from any two on screen signals within any frequency span	≥ −100 dBc when signals are separated 100 MHz or more in preselected bands
1.7-1.8 GHz (Band 2 only)	At least −70 dBc from any two −40 dBm signals within any frequency span	
Harmonic Distortion 50 kHz-1.8 GHz (Band 1)	At least −60 dBc below a full screen signal in MIN DISTORTION mode	
1.7-21 GHz	At least −100 dBc	
LO Emission, with no (0) RF attenuation	Less than −70 dBm to 21 GHz	

*Refer to "Verification of Tolerance Limits" at the beginning of this specification.

Table 2-4
SENSITIVITY

Equivalent maximum input noise for each resolution bandwidth, using the internal mixer for bands 1–5 (50 kHz–18 GHz), and Tektronix High Performance Waveguide Mixers for bands 6–12 (18–325 GHz).

Band/Frequency	Equivalent Input Noise in dBm versus Resolution Bandwidth					
	30 Hz	100 Hz	1 kHz	10 kHz	100 kHz	1 MHz
Band 1 50 kHz-1.8 GHz	-121	−118	−110	−100	· 90	−80
Bands 2 & 3 1.7-7.1 GHz	−121	−118	−110	100	−90	·80
Band 4 5.4-12.0 GHz	--106	−103	-95	−85	−75	−65
Band 4 12.0-18.0 GHz	−101	−98	90	−80	70	−60
Band 5 15.0-21.0 GHz	−96	·93	−85	−75	−65	55
[a]Band 6 18.0-26.5 GHz	−111	108	−100	·90	--80	−70
[a]Band 7 26.5-40.0 GHz	−106	−103	−95	85	−75	−65
[a]Band 8 33.0-60.0 GHz	-106	−103	-95	--85	·75	−65
[a]Band 9 50.0-90.0 GHz	Typically 95 dBm for 1 kHz bandwidth at 50 GHz, degrading to 85 dBm at 90 GHz					
[a]Band 10 75.0-140 GHz	Typically −90 dBm for 1 kHz bandwidth at 75 GHz, degrading to −75 dBm at 140 GHz					
[a]Band 11 110-220 GHz	Typically −80 dBm for 1 kHz resolution bandwidth at 110 GHz, degrading to ·65 dBm at 220 GHz					
[a]Band 12 170-325 GHz	Typically −70 dBm for 1 kHz resolution bandwidth at 170 GHz, degrading to −55 dBm at 325 GHz					

[a]Tektronix High Performance Waveguide Mixers

Table 2-5
INPUT SIGNAL CHARACTERISTICS

Characteristic	Performance Requirement	Supplemental Information
RF INPUT		Type N female connector, specified to 21 GHz.
Input Impedance		50 Ω; vswr with RF attenuation ≥10 dB: 50 kHz-2.5 GHz: 1.3:1 (typically 1.2:1) 2.5-6.0 GHz; 1.7:1 (typically 1.5:1) 6.0-18 GHz: 2.3:1 (typically 1.9:1) 18-21 GHz: 3.5:1 (typically 2.7:1)
Maximum Safe Input		−30 dBm (1 W) continuous, 75 W peak, pulse width 1 μs or less with a maximum duty factor of 0.001 (attenuator limit). DO NOT APPLY DC VOLTAGE TO THE RF INPUT
1 dB Compression Point (minumum)		
1.7-2.0 GHz	28 dBm	With no RF attenuation
Otherwise	−18 dBm	With no RF attenuation
Optimum level for linear operation		−30 dBm, referenced to input mixer. This is achieved in MIN DISTORTION mode when not exceeding full screen display.
External Mixer		Input for an IF signal and the source of bias for external waveguide mixers. Bias range +1.0 to −2.0 V, 70 Ω source.
EXTERNAL REFERENCE		
Frequency	1, 2, 5, or 10 MHz, ±5 ppm	
Power	15 dBm to +15 dBm.	
Waveshape		Sinewave, ECL or TTL. (Allowable duty cycle symmetry is 40-60%)
Input Impedance		50 Ω ac, 500 Ω dc
HORIZ/TRIG		Dc coupled input for horizontal drive and ac coupled for trigger signal
Input Voltage Range		
Sweep		0 to +10 V (dc + peak ac) for full screen deflection
Trigger	1.0 V peak, frequency 15 Hz to 1 MHz	Maximum input: 50 V (dc + peak ac). Maximum ac input: 30 Vrms to 10 kHz then derate linearly to 3.5 Vrms at 100 kHz and above. Pulse width is 0.1 μs minimum.
MARKER/VIDEO		Video, 0 to +4 V, if Ext Video is selected; or, it interfaces with the 1405 TV Sideband Adapter to insert an externally generated marker on internal video. Marker 0 to −10 V
ACCESSORY (J104)		
Pin 1—External Video Select		TTL logic 0 selects the External Video Input
Pin 2—External Preselector Out		±15 V maximum
Pin 3—External Preselector Return		
Pin 5—Chassis Gnd		

Table 2-6
OUTPUT SIGNAL CHARACTERISTICS

Characteristic	Performance Requirement	Supplemental Information
Calibrator (CAL OUT)	−20 dBm ± 0.3 dB at 100 MHz (phase locked to reference oscillator)	100 MHz comb of markers provide amplitude calibration at 100 MHz and markers for frequency and span calibration, to 1.0 GHz
1st LO and 2nd LO		Provides access to the output of the respective local oscillators. 1st LO +7.5 dBm minimum, to a maximum of +15 dBm; 2nd LO −22 dBm minimum, to a maximum of +15 dBm. THESE PORTS MUST BE TERMINATED IN 50 Ω AT ALL TIMES.
EXTERNAL MIXER		In the EXTERNAL MIXER mode, bias range is +1.0 to −2.0 V; or, with change of internal straps, −1.0 to +2.0 V.
VERTical		Provides 0.5 V +5% of signal per division of video that is above and below the centerline. Source impedance approximately 1 kΩ.
HORIZ Out		Provides 0.5 V/div either side of center. Full range −2.5 V to −2.5 V. Source impedance approximately 1 kΩ.
PEN LIFT		TTL compatible, nominal ±5 volts to lift pen.
10 MHz IF		Access to the 10 MHz IF. Output level is approximately −5 dBm for a full screen signal at −30 dBm reference level. Nominal impedance approximately 50 Ω.

Table 2-7
GENERAL CHARACTERISTICS

Characteristic	Performance Requirement	Supplemental Information
IEEE Std 488-1978 Port (GPIB) 494P		In accordance with IEEE 488 standard, and Tektronix codes and format standard Version 81.1
PROBE POWER		Provides operating voltages for active probes. Output voltages are: Pin 1, +15 V @ 100 mA max. Pin 2, ground. Pin 3, −15 V @ 100 mA max. Pin 4, +15 V @ 100 mA max. (see Figure 2-1)
Sweep		Triggered, auto, manual, and external.
Sweep Time	20 μs/Div to 5 s/Div in 1-2-5 sequence (10 s/Div available in AUTO).	
Accuracy	±5%.	
Triggering	2 division or more of signal for internal; and 1.0 V peak, minimum, for external	
Crt Readout		Displays: Reference level, frequency, vertical display mode, frequency span/div, frequency range, resolution bandwidth, RF attenuation, internal or external frequency reference, and GPIB states (494P only)
Non-volatile Memory		Instrument settings, displays, calibration offsets, and preselector peaking codes for each band are stored in back-up battery powered CMOS RAM. Battery life @ +55°C instrument ambient temperature, is 1-2 years. At +25°C, life should be greater than 5 years. Retention of data in non-volatile memory will occur over the range of −15°C to +55°C operating, and −30 to −85°C non-operating.

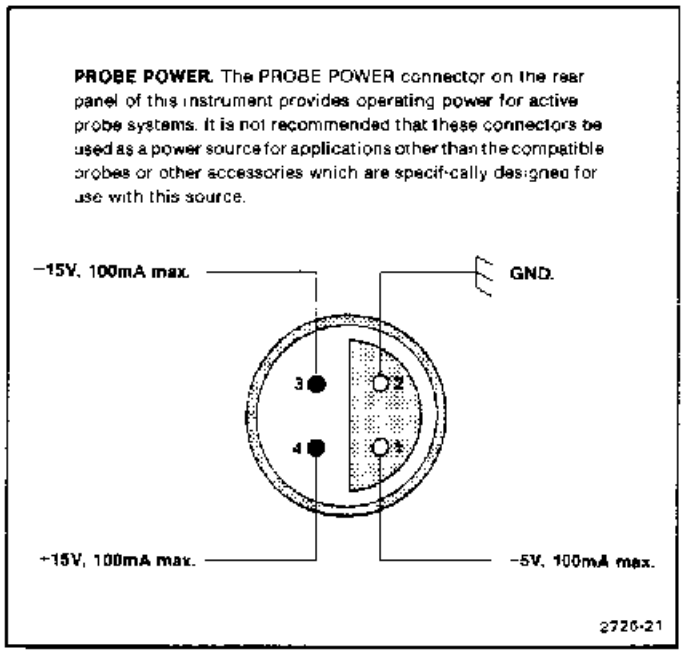

Figure 2-1. Probe Power connector pin out.

Table 2-8
POWER REQUIREMENTS

Characteristic	Description
Input Voltage	90 to 132 Vac or 180 to 250 Vac, 48 to 440 Hz.
Power	
Power	At 115 V, 60 Hz: 210 watts maximum, 3.2 amperes.
Leakage Current	5 mA maximum

NOTE

If power to this instrument is interrupted, it may be necessary to re-initialize the microcomputer; when power is restored, turn the POWER switch OFF for 5 seconds then back ON.

Table 2-9
ENVIRONMENTAL CHARACTERISTICS

Meets MIL T-28800C, type III class 3, style C specifications, comprised of the following:

Characteristic	Description
Temperature	
Operating and Humidity	−10 to +55°C/95% (- 5%, + 0%) relative humidity. (Instrument is tested and meets + 15 to +55°C)
Non-operating	62 to + 85°C.

Table 2-9 (cont)

Characteristic	Description
NOTE *After storage at temperatures below the operating range, the microcomputer may not initialize on power-up. If so, allow the instrument to warm up for 15 minutes and re-initialize the microcomputer by turning the POWER Off for 5 seconds then back On.*	
Altitude	
Operating	15,000 feet
Non-operating	40,000 feet
Humidity (Non-operating)	Five cycles (120 hours) in accordance with Mil-Std-810
Vibration	
Operating (instrument secured to a vibration platform during test)	MIL-Std-810,Method 514 Procedure X (modified). Resonant searches along all three axis at 0.020 inch displacement, frequency varied from 5-55 Hz for 15 minutes. All major resonances must be minimum/axis plus dwell at the resonant frequency, or 55 Hz if no resonance is found for 10 minutes minimum. Total vibration time about 75 minutes.
Shock (operating and non-operating)	Three shocks of 30 g, one-half sine, 11 ms duration each direction along each major axis. Guillotine-type shocks. Total of 18 shocks.
Transit drop (free fall)	8 inch, one per each of six faces and eight corners. (Instrument is tested and meets drop height of 12 inches.)
Electromagnetic Interference (EMI)	Meets requirements described in Mil-Std-461B Part 4, except as noted

	Test Method	Remarks
Conducted Emissions	CEO1—60 Hz to 15 kHz.	1 kHz to 15 kHz only.
	CEO3—15 kHz to 50 MHz power leads.	15 kHz to 50 kHz, relaxed by 15 dB.
Conducted Susceptibility	CSO1—30 Hz to 50 kHz power leads.	Full limits.
	CSO2—50 kHz to 400 MHz power leads.	Full limits.
	CSO6—spike power leads.	Full limits.
Radiated Emissions	REO1—30 Hz to 50 kHz magnetic field.	Relaxed by 10 dB for fundamental to 10th harmonic of power line. Exceptioned, 30 kHz to 36 kHz.
	REO2—14 kHz to 10 GHz.	Full limit.
Radiated Susceptibility	RSO1—30 Hz to 50 kHz.	Full limit.
	RSO2—Magnetic Induction	To 5 A only
	RSO3—14 kHz to 10 GHz	Up to 1 GHz

Table 2-10
PHYSICAL CHARACTERISTICS

Characteristic	Description
Weight (standard accessories and cover, except manuals)	52 pounds (24 kg) maximum
Dimensions	
Without front cover, handle, or feet	6.9 X 12.87 X 19.65 inches (175 X 327 X 499 millimeters)
With front cover, feet, and handle	9.15 X 15.05 X 23.1 inches (232 X 382 X 587 millimeters) with the handle folded back over the instrument, 28.85 inches (732.8 mm) with the handled fully extended

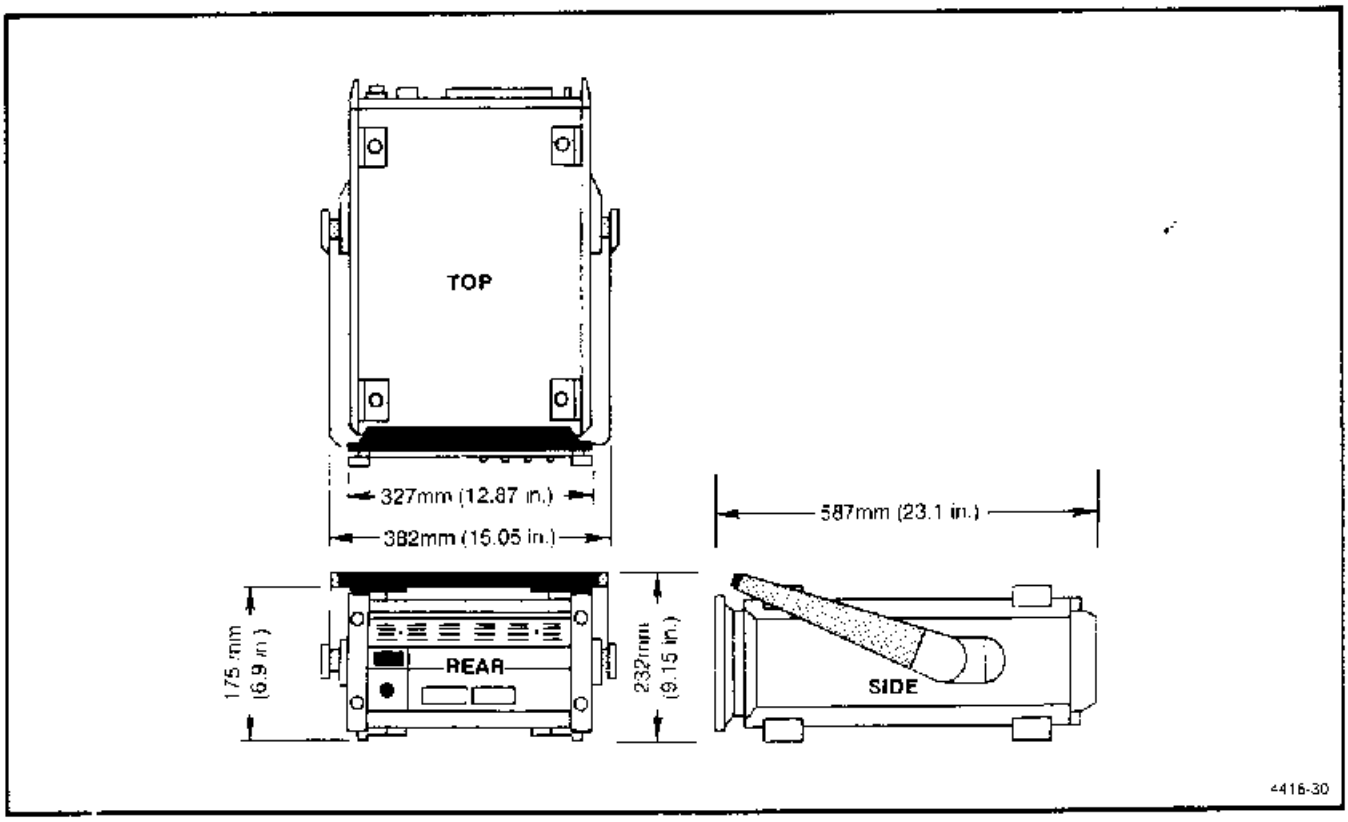

Figure 2-2. 494/494P Dimensions.

Table 2-11
494/494P SAFETY STANDARD AND REGULATORY REQUIREMENT CONFORMANCE

Subject	Description
Safety Standards	
CSA	Electrical Bulletin
FM	Electrical Utilization Standard Class 3820
ANSI C39.5	Safety Requirements for Electrical and Electronic Measuring and Controlling Instrumentation
IEC 348 (2nd edition)	Safety Requirements for Electronic Measuring Apparatus
Regulatory Requirement	
VDE 0871 Class B	Regulations for RFI Suppression of High Frequency Apparatus and Installations