

SECTION I

GENERAL INFORMATION

1-1. SCOPE

This manual provides general information, installation data, operating instructions, circuit descriptions, maintenance data, performance checks, calibration procedures, parts lists, and circuit diagrams for the Systron-Donner (Microwave Division) Model 5000A Sweeper Mainframe.

The Model 5000A Sweeper Mainframe, hereinafter referred to as the Model 5000A, the 5000A, or the mainframe, is shown in Figure 1-1 with a typical RF plug-in installed. Instruction manuals for the various RF and adapter plug-ins are supplied separately with each plug-in, and the information contained in these manuals is not duplicated herein.

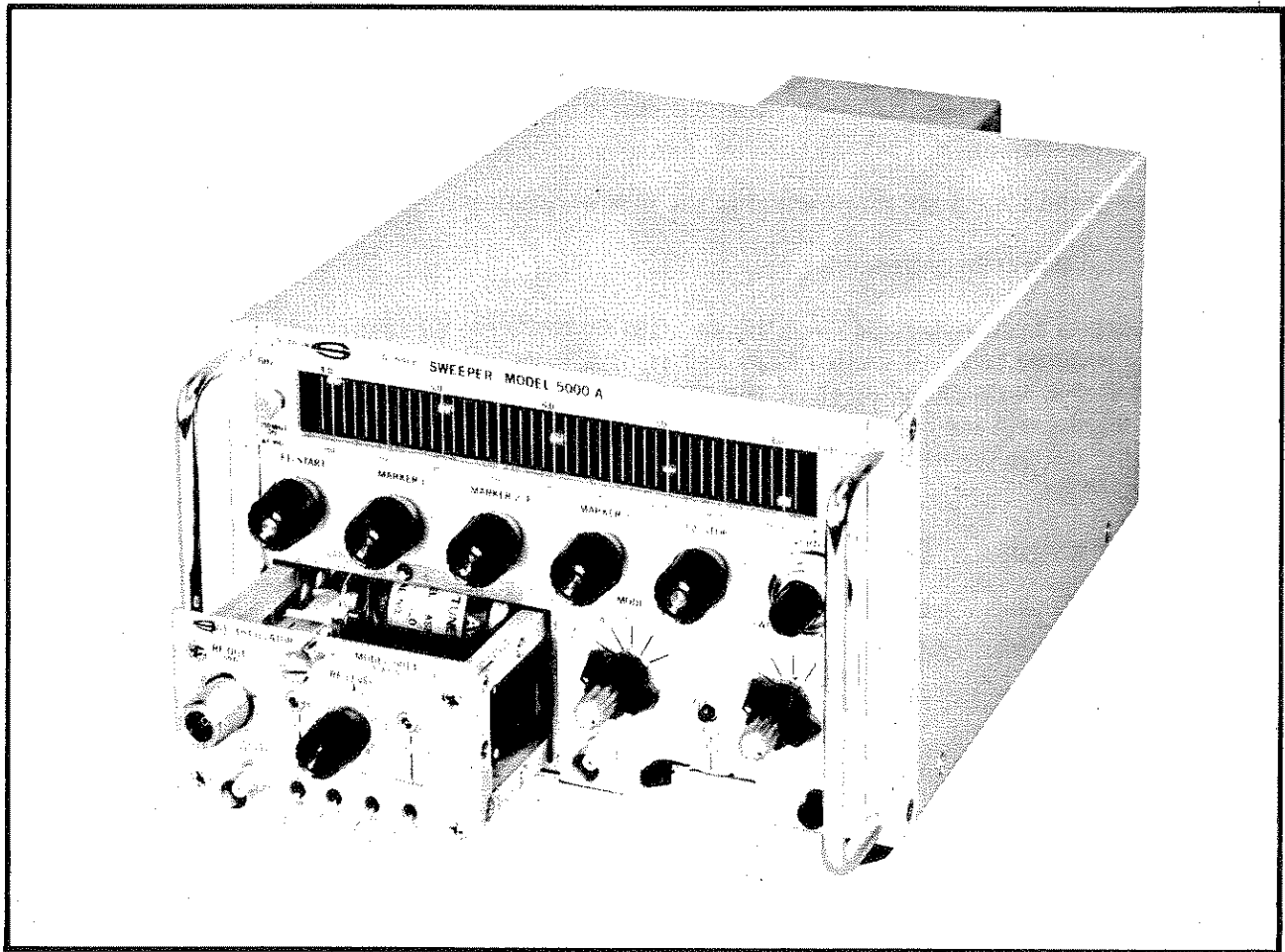


Figure 1-1. Model 5000A Sweeper Mainframe

1-2. DESCRIPTION OF EQUIPMENT

The Model 5000A accepts a variety of swept RF generator plug-in units operating over the 100 kilohertz to 26.5 gigahertz region. Each RF plug-in is supplied with a plastic frequency dial scale calibrated for the range of the plug-in. This dial scale is attached to the mainframe with the plug-in for simple frequency range changes.

GENERAL INFORMATION

Model 5000A

Major subassemblies of the 5000A are the power supply module, the power supply regulator boards and rear-panel mounted regulator transistors, two sweep generator boards, three mode generator boards, a marker generator board, the dial system assembly, and front-panel mounted operating mode switches. Most of the printed circuit assemblies are interconnected with the 5000A through chassis-mounted board-edge connectors.

1-3. CAPABILITIES AND PERFORMANCE

The Model 5000A provides versatile power supply and control signal outputs for operation of swept microwave RF sources to cover the electromagnetic spectrum presently in common use. These RF sources are intended for use in laboratory or field tests of electronic communications components, subsystems, and systems by offering a precisely-calibrated alternative to time-consuming point-by-point testing of amplitude versus frequency characteristics over wide ranges.

The power supplies provide four separate outputs for maximum versatility of plug-in operation.

Detailed performance specifications for the Model 5000A are given in Table 1-1. Detailed performance specifications for the various RF and sweeping current supply plug-in units are supplied in the applicable manuals.

Salient features of the 5000A are summarized in the following paragraphs.

1-3.1 External Power Requirements

The 5000A operates from sinusoidal single-phase 50 or 60 Hertz (to 400 Hertz on special order) power lines supplying nominal levels of 94 to 127 or 187 to 253 volts rms (root mean square). These supply voltages are available throughout most of the world. The IEC-approved power line connector on the chassis of the 5000A will readily mate with a variety of power cables available locally to meet specific power connector pin configurations. A power cable is supplied for connection to grounded 115 volt power line receptacles.

1-3.2 Output Range

The frequency range of the 5000A is determined by the RF plug-in unit used. Each RF plug-in covers a single band with the operating frequency indicated on a slide rule dial accurate to within one percent of the dial reading.

A sweeping current power supply plug-in, Model 5222A, is also available for the 5000A. The output current, up to one Ampere, is indicated on the supplied dial scale.

1-3.3 Wide Sweep Capacity

Some RF plug-in units are available to cover extreme bandwidths. These units sweep over a range of several octaves in a single band.

1-3.4 Multiple Sweep Modes

Several operating modes are available: F1-F2 sweep mode, commonly called *wide* sweep mode, allows a frequency sweep to be started at any desired frequency within the range of the plug-in and terminated at any other such frequency. For narrow sweeps, $F_c \pm \Delta F$ sweep mode (commonly called ΔF mode) allows the output of the plug-in to be swept or deviated symmetrically about a selected center frequency. The center frequency and deviation are calibrated functions. A non-swept (CW) output mode is also available, or the frequency may be controlled by a voltage source external to the 5000A.

1-3.5 Extended Sweep Rates

Sweep repetition rates of less than 10 milliseconds to over 100 seconds are available, as is manual sweep control.

1-3.6 Sweep Trigger Modes

Each frequency sweep may be initiated internally at the end of the previous sweep, synchronized with power line frequency, initiated manually with a front-panel pushbutton, or initiated electrically with an external triggering signal.

1-3.7 Amplitude Modulation Modes

The output amplitude of the RF plug-in is controlled by switches on its own front panel to turn the output on and off at a one kilohertz rate, turn the output off only during sweep retrace time, reduce the output amplitude at marker points, or modulate the amplitude with the signal from an external leveler. An external amplitude control signal may be coupled through the rear-panel EXT'L A.M. jack directly to the RF plug-in.

1-3.8 Display Blanking Output

An output of plus 19 volts available during the sweep retrace period or while awaiting a sweep trigger signal may be used to eliminate the trace from the CRT display unit or X-Y recorder.

1-3.9 Optional Configurations

1-3.9.1 OPTION M1 NEGATIVE BLANKING. Model 5000A mainframes equipped with this option have a blanking output pulse with an amplitude of approximately minus 19 volts; the blanking pulse output of a standard 5000A is approximately plus 19 volts.

1-3.9.2 OPTION M3 POSITIVE TUNING REFERENCE. Model 5000AM3 has an adjustable output of zero to plus 10 volts (minimum) to zero to plus 35 volts (maximum) proportional to the RF output frequency of the plug-in. This output is used to drive some swept response analyzers and network analyzers such as the Hewlett-Packard 8410B and its accessories. The positive tuning reference output is in addition to the standard zero to plus 10 volt sweep output and the zero to minus 10 volt frequency volts output present in all 5000A's. Option M3 is not available in units equipped with Option M10.

1-3.9.3 OPTION M10 REMOTE CONNECTORS. Two multi-pin connectors added to the rear panel of the 5000A carry sweep, blanking, and marker output signals to a display unit and operating power to an accessory unit. The 5000AM10 is provided in many Systron-Donner test sets to reduce interconnection cabling between it and the Model 7000M1 Display Unit and to provide operating power for the Model 1206 IF Amplifier. Option M10 is not available in units equipped with Option M3.

1-3.9.4 OPTION M16 EXTENDED POWER LINE FREQUENCY RANGE. Model 5000A mainframes are normally supplied for operation from 50 or 60 Hertz power sources. Model 5000AM16 will operate from power line frequencies of 50 to 400 Hertz. (400 Hertz power lines are commonly found on aircraft and ships.)

1-4. ACCESSORIES

1-4.1 Accessories Supplied with 5000A

1-4.1.1 EXTENDER BOARD. Each 5000A is supplied with a printed circuit board extender assembly part number 950007. The extender, a servicing aid used with the other plug-in printed circuit assemblies, is stored inside the 5000A near the rear panel.

GENERAL INFORMATION

Model 5000A

1-4.1.2 PHASE LOCK PLUG. One Model 9106 miniature phone plug is supplied with the 5000A; this plug mates with the rear-panel **PHASE LOCK** jack. The 9106 is supplied with a shorting wire in place but not soldered.

1-4.2 Optional Accessories

1-4.2.1 MODEL 9001 STORAGE CABINET. The storage cabinet holds four 5000-series RF plug-ins, keeping the plug-ins readily available and preventing loss of dial scales or damage to the plug-ins. When used with the Model 9004 rack-mounting kit (not included with 9001), the 5000A and 9001 bolt together to form a unit in 5¼ inches of standard 19-inch EIA rack space.

1-4.2.2 MODEL 9002 RACK ADAPTER CABINET. Model 9002 is a filler cabinet to allow mounting the half-rack width 5000A in a standard 19-inch EIA rack. No additional rack-mounting hardware is required; all necessary parts are included with the 9002.

1-4.2.3 MODEL 9004 RACK MOUNTING KIT. This kit contains the plates, handles, and all other hardware required for mounting the 5000A side-by-side with the 9001 Storage Cabinet or another half-rack instrument in 5¼ inches of rack space.

1-4.2.4 MODEL 9016 RACK MOUNTING KIT. This kit contains all hardware required to mount a 5000A Sweeper Mainframe and a Model 7000 Display Unit side-by-side in 5¼ inches of rack space.

1-4.2.5 MODEL 9107 PEN LIFT RELAY. In some cases, the plus 19 volt blanking output signal (minus 19 volts for 5000AM1) may not be the correct amplitude for blanking the sweep retrace. Many X-Y recorders require an external contact closure to drop or to lift the recording pen; the 9107 relay has single-pole, double-throw contacts rated for one Ampere at 115 volts ac (250 milliamperes at 24 volts dc) to serve this purpose when required.

1-4.2.6 MODEL 9041 TRANSIT CASE. Each pressure-molded fiberglass transit case will accommodate one Model 5000A with any plug-in; the handles are padded for easy carrying.

1-4.2.7 MODEL 9201 TEST PLUG-IN. This unit plugs into the 5000A in place of an RF plug-in, simulating the maximum power supply and heat load of a properly-operating plug-in. Each pin of the interface connector is brought out to a test point on the front panel of the 9201 to aid in calibration or troubleshooting of the 5000A.

1-4.2.8 MODEL 9202 EXTENDER. This unit fits between the 5000A and the plug-in unit to allow access to the calibration components and internal circuitry of the plug-in.

1-4.2.9 MODEL 9203 INVERTER. Used in conjunction with the 9202 Extender, this maintenance accessory allows physical inversion of the plug-in unit for easier testing or trouble isolation of the lower printed circuit assembly.

1-4.2.10 FLEXIBLE PLUG-IN EXTENSION. Any plug-in may be operated outside the 5000A mainframe using this 24-inch extension cable. Part number 109618 flexible extension is intended for trouble isolation and repair of plug-ins; it should not be used for final frequency or power level calibration because of voltage drops in the wires which carry high currents to the plug-in.

1-4.2.11 MODEL 9210 CALIBRATION DIAL. Recalibration of the frequency dial assembly may be necessary after parts replacement; in general, the dial scale supplied with an RF plug-in may be used for calibration of the 5000A. The 9210 calibration dial is recommended for facilities which have several 5000A's and several plug-ins of various ages and which need an absolute standard dial scale.

Table 1-1. Performance Specifications

ITEM	PARAMETER	SPECIFICATION
1	Plug-in Compatibility	
1.1	RF Plug-ins	All 5000-series RF plug-ins
1.2	RF Modules	All 525-series RF modules may be tested and calibrated with the 5000A using a 9202 Extender or 109618 flexible extension cable
1.3	Sweeping Current Supply Plug-ins	5222 and 5222A
1.4	Test Plug-in	9201
1.5	Extender Plug-in	9202
2	Operating Modes	
2.1	Wide F1—F2 Mode	Output frequency of RF plug-in is swept or manually scanned from limit set by F1—START control to limit set by F2—STOP control:
2.1.1	Band Coverage	100% of plug-in bandwidth
2.1.2	Sweep Direction	Up-band or down-band
2.1.3	Calibration Error	$\leq \pm 2\%$
2.2	CW Mode	Output frequency of RF plug-in is a discrete frequency set by MARKER 2—Fc control:
2.2.1	Band Coverage	100% of plug-in bandwidth
2.2.2	Calibration Error	$\leq \pm 2\%$
2.3	Fc $\pm \Delta F \times 1$ Mode	Output frequency of RF plug-in is swept or manually scanned about a center frequency set by MARKER 2—Fc control:
2.3.1	Maximum Band Coverage	10% of plug-in bandwidth (Fc $\pm \Delta F$ VERNIER set to CALIB)
2.3.2	Minimum Band Coverage	< 0.01% of plug-in bandwidth (Fc $\pm \Delta F$ VERNIER set to 0)
2.3.3	Sweep Direction	Up-band
2.3.4	Calibration Error	$\leq \pm 10\%$ of indicated bandwidth
2.4	Fc $\pm \Delta F \times .1$ Mode	Output frequency of RF plug-in is swept or manually scanned about a center frequency set by MARKER 2—Fc control:
2.4.1	Maximum Band Coverage	1% of plug-in bandwidth (Fc $\pm \Delta F$ VERNIER set to CALIB)
2.4.2	Minimum Band Coverage	< 0.01% of plug-in bandwidth (Fc $\pm \Delta F$ VERNIER set to 0)
2.4.3	Sweep Direction	Up-band
2.4.4	Calibration Error	$\leq 10\%$ of indicated bandwidth

GENERAL INFORMATION
Model 5000A

Table 1-1. Performance Specifications (Continued)

ITEM	PARAMETER	SPECIFICATION
2	Operating Modes (Cont.)	
2.5	$F_c \pm \Delta F \times .01$ Mode	Output frequency of RF plug-in is swept or manually scanned about a center frequency set by MARKER 2—F_c control:
2.5.1	Maximum Band Coverage	0.1% of plug-in bandwidth ($F_c \pm \Delta F$ VERNIER set to CALIB)
2.5.2	Minimum Band Coverage	< 0.01% of plug-in bandwidth ($F_c \pm \Delta F$ VERNIER set to 0)
2.5.3	Sweep Direction	Up-band
2.5.4	Calibration Error	$\leq 10\%$ of indicated bandwidth
3	Frequency Range	Depends on RF plug-in used
4	Frequency Accuracy	$\pm 1\%$ of indicated frequency at $+25^\circ\text{C}$ ambient and full rated RF output power of plug-in (worst-case combination of 5000A and RF plug-in specifications)
5	Frequency Vernier	
5.1	Modes	Wide F1-F2, $F_c \pm \Delta F$, and CW
5.2	Calibration	Calibrated in frequency as indicated by dial scale supplied with plug-in; vernier frequency adds to frequency shown by dial frequency indicators.
5.3	Calibration Error	$\leq \pm 10\%$ of indicated frequency
6	Sweep Trigger	
6.1	Recurrent Mode	New sweep is automatically initiated ≈ 3 ms after end of retrace
6.2	Triggered Mode	Each sweep is initiated by the front-panel MANUAL pushbutton or by an external trigger pulse to the rear-panel EXT'L TRIG connector:
6.2.1	Amplitude	$\geq +3$ V
6.2.2	Pulse Width	≥ 1 μs
6.2.3	Input Impedance	≈ 10 k Ω
6.3	Line Trigger Mode	Start of each sweep is synchronized with positive peak of power line frequency
7	Sweep Speeds	Vernier at X1 Vernier at X10
7.1	.01 Seconds	
7.1.1	Forward Trace	8.5—9.5 ms 94—104 ms
7.1.2	Retrace	0.8—1.2 ms 0.8—1.2 ms

Table 1-1. Performance Specifications (Continued)

ITEM	PARAMETER	SPECIFICATION	
7	Sweep Speeds (Cont.)	Vernier at X1	Vernier at X10
7.2	.1 Seconds		
7.2.1	Forward Trace	85–95 ms	940–1040 ms
7.2.2	Retrace	8–12 ms	8–12 ms
7.3	1 Second		
7.3.1	Forward Trace	0.85–0.95 s	9.4–10.4 s
7.3.2	Retrace	80–120 ms	80–120 ms
7.4	10 Seconds		
7.4.1	Forward Trace	8.5–9.5 s	94–104 s
7.4.2	Retrace	0.8–1.2 s	0.8–1.2 s
8	Manual Scan	Manually varies frequency between limits set in Wide F1–F2 Mode or $F_c \pm \Delta F$ Mode	
9	External Sweep	External input voltage through EXT'L SWEEP connector adds to voltage determined by setting of F1–START control (Wide F1–F2 Mode) or MARKER 2– F_c control (CW and $F_c \pm \Delta F$ Modes). F2–STOP control has no effect:	
9.1	Amplitude	0 to +10 V	
9.2	Input Impedance	$\approx 25 \text{ k}\Omega$	
9.3	Coupling	DC	
9.4	3 dB Bandwidth	10 kHz	
10	Sweep Output	Front and rear-panel SWEEP OUTPUT connectors	
10.1	Internal Sweep		
10.1.1	Modes	Wide F1–F2 and $F_c \pm \Delta F$	
10.1.2	Waveform	Linear ramp (sawtooth)	
10.1.3	Amplitude	0 V $\pm 40 \text{ mV}$ to +10 V $\pm 40 \text{ mV}$	
10.1.4	Linearity Error	$\leq \pm 0.5\%$ from straight line	
10.1.5	Output Impedance	$< 100 \Omega$	
10.1.6	Current	10 mA max.	
10.2	Manual Scan		
10.2.1	Modes	Wide F1–F2 and $F_c \pm \Delta F$	
10.2.2	Waveform	Output voltage proportional to frequency	
10.2.3	Amplitude	0 V $\pm 100 \text{ mV}$ to +10 V $\pm 100 \text{ mV}$	
10.2.4	Output Impedance	$< 100 \Omega$	
10.2.5	Current	10 mA max.	

GENERAL INFORMATION
Model 5000A

Table 1-1. Performance Specifications (Continued)

ITEM	PARAMETER	SPECIFICATION
10	Sweep Output (Cont.)	
10.3	External Sweep	
10.3.1	Modes	Wide F1—F2, $F_c \pm \Delta F$, and CW
10.3.2	Waveform	Identical to input signal
10.3.3	Amplitude	Identical to input signal
10.3.4	Output Impedance	Depends on input signal generator
10.3.5	Current	Depends on input signal generator
11	RF Blanking	+4.2 \pm 0.2 V during sweep retrace
12	Blanking Output	Rear-panel BLANKING OUTPUT connector
12.1	Internal Sweep, 5000A	Normally-supplied configuration
12.1.1	Modes	Wide F1—F2 and $F_c \pm \Delta F$
12.1.2	Waveform	Positive Pulse
12.1.3	Amplitude, Forward Sweep	≈ -600 mV
12.1.4	Amplitude, Sweep Retrace	+18 to +20 V
12.1.5	Pulse Period	Identical to sweep retrace period in recurrent sweep mode; refer to Item 7 of this table
12.1.6	Output Impedance	≈ 1 k Ω
12.2	Internal Sweep, 5000AM1	With negative blanking Option
12.2.1	Modes	Wide F1—F2 and $F_c \pm \Delta F$
12.2.2	Waveform	Negative pulse
12.2.3	Amplitude, Forward Sweep	≈ -200 mV
12.2.4	Amplitude, Sweep Retrace	-18 to -20 V
12.2.5	Pulse Period	Identical to sweep retrace period in recurrent sweep mode; refer to Item 7 of this table
12.2.6	Output Impedance	≈ 1 k Ω
12.3	Manual Scan	Blanking output fixed at ≈ -600 mVdc (5000A) or ≈ -200 mVdc (5000AM1)
12.4	External Sweep	Blanking output fixed at ≈ -600 mVdc (5000A) or ≈ -200 mVdc (5000AM1)
13	Frequency Reference Output	All 5000A configurations
13.1	Modes	All; rear-panel FREQ VOLT connector monitors frequency reference signal coupled to plug-in
13.2	Amplitudes	
13.2.1	Minimum	0 V
13.2.2	Maximum	-10 V
13.2.3	Lowest Usable Limit of Plug-in	-0.100 V
13.2.4	Highest Usable Limit of Plug-in	-9.900 V

Table 1-1. Performance Specifications (Continued)

ITEM	PARAMETER	SPECIFICATION
13	Frequency Reference Output (Cont.)	
13.2.5	24.5% of Rated Band	-2.585 V
13.2.6	50% of Rated Band	-5.000 V
13.2.7	74.5% of Rated Band	-7.415 V
13.3	Linearity Error	
13.3.1	5000A Only	$\leq \pm 0.5\%$
13.3.2	5000A and Plug-in	$\leq \pm 1\%$
13.4	Output Impedance	$\approx 1 \text{ k}\Omega$
14	Positive Frequency Reference Output	5000AM3
14.1	Modes	All
14.2	Amplitudes	Proportional to frequency of RF plug-in
14.2.1	Minimum	0 V
14.2.2	Maximum	Adjustable +10 to +35 V
14.3	Output Impedance	$\approx 10 \Omega$
15	Markers	
15.1	Wide F1—F2 Mode	
15.1.1	Marker Coverage	100% of Band
15.1.2	Markers Available	Marker 1, Marker 2, and Marker 3
15.1.3	Marker Frequency Calibration	Direct-reading in frequency
15.1.4	Calibration Error	$\leq \pm 1\%$
15.2	Fc $\pm \Delta F$ Mode	
15.2.1	Marker Coverage	$\pm 5\%$ of Band
15.2.2	Markers Available	Marker 1 and Marker 3
15.2.3	Marker Frequency Calibration	Reading in frequency offset from Fc
15.2.4	Calibration Error	$\leq \pm 10\%$
15.3	Marker Output	Rear-panel MARKER OUTPUT connector
15.3.1	Waveform	Triangular pulse
15.3.2	Marker 1 Amplitude	$\geq -1.0 \text{ V peak}$
15.3.3	Marker 2 Amplitude	$\geq -1.2 \text{ V peak}$
15.3.4	Marker 3 Amplitude	$\geq -1.0 \text{ V peak}$
15.3.5	Output Impedance	$\approx 3 \text{ k}\Omega$

GENERAL INFORMATION
Model 5000A

Table 1-1. Performance Specifications (Continued)

ITEM	PARAMETER	SPECIFICATION
16	Quieting	Output activates tuning-bandwidth rate limit circuitry in RF plug-in:
16.1	Modes	CW and Manual Scan
16.2	Amplitude	
16.2.1	CW Mode	+3 to +6.5 Vdc
16.2.2	Manual Scan Mode	+4 to +7 Vdc
18	1 kHz Output	Rear-panel 1 KHZ OUTPUT connector carries 1 kHz output of RF plug-in; refer to RF plug-in manual for detailed specifications:
17.1	Waveform	Square Wave
17.2	Frequency	1000 Hz nominal
17.3	Adjustment Range	$\geq \pm 50$ Hz (set by RF plug-in)
17.4	Amplitude	$\approx +2$ V peak
17.5	Output Impedance	≈ 1 k Ω
18	External Amplitude Modulation	Rear-panel EXT'L A.M. connector couples external input directly to RF plug-in; refer to appropriate RF plug-in manual for specifications
19	Phase Lock	Rear-panel PHASE LOCK connector couples external input directly to RF plug-in; refer to appropriate RF plug-in manual for specifications
20	Power Input	
20.1	Voltages	104 V $\pm 10\%$ (93.6 to 114.4 Vac) 115 V $\pm 10\%$ (103.5 to 126.5 Vac) 208 V $\pm 10\%$ (187.2 to 228.8 Vac) 230 V $\pm 10\%$ (207 to 253 Vac)
20.2	Frequency	
20.2.1	5000A	47–63 Hz
20.2.2	5000AM16	50–400 Hz
20.3	Phase	1 ϕ
20.4	Power	≤ 90 VA
21	Power Supplies	
21.1	+30 V Output	
21.1.1	Tolerance	+30.0 Vdc ± 100 mVdc
21.1.2	Current Limit	800 ± 50 mA

Table 1-1. Performance Specifications (Continued)

ITEM	PARAMETER	SPECIFICATION
21	Power Supplies (Continued)	
21.1.3	Current Distribution	20 mA used in 5000A mainframe with 780 mA available for plug-in (a combined total of 1.0 A is available from the +30 V and +20 V outputs)
21.1.4	Load Regulation	$\leq 0.01\%$ (± 3 mVdc change for 0 to 600 mA load current)
21.1.5	Line Regulation	$\leq 0.01\%$ (± 3 mVdc change for $\pm 10\%$ change in line voltage)
21.1.6	Ripple @ 600 mA Load	$\leq 300 \mu\text{V}$ p-p, 1 Hz–30 kHz bandwidth
21.2	+20 V Output	
21.2.1	Tolerance	+20 Vdc ± 20 mVdc
21.2.2	Current Limit	1.2 A ± 100 mA
21.2.3	Current Distribution	200 mA used in 5000A mainframe, with 1.0 A available for plug-in (a combined total of 1.0 A is available from the +20 V and +30 V outputs)
21.2.4	Load Regulation	$\leq 0.01\%$ (± 2 mVdc change for 0 to 1.0 A load)
21.2.5	Line Regulation	$\leq 0.01\%$ (± 2 mVdc change for $\pm 10\%$ change in line voltage)
21.2.6	Ripple @ 1.0 A Load	$\leq 200 \mu\text{V}$ p-p, 1 Hz–30 kHz bandwidth
21.3	–20 V Output	
21.3.1	Tolerance	–20 Vdc ± 20 mVdc
21.3.2	Current Limit	1.2 A ± 100 mA
21.3.3	Current Distribution	200 mA used in 5000A mainframe with 1.0 A available for plug-in
21.3.4	Load Regulation	$\leq 0.01\%$ (± 2 mVdc change for 0 to 1.0 A load)
21.3.5	Line Regulation	$\leq 0.01\%$ (± 2 mVdc change for $\pm 10\%$ change in line voltage)
21.3.6	Ripple @ 1.0 A Load	$\leq 200 \mu\text{V}$ p-p, 1 Hz–30 kHz bandwidth
21.4	+250 V Output	
21.4.1	Tolerance	+250 Vdc ± 25 Vdc (no load)
21.4.2	Current	40 mA available; output voltage decreases to ≈ 100 Vdc
21.4.3	Regulation	Unregulated
21.4.4	Ripple	≤ 1 V p-p (no load)
22	Environment	
22.1	Operating Temperature	0 to +55°C (+32 to +131°F) ambient
22.2	Storage Temperature	–55 to +85°C (–67 to +185°F) ambient
22.3	Altitude	0 to 10,000 feet (3,05 km)

GENERAL INFORMATION
Model 5000A

Table 1-1. Performance Specifications (Continued)

ITEM	PARAMETER	SPECIFICATION
23	Dimensions	
23.1	Height	5.25 in. (13,3 cm)
23.2	Width	8.50 in. (21,6 cm)
23.3	Total Depth	13.5 in. (34,3 cm)
23.4	Depth from Front Panel	11.75 in. (29,9 cm)
24	Weight (without plug-in)	≈ 15 lbs (6,8 kg)