

Section 1

Specifications

Introduction

This section of the manual contains a general description of the TEKTRONIX SG 5030 Programmable Leveled Sine Wave Generator and its electrical, environmental, and physical specifications.

Instrument Description

The SG 5030 Programmable Leveled Sine Wave Generator is a GPIB programmable TM 5000-series plug-in instrument designed to provide a low-distortion sinusoidal waveform with leveled output amplitude. Frequency, amplitude, and the front-panel store/recall parameters are fully programmable. Parameter values are displayed by 8 seven-segment LEDs in the display window. The SG 5030 output amplitude is programmable from 4.5mV to 5.5V peak-to-peak into 50 Ω , and has a frequency range of 0.1Hz to 550MHz with a reference frequency of 50kHz. Additional connectors provide timebase input and output reference signals to external sources.

At power up, the instrument performs a self-test and assumes the settings in use when previously powered down, with the exception that the output is in the "OFF" condition. Up to twenty user-definable instrument configurations stored in memory.

Rear interface connections provide access to versions of all front-panel signals except the main output.

Output Leveling Head

Each SG 5030 is provided with a matching Output Leveling Head. This leveling head must be installed on the SG 5030 at all times for proper operation.

A label attached to the leveling head cable identifies the serial number of the SG 5030 to which the leveling head is calibrated. If it is necessary to change leveling heads, the complete Adjustment Procedure must be performed to match the new leveling head to the SG 5030. After adjustment, it is recommended a new identification label be attached to the leveling head.

IEEE 488 (GPIB) Functions

The SG 5030 can be remotely programmed via the digital interface specified in IEEE Standard 488.1-1987, IEEE Standard Digital Interface for Programmable Instrumentation. In this manual, the digital interface is called the General Purpose Interface Bus (GPIB).

The IEEE standard identifies the interface function repertoire of an instrument on the GPIB in terms of interface function subsets. The subsets that apply to the SG 5030 are listed in Table 1-1.

NOTE

Refer to IEEE Standard 488.1-1987 for more detailed information. The standard is published by the Institute of Electrical and Electronics Engineers, Inc., 345 East 47th Street, New York, New York 10017.

Table 1-1: Interface Function Subsets

Function	Subset	Capability
Source Handshake	SH1	Complete Capability
Acceptor Handshake	AH1	Complete Capability
Basic Talker	T6	Responds to serial poll. Untalks if My Listen Address (MLA) is received.
Basic Listener	L4	Unlistens if My Talk Address (MTA) is received
Service Request	SR1	Complete Capability
Remote-Local	RL1	Complete Capability
Parallel Poll	PP0	Does not respond to Parallel Poll
Device Clear	DC1	Complete Capability
Device Trigger	DT0	Does not respond to GET
Controller Function	C0	No controller function
Electrical Interface	E2	Tri-state drivers

Electrical Characteristics

Performance Conditions

The limits stated in the Performance Requirements column of the following tables are valid with the following conditions:

1. All measurements are made at the output connector of the Output Leveling Head. The SG 5030 must have been adjusted with the same leveling head that is used during specification verification measurements.
2. The SG 5030 internal adjustments are performed at an ambient temperature of +20°C to +30°C.

3. The SG 5030 must be in a noncondensing environment whose limits are described under Table 1-3, Environmental.
4. Allow thirty minutes warm-up time for operation to specified accuracy; sixty minutes after exposure to or storage in high-humidity or condensing environment.

Items listed in the Performance Requirements column of the Electrical Characteristics are verified by completing the Performance Check in the Service Manual. Items listed in the Supplemental Information and Description columns is provided for user information only and should not be interpreted to be Performance Check Requirements.

Note

The SG 5030 has been designed in accordance with the intent of UL Standard 1244, "Safety Requirements for Electrical and Electronic Measuring and Test Equipment".

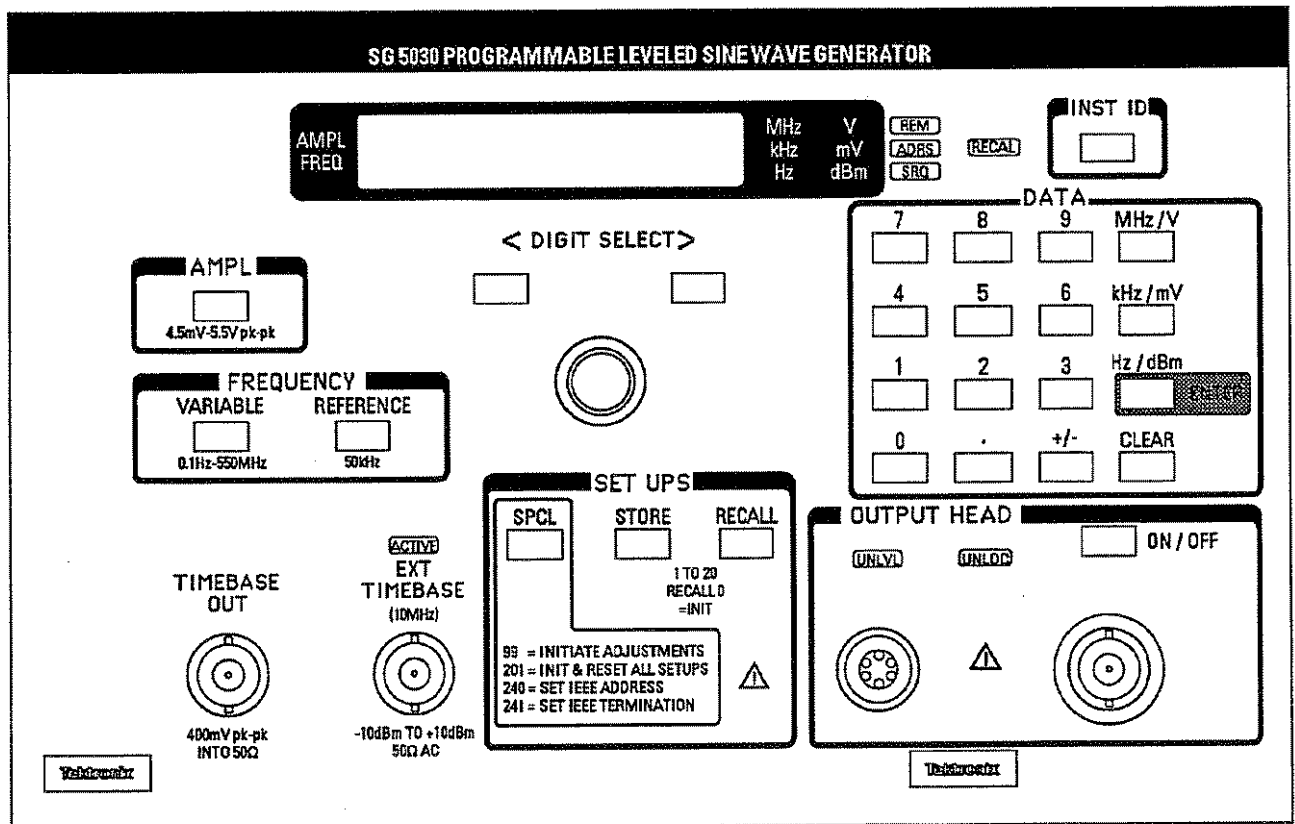


Figure 1-1: The SG 5030

Table 1-2: Electrical

Characteristics	Performance Requirement	Supplemental Information
Frequency Range/Resolution 0.1Hz to 4.9999kHz 5.000kHz to 49.999kHz 50.00kHz to 550.00000MHz		0.1Hz steps 1Hz steps 10Hz steps
Frequency Accuracy Using Internal Timebase (within 1 year of last adjustment) 0.1Hz to 4.9999kHz 5.000kHz to 49.999kHz 50.00kHz to 550.00000MHz Frequency Aging Using External Timebase (10MHz \pm 1.5 ppm) 0.1Hz to 4.9999kHz 5.000kHz to 49.999kHz 50.00kHz to 550.00000MHz Input Amplitude Requirement Input Resistance Lock Time	\pm (0.0003% of setting +0.06Hz) \pm (0.0003% of setting +0.3Hz) \pm (0.0003% of setting +3Hz)	1ppm/year \pm (external timebase error + 0.06Hz) \pm (external timebase error + 0.3Hz) \pm (external timebase error + 3Hz) -10dBm to +10dBm (70mV to 700mV RMS) 50 Ω AC, 500 Ω DC Less than 3 seconds
Timebase Out Output Frequency Frequency Accuracy Output Amplitude Output Resistance	10MHz \pm 3ppm (using internal timebase)	\pm X ppm (using external timebase) Where X ppm is external timebase accuracy 400mV pk-to-pk into 50 Ω 50 Ω
Amplitude Range/Resolution 4.50mV to 55.00mV pk to pk 55.2mV to 550.0mV pk to pk 0.552V to 5.500V pk to pk -42.95dBm to +18.75dBm		0.02mVolts peak to peak per step 0.2mVolts peak to peak per step 2mVolts peak to peak per step 0.05dBm per step
Amplitude Accuracy ¹ (0.1Hz to 50kHz)	\pm 1.5% of setting	

¹ Accuracy guaranteed only when the Leveling Head and SG 5030 have been calibrated together.

**Electrical
(continued)**

Characteristics	Performance Requirement	Supplemental Information
Amplitude Flatness 50.00kHz to 100MHz >100MHz to 250 MHz >250MHz to 550MHz	±1.5% (of 50kHz ref) ±3% (of 50kHz ref) ±4% (of 50kHz ref)	Voltage peak-to-peak into 50 ohms
Output Source Resistance		50Ω, ±1%
Output DC Offset		< ± 1% of amplitude (V _{pp}) for 20°C to 30°C < ± 2% of amplitude (V _{pp}) for 0°C to 40°C
Output VSWR	Less than 1.2:1 up to 550MHz	
Spectral Purity 0.1Hz to 49.999kHz 50.00kHz to 550.00000MHz Harmonics Nonharmonics Phase Noise	Less than -30dBc 2nd harmonic Less than -35dBc 3rd harmonic Less than -40dBc all others	All harmonics and spurs less than -50dBc Less than -40 dBc Less than -85 dBc/Hz at 10kHz offset
GPIB Settling Time Output OFF to ON All other function changes		From trailing edge of GPIB EOI until sine wave output is stable <150mS <80mS

Table 1-3: Environmental¹

Characteristics	Description
Temperature Operating Nonoperating	Meets MIL-T-28800D, class 5, with exception to operating temperature. 0°C to +40°C -40°C to +71°C
Humidity (Noncondensing) Operating	Exceeds MIL-T-28800D, class 5 95% ±5% RH, +10°C to +30°C, 75% ±5% RH, +30°C to +40°C, RH not controlled below +10°C
Altitude Operating Nonoperating	Exceeds MIL-T-28800D, class 5 10,000 ft (4.5 Km) 50,000 ft (15 Km)
Vibration ² Operating	Meets MIL-T-28800D, class 5 Displacement (peak-to-peak), 0.38mm (0.015"). 10Hz to 55Hz. Total time, 75 minutes.
Shock Nonoperating	30 g's, half sine, 11ms duration, 3 shocks in each direction along 3 major axis; 18 total shocks.
Bench Handling Operating	Meets MIL-T-28800D, class 5 45 degrees or 4 inches or point of balance, whichever occurs first.
ESD	Meets IEC 802-2 ESD Test Meets 20kV maximum discharge applied to instrument case per Tektronix Product Design
EMC ³	Within conducted emissions limit for FCC Regulations, Part 15, Subpart J, Class A and VDE 0871 Class B. Exceeds radiated emissions limit for FCC Regulations Part 15, Subpart J, Class A and VDE 0871 at the selected OUTPUT signal frequency. Within conducted emissions limits for MIL STD 461B/462 CE01, part 2 and CE03. Within conducted susceptibility limits for MIL STD 461C CS01, CS02 and CS06.

¹Note: The SG 5030 will meet MIL-T-28800D, Class 5 only as specified in the table below.

²Meets MIL-T-28800D, class 3, when tested outside a TM 5000-series power module.

³Tested with a TM 5006A, Option 15 Power Module.

Table 1-4: Mechanical

CHARACTERISTICS	DESCRIPTION
Maximum Overall Dimensions without leveling head	
Height	5.0"
Width	7.950"
Length	12.2"
Net Weight	
Standard Instrument Including leveling head	7.0 lbs