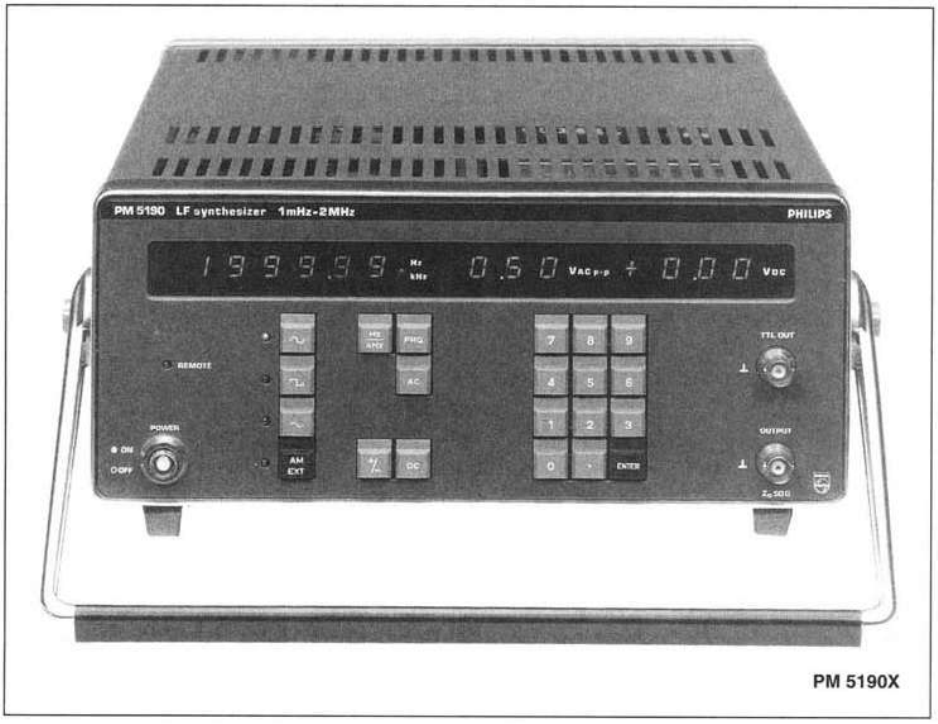
PM 5190X

GPIB IEEE-488



PM 5190X

PM 5190X 2 MHz Synthesized Function Generator

- Sine, triangle, square waveforms
- 0.001 Hz to 2.147 MHz frequency range
- Max 20V p-p output and separate TTL output
- Excellent short- and long-term stability
- External amplitude modulation capability
- Direct digital synthesis for fast setting times
- Fast feather-touch parameter selection

This function generator, based on a direct digital synthesis technique, includes many unique features that lift it into a special class of medium-priced signal sources for many professional applications. Features include $\pm 1 \times 10^{-6}$ frequency setting error and an aging characteristic of $<1.5 \times 10^{-6}$/year, clearly demonstrating the inherently high accuracy and stability of this instrument.

It will thus be of interest to design or research laboratories seeking such a highly accurate, stable signal source in the range 0.001 Hz to 2.147 MHz for both routine bench use and inclusion in automatic test systems. Its high-grade, virtually zero-error performance, plus simplicity and speed of operation make it equally attractive for use in advanced educational programs.

The user has a choice of sine, square and triangle waveform outputs, all available from a 50Ω front panel BNC connector.

In addition, there is an adjacent TTL socket. External amplitude modulation signals, from 0% to 90% modulation depth can be connected via a rear input socket.

Maximum ac output voltage for all waveforms is 19.9V p-p. A dc offset voltage of up to 9.9V max is available for setting the output to the desired dc level, up to 19.9V total amplitude. Voltage levels can be set in minimum increments of 1 mV.

A very clear, simply designed front panel makes operation extremely easy. Fast selection of the desired parameters is assured by 'feather-touch' input pushbuttons.

The output frequency of the crystal controlled oscillator is shown on a bright 6-digit LED display together with the ac (2 digits) and dc (2 digits) outputs. DC polarity is also displayed. In addition, the preselected waveforms and external amplitude modulation characteristics are indicated on this panel.

All functions are fully controllable via the built-in IEC-bus interface, or GPIB/IEEE-488* via PM 2296/60, supplied with the instrument. This enables the PM 5190X be used within an automatic testing system. This facility is further enhanced by the high switching speeds resulting from a direct digital signal synthesis technique.

All these comprehensive facilities are contained in a very compact, portable package.

Typical applications in an automated system include:

- Accurate testing of audio filters when checking bandpass curves.
- As a standard, when checking servo motor speed control systems or for audio/video tape stress testing, etc.

Also, when employed as a signal source for calibrating instruments (e.g. frequency meters) its highly accurate and stable output signal may be used.

Specifications

Technical Specifications

Frequency

Nominal Range: 1 mHz to 2.147 MHz
Measuring Range: 1 mHz to 2.147 MHz for sine and square wave; 1 mHz to <100 kHz for triangle wave

Setting
Local: Via front panel keyboard
Remote: Via IEC bus interface
Display: 6-digit 7-segment LED display; 6 decimal points; 2 LEDs for dimension Hz, kHz
Setting Error: $\pm 1 \times 10^{-6}$ at 23°C
Temperature Coefficient: $<1 \times 10^{-6}$/C
Aging: $<1.5 \times 10^{-6}$ per year

Waveforms

Sine wave
Square wave
Triangle wave
All time-symmetrical
All with or without dc offset
DC voltage without ac

Selection
Local: Via front panel keyboard
Remote: Via IEC bus interface
Indication: LEDs for the selected waveforms

Sine Wave
Total Harmonic Distortion: <0.4% (1 mHz to 50 kHz); <1.5% (50 kHz to 2.147 MHz)
Non-Harmonic Components at Max Amplitude: ≤46 dB
Phase Noise: ≤50 dB within 30 kHz bands, centered to the output frequency; (frequencies <50 kHz)

**The terms GPIB and IEEE-488 may be used interchangeably throughout this catalog.*

PM 5190X

Square Wave
Rise Time, Fall Time: <50 ns
Tilt: <3% (f <100 kHz)
Overshoot: <3%
Duty Cycle: 50%
Duty Cycle Tolerance: <0.5% (1 kHz)

Triangle Wave
Frequency Range: 1 mHz to 100 kHz
Linearity: <99% for frequencies <10 kHz

Modulation

Mode: Amplitude modulation, external
Indication: LED
Carrier: Sinusoidal and triangular waveform frequency >10 Hz
Modulation Frequency: DC to 20 kHz
Modulation Coefficient: 0.1V per 10% AM
Modulation Depth: 0% to 90%
Connector: BNC socket AM EXT (rear side)
Input Impedance: 20 kΩ
Max. External Voltage: ±30V
Reference Potential: External contact of BNC socket

Output Characteristics

Connector: BNC socket (front side)
Impedance: 50Ω ±2%
Short-Circuit Proof: Yes
Max. External Input Voltage: ±15V
Reference Potential: External contact of BNC socket

AC Voltage

Range: 19.9V ac p-p open circuit

Sub-Ranges
I .000V to 0.199V ac
II 0.00V to 1.99V ac
III 00.0V to 19.9V ac

Setting
Local: Via front panel keyboard
Remote: Via IEC bus interface
Resolution: 2½ digit
Setting Error: 3% for settings 2.0V to19.9V for frequencies <100 kHz
Temperature Coefficient: 0.1%/C

DC Offset Voltage

Range: 0 to 9.9V dc

Sub-Ranges
I .000V to 0.099V dc
II 0.00V to 0.99V dc
III 00.0V to 09.9V dc

Sub-Range Selection: Determined by sub-range setting

Mimimum Increments
1 mV in sub-range I
10 mV in sub-range II
100 mV in sub-range III

Polarity: Positive or negative selectable via keyboard

Setting
Local: Via front panel keyboard
Remote: Via IEC bus interface
Resolution: 2-digits
Display: Polarity ±2-digit, 7-segment LED, decimal point, position determined by ac decimal point setting
Setting Error: ±4% (10% to 100% of each subrange)
Temperature Coefficient: <0.1%/K (10% to 100% of each subrange)
Max. DC Voltage Setting: Depending on ac voltage setting: dc indication ≤100 - (ac indication)/2; decimal points ignored

TTL Output
Connector: BNC socket TTL OUT
Duty Cycle: 50%
Fan Out: ≥10
Level: Standard TTL-level

Remote Control

Interface: Built-in IEC 625 interface, compatible with IEEE-488 via separate adaptor PM 2296/60 IEC-625/GPIB/IEEE-488 adaptor supplied with the instrument
Remote State Indication: Front panel LED
Programmable Parameters: Frequency, ac voltage, dc voltage, waveform
Response Time: 4 ms for waveform, 10 ms for ac voltage, 7 ms for frequency, 12 ms for dc voltage

GPIB/IEEE-488/IEC Interface Data

An IEC-625 interface is supplied, built into the instrument, with rear access; compatible with IEEE-488 via included PM 2296/60 adaptor
Connector: 25-pole IEC standard connector

Interface Functions
AH1 Acceptor handshake
L2 No additional functions possible
RL2 Remote/local total capability
Code: ISO 7-bit code
Connector: 25-pole standard interface connector (rear side)

Max. External Voltage: -0.5 to +5.5V, standard TTL level
Reference Potential: Measuring earth
Connector Housing: Connected to protective conductor

General Specifications

Power Requirements

Voltage: 110V, 128V, 220V, 238V ±10%
Power Consumption: 47W
Frequency: 47.5 Hz to 63 Hz

Operating Conditions

Reference Value: +23°C ±1°C
Nominal Range: +5°C to +40°C
Limits for Storage and Transportation: -40°C to +70°C

Mechanical Data

Size: 310 mm W x 140 mm H x 365 mm L (12.5 in W x 5.5 in H x 14.5 in L)
Weight: 6 kg (13.2 lb)

Ordering Information

Model

U.S. Version
PM 5190XM LF Synthesizer with ENTER key

European Version
PM 5190X LF Synthesizer with ENTER key

Included with Instrument
Instruction manual, attached line cord, and PM 2296/60 IEC-625/IEEE-488 interface adapter.

Accessories (Also see Section 19)
PM 9075 Coaxial Cable BNC BNC
PM 9560 19-in Rack Mount Adapter
PM 9551 50Ω to 600Ω Impedance Adapter
PM 2296/60 IEC-625/GPIB/IEEE-488 Adapter
Y8021 Shielded IEEE-488 Cable, 1m (3.28 ft)
Y8022 Shielded IEEE-488 Cable, 2m (6.56 ft)
Y8023 Shielded IEEE-488 Cable, 4m (13 ft)

Manual
PM 5190 Instruction*
**No charge with purchase of unit*

Customer Support Services

Also see Section 20.

Factory Warranty
One-year product warranty.