1983. 4416-2 £ 1013

AUXILIARY OUTPUT

Sweep generator F2

Output signal
ramp

Amplitude :
5 V peak to peak open circuit

Output impedance :
600 Ω nominal

Frequency :
Variable from 33 Hz to 33 × 10⁻³ (nominal)

TTL output

TTL level output signals
Duty cycle : 50 %
This output is synchronized with the main output signal ; fan-out : ≥ 5
protected against short-circuits

U/F output

Level : from 0 to + 2 V, open circuit, proportional to generator frequency

Output impedance :
600 Ω nominal

FREQUENCY MODULATION

Internal :
Ramp width adjustable from 30 ms to 30 s (sweep rate) available modulation ratio, 1000 : 1, adjusted with potentiometer (excursion) except on × 1 Hz and × 10 Hz ranges.

External :
Modulation input.
Modulation ratio 1000 : 1, except on × 1 Hz and × 10 Hz ranges

Input impedance :
2 kΩ nominal

Sensitivity :
0 to 2 volts

GENERAL CHARACTERISTICS

Power requirements :
AC mains voltage : 110, 127, 220, 240 V ± 10 %
Frequency : 48 to 420 Hz
Power consumption : about 15 VA
Isolation between electrical and chassis grounds : 500 V DC

Temperature ranges :
Operating : 0°C to + 50°C
Performance specified for + 25°C ± 5°C
Storage : − 20°C to + 70°C

Format : bench case, 5/8 rack, 2U

Rack mounting : possible through an adapter set : 26154

Dimensions in mm (in) :
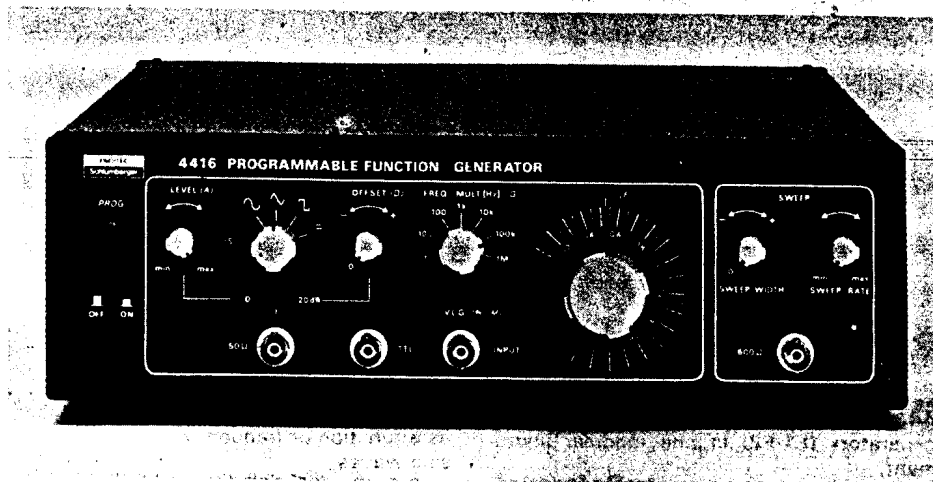Height : 92 (3.62), width : 280 (11), depth : 296 (11.65)

Weight : 2,9 kg (6.4 lb)

ACCESSORIES

Supplied with instrument :
Technical manual

4416
PROGRAMMABLE VERSION

The 4416 is a programmable version of 4415 generator. It has the same characteristics of this latter, except :

MANUAL MODE

Main output ∿ , ∧ , ⊓

Output level :
5 V peak to peak into 50 Ω
10 V peak to peak open circuit

PROGRAMMED MODE

For sinewaves, into 50 Ω at 25°C ± 5°C

Frequency programming (F1) :
0.1 Hz to 2 MHz in 7 ranges, with adjustment in the range by 10 bits analog/digital converter.

Resolution : 2 × 10⁻³

Accuracy :
± 2 % of full scale until × 100 k
± 3 % on × 1 M

Amplitude programming :
at 1 kHz, without offset voltage.

Amplitude :
5 V peak to peak
protection against short-circuits.

Attenuation :
0 db to − 63 dB
0 dB equivalent to 5 V peak to peak

Resolution : 1 dB

Accuracy :
From   0 dB to − 15 dB : ± 0.5 dB
From − 16 dB to − 63 dB : ± 1   dB of displayed value

Offset programming :
DC position, attenuation 0 dB
offset : ±   5 V into 50 Ω
  : ± 10 V open circuit
resolution : 100 mV
accuracy : ± 2 % of full scale

OPTION 4416/2

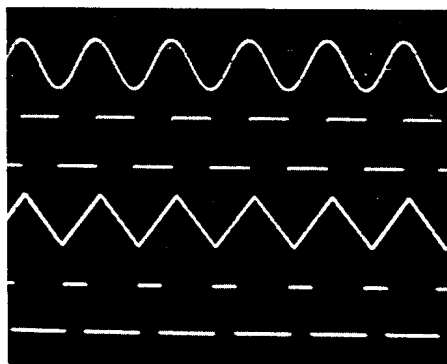Programming compatible with I.E.C. recommendations.
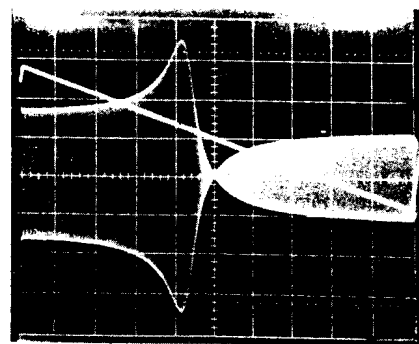
GENERAL CHARACTERISTICS

Dimensions in mm (in) :
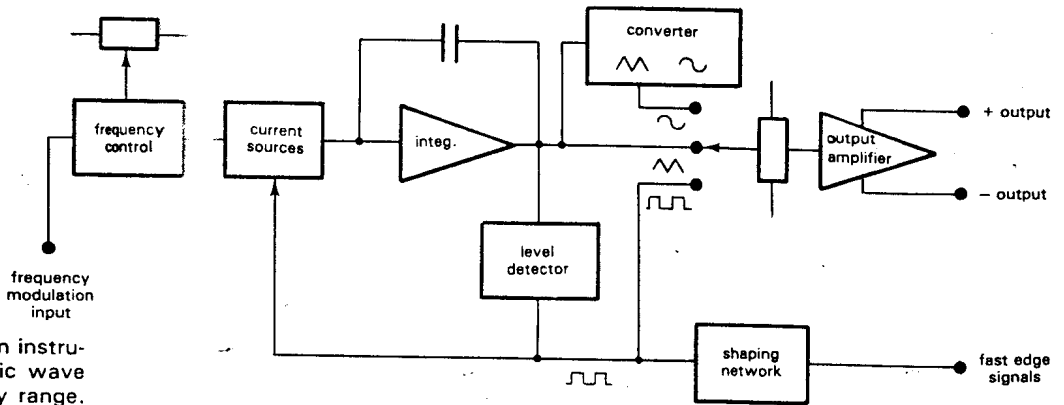Height : 92 (3.62), width : 280 (11), depth : 370 (14.57)

Weight : 4.2 kg (9.21 lb)

Waveforms supplied by 4415 - 4416 - 4430 or 4432

Response of a filter

Function Generator

Basically the function generator is an instrument which supplies several periodic wave forms, throughout a wide frequency range. Usually the lowest frequency is some 10^{-4} Hz, occasionally even lower. Most often the different wave forms are square, triangular sinusoidal pulse and ramp. The design philosophy for this type of instrument offers the user a certain number of interesting ancillary features, such as sweeping the frequency with an external analogue voltage supplied by another generator. Often this frequency sweep covers more than one decade and allows the frequency response of numerous systems to be analysed.
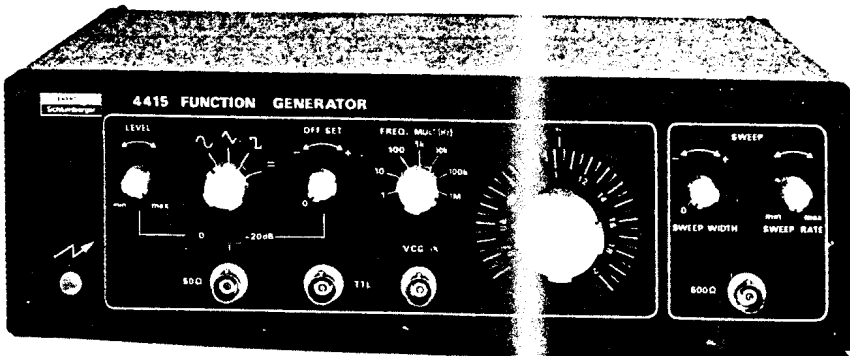
Design

The function generator is mainly formed by an integrator which provides sawtooth signals. A detector circuit measures the level of this signal and provides an output when the level reaches two known thresholds. This out put is a square wave signal which switches the currents sources at the input of the integrator. The common value of the current sources is adjustable and determines the frequency.

The sinusoidal voltage is obtained from the sawtooth signal by means of a special converter. The three signals made available in this way are amplified and, if required, are offset by an adjustable DC level.

4415 - 0.1 Hz - 2 MHz   f333 in 1983

4415 function generator combines two generators (F1-F2) in one modular instrument

The main generator (F1) supplies sine, triangular and square waves, TTL triggering and DC.

It can be frequency modulated by an external source or by the internal sweep generator (F2).

All the outputs from the main generator (F1) can be offset by an internal DC voltage.

The auxiliary generator (F2) supplies a ramp which sweeps the main generator frequency at a variable rate, with frequency excursion adjusted by potentiometer all instrument inputs and outputs are floating.

output signals

$\sim$, $\wedge$, $\sqcap$, $\wedge$, TTL sync.

output levels (4415)
10 V peak to peak into 50 Ω
20 V peak to peak open circuit

internal modulation 1000 : 1

IEC programmable version (4416)

MAIN GENERATOR F1

Output signals
Sine, triangular, square, DC voltage.

Frequency range :
0.1 Hz to 2 MHz in 7 ranges, dial graduated from 0 to 2

Frequency accuracy :
± 2 %   full scale until × 100 k
± 3 %   1 M

Frequency stability :
With time at constant temperature
Short term (10 minutes) :≤ ± 5 × 10⁻⁴
Long term (8 hours) :   ≤ ± 1 × 10⁻³
With mains variation (± 10 %) :
≤ ± 5   10⁻⁴

Output levels : $\sim$, $\wedge$, $\sqcap$
10 V peak to peak into 50 Ω
20 V peak to peak open circuit
protected against short-circuits

Offset voltage :
± 5 V into 50 Ω
± 10 open circuit

Offset voltage only can be output (DC position)

Fixed attenuator : 0 or − 20 dB

Variable attenuator :
30 dB, by potentiometer, with 0 position

Output level stability :
As a function of frequency :
Sine wave :
± 0.2 dB up to 200 kHz (typically ± 0.05)
± 1 dB up to 1 MHz (typically ± 0.3)

Distortion :
Sine waves
≤ ± 0.5 % on × 100, × 1 k, × 10 k ranges (typically 0.15)
≤ ± 1 % on × 1, × 10, × 100 k ranges (typically 0.5)
on × 1 M range, all harmonics are 30 dB down

Squares waves :
rise and full times, ≤ 80 ns on all ranges (typically 50 ns).
Triangular waves :
linearity : about 99 % of nominal up to 200 kHz.