INSTRUCTION MANUAL

CALIBRATED IMPULSE GENERATOR

MODEL CIG-25

10 kHz – 1 GHz

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ELECTRO-METRICS

MODEL CIG-25

SERIAL NO: N/A

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WARRANTY

This Model CIG-25 Calibrated Impulse Generator is warranted for a period of 12 months (USA only) from date of shipment against defective materials and workmanship. This warranty is limited to the repair of or replacement of defective parts and is void if unauthorized repair or modification is attempted. Repairs for damage due to misuse or abnormal operating conditions will be performed at the factory and will be billed at our commercial hourly rates. Our estimate will be provided before the work is started.

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1.0 Introduction

The Electro-Metrics Model CIG-25 Calibrated Impulse Generator produces calibrated impulses at variable repetition rates from 10 kHz to 1000 MHz.

The repetition rate is variable between 1 Hz and 100 Hz (1 Hz steps--1 to 10 Hz, 10 Hz steps--10 to 100 Hz) from 10 kHz to 1000 MHz.

The impulse level is variable in 1 dB steps from 0 to 90 dB(µV/MHz) with an accuracy of ±1.0 dB for the level selected and a flatness of ±0.5 dB over the calibrated frequency range. The pulse width is approximately 0.2 nsec (0.2×10^{-9} sec.), while a fixed internal attenuator ensures a VSWR not exceeding 1.7:1.

Additional features are:

a. The unit can be synchronized with and operated at the AC line frequency.

b. Single pulse (manual) operation.

c. Selection of either positive or negative polarity impulse to facilitate checking for possible overloads of a device or unit under test.

2.0 Specifications

2.1 Electrical

Frequency Range (calibrated):	10 kHz to 1000 MHz.
Repetition Rate:	1 Hz to 100 Hz.
Calibrated Output Level:	0 to +90 dB(µV/MHz).
Average VSWR:	1.7:1.
Impedance:	Matched to 50 ohms.
Output Connector:	TNC, female.

2.2 Mechanical

Length:	302 mm (11 7/8\").
Width:	208 mm (8 3/16").
Height:	148 mm (5 13/16").
Weight:	≈2.7 kg (6 lbs).

3.0 Power Supply

3.1 Power Requirements

a. AC Power Sources:

1) 105-130 VAC, 50-400 Hz.

2) 210-230 VAC, 50-400 Hz.

3.2 Power Source Selector

The Power Source Selector is incorporated as part of the power input connector. The number visible in the window indicates the nominal AC power source for which the receiver is set. To change the power source setting:

a. Remove the power cord from the connector plug.

b. Pull the handle marked **FUSE PULL** and remove the fuse.

c. Rotate the handle down and gently pull the printed circuit voltage selector card from its slot.

d. Orient the card so that the desired operating voltage appears on the bottom-left side.

e. Firmly push the voltage selector card back into its slot.

f. Rotate the **FUSE PULL** handle up and install the correct rating fuse.

g. Reconnect the AC power cord to the connector.

CAUTION

Verify that the Power Source Selector setting corresponds to the AC power source being used. Operation on "220" VAC with the module set for "110" VAC can cause extensive circuit damage.

3.3 Fuse Specifications

The CIG-25 uses the following fuses:

a. 115 VAC operation: 1/8 AMP 3AG TIME-DELAY.

b. 230 VAC operation: 1/16 AMP 3AG TIME-DELAY.

4.0 Description Front/Rear Panel

4.1 Front Panel

a. Power Switch

Type: Two position toggle switch.

Function: Self-explanatory.

b. Power On Indicator

Type: LED.

Color: Amber.

Function: Self-explanatory.

c. Repetition Rate Select Switch

Type: Four (4) position rotary.

Function: To select either X10, X1, Line Synchronized, or Manual (MAN) mode of impulse repetition rate.

c1. Repetition Rate Multipication Select Switch

Type: Ten (10) position rotary.

Function: To select the multiplication factor to be used in conjuction with the X1 and X10 positions of the Repetition Rate Select Switch.

c2. Manual Impulse Switch

Type: Momentary Pushbutton.

Function: In the Manual position of the Repetition Rate Select Switch, used to manually generate the impulse output.

d. Output Level Select Switches

Type: Nine (9) and ten (10) position rotary.

Function: To set the output level of the impulse signal from 0 to 90 dB(µV/MHz) in 1 dB steps.

e. Polarity Select Switch

Type: Two position toggle switch.

Function: To select either a positive or negative polarity for the impulse signal being generated.

f. Output Connectors

Type: TNC, female.

Function: Self-explanatory.

4.2 Rear Panel

a. Power Input Connector

Type: Combined voltage selector and fuse holder.

Function: Self-explanatory.

5.0 Operating Procedure

5.1 Initial Power-Up Procedure

a. Before applying power to the CIG-25 check the following:

1) The CIG-25 **must be** in an **up-right position** to function properly.

2) Power Source Selector setting should correspond to the AC power source being used.

3) The fuse should be the correct rating for the AC power source being used.

b. Connect the power cord between the J1 POWER Connector and the AC power source selected.

c. Push the POWER Switch in, the POWER ON light should come on. Allow a minimum warm-up time of 30 minutes.

5.2 Operating Instructions

a. Power-up the instrument following the procedure in Paragraph 4.1.

b. Use a 50-ohm coaxial cable to connect the output of the CIG-25 to the input of the receiver being calibrated. Frequency range of the receiver must be within the 10 kHz to 1000 MHz range of the CIG-25. In addition, the CIG-25 must work into a 50-ohm load impedance for accurate results.

c. The output level in dB(µV/MHz) is the sum of the front panel attenuator settings.

d. Set the polarity (positive or negative) of the output pulse to the setting required using the front panel POLARITY Switch.

When operating with broadband impulse noise, care should be taken to prevent receiver overload. This is easily detected by noting the receiver output readings obtained for positive and negative pulses of the same amplitude level. The CIG-25 output level does not change with polarity; thus, any change in receiver output is caused by overloading of the receiver input circuitry. The input stage often is receiving a strong signal although the receiver output may be low. It is recommended, therefore, to set the receiver gain high and keep the CIG-25 amplitude level low.

If receiver overload cannot be prevented in this manner, the use of a low-pass filter is recommended. The filter should have a cut-off frequency slightly above the highest intended operating frequency.

6.0 Applications

The CIG-25 Calibrated Impulse Generator is an ideal calibration standard for use with RF noise meters and EMI receivers. It can also be used for receiver alignment, bandwidth measurements, and for checking transient response.

When used with a receiver equipped with a "slideback control", the indicating meter of the receiver is adjusted so that the unknown impulsive signal or noise is just above the cut-off point. The unknown impulsive signal or noise is then disconnected and the output of the CIG-25 connected to the receiver. Its level is then adjusted to match that of the unknown impulsive signal or noise, the level of the unknown signal is equal to that of the CIG-25.

NOTE: It is important that the front panel controls of the receiver are not changed between the time the unknown and known signals are read.

Due to the broadband characteristics of the CIG-25 output, the receiver circuits respond in an equal manner to both the unknown and known impulse signals. Thus the bandwidth of the receiver need not be considered as is the case when using a sine wave or CW calibration voltage as a transfer standard.

Changes in receiver bandwidth at any frequency up to 1000 MHz can be measured by comparing the sine wave sensitivity of the receiver to its impulse sensitivity. Since the CIG-25 produces a flat noise spectrum to 1000 MHz, any change in sine wave sensitivity is an indication of a bandwidth change. This method permits bandwidth measurements with greater accuracy than is the case with conventional means.

Due to the short pulse duration and low repetition rate of the CIG-25, it is necessary that a "peak" indicator be used in the receiver. This may be a peak reading VTVM, a slideback second detector, or an oscilloscope connected ahead of the second detector.

FIGURE 1

CIG-25 CORRECTION FACTOR CHART

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