



The Model 587E Solid State Voltage and Current Surge Generator provides the waveshapes and characteristics that meet and exceed those required by IEEE/ANSI C62.41-1991 and IEC 801-5. These standards describe surge testing requirements in low voltage AC power circuits, and for transient voltage suppressors. The Model 587E performance specifications apply when operating with or without a Model V-2980 Coupler Isolation Network or equivalent.

1.2 Model 587E Specifications:

The Model 587E Generator has four front panel selectable surge outputs:

Position 1 (CCW): Combination Wave Open Circuit Exponential Waveform: 6kV, 1.2 x 50 μ s. Short Circuit Exponential Waveform: 143A_p. Source impedance 42 Ω .

Position 2: Combination Wave Open Circuit Exponential Waveform: 6kV, 1.2 x 50 μ s. Short Circuit Exponential Waveform: 500A_p. Source impedance 12 Ω .

Position 3: Combination Wave Open Circuit Exponential Waveform: 6kV, 1.2 x 50 μ s. Short Circuit Exponential Waveform: 3/4.5kA_p, 8 x 20 μ s. These waveforms meet part of *Category "B"* testing (C62.41).

Position 4 (CW): Oscillatory Waveform (Ring Wave): 6kV, 0.5 μ s, 100kHz. A selectable current range provides for 200A or 500A peak current to meet *Category "A"* and the remainder of *Category "B"* testing (C62.41).

1. Higher current can be expected at the output of the 587E to compensate for losses in surge coupler/isolation networks. Short circuit current at the output of the surge coupler/isolation network in Position 3 is 3kA, as specified. When using the generator without the surge coupler/isolation network, the output S.C. current is switch selectable for 3 or 4.5kA.

When operating in the Combination Wave modes, positions 1, 2 and 3 the generator will provide the respective outputs into an open or short circuit. When operating into any other impedance, the waveform is undefined, but will generally lie between the two sets of values given. When returning to open or short circuit conditions the waveforms will return to the values shown (i.e., the output signal is switching from Hi Z to Lo Z or vice versa).

DETAILED SPECIFICATIONS

Position 1

Exponential Combination Wave Form:
(IEC 801-5)

	<u>Open Circuit</u>	<u>Short Circuit</u>
Output Voltage:	Adjustable by front panel control up to > 6kV (peak value)	-
Output Current:	-	Adjustable by front panel control up to > 143A with the voltage adjust.
Front Time: (30-90% x 1.67)	1.2 μ s +/- 0.36 μ s	-
Front Time: (10-90% x 1.25)	-	< 8 μ s
Decay Time:	50 μ s +/- 10 μ s to 1/2 peak voltage value.	> 20 μ s from virtual origin to 1/2 peak current value.
Effective Source Impedance:	Approximately 42 Ω	
Repetition Rate:	Approximately 0.04Hz or one exponential waveform for every 25 seconds.	
Surge Initiation:	One-Shot Push Button; Up to 0.04Hz maximum, phase synchronized to selected line.	
	Non-synced; Approximately 0.04Hz.	
	Line-synced; One exponential waveform phase synchronized, for each 1500 cycles, (1250 cycles for Option F, K, Q or W).	
	External Trigger; Up to 0.04Hz maximum.	

Position 2
 Exponential Combination Wave Form:
 (IEC 801-5)

	<u>Open Circuit</u>	<u>Short Circuit</u>
Output Voltage:	Adjustable by front panel control up to >6kV (peak value)	-
Output Current:	-	Adjustable by front panel control up to >500A with the voltage adjust.
Front Time: (30-90% x 1.67)	1.2 μ s +/- 0.36 μ s	-
Front Time: (10-90% x 1.25)	-	< 8 μ s
Decay Time:	50 μ s +/- 10 μ s to 1/2 peak voltage value.	> 20 μ s from virtual origin to 1/2 peak current value.
Effective Source Impedance:	Approximately 12 Ω	
Repetition Rate:	Approximately 0.04Hz or one exponential waveform for every 25 seconds.	
Surge Initiation:	One-Shot Push Button; Up to 0.04Hz maximum, phase synchronized to selected line.	
	Non-synced; Approximately 0.04Hz.	
	Line-synced; One exponential waveform phase synchronized, for each 1500 cycles, (1250 cycles for Option F, K, Q or W).	
	External Trigger; Up to 0.04Hz maximum.	

Position 3

Exponential Combination Waveform:
(ANSI 62.41 & IEC 801-5)

	<u>Open Circuit</u>	<u>Short Circuit</u>
Output Voltage:	Adjustable by front panel control up to > 6kV (peak value)	-
Output Current:	-	Adjustable by front panel control up to 3/4.5kA
Front Time: (30-90% x 1.67)	1.2 μ s +/- 0.36 μ s	-
Front Time: (10-90% x 1.25)	-	8 μ s (+1.0 -2.5) μ s
Decay Time:	50 μ s +/- 10 μ s to 1/2 peak voltage value. * Programmable to 20ms thru rear connector J203.	20 μ s (+8, -4) μ s from virtual origin to 1/2 peak current value.
Effective Source Impedance:	1.33 or 2.00 +/- 0.25 Ω switch selectable for surge generator. 2.0 Ω when operating in conjunction with a surge coupler/isolation network.	
Repetition Rate:	Approximately 0.04Hz or one exponential waveform for every 25 seconds.	
Surge Initiation:	One-Shot Push Button; Up to 0.04Hz maximum, phase synchronized to selected line. Non-synced; Approximately 0.04Hz Line-synced; One exponential waveform phase synchronized, for each 1500 cycles, (1250 cycles for Option F, K, Q or W).	

* Programming done at high voltage.

Position 4
Oscillatory Waveform (Ring Wave):
ANSI 62.41

	<u>Open Circuit</u>	<u>Short Circuit</u>
Output Voltage:	Variable by front panel control up to >6kV (crest value of the first half cycle peak.	
Output Current:	-	Switch selectable for 500A or 200A peak. Selected current linearly variable with the voltage adjust.
Rise Time (10-90%)	0.5 μ s +/- 0.15 μ s	
Oscillatory Frequency:	100kHz +/- 20kHz	
Decay Time:	Each peak 60% of preceding peak.	
Repetition Rate:	Approximately 1Hz, or 0.1Hz programmable thru rear connector J202.	
Surge Initiation:	One-Shot Push Button: Up to 1Hz maximum, phase synchronized to selected line. Non-synced: Approximately 1Hz, or 0.1Hz programmable thru rear connector J202. Line-synced: One exponential waveform, phase synchronized, for each 60 cycles, (50 cycles for Option F, K, Q or W) when operating at 1Hz. External Trigger; Up to 1Hz maximum.	

The following specifications are common to all settings of the Model 587E Voltage and Current Surge Generator:

External Trigger: The external trigger requirement is a 2.5 to 10V, 0.05 μ s minimum width, positive pulse.

Repetition Rate: Up to 0.04Hz, 0.1Hz or 1Hz maximum depending on the surge selector position and programming. Automatic shut down limiting is provided above 1Hz.

Output Isolation: The output circuitry is isolated from ground. One side of the output should always be strapped to chassis ground for safety, except when connected to an AC power line through Model V-2930 or equivalent Surge Coupler/Isolation Networks. The Model 587E when coupled through an appropriate surge coupler/isolation network is rated to 277 VAC, from 43-63Hz.

CAUTION: Never connect the Model 587E directly to any AC or DC power source. Damage to the unit will occur!

Shielding: Surge signals are shielded to prevent unwanted radiation or conduction of signal.

Voltage Monitor Output: A front panel BNC connector provides an output voltage attenuated by 1000:1, for use with an oscilloscope.

Current Monitor Output: A front panel BNC connector provides a 10 A/Volt current monitor, for use with an oscilloscope when terminated into a 50 Ω impedance.

Phase Adjustment: Surge initiation from 0 to 360° of the selected AC line phase is provided in the *One Shot* and *Line Sync* positions. A line signal selection circuit will test pins "E" and "F" of J201 on the rear panel for a line signal and if present will then synchronize the phase control to it. If no signal is present then the phase control will sync to the Model 587E power line. Front panel LED indicators show the source of the phase synced line. External or Internal to the Model 587E.

Polarity: Surge polarity is selected via connection of the ground strap of the High or Low floating output. Referencing the high output terminal to ground provides a negative output, referencing the low output terminal to ground provides a positive output. Whenever the Model 587E is used together with a surge coupler/isolation network, consult the respective instruction manual for location of the ground strap.

Scope Trigger Output: A ground isolated front panel oscilloscope trigger provides synchronization with the surge event. A front panel BNC connector provides a trigger pulse for scope synchronizing purposes. This trigger is of positive polarity and approximately 5V. A scope trigger is present whenever the power is on and an external trigger is fed to the generator, or the one shot button is actuated, or the mode switch is in the non-synced or line-synced mode. The scope output BNC is isolated from chassis ground.

Metering: A front panel digital voltmeter indicates approximate peak surge output voltage.

Ready for Test Indicator: A front panel green indicator light advises the operator when unit is ready for test. The Ready for test indicator shows when a full charge is on the internal discharge capacitors and a surge can be initiated. A duplicate ready for test signal is also present on J202 on the rear panel for user interface.

High Voltage Protection: Two buttons (located on opposite sides of the front panel) must be pushed at the same time in order to obtain high voltage output. A series of high voltage interlocks on the front cavity, the rear HV connectors and top and bottom covers also protect the user.

Power Requirements: Line input is 115V \pm 10%, 60Hz, 300 watts. Output is regulated to minimize effects of input line variations.

230V \pm 10%, 50Hz, Model 587E-F
 100V \pm 10%, 60Hz, Model 587E-J
 115V \pm 10%, 50Hz, Model 587E-K
 230V \pm 10%, 60Hz, Model 587E-N
 100V \pm 10%, 50Hz, Model 587E-Q
 200V \pm 10%, 50Hz, Model 587E-W
 115V/230 \pm 10%, 60Hz Switch Selectable for Model 587E-G

Mechanical: Housed in a cabinet 19-3/4"W x 13" H x 21-1/2"D. Standard 19" rack mounting is also available, specify Model 587E-R.

Weight: Approximately 100 lbs. (cabinet model).

Available Accessories:

The Model V-2980 Surge Coupler/Isolation Network provides fast change of surge polarity and coupling modes, reduced backswing and bit programmability of coupling and polarity. The Model V-2980 is designed for the production and engineering testing environment with ease of operation and setup in mind. Testing can be conducted on equipment up to 277V at 25A RMS.

The Model V-3000 Surge Coupler/Isolation Network provides similar performance as the Model V-2980, but allows testing with power line voltages up to 480V at 25A RMS. The Model 587E with Option "P" is used in conjunction with the V-3000.

The Model V-3050 Surge Coupler/Isolation Network allows testing with power line voltages of 277V per phase, and up to 480V phase to phase Y at 25A RMS, when used with the Model 587E-P.

Available Options:

Option Designator

L
M
P
R
PA
SA

Description

Remote One Shot Trigger Capability
Remote Safety Feature
EUT Operation up to 480V RMS
Rack Mounting
EUT Operation up to 600V RMS
Digital Phase Control and Single Shot Programming