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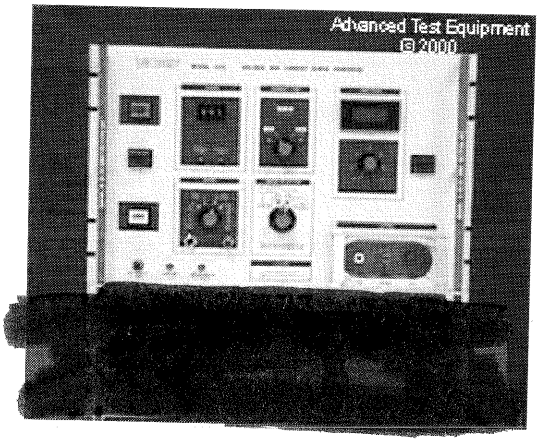
Velonex 587E



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587E - Voltage and Current Surge Generator

Position 1: Combination Wave Open Circuit Exponential Waveform: 6kV, 1.2 x 50µs. Short Circuit Exponential Waveform: 143A. Source impedance 42 ohm.

Position 2: Combination Wave Open Circuit Exponential Waveform: 6kV, 1.2 x 50µs. Short Circuit Exponential Waveform: 500A. Source impedance 12 ohm.

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

Position 4: Oscillatory Waveform (Ring Wave): 6kV, 0.5µs, 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).

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

- Surge Voltage: Up to 6kV of isolation and attenuation from a "6kV, 100kHz" oscillatory waveform or a "6kV, 1.2 x 50µs" exponential continuous voltage wave
- Surge Current: Up to 3kA peak current isolation and attenuation for the "3kA, 8 x 20µs" exponential short circuit current wave
- Polarity Selector: positive or negative surge injection is front panel switch select able or bit programmable
- Injection Mode Selector: One normal and three common injection modes are switch selectable or bit programmable
- AC Line Voltage: Maximum line voltage to load, 277V RMS, 50/60 Hz
- AC Line Current: Maximum continuous current to load 25A RMS, maximum intermittent loading of 30A
- Approx. Weight: 95 lbs.
- External Trigger: The external trigger requirement is a 2.5 to 10V, 0.05µs minimum width, positive pulse
- Repetition Rate: Up to 0.04Hz, 0.1 Hz maximum depending on the surge selector position and programming.
- 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-2980 or equivalent Surge Coupler/Isolation Networks.
- 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 1V/100A current monitor, for use with an oscilloscope
- Phase Adjustment: Surge initiation from 0 to 360° of the selected AC line phase
- Scope Trigger Output: A ground isolated front panel oscilloscope trigger provides synchronization with the surge event
- Metering: A front panel digital voltmeter indicates approximate peak surge output voltage

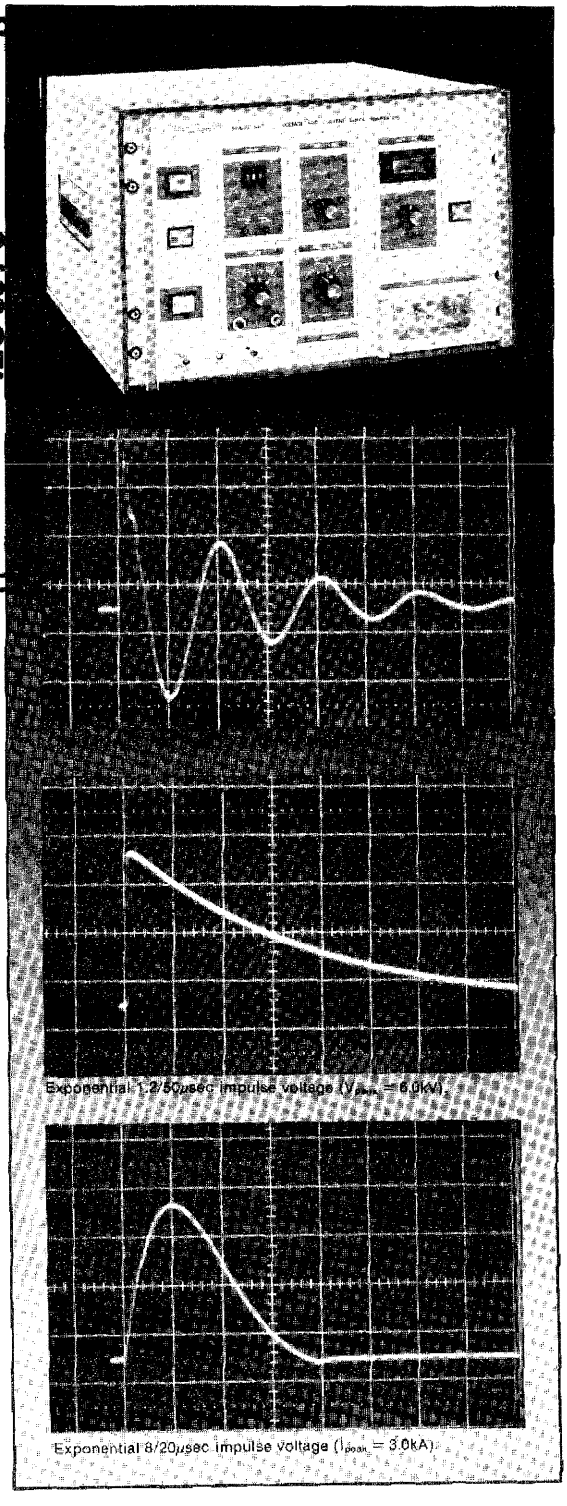
VELONEX

MODEL 587
VOLTAGE/CURRENT SURGE GENERATOR
6000V/3000A

FEATURES

- **Meets or exceeds ANSI/IEEE C62.41-1980 (formerly IEEE STD 587-1980) Category A and B**
- **Meets or exceeds IEC Publication 664-1980 Category 1, 2, 3, and 4**
- **6000V/3000A Surge Capability**
- ***Surge Waveforms:* (Switch Selectable)**
  1) **Oscillatory, 100kHz, t_R = 0.5μsec**
  2) **Exponential, 1.2/50μsec**
  3) ***Continuous Dual Exponential:***
     1.2/50μsec Voltage;
     8/20μsec Current
- **Reliable Solid State Design**
- **Ease of Operation**
- **Operator Safety**
- **Optional Isolation Networks**
- **Variable Surge Voltage and Current**
- **Digital Phase Control**
- **Programmable Decay Time & PRF**

Waveforms: ANSI-C62.41-1991 & IEC 801-5



DESCRIPTION

The Velonex Model 587 is a self-contained voltage and surge generator which provides all three waveforms specified by the ANSI/IEEE Standard C62.41-1980 (formerly IEEE STD 587-1980) and IEC 664-1980 for surge voltage testing. (See Note 1 for explanation of ANSI/IEEE Standards.)

GENERAL

The Velonex Model 587 is a cost effective surge generator that is capable of producing a variety of test voltages and waveforms to meet a number of applicable industry standards. The Model 587 is an easy-to-operate, solid state voltage and current generator providing three specific waveforms, one oscillatory and two exponential. This compact surge generator can be used to test electronic apparatus for their "withstand" capabilities with respect to line surge voltages as defined in Table 1.

APPLICATIONS

The Velonex Model 587 is designed to test electronic equipment for susceptibility to line transients. The output voltage amplitude and current is adjustable, increasing the instrument's flexibility, and can be used for a wide variety of applications including the testing of components, sub-systems, and integrated systems.

In addition to performing tests to the ANSI/IEEE C62.41-1980 and IEC report 664, the Velonex Model 587 surge generator can produce waveforms in accordance with the following U.S. and foreign specifications:

*With the addition of a Surge Network.

BEAMA 219	**IEC 255-6**	**SEV 1055-1978**	**UL943**
CCITT Rec. K17*	**IEC 255-10***	**SEV 3313**	**UL1449**
ENEL LV 1504	**IEC Report 521**	**UL217***	**VDE 0418**
CIGRE 36-05	**IEC TC-65**	**UL268***	**VDE 0565**
IEC 255-4	**MIL STD 1399**	**UL365***	**VDE 845**
IEC 255-5	**SEN 361 503-1**	**UL 864***	

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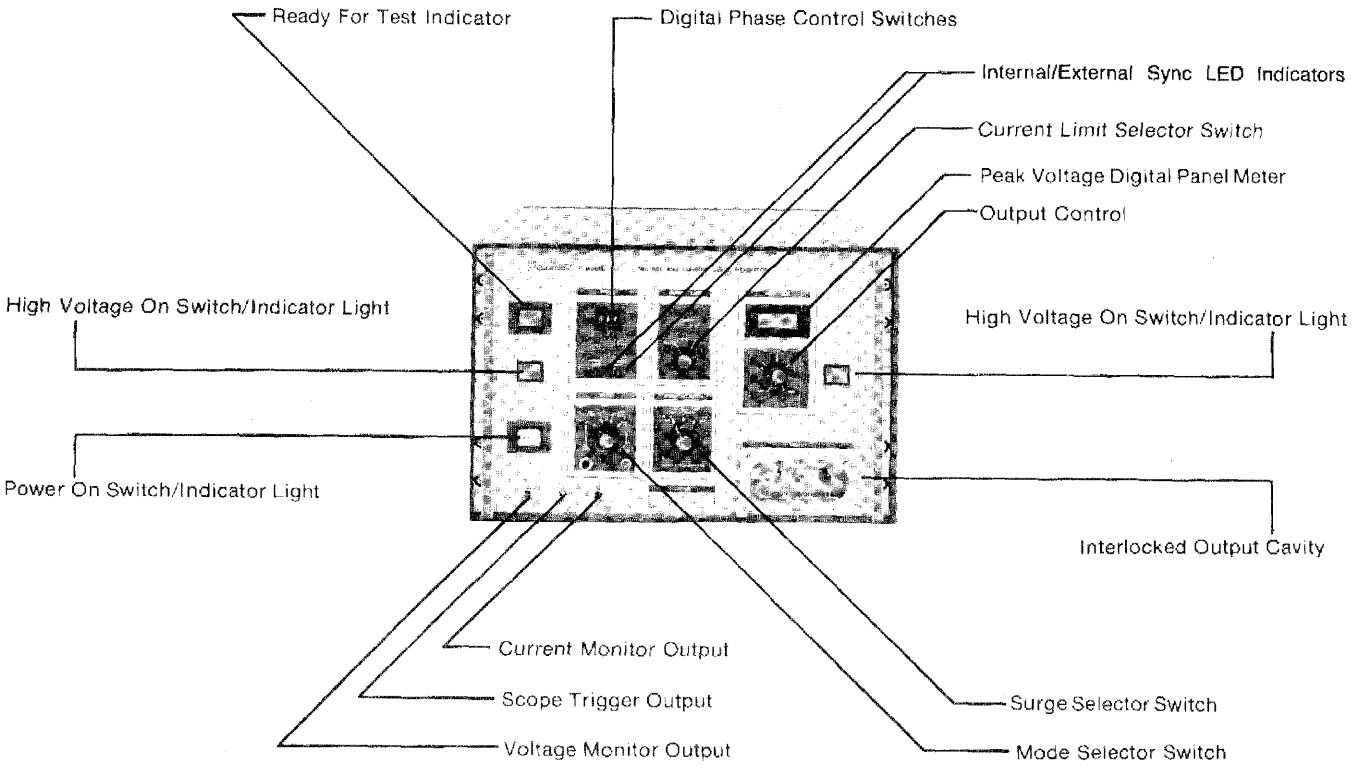
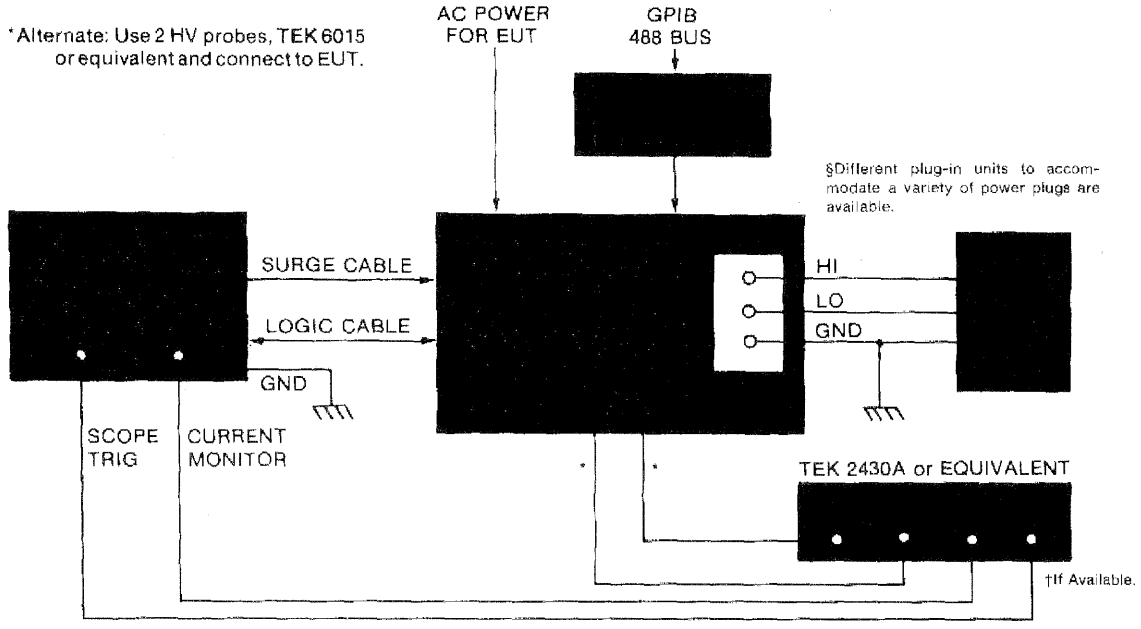
MODEL 587 VOLTAGE/CURRENT SURGE GENERATOR

FRONT PANEL FEATURES



TYPICAL INTERCONNECT DIAGRAM



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MODEL 587 VOLTAGE/CURRENT SURGE GENERATOR

OPTIONAL

OPTION TABLE

L	Remote one-shot.
M	Remote safety feature.
P	Provides surges on power lines up to 480VRMS in conjunction with an isolation unit.
R	Rack-mounting.

INPUT POWER OPTIONS

F	Input: 230V, ±10%, 50Hz
G	Switch selectable input voltage: 115/230V, ±10%, 60Hz
J	Input: 100V, ±10%, 60Hz
K	Input: 115V, ±10%, 50Hz
N	Input: 230V, ±10%, 60Hz
Q	Input: 100V, ±10%, 50Hz
W	Input: 200V, ±10%, 50Hz

ISOLATION NETWORK OPTIONS

The Velonex **V-2734** single-phase 20ARMS surge coupler/isolation network is a basic, cost effective unit which allows dynamic testing of equipment while connected to the power line. The V-2734 provides coupling of the surge signal to the equipment under test while protecting the power line from the surge event and the generator from the AC voltage. The unit handles 20A up to 130VRMS and 10A up to 277VRMS.

The Velonex **V-2950** three-phase 25ARMS surge coupler/isolation network provides coupling and line isolation for three-phase powered equipment. The V-2950 allows for ten different modes of injection and polarity control from front panel switches. Testing can be conducted on equipment up to 277V at 25ARMS per phase and 277V phase-to-phase.

The Velonex **V-2980** single-phase 25ARMS surge coupler/isolation network provides similar performance as the V-2734. In addition, the V-2980 is Bit programmable and allows for automatic surge polarity and line coupling selection. Mode is selectable via panel switch or programmed input. Its advanced solid state design provides for low specified backswing. Testing can be conducted on equipment up to 277V at 25ARMS. For IEEE 488 GPIB bus control, a Velonex V-2627 interface adapter is available.

The Velonex **V-3000** single-phase 25ARMS surge coupler/isolation network is a 480V unit and incorporates all the features of the Model V-2980. The Model V-3000 is used with the Velonex Model 587 (option "P") Voltage/Surge Generator.

The Velonex **V-3050** is identical to the V-2950 except it will tolerate 480V phase-to-phase.

The Velonex **V-3070** surge network, when used in conjunction with the Velonex Model 587 voltage/surge current generator, extends the testing capability of the Model 587 to include CCITT Rec. K17 specification.

The Velonex **V-3075** surge network, when used in conjunction with the Velonex Model 587 voltage/current surge generator, extends the testing capability of the Model 587 to include UL specifications: UL217, UL268, UL365, and UL864.

MODEL 587 CABINET DIMENSIONS		
Width	19¾ inches	502mm
Depth	21½ inches	550mm
Height	13 inches	330mm
Weight	100 pounds	45kg

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MODEL 587 VOLTAGE/CURRENT SURGE GENERATOR

WAVEFORMS

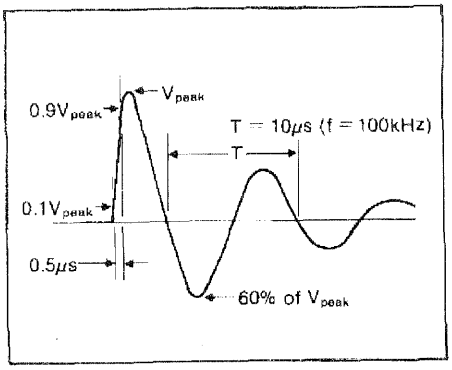

FIGURE 1
Oscillatory 100kHz Waveform

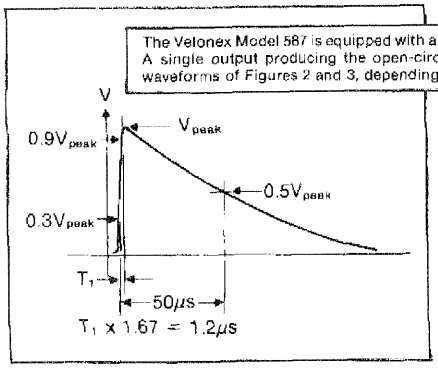

FIGURE 2
Exponential 1.2/50μsec Waveform

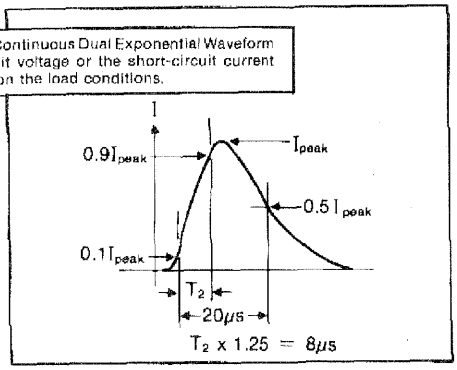

FIGURE 3
Exponential 8/20μsec Waveform

TABLE 1—
TECHNICAL DATA

X = ON OUR UNIT

	WAVEFORMS			
			Continuous Dual Exponential*	
	Oscillatory 100kHz X	Exponential 1.2/50μsec (Open Circuit) X	1.2/50μsec (Open Circuit) X	8/20μsec (Short Circuit) X
Maximum Peak Voltage (E_O)	6.0kV	6.0kV	6.0kV	—
Maximum Peak Current (I_O)	200A/500A	30A	—	3.0kA
Rise Time (t_R)	0.5μsec	1.2μsec	1.2μsec	8.0μsec
Decay Time (t_d)	60% of Previous Peak	50μsec	50μsec	20μsec
Source Impedance (Z_S)	30/12 Ohms	200 Ohms	2.0 Ohms	2.0 Ohms
Phase Adjust (5% Resolution)	0° — 360°	0° — 360°	0° — 360°	0° — 360°
Repetition Rate†	0.1Hz/1.0Hz	0.1Hz/1.0Hz	0.04Hz	0.04Hz
Polarity	User Selected			
Output Isolation§	Floating			

*The Velonex Continuous Dual Waveform is now being introduced in various national and international standards and referred to as *Combination Wave* (e.g. UL 1449, IEC 65 etc.).
†One Shot line synchronized capability included. §Required when testing equipment or components under load conditions (Power On). See page 4.

DESIGN FEATURES

The Model 587 generator is adjustable from 0 to 6kV and has a short circuit capability of 3000 amps. A surge selector switch, a power push button and two high-voltage push buttons, located on the front panel, are incorporated into this instrument for convenience and safety. A digital meter, also located on the front panel, indicates the peak pulse open circuit voltage. Input power of 115V ± 10%, 60Hz is standard (for other input power requirements see Input Power Options Table). The isolation network Model V-2734 or V-2980 is recommended to be used with the Model 587. An isolation network must be used when the EUT is connected to an AC power line.

ANSI/IEEE 62.41-1980

Note 1: The ANSI/IEEE 62.41-1980 document is an industry accepted specification delineating the most common types of transient surge voltages associated with the 115/230V AC power as supplied by U.S. utility companies. It has two categories and 3 levels:

Level A: Electrical Outlets and Long Branch Circuits.
Level B: Major Electrical feeders and Short Branch Circuits.
Level C: Outside and Service Entrances.

Category A: Long-branch circuits or wall outlets. Requires an oscillatory waveshape of 6kV amplitude with a current surge capability of 200A.

Category B: Short-branch circuits or load near the circuit breaker panel. Requires an oscillatory waveshape of 6kV amplitude with a current surge capability of 500A. In addition, two exponential waveshapes are needed for impulse wave tests. A $6kV_{peak}$ voltage surge (open circuit) at 1.2/50μs, and a $3kA_{peak}$ current surge (short circuit) at 8/20μs.

IEC Report 664

Category I: Requires a 1.2/50μs voltage waveform at 500V—Telecommunication and Electronic testing. Following *Category II.*

Category II: Requires a 1.2/50μs voltage waveform at 2.5kV—Appliances, and portable equipment. Following *Category III.*

Category III: Requires a 1.2/50μs voltage waveform at 4kV—Fixed Installations. Following *Category IV.*

Category IV: Requires a 1.2/50μs voltage waveform at 6kV—Primary supply, overhead lines, cable systems, including distribution bus and its overcurrent protection.

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