

FOUR CHANNEL
HIGH CURRENT PULSE GENERATOR FOR
EED AND NEA INITIATOR



Model 8601A
Pyrotechnics Pulse Generator



APPLICATIONS

- *Pyrotechnics and Non Explosive Actuators (NEA) testing in the aerospace industry*
- *HRMCE EGSE*
- *Fireset for testing purposes*
- *Automotive explosive devices testing (Airbag initiators, EVV battery disconnection switch, pyro-switch)*

KEY FEATURES

- *Validated in the following space programs: SICRAL, Athena FIDUS, Bepi Colombo, Euclid, Jason CS/Sentinel 6, One Sat, Biomass*
- *Constant current design to overcome long wiring harness*
- *Full analog circuitry, no microprocessor controlled for maximum safety*
- *Two set of four Nominal/Redundant channels*
- *Peak current LCD display*
- *Circuit continuity LED indicators*
- *1 V/A test connectors for pulse recording*

Overview

Model 8601A is a four-channel, high-current pulse generator designed to ignite Electro Explosive Devices (EED), type "NASA Standard Initiators" (NSI), and to activate Non Explosive Actuators (NEA).

By providing a high-energy, time-controlled pulse, unit fires standard initiators and squibs well above the all-fire current rating. Constant current design allows long interconnecting cables to be laid between the EGSE and the EED.

The FIRE pushbutton starts a pulse generator with a selectable width (5 to 60 ms) which allows the current pulse to flow through the selected circuits.

A digital LCD display shows the fire current for each channel.

Circuit continuity is continuously verified by means of a test current circulated through the harness and initiators, and displayed by LED indicators.

Functional Description

The high-current pulse generator contains the following main components:

- 600W power supply.
- DC board assembly.
- Relay board assembly.
- Service power supply.

The DC board contains four fire circuits, and a control section. Each fire circuit is composed by a constant current regulator, a high and low side high current switch, metering circuit, and test current circuit. Control section contains the pulse generator, sample & hold timing logic, interlock protection, and control signal routing.

The relay board routes the 4 fire channels to the 8 nominal and 8 redundant output channel connectors. The power supply consists of a switching unit, with a maximum power of 600W at 28 V.

Front panel is divided into 5 sections. From left to right: 4 channel controls, 1 fire control section. Each channel contains an LCD display indicating the peak current recorded during firing, selection of the fire channels (1-4 or 5-8), a selector between nominal and redundant channel, circuit continuity LED indicators, and the 1V/A output. Control section contains the pulse width selector, the SAFE/ARM switch selector,

the main power ON/OFF switch, and the FIRE pushbutton, with protective cover.

The SAFE/ARM switch energizes the high power supply, providing the voltage to the fire circuits. The FIRE pushbutton starts the single shoot pulse generator and the associated timing logic (pulse enable, sample and hold strobe pulse, dead time safety interlock after fire activation).

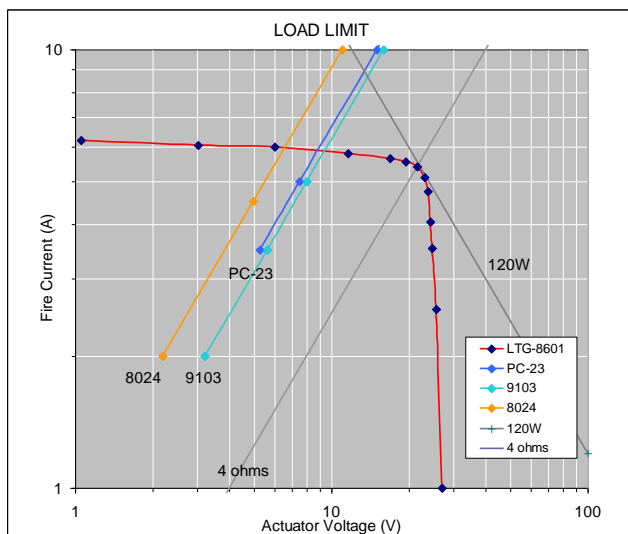


Rear panel connections

The rear panel contains the AC mains input assembly with integrated fuse holders, and two round type MIL connectors. One for the nominal and redundant channels 1 to 4, the other for the nominal and redundant channels 5 to 8.

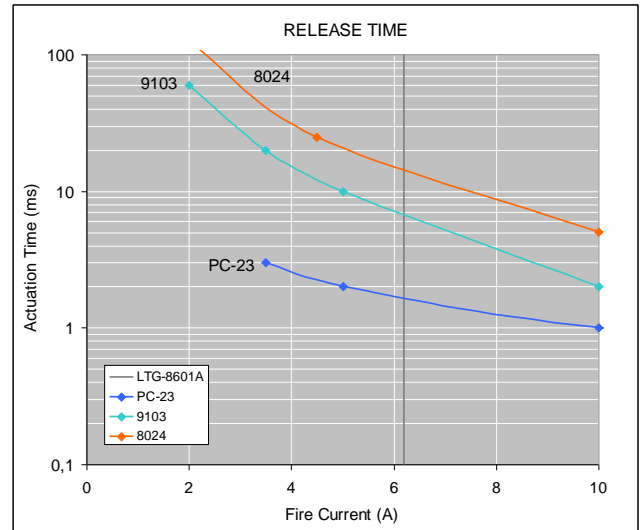
A series of performance graphs are provided, which illustrates the capability of the pulse generator with varying load resistance, and typical actuation time at the nominal current delivered by the equipment.

The first graph shows the compliance in current and voltage between the LTG-8601A and some the EED and NEA devices. NEA devices have been designed to work with existing pyro firing circuits.



Actuator Voltage Vs Fire Current

The graph includes data from NEA® model 9103 Hold Down & Release Mechanism (also used for Non-Pyrotechnic Valves), and Cooper® model 8024 tension release. Standard NASA. PC-23 initiator is also included as a reference.

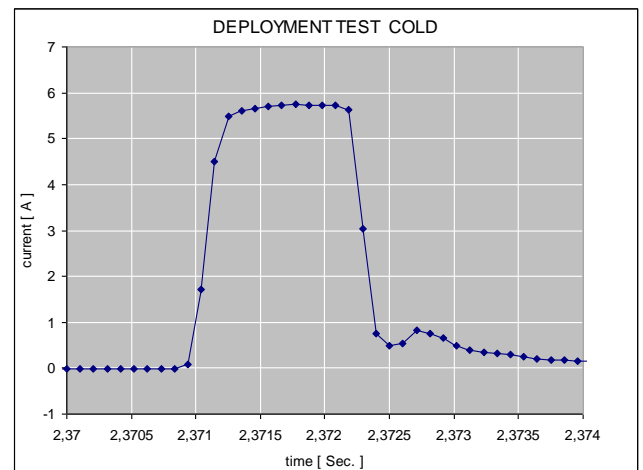


Fire Current Vs Actuation Time

The graph above shows the compliance in current and actuation time for various types of EED and NEA devices.

The current profile of an initiator under test can be easily recorded by using an external recording device (for example a digital oscilloscope) connected to the 1V/A outputs on the front panel. In this way the actuation time of the device under test can be easily characterized as a function of the current supplied by the pulse generator.

The following graph shows the typical profile of a hi-shear® PC-23 'equivalent' NASA standard initiator (NSI), part of bolt cutter assemblies.



Typical recorded profile of a PC-23 initiator, during a firing test (1 V/A output)

Technical Specifications

PULSE GENERATOR	
MODEL P/N	8601A
NUMBER OF CHANNELS	4
ROUTING SWITCHES	8N + 8R
FIRE CURRENT	>5.5A (MAX 6.5A)
FIRE VOLTAGE	28V
MAX. CIRCUIT RESISTANCE	7Ω @ 3.5A ALL-FIRE CURRENT
TEST CURRENT	<10 mA
PULSE WIDTH	5 ÷ 60 ms, 5 ms step
PULSE WIDTH ACCURACY	± 5%
PULSE RISE/FALL TIME	100 μs, 30 μs (1 Ω resistive load)
AC LINE	85 ÷ 265 VAC 47 ÷ 63 Hz
AC POWER	30W STD-BY (SAFE) >100W PEAK (FIRE)
AC INLET	IEC 320-C14
I/F CONNECTORS (2)	MS3112E16-26S
1V/A OUTPUTS (Z=10 KOHM)	BNC
1 V/A OUTPUT ACCURACY	±1.2% (2% MAX)
LCD DISPLAY CURRENT SAMPLING	1 ms from pulse trailing edge
DIMENSIONS (3U, 84TE)	520X400X400 mm
WEIGHT	15 KG
TEST CABLE	
MODEL P/N	8601-8006
CABLE TYPE	BELDEN 8760
AWG	18
LENGTH	1 m
MATING CONNECTORS	MS3116F16-26P DB25S
TEST LOAD	
MODEL P/N	8601-8007
NUMBER OF LOADS	8
NOMINAL RESISTANCE	1Ω ±1%
AVG. POWER (EACH)	25W
I/F CONNECTOR	DB25P

Main Programs

SICRAL, Athena FIDUS	APME HRMCE
BEPI Colombo	Pyro valves
Euclid	HGAMA (Solar Orbiter)

Main Customers

Thales Alenia Space Italy	2011, 2013
Airbus UK (former EADS Astrium)	2017
SAAB Bofors Dynamics (CH)	2020

Accessories and Options



8601-8007 8 channels Test Load



LTG 8601A stand-alone version with rack enclosure (standard delivery)



LTG 8601A for system integration in SCOE systems (optional)



Space-qualified cable assemblies (on request)

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