

ITOPP
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ITOPP, Leader in Pulsed Power Systems
Linear Transformer Driver



from **spark** to **lightning**

ITOPP leader in the Linear Transformer Driver (LTD) technology

ITOPP is the only company throughout the world that has industrialized the manufacturing of LTD machines (Linear Transformer Driver).

The LTD is a generator of pulsed power able to directly drive the load without further shaping of the pulse.

Compact and modular, this technology is perfectly adapted to many applications where a large current or voltage is required:

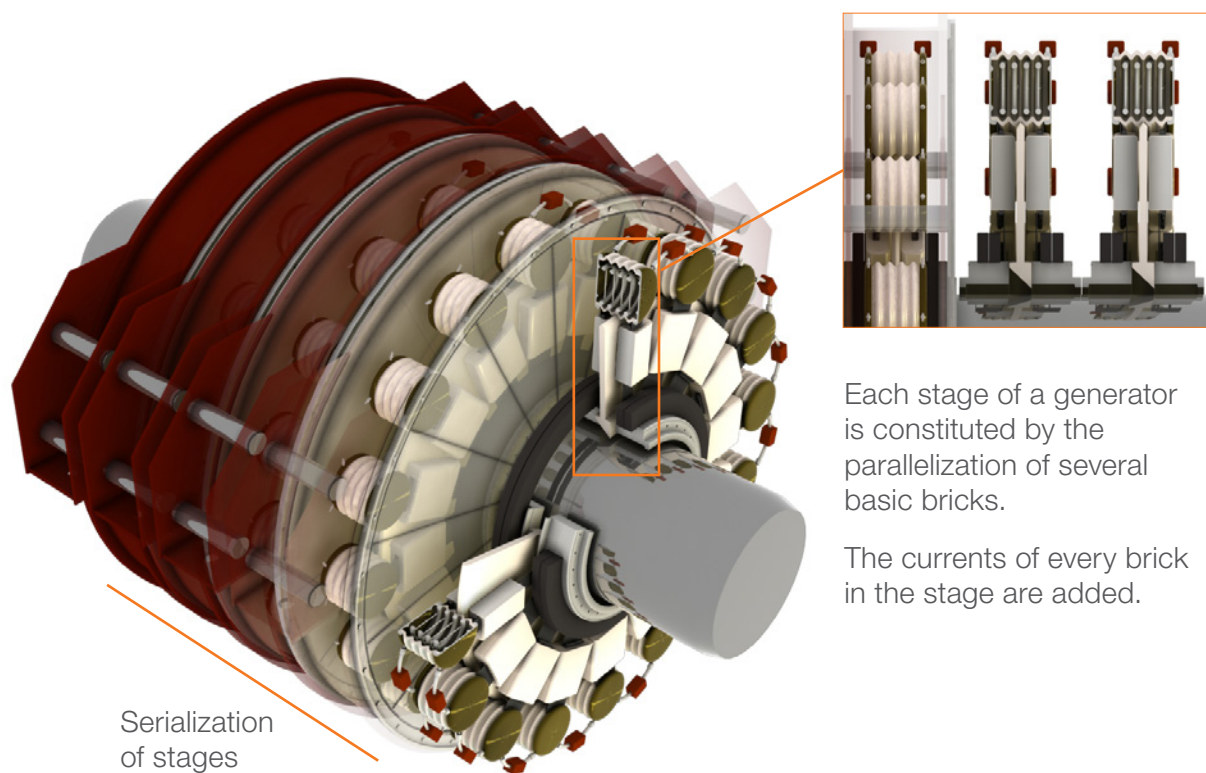
- Plasma research on a wide range of densities and temperatures.
- Study of intense particle beams.

- Creation of extreme conditions in matter,
- Flash radiography.

A linear transformer driver (LTD) voltage is made of several stages of capacitors and switches that are arranged in parallel to increase the energy stored per stage (increasing the current), and stages are arranged in series to increase the system output voltage. This structures makes this technology:

Very easy to upgrade

The serialization of the stages allows to add the output voltage simply by adding the number of stages.



Each stage of a generator is constituted by the parallelization of several basic bricks.

The currents of every brick in the stage are added.

Through more than 25 years ITOPP has acquired years of experience in the maintenance and the development of LTD systems and can respond to customers' specific needs by adapting this system in terms of current and voltage, or by a complete design taking into consideration required performances.

1 MV LTD Generator to drive resistive load or vacuum diode

Technical parameters

Output voltage of each stage	~ 100kV
Stages assembled in series	
Peak voltage	~ 1 MV
Pulse duration	75 ns FWHM (Full Width Half Maximum)
Rise time 10-90%	~ 20 ns
Low jitter (1)	< 2.5 ns
No SF ₆	



- 10 stages made of aluminium body, polycarbonate vacuum interface and stainless steel electrodes.
- Each stage includes 16 bricks composed of two capacitors and one multigap multichannel (MMCS) switch which is designed to operate under pressurised dry air (up to 4 bar).
- Differential voltage measurement integrated in each stage + current and voltage monitors in vacuum at the output.
- Oil insulation in the stages and vacuum or MITL output line (Magnetically Insulated Transmission Line).

800 kV LTD Patm insulated with dry air at atmospheric pressure

Technical parameters

Output voltage of each stage	~ 50 kV
Stages in series	
Peak voltage	~ 800 kV (Operation with positive or negative output by 180° tilt of the stages)
Pulse duration	85 ns FWHM (Full Width Half Maximum)
Rise time 10-90%	~ 30 ns
Low jitter (1)	< 1.5 ns
No oil - No SF ₆	



- 17 stages made of aluminium supporting plates and PMMA interface.
- Each stage includes 2 bricks composed of two capacitors and one multigap multichannel switch (MMCS) molded in epoxy compound (designed to operate with dry air at atmospheric pressure).
- Voltage measurement integrated in each stage + current and voltage monitors in vacuum at the output.
- Air insulation at atmospheric pressure in each stage and vacuum insulated output line.

With more than 25 years of existence, ITOPP has become the French leader in pulsed power and high-power microwave technologies. Based on the customer's specifications,

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ITOPP designs and manufactures highly innovative adapted systems related to these technologies for scientific research as well as civil and military applications.

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6 rue Paul Baudry – 75008 Paris – France
Tel. + 33 (0)1 40 72 55 00
alcen@alcen.com
www.alcen.com



ITOPP

1160 route de Miers – 46500 Thegra – France
Tel. +33(0)5 65 33 43 30
contact@itopp-alcen.com
www.itopp-alcen.com