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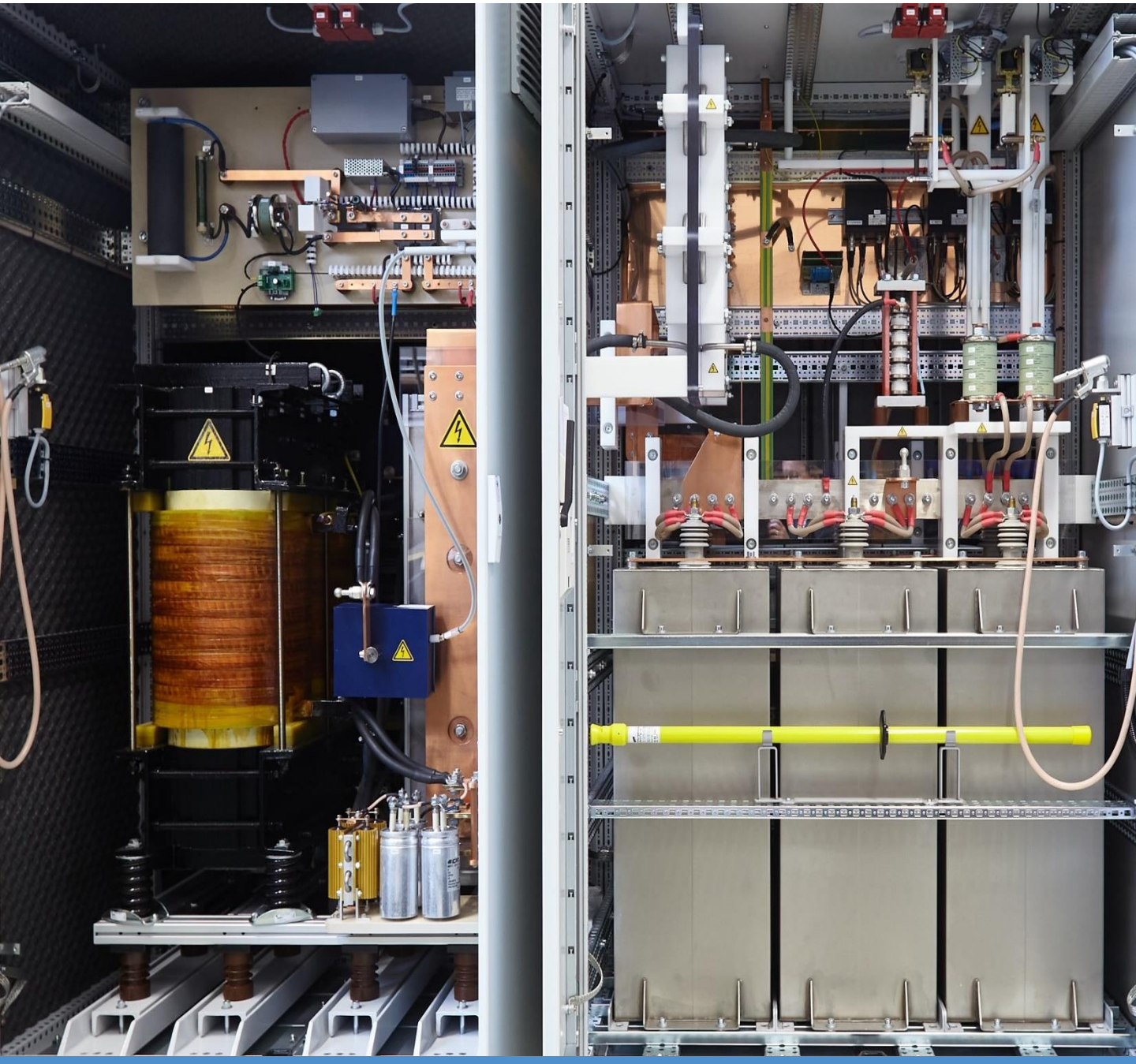


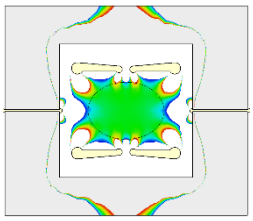
Pulsed Power Technology for Industry and Science

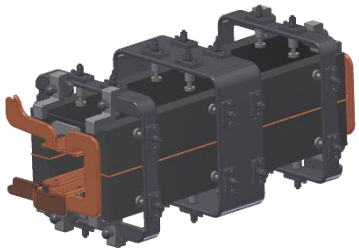
www.research-instruments.de

RI Research Instruments GmbH – Your Experienced Partner for Pulsed Power Systems

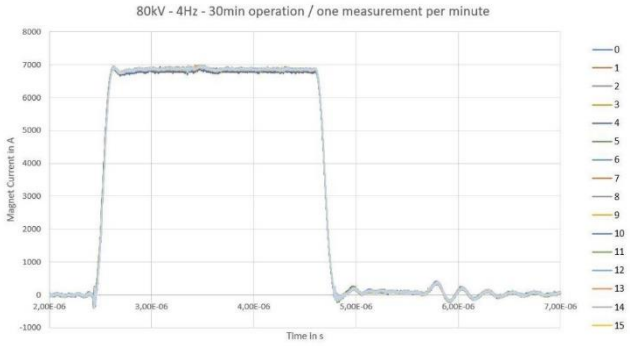
We are a leading provider of cutting-edge systems for industrial and scientific customers. We offer a wide range of innovative solutions to achieve highly specific technical requirements that can help you achieve your goals and take your business to the next level. As a systems designer, we take care of the whole technology chain all the way from the grid input towards the load. Besides the actual pulse generator, this takes also matching elements like networks or transformers into account as well as the overall control system to handle personnel and machine protection and the interface to the customer.
In this brochure, we will introduce you to some of our pulsed power activities for short and long pulse systems as well as components for scientific and medical applications.

Fast Short Pulsed Systems





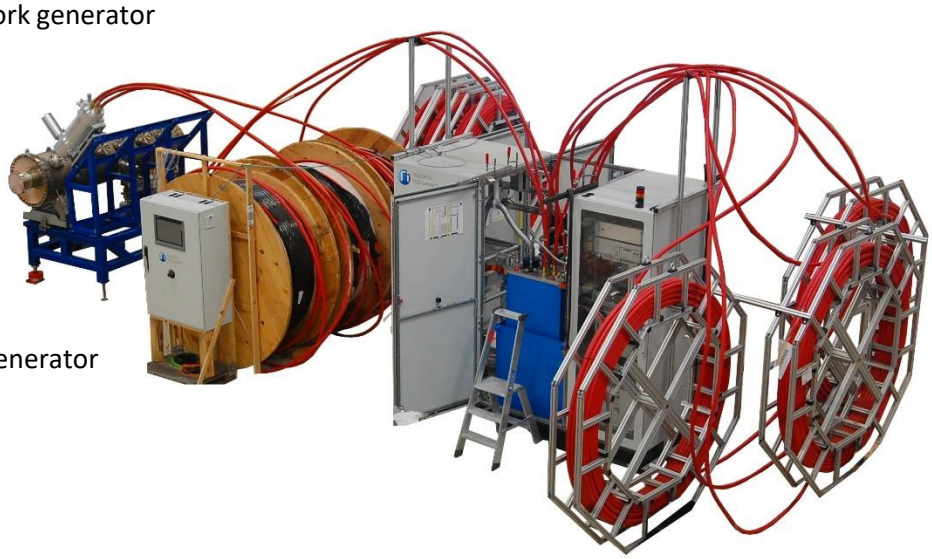
RI designs and develops fast pulsed power systems for e.g., Kicker, Septa and Bumper magnets according to high demanding customer specification.
Beginning with the load the pulsed power system will be designed to match the customers specification, whether it is an already existing magnet design or only a definition of the required B-field quality. The actual pulse generator will be designed in accordance with these load requirements and may also incorporate external matching elements, e.g., transformers or RLC-networks. To fire the required current pulses RI utilizes either Thyratrons or self-developed solid-state solutions based on IGBTs or Thyristors.
For local or remote operation, RI also provides Siemens or Beckhoff based control systems, that operates and monitors the pulsed power system and handles the communication interfaces towards the customer.



Example I:

GSI's SIS100 Extraction/Emergency Kicker System

Type:	Pulse forming network generator
Voltage:	7kV < U < 80kV
Current:	< 7kA
Rise time:	~800ns
Flat top:	7.0µs



Example II:

GSI's SIS100 Injection Kicker System

Type:	Pulse forming line generator
Voltage:	40kV < U < 80kV
Current:	< 7kA
Rise time:	~160ns
Flat top:	0.5µs < t < 2.0µs

System Solutions for Industry and Science

Our high-tech production covers all key manufacturing steps involved in the production. At our company, we take pride in having a dedicated team of over 330 employees who are committed to delivering the best solutions to our clients. We have a state-of-the-art facility that also includes clean rooms, manufacturing workshops, milling and turning machines, welding equipment, and more. Our manufacturing workshops are equipped with advanced machinery and equipment to ensure high precision and quality in our products.
In our Dortmund premises, we have our hands on all manufacturing and testing steps, necessary to set up complex pulse generating systems. Our electrical workshop covers PCB soldering infrastructure, compound casting in vacuum, several high voltage testing areas providing testing voltages up to 200kV DC.

Long Pulse Generator Systems

These systems can be adapted to virtually any customer specification. Our monolithic component based long pulse modulators complement RI's range of high voltage pulsed modulator and RF amplifier systems as new applications require high average output powers.

Example I:

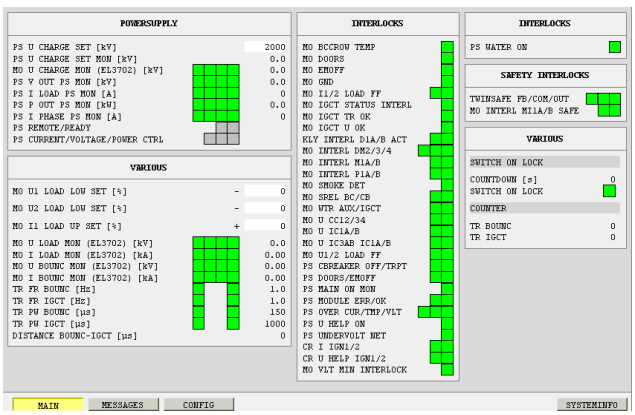
DESY FLASH Klystron Modulator

Type:	Bouncer Modulator
Voltage:	12kV
Current:	1.600A
Flat top:	1.6ms
AV Power:	256kW

Example II:

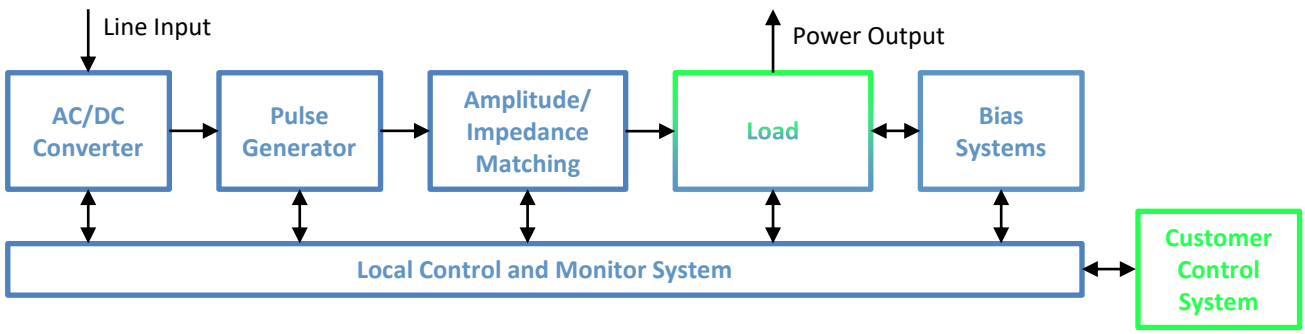
Space Radar Klystron Modulator

Type:	Bouncer Modulator
Voltage:	7,5kV
Current:	880A
Flat top:	1,6ms
AV Power:	300kW



System thinking:

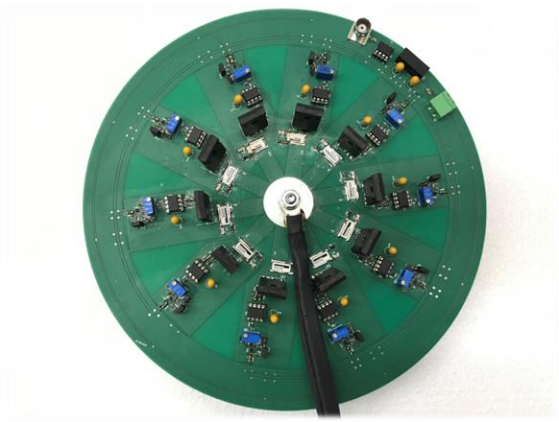
Bringing highly specific customer requirements into a technical concept can easily end up in a very heterogenic conglomerate of different components. However, breaking such a concept down you will always find more ore less the same sub-systems. And this is how we think and manufacture our concepts. The figure bellow depictures all major sub-components of each pulsed power system we take care about. Having the full scope in our own hands enables us to test those systems as stand-alone devices even without the customer's own assets. Even if the actual load is not accessible for us or not in our project scope, we are providing specific dummy loads to conduct our tests.



Fast Solid-State High Voltage Switches

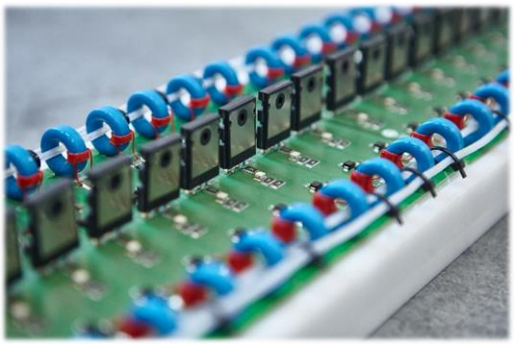
At RI, we understand that every customer has unique needs and requirements. That's why we don't believe in a one-size-fits-all approach to manufacturing solutions. Instead, we work closely with each customer to understand their specific needs and preferences, and then tailor our solutions to meet those needs. Our goal is to create the best solution for each customer, and we take pride in our ability to deliver on that promise. Whether you need a standard product or a custom-designed solution, we are dedicated to delivering the highest quality products and services that exceed your expectations. With our state-of-the-art facilities, experienced team, and commitment to customer satisfaction, you can trust us to be your manufacturing partner of choice.

High Voltage Switching Modules (HVSM)



At RI, we've developed a solid-state based high voltage switch technology, that can easily be adapted to our customers needs. These so-called high voltage switch modules (HVSM) are currently being used in a variety of systems for medical and scientific applications.

Medical applications

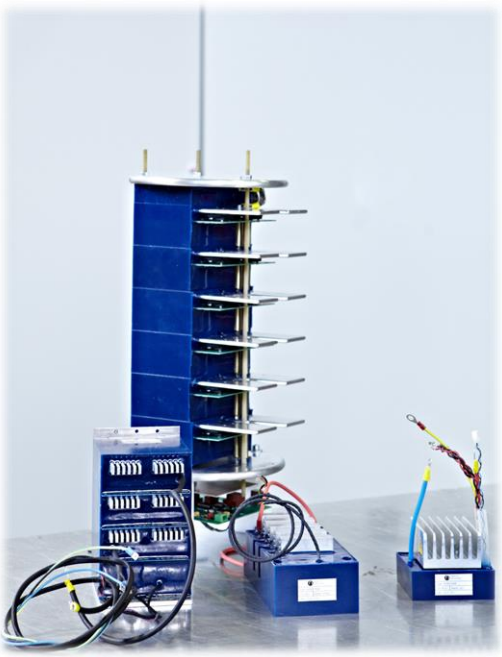


Our Shock-wave generator switches are used for medical treatments, such as lithotripsy or muscle treatment. These HVSM types were designed to replace formerly used spark gaps and thyratrons in order to prolong the meantime before maintenance.

Technical parameters of our HVSM series:

Voltage:	4kV < U < 20kV
Current:	< 10kA
Rise time:	< 1µs
Reverse current capabilities:	- 50%

Thyratron replacement



Replacing thyratrons in pulsed power systems is an emerging trend for many reasons such as life-time issues and sparing energy consuming peripheral components like heaters etc.

For these tasks, we are developing switches of higher voltages of up to 40kV which have already been tested successfully in low repetition rate klystron modulators.

Rough pulse power systems

We also offer crowbar switches, which are used to provide fast energy dumps in a range of applications, including power supplies and pulse generators. These switches are designed to be reliable and efficient, ensuring that our clients can achieve the highest levels of performance.

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Teamwork makes the dream work.

Let‘s team up and see how our experts can support your cause.

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