

## "Spitzenberger & Spies offers extra protection for expensive prototype cars"

*The relating standards:*  
 ISO 7637  
 ISO 16750-2  
 ISO 21848  
 BMW GS 95002  
 and many manufacturers test specifications

High currents require extra protection devices. Thinking about luxury and upper class automobiles, currents up to 800A for the initial motor startup are necessary. Everybody can imagine, in which dimensions a simulation system for automotive supply networks has to be.

Taking a fully equipped modern limousine as an example, many different power consuming units are on board. Motoric devices as well as high speed heating systems for front windows and lots of other appliances. All of them require immediately high currents for their desired operation.



At the prototyping cycle of current cars in in-house testing facilities (according to ISO 7637 and lots of manufacturer specific test regulations) a programmable DC power supply source with a very high current capability, very short rise time (+/-), very low internal resistance and a very high peak power capability is absolutely necessary.

A well-known representative of such a voltage source is the PAS 15000 GN/Kfz, able to deliver short time currents far above 1000A. With such a simulator devices with high-energy needs can be tested also.

**During any test run the protection of the (mostly expensive) prototype against overvoltage must be most important.**

In any case of fault condition the supply source must be prevented from delivering power into the prototype system. If not, uncontrollable damages of the system up to burning fire can happen. Spitzenberger & Spies has developed an **overvoltage protection device OPD** suitable for the above mentioned purpose. It is offered as an optional unit for the well-proved Spitzenberger automotive supply simulator series PAS xxx GN/Kfz.

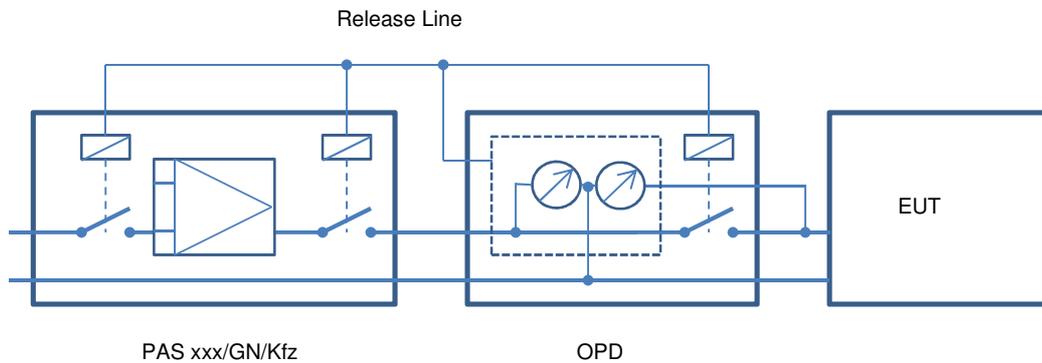


The functional principle of the OPD is a mechanical power switch with a monitoring and supervising unit. This switching unit is located between the simulator and the EUT.

To afford maximum security **the monitoring of the output voltage is set up as a redundant system**. On the one hand the output voltage is supervised directly at the EUT through external sense lines. On the other hand the current flow through the protection diodes of the supervising unit is analyzed. The OPD output is enabled only if both monitoring units evaluate "ok".

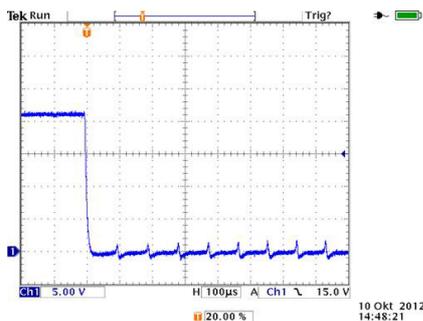
Additionally the polarity of the output voltage is supervised.





The release line controls the cut-off switches inside the OPD and in the voltage input of the simulator

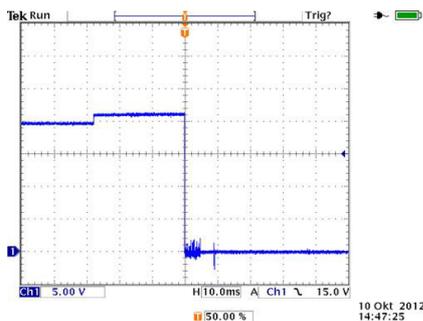
The main function of the electronic protection is to prevent the EUT from any damage until the mechanical switches have cut off the voltage. This duration is typically 20-30ms. The components inside this electronic protection must have an improved quality to withstand the voltage and power delivered to the EUT until the mechanical switches have released.



Release characteristic of the electronic protection (100µs/DIV)

Only one measured difference from the reference values is necessary to activate the protection sequence. In any case of fault the electronic monitoring unit activates immediately a multi-stage protection sequence.

Within µs an electronic protection cuts off the voltage to shield the EUT until the mechanical protection switch has released (typically 20-30 ms duration). The supply lines between EUT, OPD and the automotive supply simulator are disconnected, the whole system is de-energized.



Release characteristic of the mechanical switch (10ms/DIV)

To guarantee a perfect protection the functionality of the protection unit is tested automatically at each startup (Power-On Self-Test). A manual function test can be performed at each time using the according front panel buttons.

As a reminder for the operator the output of the simulator is locked until the function test of the OPD is stating "OK". Only a passed function test is releasing the output of the simulator and the OPD.

The diagrams above show the typical switch-off duration of the OPD's electronic protection on the one hand and the release duration of the mechanical switches on the other hand.

The result is: The **Overvoltage Protection Device** is **the perfect bodyguard for expensive EUT's**.

