

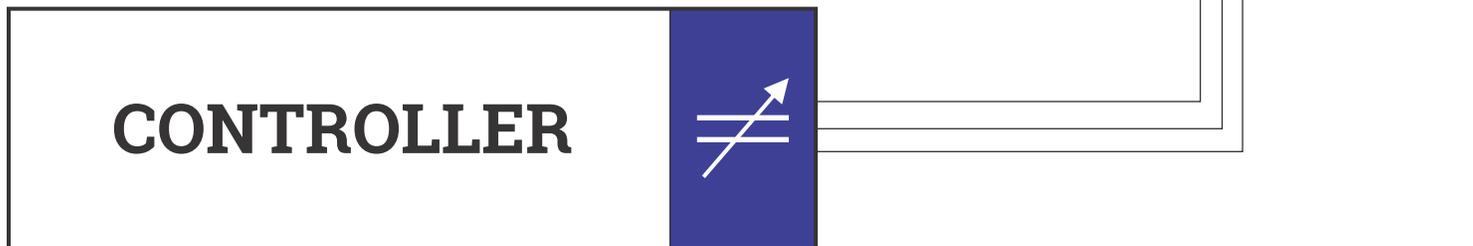


# **VARIABLE SHUNT REACTOR**

- **Advanced Controlling**
- **Transient-free Switching**
- **Optimal Design**
- **Lasting Quality**

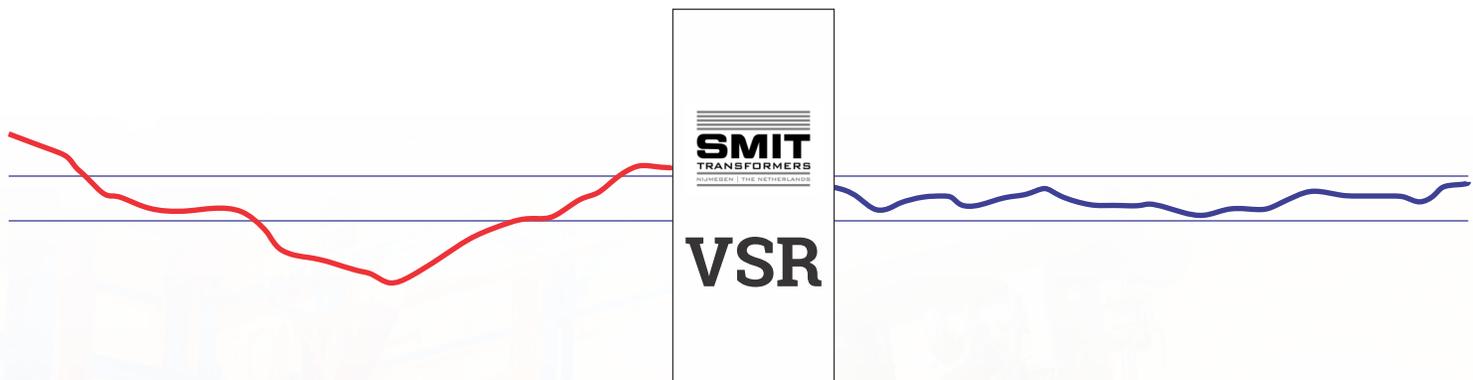
## Technology

State-of-the-art reactive power control technology allows Royal Smit Variable Shunt Reactor to quickly adapt to all load variation scenarios on the grid. The reactor output is controlled by injecting capacitive current based sophisticated computation by the on-board rugged controller. All controller at RS are tested under extreme weathering conditions, enabling maximum availability for the whole system.



## Voltage Regulation

The control system response time is carefully optimized in order to react to rapid grid voltage fluctuations. When automatic control is enabled, Royal Smit VSR will ensure that grid voltage stays inside pre-set ranges.



## System Integration & Remote Control

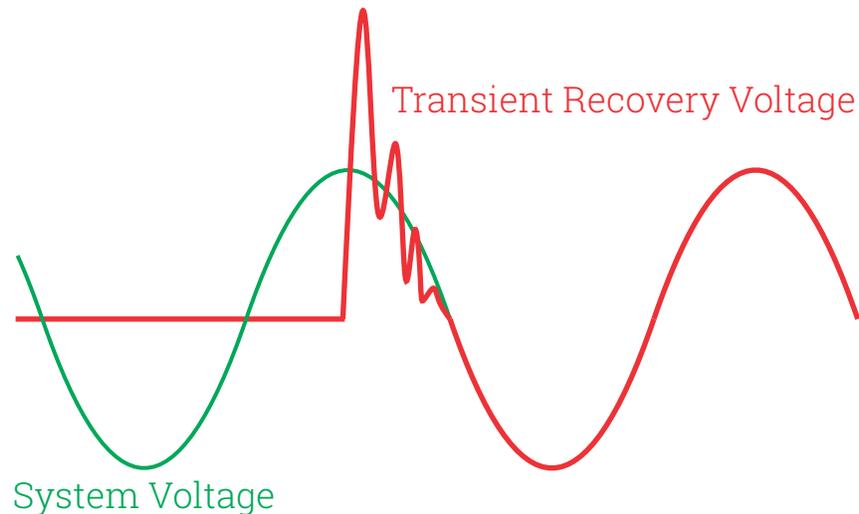
Large scale adaptation of Royal Smit VSR into existing system is fully supported with SCADA integration capability by the onboard controller. Reactive and voltage set points can be remotely sent to the controller to coordinate multiple VSR at the same time.

The controller also incorporated advanced power monitoring so that operator could evaluate system performance on the spot with standardized monitoring precision.

## Advanced Controlling

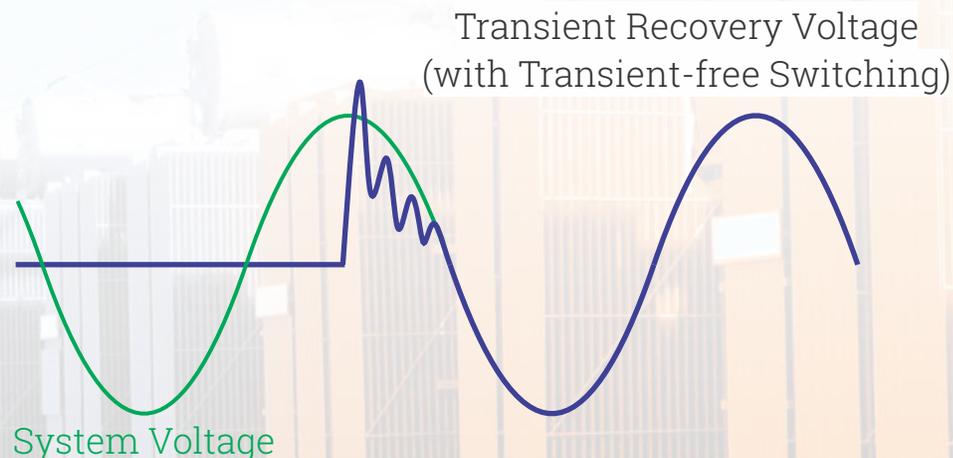
# Transient Recovery Voltage

Transient Recovery Voltage (TRV) is the voltage across the terminals of circuit breaker poles following a switching operation. TRV is very dangerous to switching devices and to shunt reactors as it could create restrike voltages which are even higher in magnitude compared to the previous TRV and lead to equipment failures.



# TRV Reduction Technology

Royal Smit VSR transient-free switching technology is an in-house product of decades of experience in dealing with Transient Recovery Voltage when switching on and off shunt reactors. The core technology is a transient energy absorbing loop integrated within the accompanied Transient-free Switching Controller. This technology could reduce TRV value to a safe level at which reactor circuit breaker could be reliably operated.



# Independent Winding Clamping

Royal SMIT produces Variable Shunt Reactors with independent clamping of the core and windings. This clamping system is unique amongst other manufacturers.

- No stresses are transferred to the core steel material, resulting in improved core losses in service
- Better supported windings and greatly improved short-circuit performance of the reactor

## Unique Winding Style

Royal SMIT style windings differ from most of our competitors in having axial cooling ducts without pressboard radial spacers.

- Less axial shrinkage of the windings, so that the winding clamping pressure is maintained throughout the life of the reactor, resulting in improved short-circuit withstand capabilities

## Accurate Tank Design

Royal SMIT Transformers B.V. has developed finite element models of the reactor tank design allowing the tank stresses and vibration levels to be accurately predicted

- Vibration levels on the tank surfaces can be greatly reduced, giving increased reliability in service

## Specifications

<b>System Voltage</b>	Up to 765 kV
<b>Max Capacity</b>	Up to 300 MVar
<b>Capacity Control Range</b>	0% to 100% (customizable)
<b>Response Time</b>	<1s
<b>Type</b>	Oil Immersed
<b>System Frequency</b>	50Hz, 60Hz
<b>Communication</b>	IEC61850 (other standard customizable)
<b>Power Monitoring Standard</b>	IEC61000-4-30



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