

A CLEAN DEAL!

HYBRID SYSTEM FROM MR COMPENSATES FOR PEAKS IN VOLTAGE



Lüchow-based HAY Speed Umformtechnik GmbH is one of Europe's leading automotive suppliers of forged parts for gearboxes, engines and axles. The peaks in voltage which its power-hungry, inductive large-scale systems used to produce have been eliminated with a combined hybrid solution from MR. Power supply and voltage quality are important to HAY Speed. Modernizing the installation cut the cost of reactive power and improved the power supply.

Solution for extreme power intensity

A total of seven Hatebur and one Hasenclever hot-forging presses produce forces of up to 20,000 KN and process 22 mm bar stock with diameters of up to 90 mm and lengths of up to 10 m. The machines produce 60 to 120 parts – each minute! HAY Speed also has eight ring-rolling mills, which roll some of the forged parts to larger diameters.

The power intensity of these large systems is huge – as is the demand for reactive power. This was causing problems for the grid operator. „The grid in our region covers a very large area. In order to supply all the localities connected to the grid operator's substation with the grid quality needed, the responsible grid transformer was set to the maximum desired value of 102.5 % output voltage. We were only allowed a voltage fluctuation of 200 V due to various fluctuations in the grid. Switching off and



View into the MV part of the hybrid system with restrictors (blue) and MV capacitors in the foreground.



The 2 dynamic systems supplied in the form of concrete stations for safety reasons.



Step-up transformer to increase the voltage from 690 V to 30 kV for the dynamic part of the system.



Our head of northern regional sales explains how the thyristors for the dynamic part of the regulation work.

powering up our large-scale systems produced voltage peaks far in excess of 400 V in the 20 kV grid. As a result, operators feeding into the grid, such as biogas systems, wind farms, and solar power generators, had to be switched off," explains Sebastian Riesch, the responsible project engineer, and Axel Freischmidt, the responsible supervisor. A solution had to be found urgently.

Having previously contacted MR about a low-voltage compensation system, HAY Speed relied on the advice and implementation work of MR specialists from the Power Quality division for this new, tricky problem.

The solution was a hybrid system that can quickly and reliably balance out the peaks in voltage produced by the tap-change operations of large inductive loads. So the voltage fluctuations produced during tap-change operations had to be compensated for on the medium voltage side. The hybrid solution produced specially for the job consists, on the one hand, of a purely medium-voltage section with a capacitive reactive power of

2 x 2.5 Mvar for the base load and, on the other hand, of a low-voltage switching device of 1 x 1.74 Mvar (constructed from 4 x 435 kvar thyristor-controlled levels) to compensate for the dynamic processes of the voltage fluctuations. Additionally, a step-up transformer is used to increase the voltage from 690 V to 20 kV. Both system parts have a tuning frequency of 225 Hz. Since the systems were installed in an area that is walked and driven over, the decision was made to install them in a concrete station for safety reasons. A total of two systems in two concrete stations were supplied. As well as protecting people, this construction also ensures that the installation's value will be retained in the long term.

Positive results for HAY Speed: „Since the system was commissioned, we haven't had to pay for any reactive power. We are only using up to a third of the reactive power provided for free by the grid operator. We've also not had any problems with voltage fluctuations.