



## Alstom Power Hydro

### Test of steam valves for power plant application

In La Courneuve Cedex (Paris/F) Alstom Power Hydro is developing and producing valves for steam controlling in power plants. These valves control the steam supply for turbines that have a length of up to 60 m and a diameter of 6.5 m and generating power of 1500 MW. Due to a different pressure of 80 bar at the valve flap a force of 600 kN will appear. The hydraulic pressure into the valves is 350 bar. To ensure a reliable and safe functionality of the opening and closing operation at the valves, the displacement of the valve flap has to be measured and monitored in dependency of the control pressure. The displacement/pressure characteristic diagram is the relevant parameter for the evaluation of the valve.

For the measurement of the characteristic quantities of the valves and for the controlling of the valve drive the modules of the e.series are used. The dynamic and accurate measurement of the pressures take place with the multifunctional module e.bloxx A1. For the measurement with the inductive (LVDT) displacement sensors the carrier frequency module e.bloxx A6-2CF is used. All signals (pressure and displacement) are measured with 1000 samples and synchronized at 20  $\mu$ s. So the requirements regarding the dynamic are sufficiently fulfilled.

As a test controller the e.pac (PAC = Programmable Automation Controller) is used. The e.pac is recording and storing the pairs of displacement and pressure values synchronously and is online supervising the values of exceeding limits. The ok/nok result it available as 24 V output also.

The PID functionality of the e.pac is controlling the valve positions during the test process. The setpoint curve can easily be generated by the e.pac and is provided by the analog output of the module e.bloxx A9.

For Alstom besides the good measurement performance and the remote synchronized structure of the graphical programming tool e.con was very important to make the decision. It was possible to get the test results after a very short setup time and to modify test parameters easily.

Because of the good experience Alstom is planning to use the e.series solution for the permanent monitoring of the valves during the operation in power plants too. The big advantage is the independency of a PC or a PLC.

