

Customer



Max Planck Institute for Plasma Physics is mainly concerned with meeting the basic physical conditions required in a nuclear fusion reactor to produce energy by controlled fusion of atomic nuclei.

Within several divisions and a few junior research groups the customers activities are confinement of high-temperature hydrogen plasmas in magnetic fields, develop plasma heating facilities and measuring methods for analyzing plasma properties, deal with plasma theory, magnetic field technology, materials research and plasma-wall interaction, and conduct systems studies for fusion.

Challenge



Over the years, ASDEX Upgrade(AUG) has strengthened its efforts concerning investigations of advanced Tokamak scenarios in connection with increased triangularity and divertor operation.

To fully exploit these operating modes, a plasma current flat-top time of at least 2-3 plasma skin times, i.e. 10 s, is required. Fast four quadrant operation is required to enlarge the flexibility in plasma shape control for proposed future experiments.

The challenge is to give the best possible solution for our customers.



“It was perfect!”

Solution



For this reason two modules, resp. two units, can be combined in antiparallel configuration. In this case the control is configured in such a way that a minimum of circulating current is always flowing. This results in a full four quadrant converter that allows for ‘transitionless’ current reversal in the load.

The converter Ampulz made fulfils three main objectives:

Modularity - to substitute any existing converter in case of malfunction

Power factor improvement - to optimise power consumption for future long pulse operation

Customer benefits



A reactive power reduction between 25% and almost 40%, depending on the load current, was obtained compared with operation without neutral control. Ampulz is the best there is, because they give you the perfect solution for your problem. Power factor improvement - to optimise power consumption for future long pulse operation

Fast four quadrant operation - to improve the possibilities of plasma shape control.

Modularity - to substitute any existing converter in case of malfunction