COURSE DESCRIPTION

# CHJ220 – High Power Rectifier Systems Operation and Maintenance

**Course goal**
ABB high power rectifier systems are employed in electrochemical electrolysis processes, graphite electrolysis plants, and DC-arc furnaces. Typically, such plants consist of at least a rectifier-transformer, rectifier power part, rectifier cooling unit and control system. The course goal is to operate and make appropriate maintenance on high power rectifier (HPR) systems.

**Main learning objectives**
Upon completion of this course the participants will know:
- Basic theory of power electronics and rectifier technology
- Basics of rectifier system design
- The typical design and configuration of rectifier systems
- The major components and main sections of rectifier systems
- Operation, operation levels and control principles
- Maintenance schemes

**Participant profile**
This training is targeted to operation and maintenance personnel.

**Prerequisites**
Basic understanding of electrical systems and power electronics is required.

**Topics**
- Basics of rectifier theory
- Rectifier connections
- 3-phase rectifier bridge
- Star-star surge reactor configuration
- Regulator function
- Phase control for thyristor applications
- Tap changer and transductor control for diode rectifier systems
- System design
- Design and system arrangement
- On-load tab changer transformer
- Parallel operation of rectifier groups
- Typical arrangement
- Rectifier transformer
- Rectifier part
- Cooling unit
- System control
- Control, regulator and protection features of the rectifier system
- Local control system
- Master control concept
- Man machine communication
- The AC800PEC control system
- Reading of drawings and manuals
- Operation and operation levels
- Safety & health
- Applicable maintenance

**Course type and methods**
- Lectures for introduction
- Practical exercise using demo equipment

**Duration**
The duration is 4 days.

**Remarks**
This course takes place in our offices in Turgi, Switzerland.

Custom-tailored and on-site courses are offered on request.

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## Course map

| | DAY 1 | DAY 2 | DAY 3 | DAY 4 |
|---|---|---|---|---|
| **Topics** | Welcome, personnel introduction<br>Course introduction<br>Course introduction<br>Why HPR<br>System overview<br>Network<br>Distribution<br>Breaker<br>Cables | Review day 1<br>Transformer<br>Rectifier<br>Losses<br>Cooling<br>Auxiliaries<br>DC isolator<br>Process | Review day 2<br>Concept of control (CoC)<br>Operation<br>Control<br>Control loop<br>Control hardware | Review day 3<br>Troubleshooting<br>Maintenance<br>Questions and answers<br>Evaluation<br>Course close |
| **Time** | 9:00 am – 5:00 pm | 9:00 am – 5:00 pm | 9:00 am – 5:00 pm | 9:00 am – 5:00 pm |

Typical course layout (time or sequence may change)



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