

# Gudenaacentralen: Bjerringbro, Denmark

## Aesthetic Retrofit of Vintage Control System

*Integrating a modern control system with a vintage look proved possible at Denmark's National Energy Museum...*

In 2012, DEIF Hydro Control Technology delivered the backbone of a long-overdue upgrade of Denmark's biggest hydro power plant, Gudenaacentralen.

Delivered by ASEA Brown Boveri in the 1980s, the plant's 3 × 1.3 MW Francis turbine generators' control system was operational but there were no spare parts available and no support.

The owner decided on DEIF's DM 400 Hydro solution because of its comprehensive format: One simple-to-operate controller manages all turbine and generator controls and protections.

DM 400 Hydro functionality includes:

- Synchronising and load control
- Generator protection
- Mains failure protection
- Voltage and power factor control
- Turbine start/stop control
- Turbine monitoring
- Hydraulic power pack control and monitoring
- Graphic presentation of data and remote access via internet.

The plant was inaugurated in 1921 and is part of Denmark's National Energy Museum, which made retrofitting the system an aesthetic challenge: The previous control system had been visible but DEIF's new hardware had to be integrated and hidden in the original design features of the plant.

DEIF solved the problem by hiding the majority of the control system behind the existing distribution panel. The remaining visible parts were placed in a console designed to agree with the plant's vintage look.



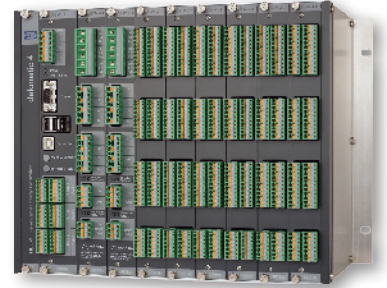
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## Data

- ✓ Original Commissioning: 1921
- ✓ Year of Retrofit: 2012
- ✓ Machine Type: 2-chamber Francis
- ✓ Capacity: 3 × 1.3 MW
- ✓ Machine Head: 10 m (33 Feet)

## Products



Integrated Systems, DM 400 Hydro



Multi-Differential Relay, MDR-2



Insulation Monitor, ADL-111Q96



Generator Protection Unit, GPU-3 Hydro



Battery Charger, DBC-1



Advanced Graphical Interface, AGI 100 series



Rudder Angle Transmitter, RT-2



Ground Fault Relay, RMC-142D

## Diagram From Case

