

Automated Scheduling System for Hydroelectric Power Stations

Application: Power & Energy
Location: Jiangsu/China



Project Introduction:

Hydroelectric Power Stations require complex automated scheduling systems to regulate their power generation processes. These systems can benefit from adopting a topological structure which combines reliable industrial-grade products and redundant ring networks. The backbone for such networks require at least two fiber optic rings to realize both link and device redundancy. All of these elements combine to provide excellent performance and high reliability with a automated operations, remote control, fault self-recovery and advanced network management functions.

System Requirements:

Our customer had specific demands which needed to be met in order to satisfy their advanced networking needs. These requirements included:

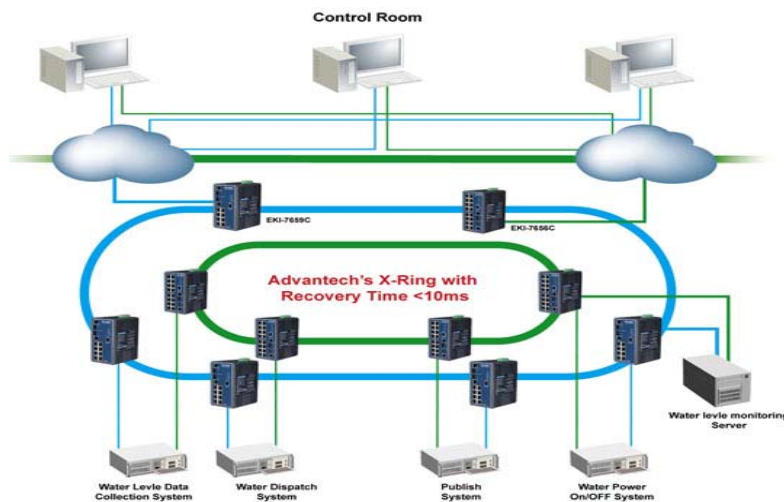
- Long distance data transmission capabilities.
- The network needs to be progressively built and allow easy future expansion.
- All devices should be highly reliable to fulfill unmanned tasks.
- A single point of failure on the link should not affect the data transmissions of the entire network.
- All devices need to be able to withstand harsh, high-temperature and high-humidity environments with strong electromagnetic interference resistance.

Project Implementation:

EKI-7659C: Industrial 8+2G-port Managed Redundant Gigabit Ethernet Switch

EKI-7656C: Industrial 16+2G-port Managed Redundant Gigabit Ethernet Switch

System Diagram:



System Description:

In this project, the system takes advantage of two Redundant Rings to create a fully redundant environment. This means that if one ring fails or is shut down, the other ring will automatically begin handling the network and information flow, within 10ms. Furthermore, Advantech EKI-7659C and EKI-7656C are rugged modules that can operate stable in extreme temperatures, so they are ideal for any outdoor environment. The EKI-7000 Series' features fast recovery time and industrial-grade designs to satisfy any need.

Conclusion:

Advantech's EKI-7659C and EKI-7656C were used due to their incredibly fast recovery time (< 10ms) and highly reliable and durable design. Once implemented, the system was able to provide the following features:

Real-time capabilities. This solution provides a 1000Mbps full duplex fiber optic switched Ethernet, which could speed up the transmission, reduce the transmission conflict and improve the real-time capability and correctness of system transmission.

High reliability Redundant ring structures ensure network flexibility. When any connection in the loop fails, the system can get back to normal operation in less than 10ms. Secondly, the design of a couple ring network protects the communication from being affected when any switch fails. Thirdly, high-quality Advantech industrial network switch can work stably in a rugged environment and MTBF averages more than 200,000 hrs.

High Security. In order to achieve security, on the 2nd layer of OSI Network Architecture Model-Logic Link layer, different sub stations can be separated from each other through VLAN partition. Besides, binding between the device and port or the close of unused port can greatly improve the security of network.