

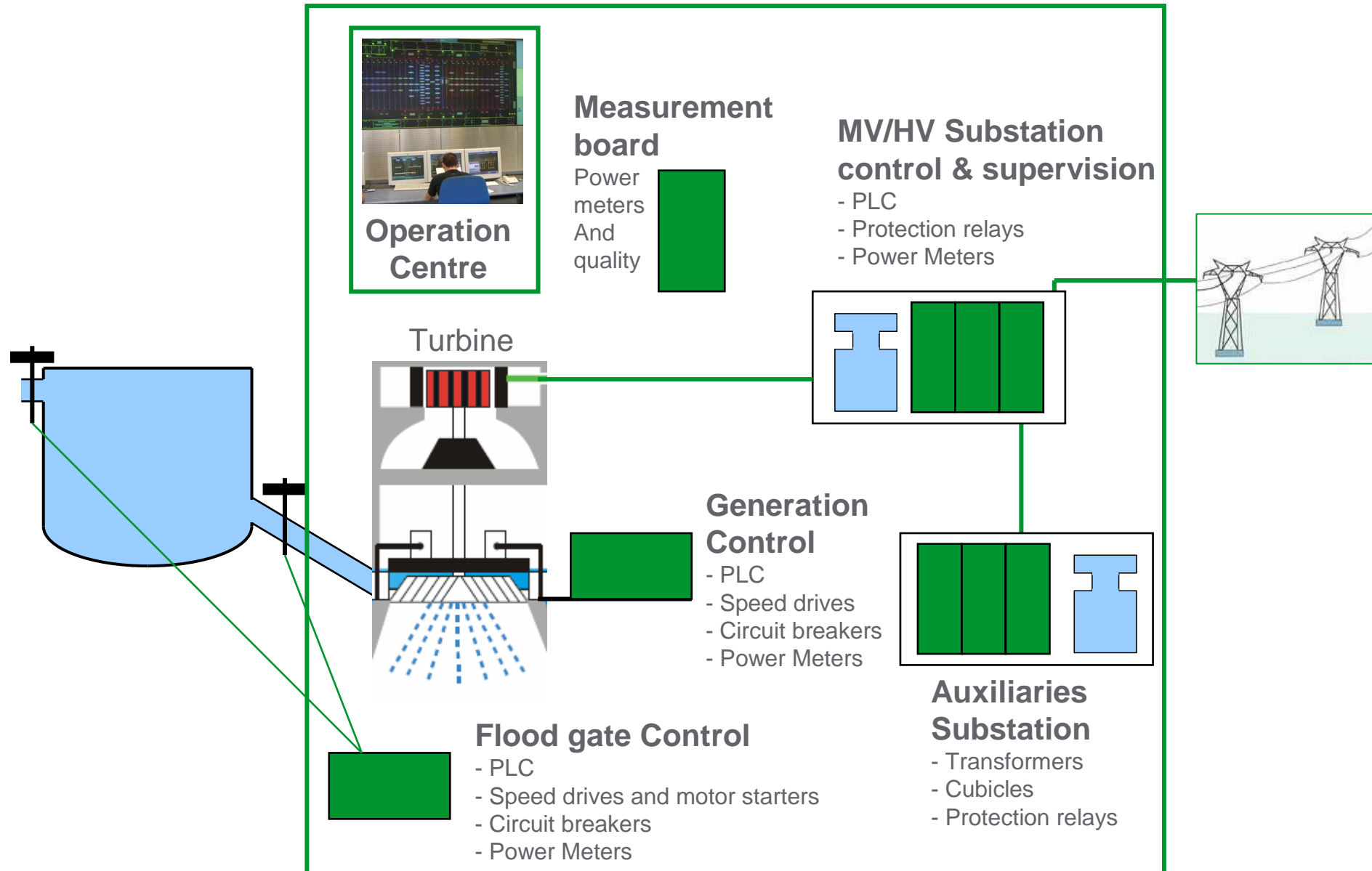
Small hydro power plant automation

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CDI Power

Small Hydroelectric: Power and Control solution

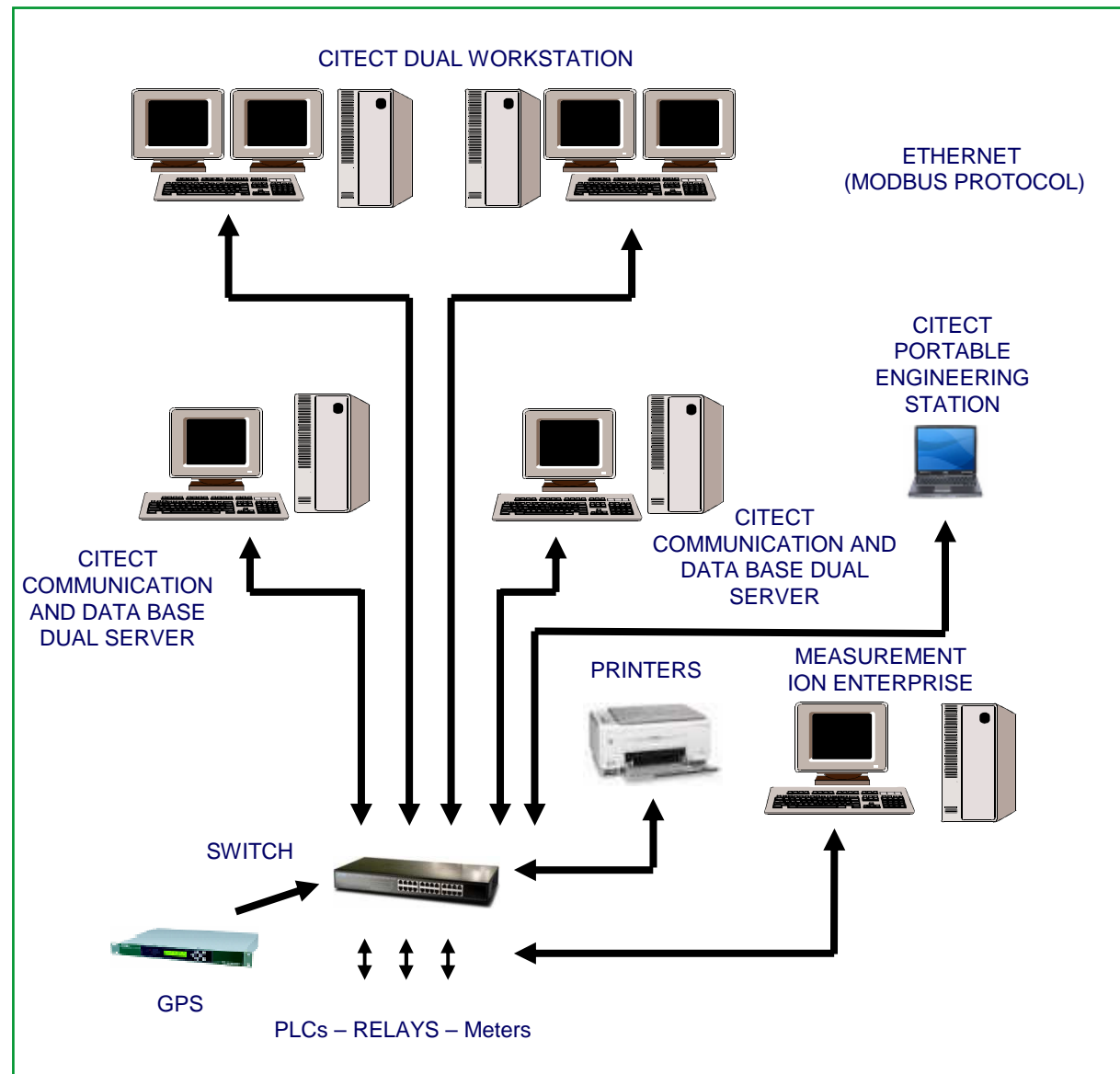


Integrated Schneider Electric Solution including

- Operation centre based on CITECT Scada
- Generator control
- Generator and Transformer protections
- Flood gate control
- MV/HV substation control and supervision
- Measurement boards

Operation Center based on CITECT SCADA

- Two redundant Servers (Com. and Database): data collection (Ethernet Network), storage and management from the PLCs
- Two Workstations for Hydroelectric and Substation control and supervision; scanning Generators, Transformers and Transmission Lines;
- One Portable Engineering Station: configuration and development of new applications
- One ION ENTERPRISE Station: Measurement supervision
- One Ethernet Network for communication using Switches with PLCs, RTU, Protection Relays, Meters, GPS and printers.



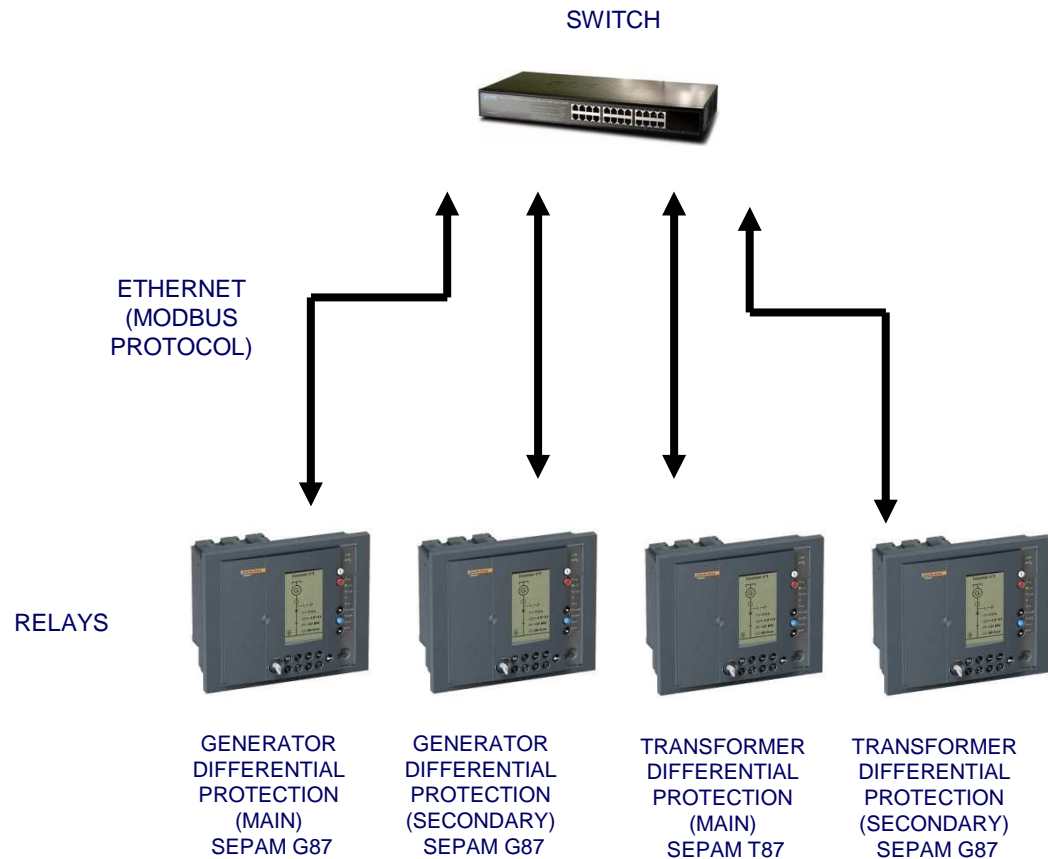
Generator Control

- Generator solution based on MODICOM PLC with local Magelis HMI (Vijeo CITECT Operation Software)
- Generators PLC responsible for: **PLC**
 - Transfer field data to the Operations Center (Ethernet Network)
 - Generator Units Supervision and Control (Digital and Analog Modules)
 - Voltage Regulator and Speed Drives Supervision and Control
 - Motor Starters and Frequency Inverters Supervision and Control
 - Circuit Breakers Supervision and Control
 - Power Meters PM 820 Supervision



Generator and Transformer Protection

- Generator Protection based on SEPAM digital protection relay (20, 40 and 80 ranges).
- Sepam Relays manage Generators and transformers protection, data transfer to Operations Center (Ethernet Network)
- Sepam relays are easy to configure, programmable. They provide sequence of events and oscillography.

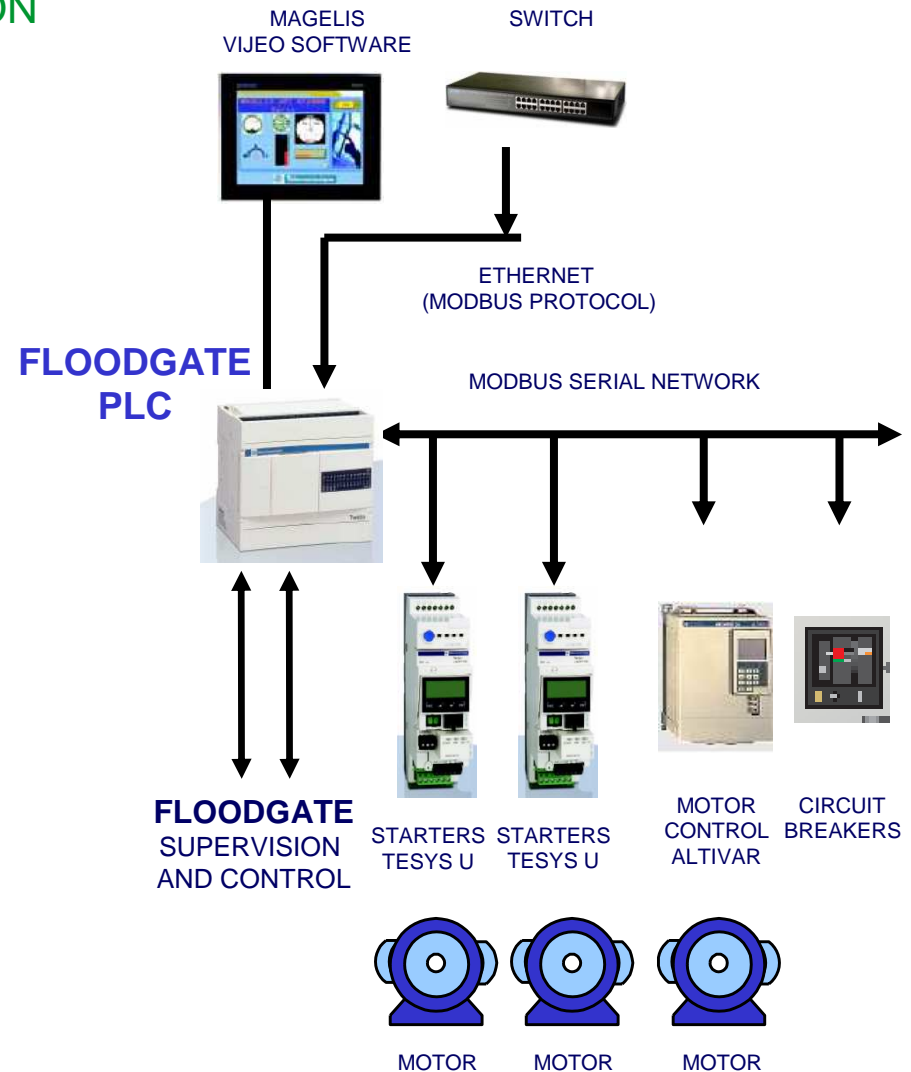


Floodgate Control

Floodgate control solution consists in MODICON PLCs with local Magelis HMI using Vijeo CITECT Operation Software.

The Programmable Logical Controllers of floodgates are responsible for:

- Field data transfer to the Operations Center through Ethernet Network.
- Floodgates Supervision and Control
- Motor Starters Supervision and Control
- Circuit Breakers Supervision and Control

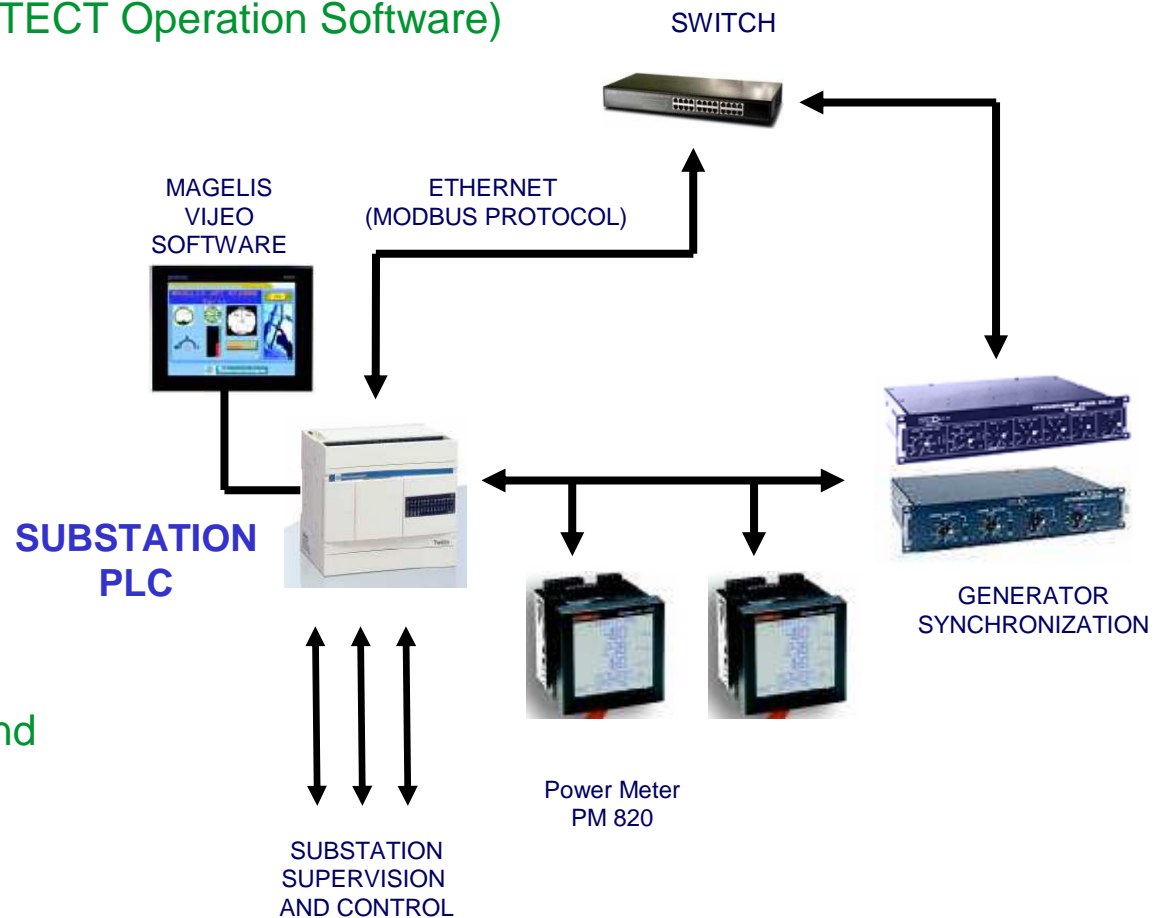


Substation Control

Substation control and protection based on MODICON PLC and local HMI Magelis (Vijeo CITECT Operation Software)

Substation PLC manage:

- Transfer field data to the Operations Center;
- Supervision of Substation and Lines
- Circuit Breakers Supervision and Control
- Supervision of Synchronization
- Supervision of Power Meters PM820.



Measurement boards

Measurement boards are based on ION 8600 Meters and ION ENTERPRISE Monitoring Software

The ION 8600 Meters are in charge of:

- Gross and Net Measurement
- Transfer measurement data towards Operations Center;
- Transfer measurement data towards the CCEE
- Transfer measurement data towards Utility Control Center

ION Enterprise Software allows:

- measurement data monitoring
- power quality assessment.

