

# SOLUTION NOTE

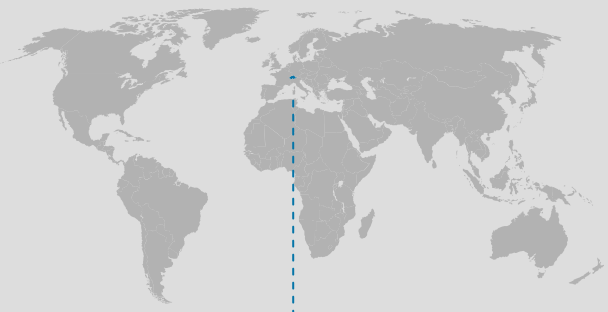
## GBT - GOTTHARD TUNNEL BASE

Alpiq (Switzerland)

### GOTTHARD TUNNEL BASE (GBT) WORKSITE POWER SUPPLY SOLUTION

GBT, the world's longest rail tunnel, is part of the Swiss Alp transit project, it is intended to bypass winding mountain routes and establish a direct route suitable for high speed rail and heavy freight trains. Once completed in 2016, the tunnel will be with a 57 km length and an estimated budget of 57 billion dollars and is expected to reduce the 3.5 hour travel time from Milan to Zürich by one hour.

**DUE TO** » 2010-2012 (3 Phases)  
**CLIENT** » Alpiq  
**LOCATION** » Bodio, Switzerland  
**SOLUTION** » Complete Distribution Network Solution  
**SEGMENT** » End Users (E3U) – Railways



#### ORMAZABAL CGMCOSMOS: FIXED MOUNTED, SINGLE BUSBAR, GAS INSULATED SWITCHGEAR UP TO 24 KV

<b>Switchgear Types:</b> Feeder (L) Fuse Protection (P) Circuit Breaker (V)	<b>Electric Data:</b> 24 kV – 630 A – 20 kA	<b>Scope of Supply:</b> 110 Cubicles (Phase 1: Bodio - Faido) 39 Cubicles (Phase 2: Erstfeld - Amsteg) 70 Cubicles (Phase 3: Faido - Sedrun)
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#### ORMAZABAL ekorSTP: AUTOMATIC LINE TRANSFER UNIT

**Characteristics:**  
Uninterrupted and safe supply between two incoming lines



#### ORMAZABAL ekorRPGci: INTEGRATED CONTROL PROTECTION UNIT

**Characteristics:**  
Protection and metering unit with integrated control for circuit-breaker protection cubicles



#### ORMAZABAL ekorRPS: MULTIFUNCTIONAL PROTECTION UNIT

**Characteristics:**  
Multifunctional protection, control and measurement relay

### THE CHALLENGE AND THE SOLUTION

The climatic conditions in the tunnel with relative high temperatures (30 – 40°C) and humidity of more than 80% are quite challenging for the equipment installed. The electrical equipment needed in the construction phase is powering the ventilation and illumination, as well as the complete machinery used in construction of tunnel and therefore it is essential to guarantee the workers safety and health. In addition, remote control and automation options were key requirements in the Gotthard tunnel project due to its large distances and the scope of supply. To be considered for this important project, the equipment had to convince the customer concerning reliability, autonomy and safety.

Ormazabal delivered **CGMCOSMOS** cubicles which perfectly withstand the harsh installation conditions like they will occur in the Gotthard base tunnel. The redundant system with Ormazabal **ekorSTP** automatic line transfer safeguards the continuous ventilation of the tunnel in case of loss of one power supply.

Ormazabal **ekorRPS** and **ekorRPGci** protection units using toroidal transformers installed at the bushings saved space and installation costs in comparison to the competitive offer.

With this solution Ormazabal could support the customer to achieve highest safety and reliability standards, which are mandatory in the project.

- Highly reliable operation under harsh environmental conditions
- Ultra safe switchgear, internal arc tested according to IEC standards
- Advanced automation and protection functions guarantees top performance
- Modularity allows upgrades and reconfigurations of electrical schemes
- Long life term asset which has an important impact on the clients ROI