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PLC AUTOMATION

AC500 PLC
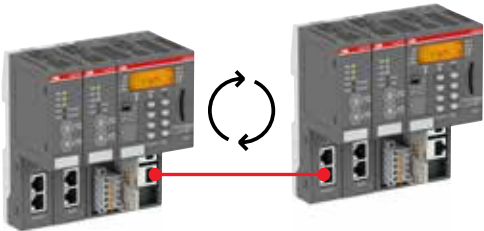## Tunnel automation solutions

Automation Builder

Automation Builder is the integrated software suite combining the tools required for configuring, programming, debugging and maintaining automation projects from one common intuitive interface.

- Automation Builder combines the engineering tools for PLC, safety, control panels, SCADA, drives and motion.

AC500 PLC High Availability

The high availability of AC500 HA prevents downtimes caused by either human error or cabling/hardware/software malfunction. Redundant CPUs and the redundant I/O communication reduce the risk of total system failure, thus enhancing system availability.

If critical data retention and the avoidance of downtimes are paramount to your application, ABB's AC500 HA will be the perfect solution.

- Powerful PLC with scalable performance, communications and I/O capabilities for critical infrastructure applications.
- The ideal choice for complex, networked solutions with a large number of I/Os.
- Options with OPC, OPC UA and tele-control protocols.
- Long distance HA-sync possible.
- Bulk data manager for efficient engineering.

S500 with Hot Swap

The hot swap terminal units TU516-H and TU532-H allow no-load hot swapping of S500 I/O modules during operation. When replacing a S500 I/O module the other modules in the cluster continue operating.

- Modular I/O devices with protected outputs and comprehensive diagnosis, covering a wide range of signal types.
- The I/O modules can be installed as decentralized I/O with a communication interface module or be connected directly to the AC500 CPU.
- Support of different fieldbuses makes it possible to use the S500 I/O modules with PLCs from different manufacturers.
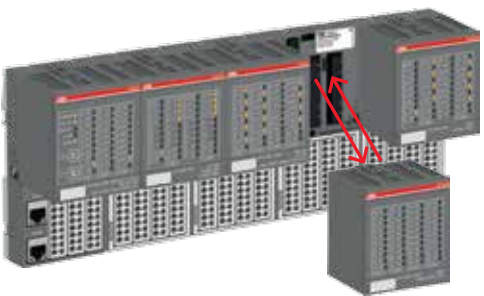
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ABB automation products

AC500-S Safety
Integrated safety PLC (SIL3, PL e) designed for safety applications in factory, machinery, process or infrastructure automation.

- For simple to complex safety solutions.
- Flexible and safe controller-controller communication using PROFINET/PROFIsafe for HA with functional safety.
- Separate safety CPU offers the benefit of safety functions which remain active even if non-safety control is inactive.

Visualization
ABB Control panels feature excellent robustness and easy usability.

- The basic CP600-eCo control panel is intended to be used for standard functions and features high usability for clear interaction with the operation process.
- The robust CP600 HMI provides high visualization performance, versatile communication and a representative design for machines and systems.
- The CP600-Pro HMI comes with high-end visualization performance, multi-touch operation, versatile trendsetting communication and representative design.

ACH580 and ACS880 Drives
ABB has a large range of devices for motor control, from softstarters to units with advanced functionality like programmable drives, which offer options for remote and local application control. ABB offers drives designed for tunnel applications with features like:

- Override-function: overrides most of the faults in emergency situations. Ensures fan operation as long as technically possible.
- Ultra-low harmonic (ULH) drives: almost non-existing supply harmonics to reduce losses and further supply issues. ULH drives can also boost the voltage to compensate for voltage drop due to long motor cables.
- Up to IP55 available for wall-mounted drives enabling cabinet-free installation.
- ACH580 is designed for ventilation and other HVACR applications.
- ACS880 offers an extensive power and voltage range as well as a wide selection of variants and options.

AC500 PLC
This is our way for your success!

ABB´s core competence is proven by numerous tunnels globally - based on PLCs, HMIs, motors, drives and the Automation Builder integrated engineering suite. They are a perfect fit for tunnel applications, resulting in engineering productivity.

Tunnels are created wherever local conditions do not permit an efficient road or rail routes. They connect people by shortening travel times significantly, protect man and nature from noise and exhaust fumes and make remote areas accessible.

The safety standards for tunnels are regularly reviewed and adapted to the latest findings. New tunnels will be built and equipped on the basis of the most up-to-date and safe technologies and constructions, while older tunnels will have to be upgraded.

Technical consulting
ABB engineers assist the customer in defining the application specifications and finding the most effective technological solutions for a future-proof plant.

Products
ABB's technological portfolio is entirely integrated: high efficiency, cutting-edge solutions, fully scalable and compliant with the strictest international standards.

Commissioning
ABB accompanies commissioning, supporting the customer during all plant-testing stages.

Global support
Our presence in more than 100 countries provides quick and timely support in any part of the world. Proactive service operations can be planned around the customers' specific needs.

Protection and security
- Tunnel ventilation to protect people and equipment in every situation
  - Smoke extraction
  - Fresh air circulation
- Video and radar control to detect hazardous situations early
- Emergency evacuation system of the entire tunnel providing safe waiting spaces
- Modern lighting technology for safe navigation and good recognition of vehicles and passengers
- Manual call points along the exit routes
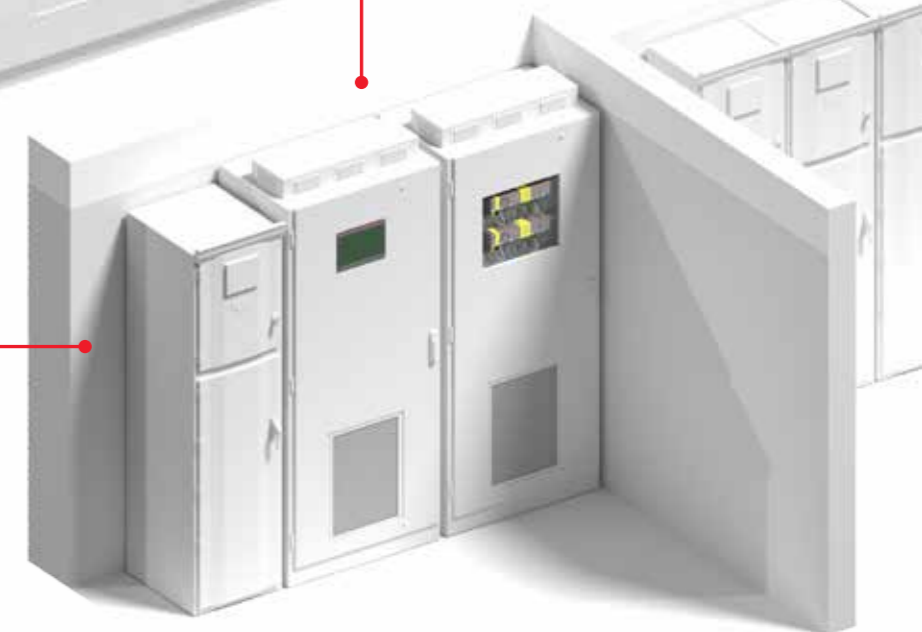- Firefighting systems
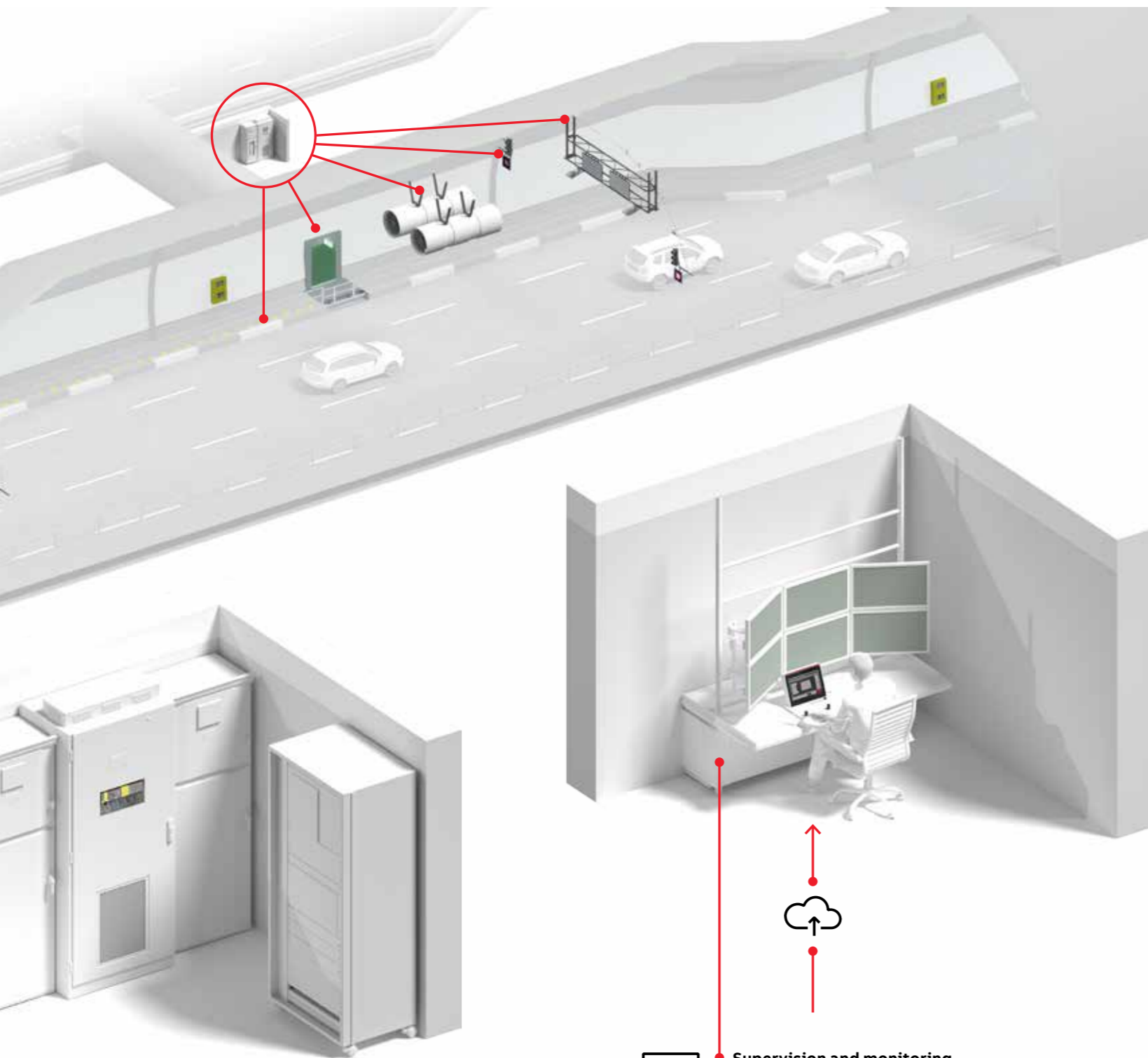
Communication and reporting
- Remote monitoring/IoT
- Remote maintenance
- General public announcement system
- Communication and notification system accessible from every point in the tunnel
- Optimized traffic flow with data acquisition via AC500
  - Signal systems
  - Changing traffic signs
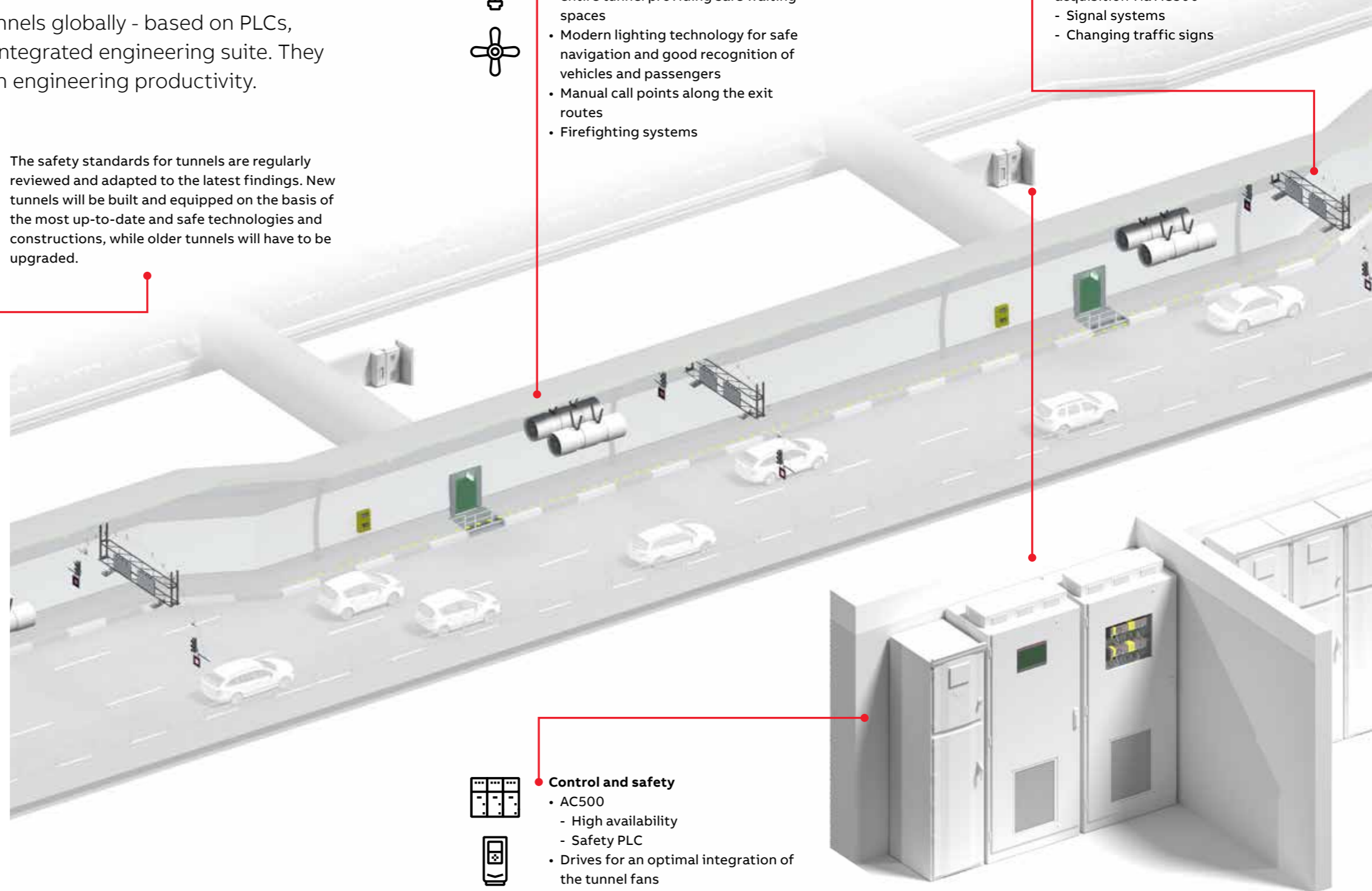
Control and safety
- AC500
  - High availability
  - Safety PLC
- Drives for an optimal integration of the tunnel fans
- Suitable offers of control systems and switchgear
- Power monitoring
- Low-/medium-voltage distribution systems
- Emergency power supply

Tunnel control architecture

HMI	Dashboards	Emergency system	Energy management

Monitoring interfaces

Local and superior control systems (SCADA)

Supervisory control system

Access road	Tunnel gate	Inside the tunnel

Local tunnel control system

Changing traffic signs	Video and radar control	Signal systems	Modern lighting	Energy management	Communication and notification system	Emergency evacuation system	Tunnel ventilation

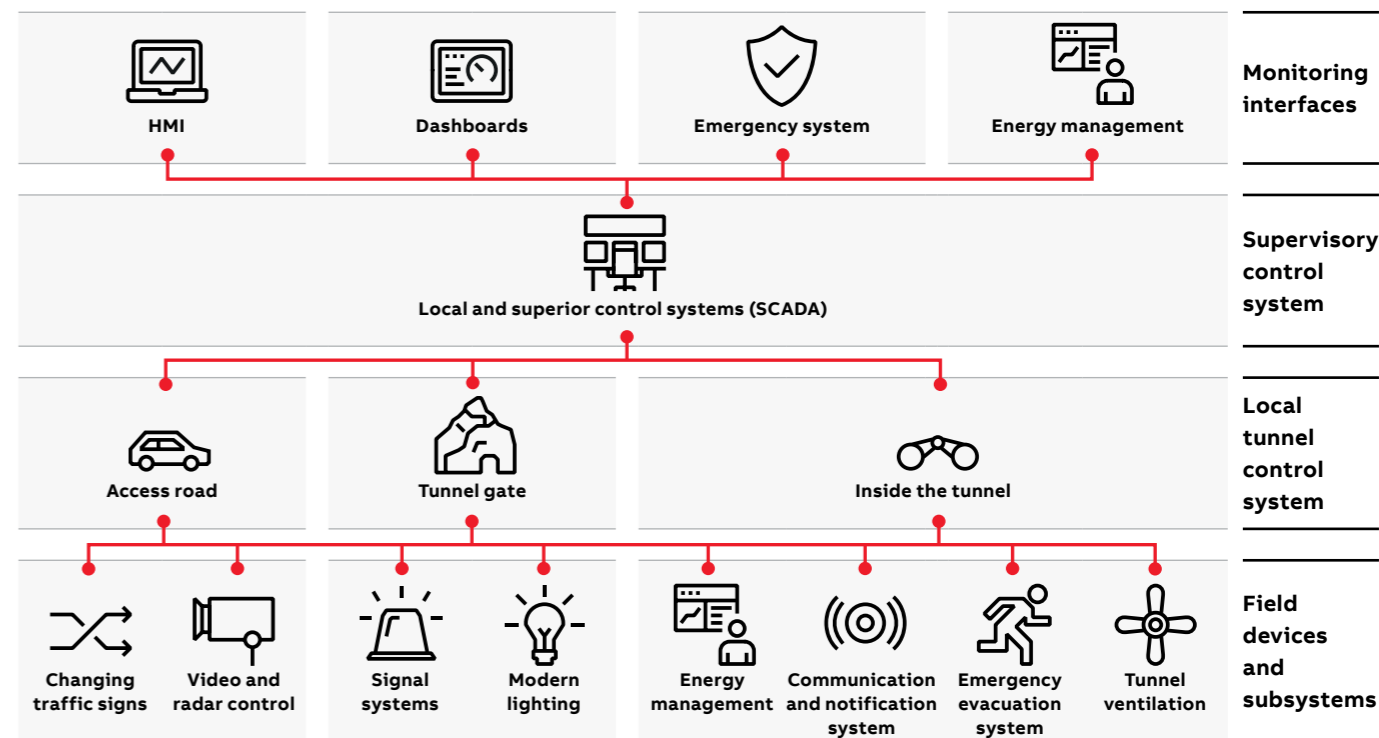**Field devices and subsystems**

ABB offers a portfolio of higher-level control systems (SCADA) which act on top of the local ABB PLC-based architecture. All technical subsystems and field devices of the tunnel system can be controlled and monitored from one or several central locations.

Physical system architecture

Management and visualization layer

Connection options: OPC UA, OPC DA, IEC60870, TCP/IP, HTML(S), FTP(S), MQTT, IEC61850, SNTP, SQL

Customer / OEM cloud — CP600 — ABB Ability™

Data base — Redundant SCADA network — Data base

Automation and plant layer

Control network: Modbus TCP, UDP, PROFINET, EtherCAT, Profibus DP, IEC61850, CAN, CS31, SNTP

Data base — AC500 — AC500 — Data base — MES/ERP

CP600 — Sync link

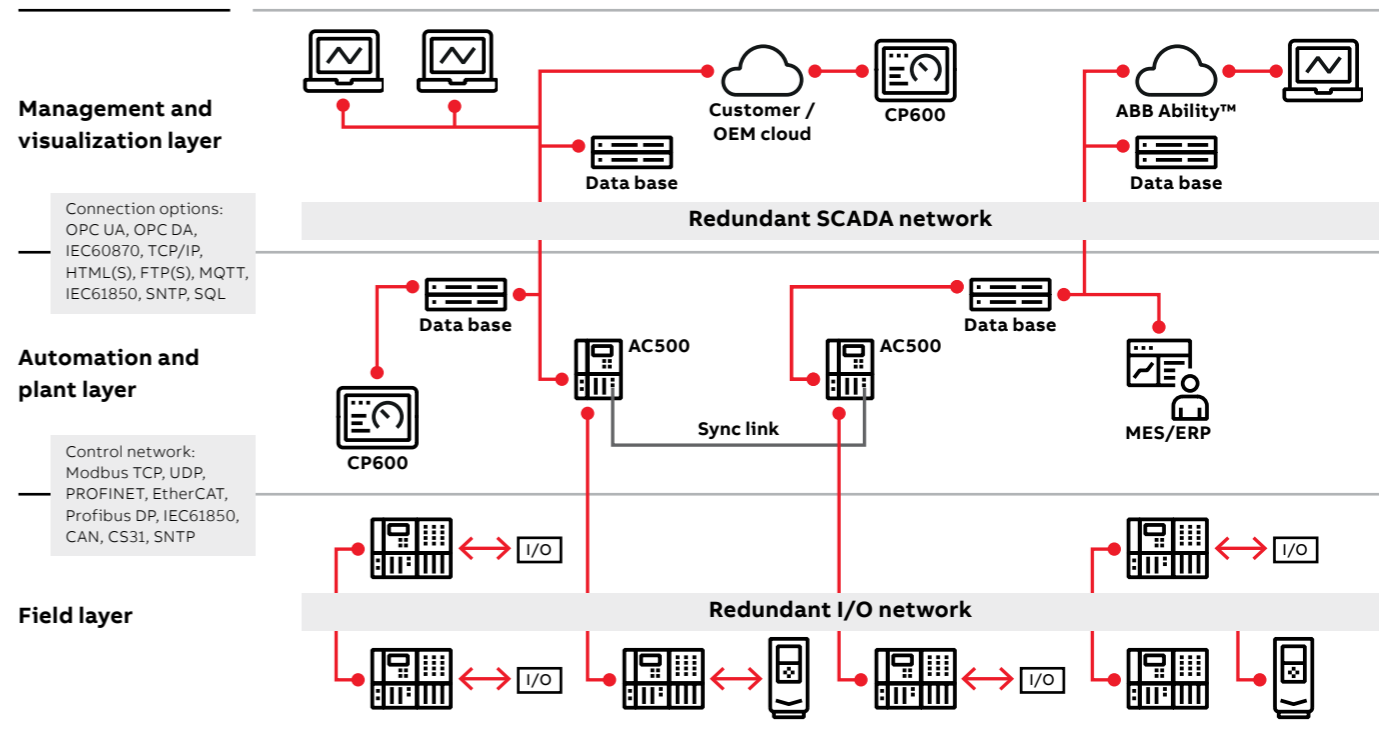**Field layer**

Redundant I/O network

ABB provides an end-to-end portfolio with a high number of scalable products and options, from the field layer right through to the management and visualization layers. This saves significant engineering time and money, while at the same time ensuring a highly available, safe and future-proof tunnel system.

Supervision and monitoring
- Local and higher-level control systems (SCADA)
  - Dashboards for an overview of the entire tunnel system
  - HMI CP600
- Energy management for the complete system
- Drive systems to efficiently operate tunnel ventilation

ABB

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