

Solution Note

Reliable Infrastructure Monitoring and Control with SIL2 Certified HC900 Safety System



A flexible system for control and safety with fast start-up time, common engineering tools, reduced training, simplified maintenance and low cost of ownership

Background

Monitor and control of infrastructure is an essential function most of us take for granted and yet without it our everyday lives would be severely disrupted. Ventilation of metros and tunnels is one example of a process that takes place in the background but that is crucial to their safe, reliable and efficient operation. Tunnels and metros provide for reduced travel times and improved connectivity between towns and cities; their enclosed environment means that some form of ventilation is required to maintain a safe environment within them.

Proper ventilation is essential to ensure adequate air quality, to control the spread of smoke in case of fire, and to maintain temperatures at desired comfort levels. The basic principle of tunnel and metro ventilation involves the dilution of vehicle emissions by providing fresh air and then removing the exhaust air from the metro or tunnel. It is the role of the ventilation control system to deliver on these requirements.



Challenge

Due to stringent safety requirements, environmental protection issues and the ever-increasing length of tunnels and metros, more demands are being made of ventilation control systems today. At the same time, their design must focus on energy efficiency and metro/tunnel availability.

Ventilation control systems require fast processing of thousands of data points, integration and coordination with various subsystems, redundancy to prevent downtime, a clear and effective user interface, and the requirement to deliver uninterrupted operation in challenging environments.

Safety and downtime avoidance are critical requirements; consequently, a SIL2 level safety certification is a common requirement for tunnel and metro ventilation control systems. The SIL rating is essentially a measure of risk mitigation in the design of both the hardware and software of the control system.

The ventilation control system is largely responsible and aims to ensure:

- The safety and comfort of passengers and personnel during normal operations
- The safety and comfort of passengers and maintenance personnel during disruptions
- The control of smoke in the event of an incident in either a tunnel or at an underground station
- Coordination with emergency lighting and public address systems in the event of an evacuation

Solution

The Honeywell HC900 SIL2 Process and Safety System is a proven solution for metro and tunnel ventilation and other infrastructure applications. The HC900 Safety System executes the myriad ventilation functions to ensure the safety and comfort of passengers and to help ensure the uninterrupted flow of transportation and commerce. In the event of upsets caused by, abnormal conditions the HC900 controller, in concert with the SCADA system, responds quickly to restore tunnel and metro operations to their safe state, protecting users as well as the infrastructure itself.



The Honeywell HC900 Process and Safety System is an advanced process and logic controller with a modular, scalable design that is built to work with a wide range of equipment, cost-effectively. The system is **SIL2 certified**, delivering high availability, safety and reliability for critical control applications. The HC900 safety system complies with major standards and regulations including CSA/FM CL1/DV2, ATEX, ABS, UL, and CE Conformity. HC900 is listed and manufactured to ISO 9001 and ISO 9002 standards.

The design of HC900 Safety Controller reduces the cost of hardware, software, training, and spare parts resulting in lower overall cost of ownership. HC900 is built upon a flexible architecture that can accommodate up to 12 racks and 4608 IO's in one single system thus making it flexible and scalable. HC900 also simplifies the documentation process and eliminates filing errors.

A common set of hardware/software tools for process and safety applications provides for straightforward engineering and development capabilities. The intuitive touch-screen operator interface makes it easy to operate.

Security

High reliability and availability is ensured by a redundant CPU, rack power supply, communications and networking, and by features such as removal and insertion of boards under power, online monitoring, edits and hardware maintenance during running operation. Communication between safety systems with safety critical data is through a SIL2 certified safety protocol. Robust sensor level diagnostics provide early warning of pending sensor failure; advanced diagnostics at the module and channel level further ensures system security.

Metro/Tunnel Requirements

Typical metro/tunnel ventilation applications involve the monitoring of air volume and velocity, pressure, differential pressure, temperature, relative humidity, carbon monoxide concentration, sump levels, and vehicle volume and speeds. The HC900 Safety Controller monitors these and other variables through networked remote I/O control panels that process at high speed the hundreds of digital and analog I/O points and through seamless integration with various third party systems.

The HC900 executes Sequence of Events and/or PID control for final control elements including switches, fans, pumps, valves, dampers, blowers, and ancillary equipment.

System Integration

Metro/Tunnel Safety depends upon a foundation of subsystems, each dedicated to specific tasks.

HC900 Safety Controller is designed to provides seamless integration with Honeywell and third-party subsystems including but not limited to

- Power Distribution
- Smoke & Fire Detection
- Lighting Systems
- Low Voltage Distribution System
- Motor Control Centers
- Metro/Train information system
- Public Address Systems
- Emergency Evacuation System
- Emergency Telephone
- CCTV System
- Operator Workstations
- Rail System SCADA
- Station Doors, Lift And Escalators
- Uninterruptible Power Supply Monitoring
- Tunnel Drainage System

Benefits

- Field-proven & reliable: eliminates downtime
- Enhanced Safety with SIL2 certification & redundancy
- Easy to use and engineer, for reduced operational costs
- Seamless integration with tunnel & metro subsystems
- Intuitive operator interface

Summary

The HC900 Process and Safety System is a flexible and robust system for metro/tunnel ventilation monitoring, control and safety management with fast start-up time, common engineering tools, reduced training, simplified maintenance and low cost of ownership. Its engineering tools and hardware can integrate with Honeywell systems and other third-party applications. This leads to improved safety and reliability, and reduced human error through a TUV certified SIL2 system.

HC900 SIL2-certified safety system is field-proven with over 13,000 installations in critical industries and applications globally including:

- Oil & Gas
- Food & Beverages
- Water & Waste Water
- Metals & Mining
- Pulp & Paper
- Cement & Glass
- Chemicals & Petro-Chemicals
- Power Generation & Distribution
- Pharmaceuticals, Biotech and Cosmetics

As a single-source supplier, Honeywell can also provide field instrumentation, engineering, training, start-up assistance and global pre and post-sale support.



For More Information

To learn more about how the Honeywell HC900 Process and Safety System benefits infrastructure monitoring and control visit our website www.honeywellprocess.com or contact your Honeywell account manager.

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