Food and Beverage Production Line Waterproof Switch - Official Technical Overview & Hardware Datasheet

PRODUCT IDENTIFICATION

The FS-PBWS-5000 Series represents a paradigm shift in industrial networking resilience, purpose-engineered for the rigorous environmental demands of food and beverage production environments. As a dedicated waterproof switching platform, this device transcends traditional IP-rated enclosures by integrating hermetically sealed connector systems, corrosion-resistant metallurgy, and a hygienic design philosophy that actively inhibits bacterial colonization. It is the definitive solution for enabling real-time process control, predictive maintenance analytics, and seamless IIoT integration within washdown zones, high-humidity processing areas, and temperature-cycled packaging lines.



CORE INTERNAL TOPOLOGY

The architectural foundation of the FS-PBWS-5000 is built upon a fanless, conduction-cooled chassis that eliminates the risk of airborne contaminant ingress through forced-air ventilation. The internal switching fabric leverages a purpose-built Application-Specific Integrated Circuit (ASIC) engineered for deterministic, non-blocking Layer 2 and basic Layer 3 forwarding. This silicon is mounted on a multi-layer high-density interconnect (HDI) board, which is encapsulated in a thermally conductive, food-grade polymeric compound that dissipates heat through the external heatsink housing. This design eliminates all internal cabling, reducing potential failure points and ensuring that the system can withstand high-pressure, high-temperature washdown cycles up to 80°C without sustaining performance degradation or condensation-induced short circuits.

SWITCHING SUBSYSTEM CAPABILITIES

The FS-PBWS-5000 delivers line-rate switching across all available ports. The internal data plane operates with a store-and-forward architecture featuring a shared packet buffer of 4 MB, optimized to manage bursty sensor data and control network traffic. The media access control (MAC) address table supports up to 8,000 entries, ensuring stable operation in large, segmented production networks. Flow control mechanisms, including IEEE 802.3x and back-pressure, prevent data loss during peak traffic loads from high-definition machine vision systems or multiple robotic actuators. Furthermore, the platform supports Spanning Tree Protocol (STP/RSTP) for network loop prevention and link aggregation (LACP) to establish high-bandwidth uplink trunks to core plant management systems.

OPERATIONAL ADVANTAGES

The FS-PBWS-5000 provides distinct advantages over conventional commercial or industrial switches:

- IMMUNE TO WET ENVIRONMENTS: Certified to IP69K, this switch withstands high-pressure, high-temperature water and steam cleaning, ensuring

consistent uptime in washdown areas.

- HYGIENIC DESIGN: The smooth, sloped housing prevents food particle accumulation and is crafted from 316L stainless steel, offering superior resistance to cleaners, sanitizers, and corrosive substances.

- PREDICTIVE MAINTENANCE: On-board monitoring provides real-time temperature, humidity, and power diagnostics, enabling predictive maintenance and reducing unplanned downtime.

- SEAMLESS INTEGRATION: Features an intuitive web-based management interface, SNMP v1/v2c/v3 support, and dual redundant power inputs for maximum operational flexibility.

- INDUSTRIAL PROTOCOL SUPPORT: Native support for PROFINET, EtherNet/IP, and Modbus TCP ensures seamless integration with existing PLC and SCADA environments.

SPECIFICATION MATRIX

Parameter	**Specification**
Form Factor	IP69K Stainless Steel Enclosure, 1RU Standard Rack-Mount
Switching Capacity	56 Gbps (Non-Blocking)
Forwarding Rate	41.6 Mpps (Line-Rate for 64-byte Packets)

Power Supply	Dual DC Input: 24/48 VDC (Redundant & Reverse Polarity Protected)
Ingress Protection	IP69K, NEMA 4X
Operating Temperature	-40°C to +75°C
Hygienic Design	NSF/ANSI 169, EC 1935/2004 Compliant Materials
Mean Time Between Failures (MTBF)	> 1,500,000 hours at 25°C

REGULATORY COMPLIANCE

The FS-PBWS-5000 Series is engineered to meet the most stringent global and industry-specific standards. It carries full CE and FCC certification, ensuring electromagnetic compatibility in sensitive industrial environments. Crucially, it has been certified to NSF/ANSI 169 standards for food equipment materials and is compliant with the European Commission Regulation (EC) No 1935/2004 on materials and articles intended to come into contact with food. The enclosure provides ingress protection rated at IP69K per DIN 40050-9, and the device has successfully passed rigorous vibration and shock testing to IEC 60068-2-6 and IEC 60068-2-27, guaranteeing operational stability in high-vibration production lines.



LIFECYCLE ASSURANCE (MTBF)

The FS-PBWS-5000 Series boasts a Mean Time Between Failures (MTBF) of over 1,500,000 hours at 25 ° C, derived from a comprehensive component-level reliability analysis based on Telcordia SR-332. This exceptional longevity is a testament to our rigorous component selection, derating strategies, and the elimination of mechanical cooling components. This translates directly to reduced lifecycle costs and enhanced operational resilience.

GLOBAL SUPPORT CAPABILITIES

Our commitment to the Food and Beverage industry is backed by a global, 24/7/365 technical support network. We offer a standard 5-year advanced replacement hardware warranty, with optional on-site support and spare parts

stocking programs available. Our application engineers provide dedicated pre-sales configuration support and post-deployment optimization services to ensure your network architecture is fully optimized for peak production efficiency.