Industrial Switches
General Product Information

Always the Right Solution
WAGO’s range of switches ensures the scalability of your ETHERNET network infrastructure, while providing outstanding electrical and mechanical characteristics. These robust switches are designed for industrial use and are fully compliant with IEEE 802.3, IEEE 802.3u and IEEE 802.3ab.

Combinable with Fiber Optic Cables
ETHERNET via fiber optic cables offers a multitude of advantages for industrial applications. High immunity to interference, electrical isolation and long ranges up to 80 km are extremely beneficial characteristics – and these benefits are a perfect fit with IT.

Scaled Offering
Unmanaged and managed switches in various designs are available for high-end applications. Our Eco Switches are ideal for cost-sensitive applications that do not require technical features such as redundancy. They are ideal for small- to medium-sized networks.

Modular and Expandable
Exchangeable SPF modules adapt WAGO’s switches to various fiber optic cables (FOC) and the associated required distances and fibers. There are SPF modules for multimode and single-mode fiber optic cables for ranges up to 80 km. With the exact combination of copper and fiber optic cables, you are prepared for a multitude of requirements.

Availability, Redundancy
Select industrial switches have several options to build redundant network structures and guarantee secure communication – even when connections are faulty:
• Rapid Spanning Tree per IEEE 802.1w – compatible with IT standards
• Jet Ring – a simple ring protocol with switching time < 300 ms
• Xpress Ring – fast ring protocol with switching time < 20 ms
• ERPSv2 per ITU-T standard with switching time < 50 ms
In addition to communication link redundancy, a redundant power supply – which can also be monitored using an alarm relay – is integrated into the switches. If the power supply fails, communication is not interrupted.

Web-Based Management
WAGO’s fully managed switches have integrated Web-based management. Any Web browser can be used to configure the switch.

Integrated Function Monitoring
For monitoring and error reporting, the managed switch has configurable functions such as e-mail alarm and SNMP traps. In addition, all switches (except for Eco versions) can monitor individual ports or the power supply via potential-free alarm contact. A DIP switch is used to configure this function.

Full Bandwidth on All Ports
The switches’ internal bandwidth is designed so that all ports can communicate simultaneously – in full duplex without restrictions.

Security
Managed switches have built-in security features, such as:
• Authentication
• Access control lists
• DHCP snooping
• Port security

Data Transmission
Managed switches provide configuration options for data transfer, such as:
• VLAN
• IGMP snooping
• IP-based VLAN
• MAC-based VLAN

Advantages:
• Adaptable to different transmission media
• Automatically adapts to - Speed (auto-negotiation)
  - Wiring (auto-crossover, MDI/MDIX)
• Optional redundancy
• Wide supply voltage range
Industrial Switches
Interfaces and Types

Power supply (1)
Technologically related differences on the connection level (2)

Housing Design (A)
- DIP switch for configuration (a)
- Diagnostic LEDs (b)
- W x H x D (mm) 50 x 120 x 105

Housing Design (B)
- DIP switch for configuration (a)
- Diagnostic LEDs (b)
- W x H x D (mm) 50 x 120 x 162

Housing Design Eco (C)
- W x H x D (mm) 23.4 x 73.8 x 109.2 or 46 x 99.6 x 116
- DIN-35 rail
- wall-mount (852-111, 852-1111)

Housing Design Eco (D)
- W x H x D (mm) 109.2 x 23.4 x 73.8
- DIN-35 rail or wall-mount

Housing Design PoE+ (E)
- Power over Ethernet (PoE+) Ports (c)
- W x H x D (mm) 50 x 120 x 160

Housing Design (F)
- SFP module for connecting fiber optic cables
- LC connector
- W x H x D (mm) 13.4 x 13.3 x 56.6

*Height from upper edge of DIN-rail

Variants

Extended Temperature Range
Industrial automation technology is typically operated in temperatures ranging from 0°C to 55°C. However, there are applications that require an extended temperature range. Nearly all switches and SFP modules are available for an extended temperature range of −40°C to +70°C.
Industrial Switches
Configuration, Diagnostics and Performance

Configuration and Diagnostics
Several options:
• Configuration via Web-based management
• Configuration via command line (SSH, Telnet, RS-232)
• Network management via SNMP v1, v2c, v3
• Support of MIB standards (Management Information Base)
• Diagnostics via Modbus TCP: Comprehensive diagnostic data available for easy diagnostics via Modbus®

Logical Network Disconnection
VLAN (e.g., per IEEE 802.1Q)
Segmentation into virtual networks:
• Broadcast limitation
• Security improvement
• Data flow prioritization
• Subdivision of machines and office networks, for example

Traffic Prioritization and Limitation
• Faster transfer of important data packets through the switch
• Prioritization of data packets per IEEE 802.1Q
• Limitation of the bandwidth or number of packets per unit of time per port
• Increase in data transmission quality

Mastering Data Traffic
• Stopping broadcast storms
• Ensuring network availability
• Limiting broadcast and multicast data flows (packets/time)

QoS

Storm Control
Industrial Switches
Security

Authentication IEEE 802.1X
Secure authentication and authorization in ETHERNET networks (locally on the switch or via RADIUS server)

Process:
• Authentication of a subscriber is performed by the authenticator.
• The authenticator checks the authentication information of the subscriber (supplicant) with an authentication server.

Firewall – Access Control List
Filtering data packets due to:
• a source MAC or source IP address
• a destination MAC or destination IP address
• a range of MAC or IP addresses
• UDP/TCP source or destination ports

Port Security
• Dynamically learns MAC addresses per port
• Limitation of MAC addresses per port
• MAC-based white/blacklist per port
Industrial Switches
Redundancy

Jet Ring
- Typical switching time < ~ 300 ms (depends on the application)
- Extremely easy configuration
- Up to 20 participants (Fast Aging) in a Jet Ring

Xpress Ring
- Switching time < 20 ms
- Easy configuration
- Up to 200 switches in one Xpress Ring
- 2 Xpress Rings per switch

Dual Ring
- Combination of both redundancy types
- 1 Jet Ring and 1 Xpress Ring per switch or 2 Xpress Rings per switch

ERPS: ETHERNET Ring Protection Switching
- Standardized and open technology
- Switching time < 50 ms
- Nested topologies with up to six rings per switch
- Realization of a one-fault tolerance (SPOF – Single Point of Failure)

ERPS – Enhancement Mode
- WAGO devices with an integrated switch and Fast Aging configuration
- Typical switching time < ~ 300 ms (depends on the application)
Industrial Switches

Item Number Key

Explanation of an item number key's components

- **Series**
  - Item No.: 852-xxxx
  - 0xxx: 100 Mbit/s
  - 1xxx: 1 Gbit/s
    - x1xx: Unmanaged Switch
    - x2xx: SFP Module
    - x3xx: Managed Switch
    - x4xx: Unmanaged Switch, PoE
    - x5xx: Managed Switch, PoE
  - xx0x: Industrial Switch
    - (Redundant Power Supply)
  - xx1x: Industrial Eco Switch
    - xxx1: 5 Ports
    - xxx2: 8 Ports
    - xxx3: 8 Ports + 2 FOC Ports
    - xxx5: 8 Ports + 4 FOC Ports
    - xxx6: 16 Ports

Standards and Rated Conditions

**General Specifications**

- Packet throughput per port
  - 10 Mbps port: 14,880 packages per second (pps)
  - 100 Mbps port: 148,800 packages per second (pps)
  - 1000 Mbps port: 1,488,000 packages per second (pps)

- Surrounding air temperature (operation)
  - −40 ... +70 °C

- Surrounding air temperature (storage)
  - −40 ... +80 °C

- Relative humidity max.
  - 95 % (non condensing)

- Vibration resistance
  - 4g per IEC 60068-2-6

- Shock resistance
  - 15g per IEC 60068-2-27

- EMC immunity to interference
  - EN 61000-6-2

- EMC emission of interference
  - EN 61000-6-4

- Protection type
  - IP30

- Mounting type
  - On DIN-35 rail, Eco version also for wall-mount

- Mounting position
  - Any

Approvals

For approvals overview (item comparison), see Section 11 (Technical Section) or visit www.wago.com.