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 performance. These rugged 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 the IT environment.

Scaled Selection

Unmanaged and managed switches in various designs are available for high-end applications. WAGO's 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. These SFP modules are available 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.

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, WAGO's managed switch have configurable functions such as an email alarm and SNMP traps. Additionally, all switches (except for Eco versions) can monitor individual ports or the power supply via a potential-free alarm contact. A DIP switch configures this function.

Full Bandwidth on All Ports

The WAGO Switches' internal bandwidth is designed so that all ports can communicate simultaneously – in full duplex without restrictions.

Security

WAGO's managed switches have built-in security features, such as:
- Authentication
- Access control lists
- DHCP snooping
- Port security

Data Transmission

WAGO's managed switches provide configuration options for data transmission, such as:
- VLAN
- IGMP snooping
- IP-based VLAN
- MAC-based VLAN

Redundancy

Select industrial switches have several options for building redundant network structures and guarantee secure communication – even when connections are faulty:
- Rapid Spanning Tree per IEEE 802.1w – compatible with the IT standard
- Jet Ring – a simple ring protocol with switching time < 300 ms
- Xpress Ring – a fast ring protocol with switching time < 20 ms
- ERPSv2 per ITU-T standard, switching time < 50 ms
- Media Redundancy Protocol (MRP), switching time < 200 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.

Different Operating Modes

The unmanaged switches are ideal for direct plug-and-play use. Managed switches are available for applications where IP filtering or further interpretation of telegrams is required for the application.

Configurable Performance

WAGO's managed switches offer performance control features, such as:
- Storm control
- Bandwidth control
- Auto-provisioning
- Link aggregation

Configuration and Diagnostics

Modbus® can be used to diagnose managed switches. Configuration and diagnostics can also be performed with standardized protocols such as SNMP.
Select products also have the "PROFINET Conformance Class B" certificate, allowing simple diagnostics and configuration in PROFINET systems.

Advantages:

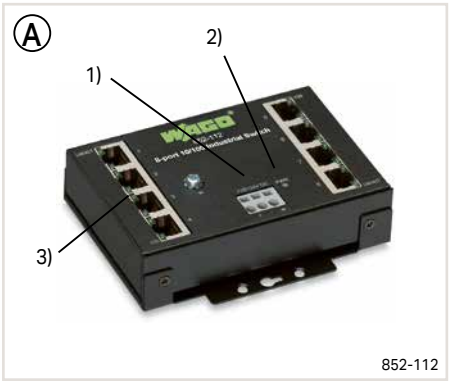
- Adaptable to different transmission media
- Automatically adapts to
  - Speed (auto-negotiation)
  - Wiring (auto-crossover, MDI/MDIX)
- Optional redundancy
- Wide supply voltage range

Industrial Switches
Functional Variants

Eco Unmanaged (A, B)

- Plug & play operation (Auto MDI-X)
- Megabit and gigabit variants
- Vibration and shock resistance
- DIN-rail adapter

1) Power supply
2) Status LEDs
3) Copper ports
4) Power over Ethernet (PoE+) ports
5) SFP ports for SFP modules



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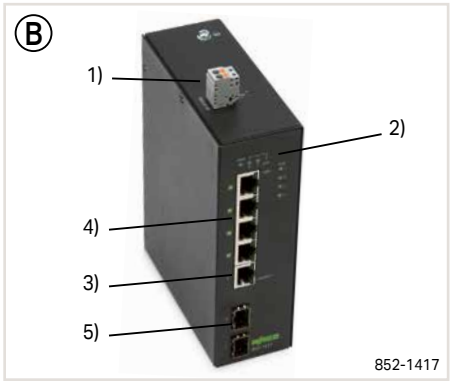

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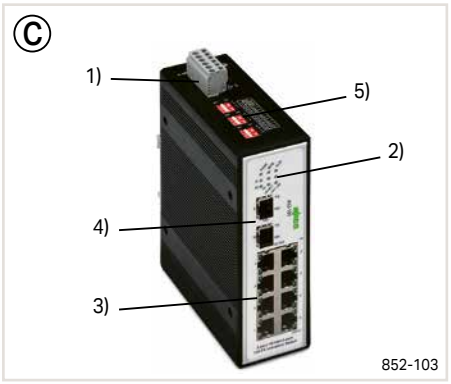
Standard Unmanaged (C, D)

- Up to 16-Gbit ports + SFP slots
- Diagnostics via LEDs and relay
- High temperature range (–40 … +70 °C)
- Redundant power supply

1) Redundant power supply
2) Status and diagnostic LEDs
3) Copper ports
4) SFP ports for SFP modules
5) DIP switches for configuration



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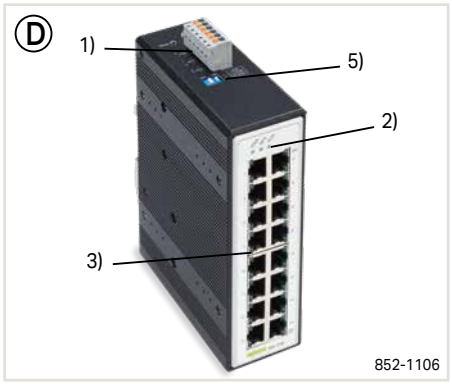

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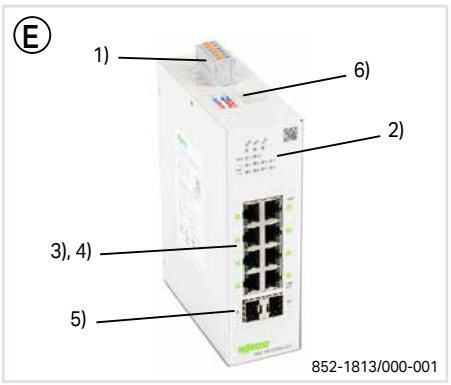
Lean Managed (E, F)

- Intuitive configuration for automation engineers
- Simple network diagnostics in the browser
- Media redundancy with RSTP/ERPS
- Network security basic functions

1) Redundant power supply
2) Status and diagnostic LEDs
3) Copper ports
4) Power over Ethernet (PoE+) ports
5) SFP ports for SFP modules
6) DIP switches for configuration



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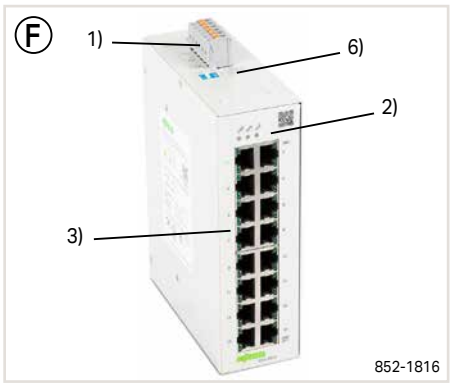
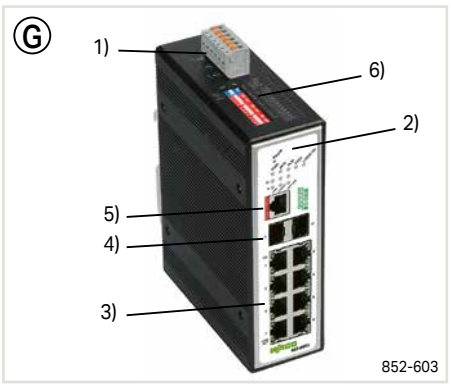


852-1816

PROFINET® Managed (G, H)

- Configuration/diagnostics in the PROFINET® system
- PROFINET®-certified (CC-B)
- Cyclically readable process image
- Potential-free networking over 80 km

1) Redundant power supply
2) Status and diagnostic LEDs
3) Copper ports
4) SFP ports for SFP modules
5) RS-232 port
6) DIP switches for configuration



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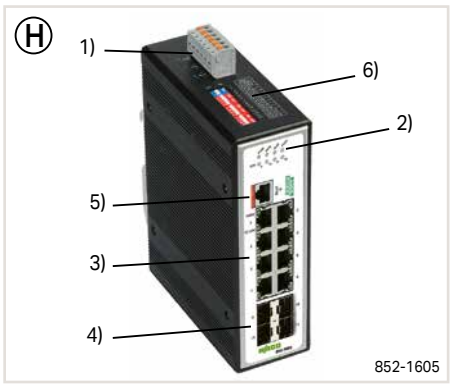
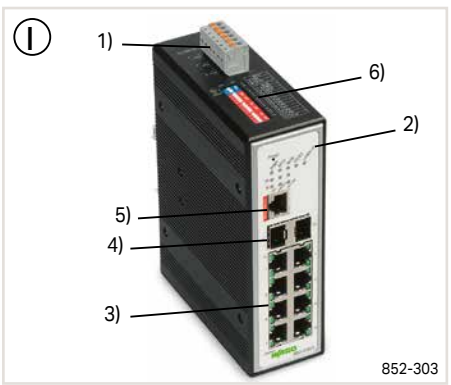


852-1605

Fully Managed (I, J)

- Fast network redundancy (< 30 ms)
- Diagnostics (SNMPv3, Modbus®, Syslog, …)
- Security (SSH, VLAN, 802.1X, ACL, …)
- Extended network functions
- (Routing, IPv6, LACP, DHCP, …)

1) Redundant power supply
2) Status and diagnostic LEDs
3) Copper ports
4) SFP ports for SFP modules
5) RS-232 port
6) DIP switches for configuration
7) USB interface



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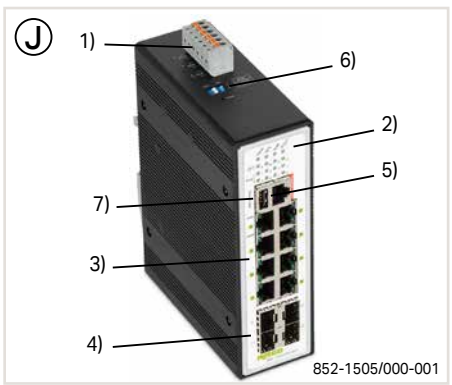

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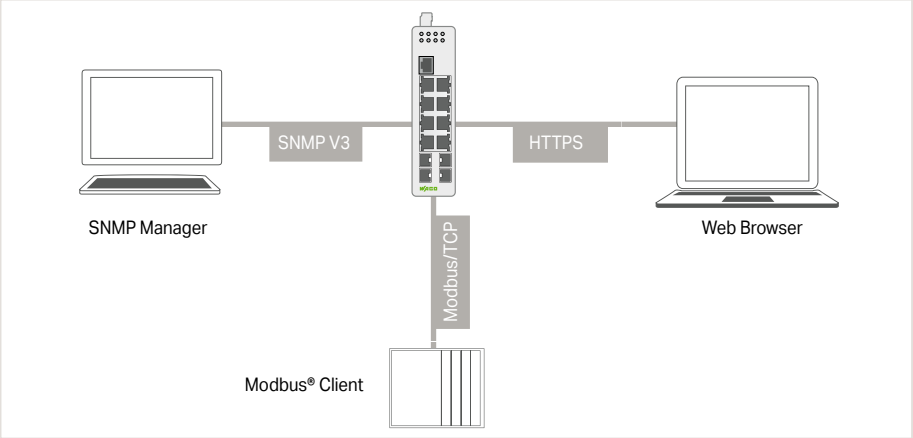
Industrial Switches
Configuration, Diagnostics and Performance

Configuration and Diagnostics

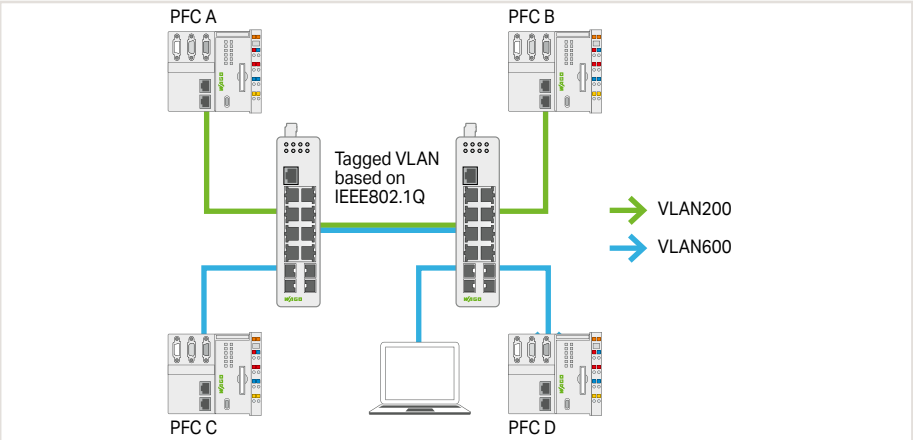
Several options:
- Configuration via Web-Based Management
- Configuration via command line (SSH, Telnet, RS-232)
- Network management via SNMP v1, v2c, v3
- Support of Management Information Base (MIB) standards
- PROFINET configuration via device description file (GSD file)
- Diagnostics via Modbus TCP: Comprehensive data available for easy diagnostics via Modbus®



Configuration interfaces

Logical Network Segmentation

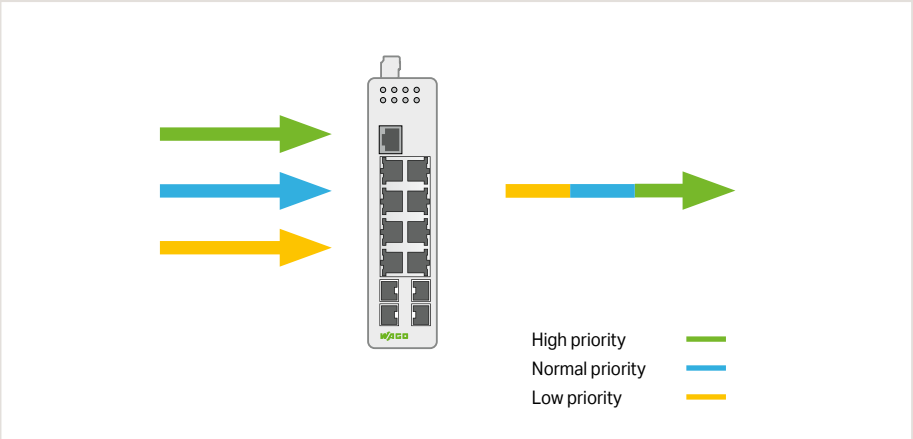
VLAN (e.g., per IEEE 802.1Q) and segmentation into virtual networks:
- Broadcast limitation
- Network security improvement
- Data flow prioritization
- Subdivision of machines and office networks



VLAN

Data Traffic Prioritization and Limitation

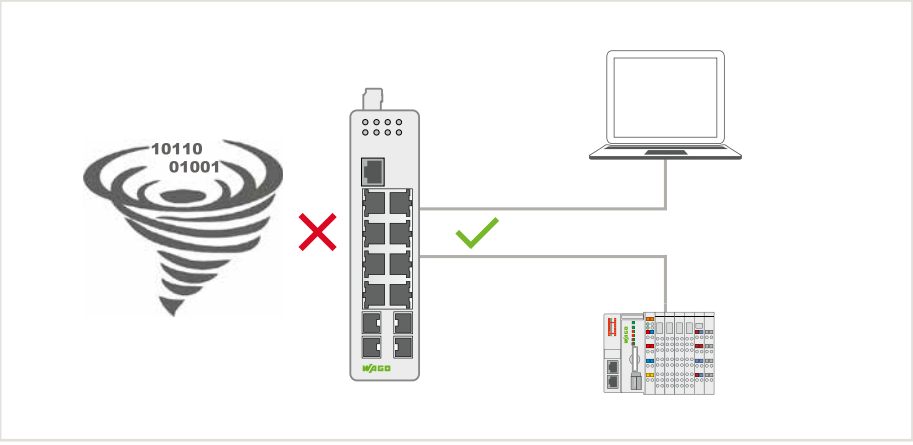
- Faster transfer of important data packets through the switch
- Prioritization of data packets per IEEE 802.1 Q
- Limitation of the bandwidth or number of packets per unit of time per port
- Increase in data transmission quality



QoS

Mastering Data Traffic

- Stopping broadcast storms
- Ensuring network availability
- Limiting broadcast and multicast data flows (packets/time)



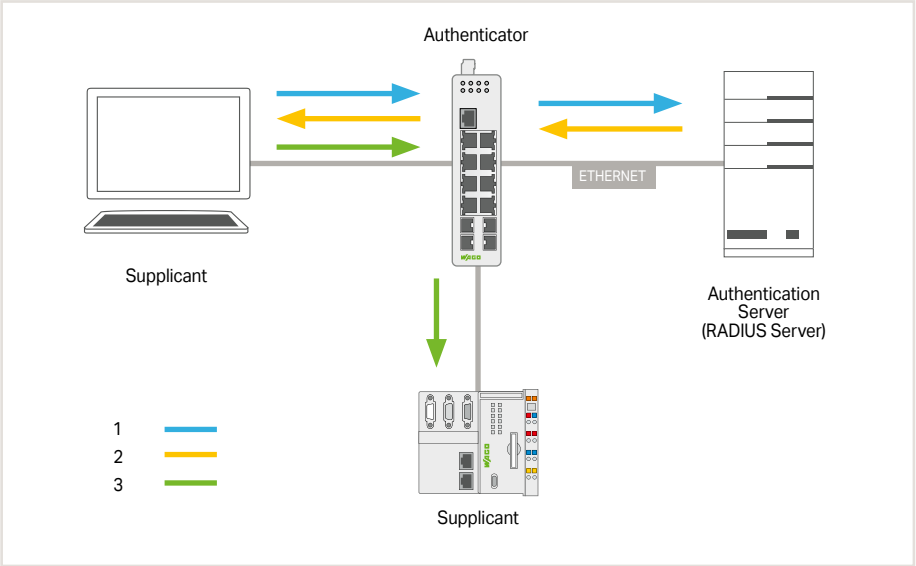
Storm Control

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.

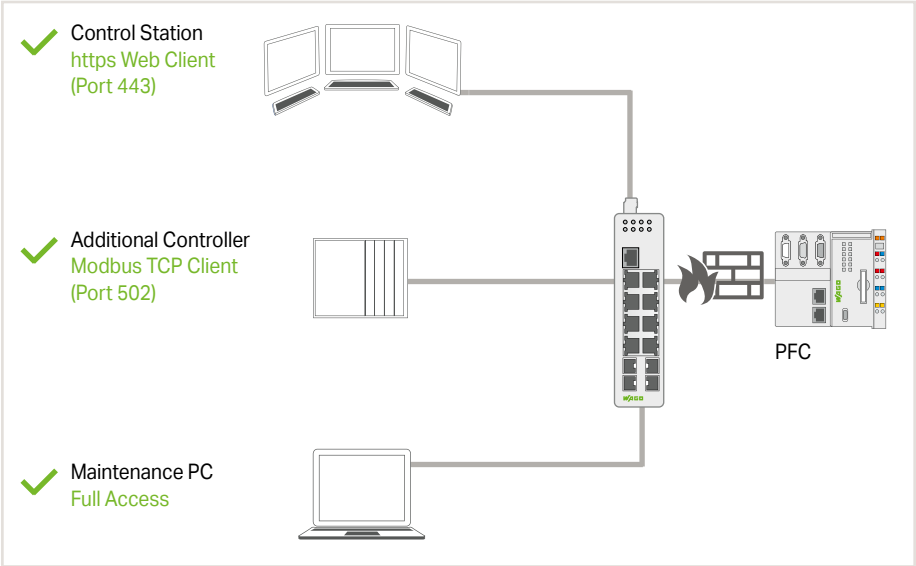


IEEE 802.1X

Firewall – Access Control List

Authorization Only for the Required Services

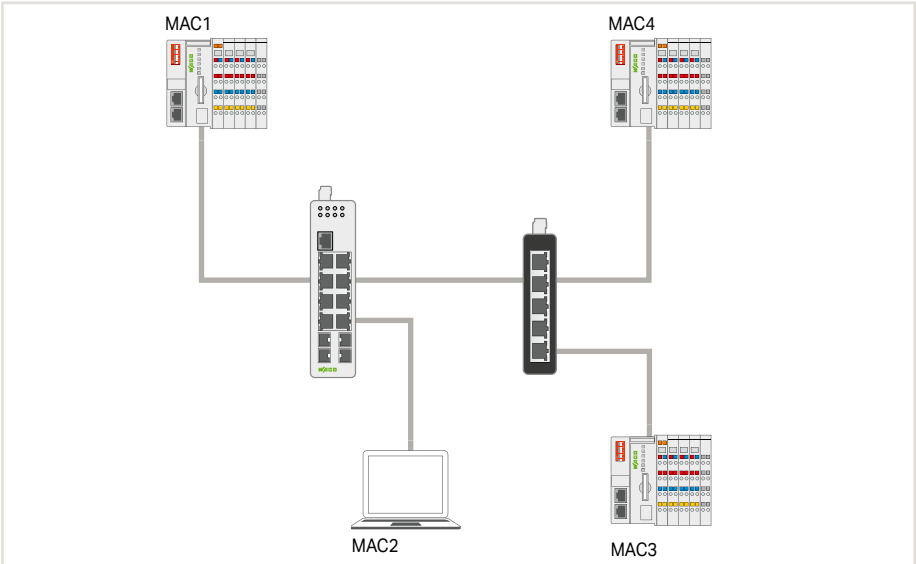
Filtering data packets via:
- Source MAC or source IP address
- Destination MAC or destination IP address
- Range of MAC or IP addresses
- UDP/TCP source or destination ports
- MAC-based white/black list for each port



Firewall

Port Security

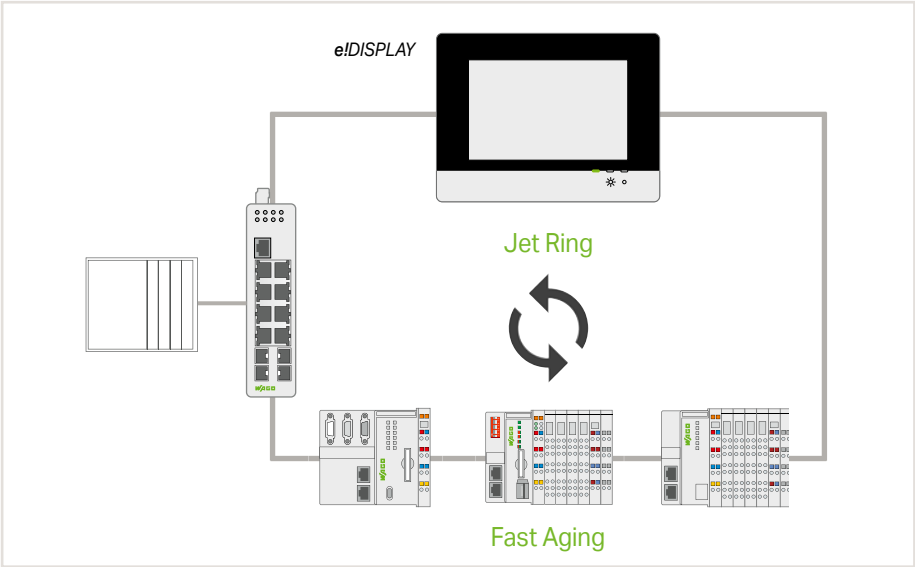
- Dynamically learns MAC addresses for each port
- Limitation of MAC addresses for each port
- MAC-based white/black list for each port



Industrial Switches
Redundancy

Jet Ring

- Typical switching time of 400 ms (depends on the application)
- Extremely easy configuration (on or off)
- Up to 20 switches in a Jet Ring
- WAGO ETHERNET devices (Fast Aging) can be used in the Jet Ring



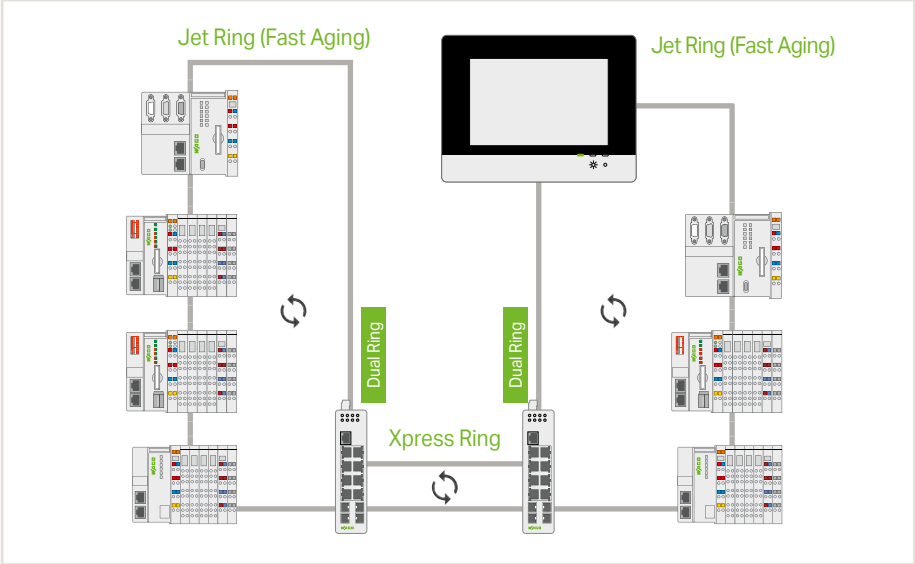
Jet Ring

Xpress Ring

- Switching time < 20 ms
- Easy configuration (3 parameters per switch)
- 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



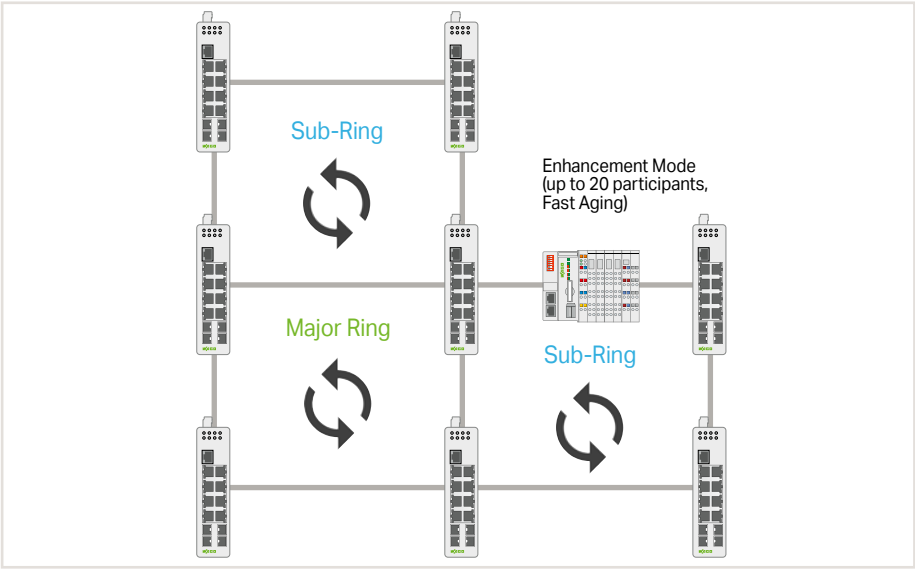
Xpress Ring and Dual Ring

ERPS: ETHERNET Ring Protection Switching

- Standardized and open technology
- Switching time < 50 ms
- Nested topologies with up to 6 rings per switch
- Implementation of one-fault tolerance (SPOF – Single Point of Failure)

ERPS – Enhancement Mode

- WAGO devices with an integrated switch and fast aging configuration
- Typical switching time of 400 ms (depends on the application)



ERPS V2

Industrial Switches
Product Overview

		Unmanaged											Managed												
		Eco						Standard					Lean Managed				MACsec		Fully Managed					PROFINET®		
		852-111	852-112	852-1111	852-1112	852-1411	852-1411/000-001	852-1417	852-101	852-102	852-103	852-1102	852-1106	852-1812	852-1813	852-1813/000-001	852-1816	852-1322	852-1328	852-303	852-1305	852-1305/000-001	852-1505	852-1505/000-001	852-602	852-603	852-1605
Hardware	Number of copper ports	5	8	5	8	5	5	5	5	8	8	8	16	8	8	8	16	8	6	8	8	8	8	8	8	8	8
	100 Mbit/s	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	1 Gbit/s			☐	☐	☐	☐	☐				☐	☐	☐	☐	☐	☐	☐	☐		☐	☐	☐	☐			☐
	PoE+ ports among these (1 Gbit/s)	–	–	–	–	4	4	4	–	–	–	–	–	–	–	8	–	–	–	–	–	–	8	8	–	–	–
	Number of SFP ports	–	–	–	–	–	–	2	–	–	2	–	–	–	2	2	–	–	2	2	4	4	4	4	–	2	4
	100 Mbit/s										☐				☐	☐			☐	☐						☐	
	1 Gbit/s							☐							☐	☐			☐	☐	☐	☐	☐	☐		☐	☐
	Alarm relay								☐	☐	☐	☐	☐	☐	☐	☐	☐			☐	☐	☐	☐	☐	☐	☐	☐
Approvals, Standards, Certificates	CE	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	DNV GL	☐		☐								☐[1]	☐[1]							☐	☐			☐[1]			
	UL 61010	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐		☐	☐	☐	☐
	IEC 61850-3																					☐		☐			
	PROFINET® CC-B (certificate)																								☐	☐	☐
Hardware Features	Status LEDs				☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	Autonegotiation	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	Auto-crossing	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	PROFINET CC-A			☐	☐	☐	☐	☐				☐	☐	☐[2]	☐[2]	☐[2]	☐[2]	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Configuration	DIP switches (diagnostics)								☐	☐	☐	☐	☐	☐	☐	☐	☐			☐	☐	☐	☐	☐	☐	☐	☐
	Web-Based Management (http, https)													☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	SNMP (MIB)													☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	CLI (SSH, Telnet)													☐	☐	☐	☐			☐	☐	☐	☐	☐	☐	☐	☐
	CLI with RS-232																			☐	☐	☐	☐	☐	☐	☐	☐
	PROFINET configurator (GSD file)																								☐	☐	☐
	USB storage																					☐		☐			
Diagnostics	Status LED (LINK active)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	Status LED (LINK down)								☐	☐	☐	☐		☐	☐	☐	☐			☐	☐	☐	☐	☐	☐	☐	☐
	Status LED (alarm)								☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	SNMP (MIB)													☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	SNMP traps													☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	Modbus® registers													☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐			
	Web-Based Management (http, https)													☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	Dashboard and topology map													☐	☐	☐	☐										
	PROFINET diagnostics (acyclic and cyclic)																								☐	☐	☐
	Neighborhood detection (LLDP)													☐	☐	☐	☐			☐	☐	☐	☐	☐	☐	☐	☐
Redundancy	Redundant power supply								☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	Jet Ring																			☐	☐	☐	☐	☐			
	Xpress Ring																			☐	☐	☐	☐	☐			
	ETHERNET Ring Protection Switching													☐[3]	☐[3]	☐[3]	☐[3]			☐	☐	☐	☐	☐			
	Media Redundancy Protocol (MRP) (client/manager)																								☐	☐	☐
	RSTP/STP													☐	☐	☐	☐	☐[2]	☐[2]	☐	☐	☐	☐	☐	☐	☐	☐
Network Security	Segmentation (VLAN)													☐[4]	☐[4]	☐[4]	☐[4]	☐[2]	☐[2]	☐	☐	☐	☐	☐	☐	☐	☐
	Authentication (IEEE 802.1X)													☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐			
	Access Control List (MAC, IP, Port)													☐[5]	☐[5]	☐[5]	☐[5]			☐	☐	☐	☐	☐	☐	☐	☐
	Port security													☐	☐	☐	☐	☐[2]	☐[2]	☐	☐	☐	☐	☐			
	MAC security (IEEE 802.1AE)																	☐	☐								
Data Transmission and Performance	LACP link aggregation																			☐	☐	☐	☐	☐			
	Prioritization (IEEE 802.1 p)			☐	☐	☐	☐	☐				☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	Quality of service (IEEE 802.1 Q)													☐	☐	☐	☐	☐[2]	☐[2]	☐	☐	☐	☐	☐	☐	☐	☐
	Bandwidth limitation																			☐	☐	☐	☐	☐	☐	☐	☐
	Broadcast limitation													☐	☐	☐	☐			☐	☐	☐	☐	☐	☐	☐	☐
	Routing within VLANs																			☐	☐	☐	☐	☐	☐	☐	☐
	Static route																			☐	☐	☐	☐	☐			

[1] DNV GL and LR starting from hardware version 5 or 3
[2] Firmware 2 or higher
[3] Supports two ERPS rings with a switchover time of less than 800 ms
[4] Supports up to five VLANs
[5] Supports up to 32 entries (based on MAC and IP address)