

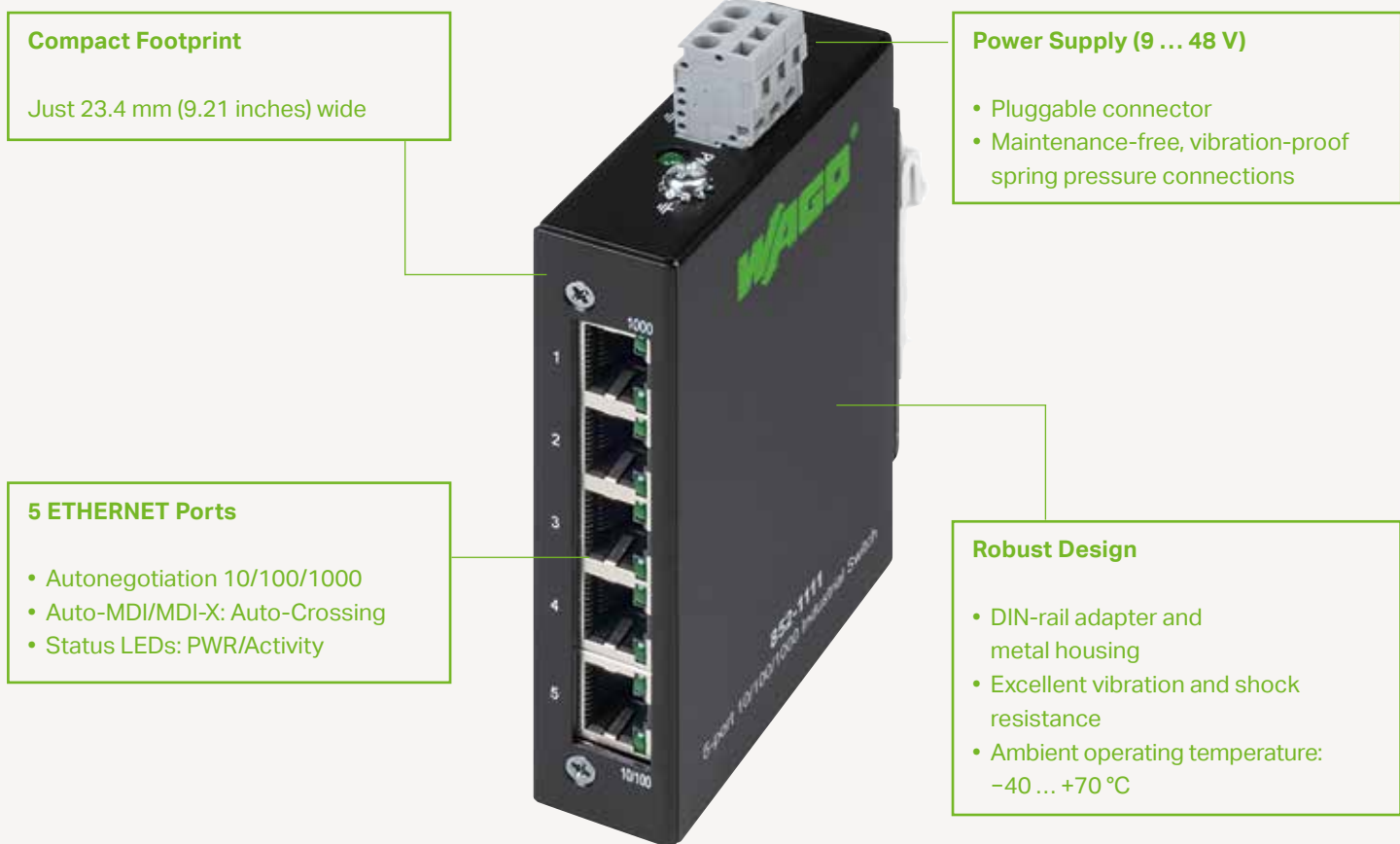
Network Infrastructure

Industrial Switches and ETHERNET Components



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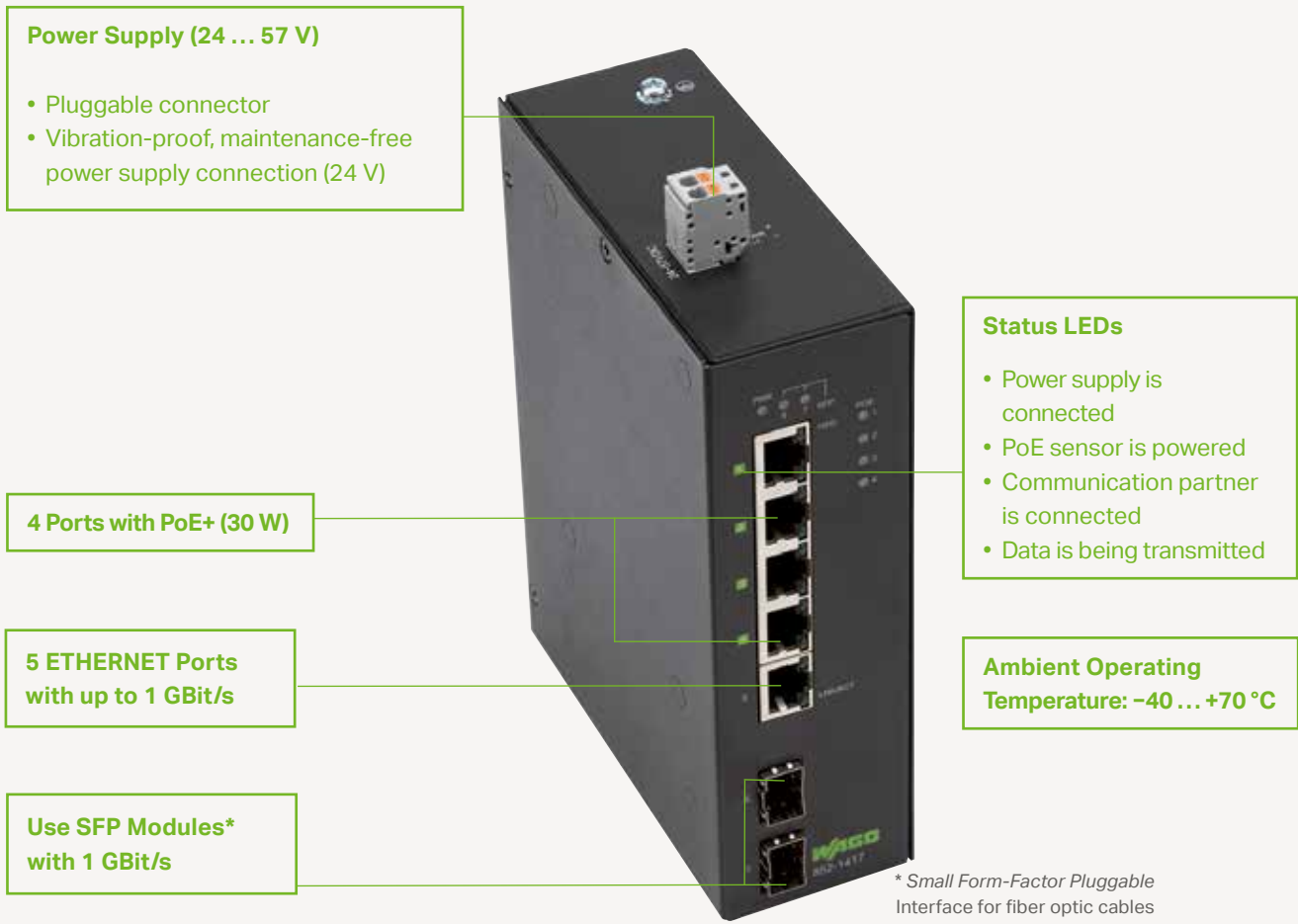
INDUSTRIAL ECO SWITCHES

Economical and Compact

	Fast Ethernet		Gigabit	
Ports	5 x 10/100Base-TX	8 x 10/100Base-TX	5 x 10/100/1000BASE-T	8 x 10/100/1000BASE-T
Power supply	18 ... 30 VDC	18 ... 30 VDC	9 ... 48 VDC	9 ... 57 VDC
Dimensions (W x H x D)	23.4 x 73.8 x 109.2 mm	109.2 x 23.4 x 73.8 mm	23.4 x 73.8 x 109.2 mm	46 x 99.6 x 116 mm
Ambient operating temperature	-40 ... +70 °C	-40 ... +70 °C	-40 ... +70 °C	0 ... +60 °C
Approvals	UL, DNV ¹	UL	UL ² , DNV ¹	UL ²
Prioritization	-	-	IEEE 802.1 p	IEEE 802.1 p
Item number	852-111	852-112	852-1111	852-1112

¹ with DIN-rail adapter, Item No. 852-9101

² pending



Power Supply via ETHERNET Cable (PoE+)

Type	PoE+	
PoE+ ports	4 x PoE+ (30 W)	4 x PoE+ (30 W)
Copper ports	5 x 10/100/1000BASE-T	5 x 10/100/1000BASE-T
SFP ports	-	2 x SFP 1000BASE-SX/LX
Power supply	24 ... 57 VDC	24 ... 57 VDC
Dimensions (W x H x D)	50 x 120 x 160 mm	50 x 120 x 160 mm
Ambient operating temperature	-40 ... +70 °C	-40 ... +70 °C
Approvals	UL ¹	UL ¹
Prioritization	IEEE 802.1 p	IEEE 802.1 p
Item number	852-1411	852-1417

“Power over Ethernet” (PoE+) technology powers PoE-capable devices via network cable using a switch. This allows, for example, PoE-capable IP cameras, IoT sensors or HMI systems to be economically integrated into the network, eliminating the separate installation of power and data cables. Other advantages include diagnostics performed within the system.

The IEEE 802.3at-2009 PoE standard, which is also known as PoE+ or PoE plus standard, provides up to 25.5 W of power to the PoE-capable devices. To make this possible, the PoE-capable switch can provide up to 30 W per PoE-enabled port.

¹ pending

Redundant Power Supply

Alarm Contact Configuration via DIP Switch

Robust Design

- DIN-rail adapter and metal housing
- Ambient operating temperature: -40 ... +70 °C



Alarm Contact

- Monitoring the primary power supply
- Monitoring the secondary power supply
- Monitoring the ETHERNET ports
- Signaling via PLC or remote I/O (e.g., indicator light on the front of the control cabinet)

INDUSTRIAL SWITCHES

Versatile

	Fast Ethernet			Gigabit	
Copper ports	5 x 10/ 100BASE-TX	8 x 10/100Base-TX	8 x 10/100Base-TX	8 x 10/100/1000BASE-T	16 x 10/100/1000BASE-T
SFP ports	-	-	2 x SFP 100BASE-FX	-	-
Power supply	9 ... 48 VDC	9 ... 48 VDC	9 ... 48 VDC	9 ... 57 VDC	12 ... 60 VDC
Redundant power supply	■	■	■	■	■
Alarm contact	■	■	■	■	■ ²
Dimensions (W x H x D)	50 x 120 x 105 mm	50 x 120 x 162 mm	50 x 120 x 162 mm	50 x 120 x 105 mm	50 x 120 x 162 mm
Ambient operating temperature	-40 ... +70 °C	-40 ... +70 °C	-40 ... +70 °C	-40 ... +70 °C	-40 ... +70 °C
Approvals	UL	UL	UL	UL ¹	UL ¹
Prioritization	-	-	-	IEEE 802.1 p	IEEE 802.1 p
Item number	852-101	852-102	852-103/040-000	852-1102	852-1106

¹ pending
² only power supply

Redundant Power Supply

Status LEDs

- Primary power supply available
- Secondary power supply available
- Alarm message is displayed

RS-232 Interface for Command-based Configuration

Integrated Web-Based Management for Configuration or Diagnostics

Use SFP Modules* with 1 GBit/s

Alarm Contact

- Jet ring diagnostics
- ERPS ring diagnostics
- Monitoring the primary power supply
- Monitoring the secondary power supply
- Monitoring the ETHERNET ports
- Signaling via PLC or remote I/O (e.g., indicator light on the front of the control cabinet)




Configurable Functions

- Security
- Availability
- Performance
- Data transmission

* Small Form-Factor Pluggable Interface for fiber optic cables

INDUSTRIAL MANAGED SWITCHES

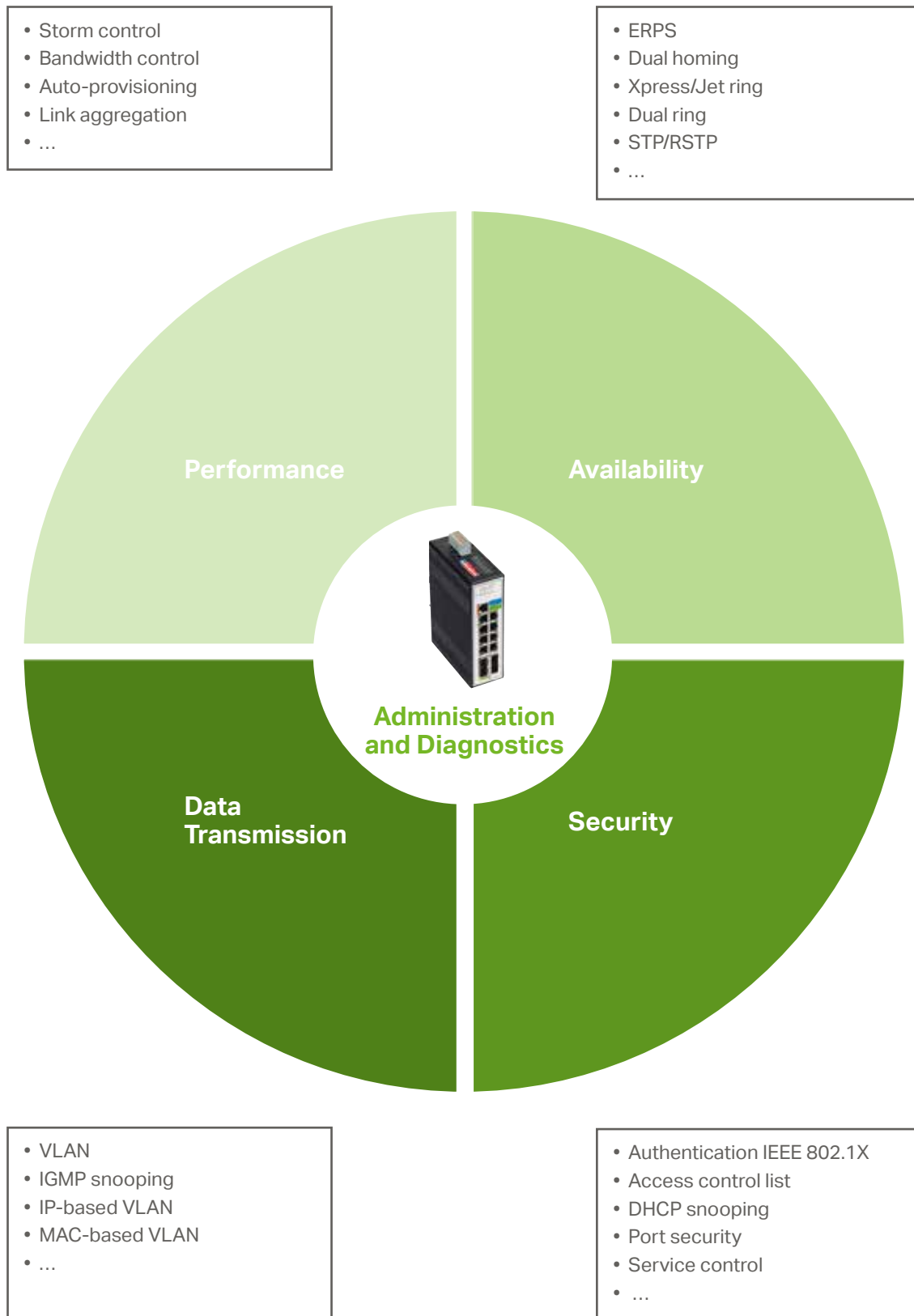
Powerful and Secure

	PoE+		
			
PoE+ ports			8 x PoE+ (30 W)
Copper ports	8 x 10/100Base-TX	8 x 10/100/1000BASE-T	8x 10/100/1000BASE-T
SFP ports	2 x SFP 100/1000 ²	4 x SFP 1000BASE-SX/LX	4 x SFP 1000BASE-SX/LX
Power supply	12 ... 60 VDC	12 ... 60 VDC	48 ... 57 VDC
Redundant power supply	■	■	■
Alarm contact	■	■	■
Dimensions (W x H x D)	50 x 120 x 162 mm	50 x 120 x 162 mm	50 x 120 x 162 mm
Ambient operating temperature	-40 ... +70 °C	-40 ... +70 °C	-40 ... +70 °C
Approvals	UL ¹ , DNV ¹	UL ¹ , DNV	UL ¹
Prioritization	IEEE 802.1Q	IEEE 802.1Q	IEEE 802.1Q
Item number	852-303	852-1305	852-1505

Suitable SFP modules, see page 14

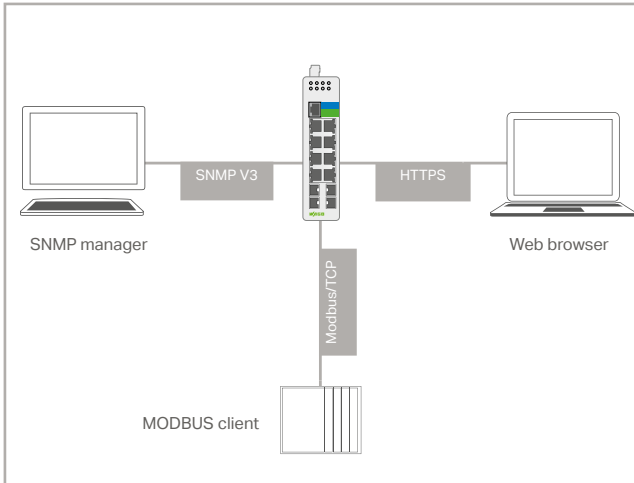
¹ pending
² configurable via DIP switch (1000BASE-SX/LX or 100BASE-FX)

FUNCTION OVERVIEW OF THE INDUSTRIAL MANAGED SWITCH



ADMINISTRATION AND DIAGNOSTICS

Simplified Commissioning and Maintenance



Configuration interfaces

Configuration and Diagnostics

Several Options

- Configuration via Web-Based Management
- Configuration via command line (SSH, Telnet, RS-232)
- Network management via SNMP v1, v2, v3
- Support of MIB standards (*Management Information Base*)
- Diagnostics via Modbus TCP
Numerous information available for easy diagnostics via MODBUS

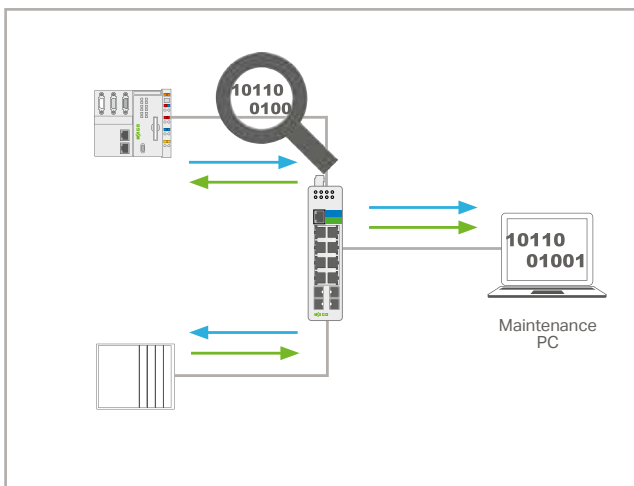
Informations SFP	
Câble fibre	Link Up
Connecteur	LC
Longueur d'onde(nm)	850
Distance de transfert(m)	660m(50m: OM2), Multimode
DDM supporté(nm)	YES (Intensity Calibrated)
Nom du fabricant(nm)	WAGO
Référence du fabricant(nm)	852-1200
Versión du fabricant(nm)	V2.0
Numéro de série du fabricant (nm)	AX16330002553
Code data(nm)	162500

Informations DDM(nm)					
	Courant(nm)	Alarme haute (nm)	Alarme basse (nm)	Avert. haut (nm)	Avert. bas(nm)
Température(C)	30.148	80.000	-45.000	85.000	-40.000
Tension(V)	3.290	3.000	3.000	3.500	3.100
Tx Bias(mA)	6.754	25.000	1.000	20.000	2.000
Tx Power(mW)	0.210	0.501	0.000	0.390	0.112
Tx Power(dBm)	-6.785	3.000	-10.505	-4.701	-5.508
Rx Power(mW)	0.252	0.831	0.016	0.501	0.020
Rx Power(dBm)	-6.990	-2.004	-18.016	-3.000	-17.012

DDM

DDM: Digital Diagnostic Monitoring

- Automatically detects a connected SFP module
- Detailed module information
- Real-time monitoring
 - Temperature
 - Power supply
 - Transmission power
 - Reception power



Port mirroring

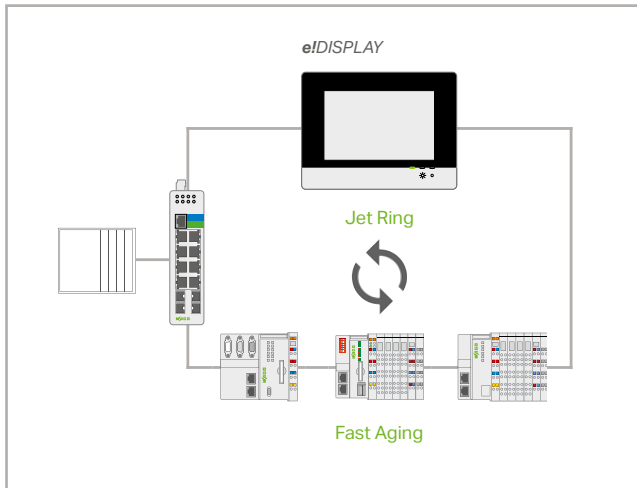
Monitoring and Diagnostics

Simplified Maintenance

- Port mirroring
Mirroring the network traffic
- LLDP
Automatic detection of adjacent devices
- Email notifications

AVAILABILITY

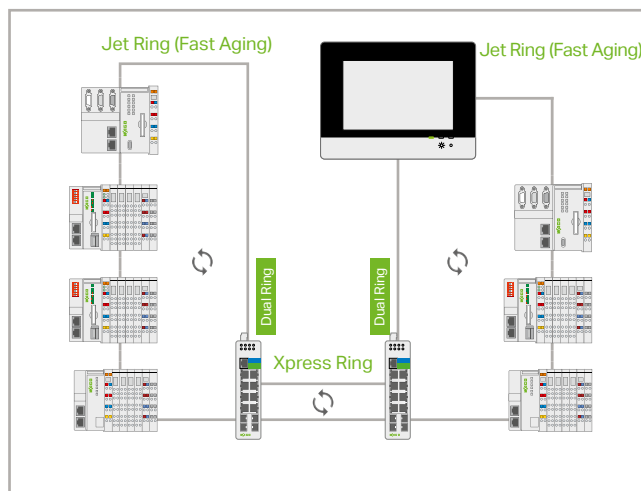
Via Communication Redundancy



Jet Ring

Jet Ring

- Typical switching time < 300 ms (depends on the application)
- Extremely easy configuration
- Up to 20 participants (fast aging) in a jet ring



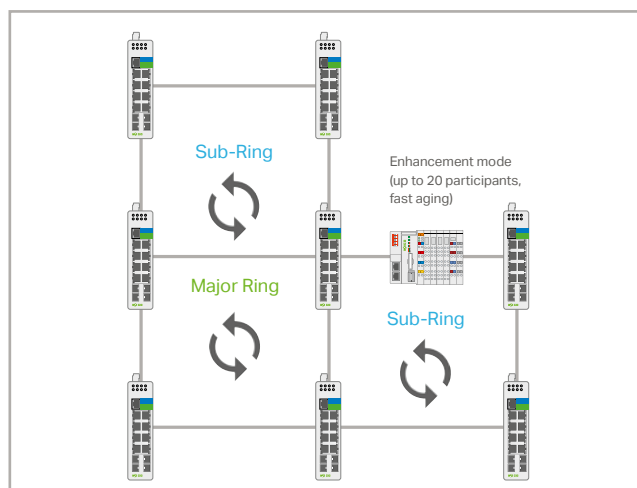
Xpress Ring and Dual Ring

Xpress Ring

- Switching time < 20 ms
- Easy configuration
- Up to 200 switches in one Xpress ring
- Two 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 V2

ERPS: ETHERNET Ring Protection Switching The Fast and Open Solution

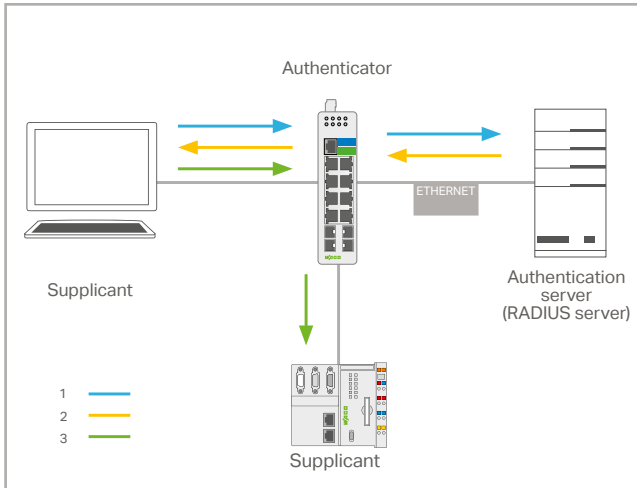
- Standardized and open technology
- Switching time < 50 ms
- Nested topologies with up to six rings per switch
- Realization of a one-fault tolerance (SPOF – Single Point of Failure)

ERPS – Enhancement Mode

- WAGO's devices with integrated switch and fast aging configuration
- Typical switching time < 300 ms (depends on the application)

SECURITY

Absolutely Secure Industrial Networks



IEEE 802.1X

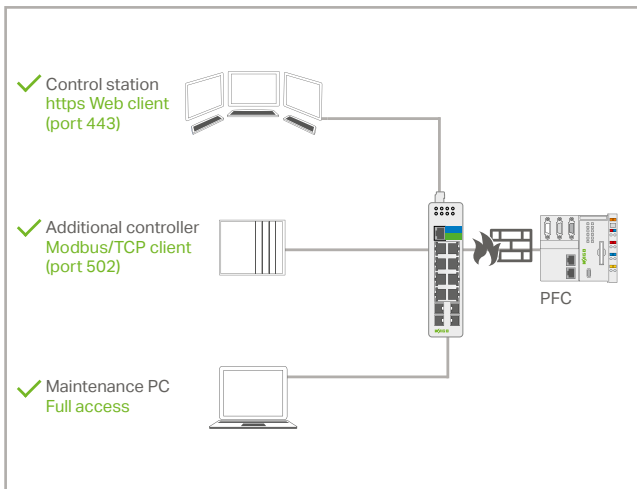
IEEE 802.1X Authentication

The Security Standard of IT Networks

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

Process:

- Authentication of a subscriber is done by the authenticator
- The authenticator checks the authentication information of the subscriber (supplicant) with an authentication server



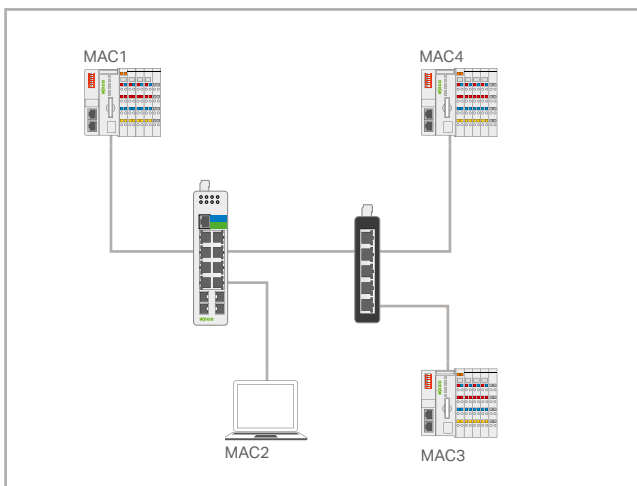
Firewall

Firewall – Access Control List

Authorization only for the required services

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

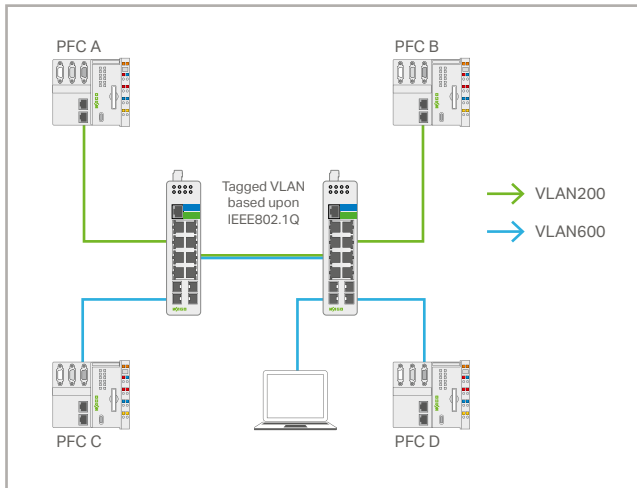


Port Security

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

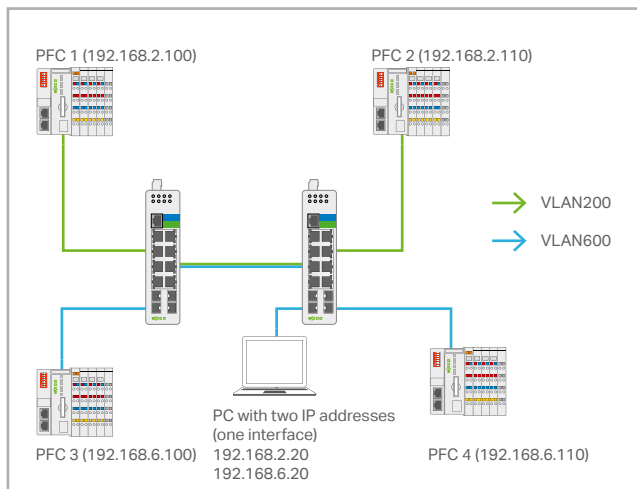
DATA TRANSMISSION

Streamlined ETHERNET Networks



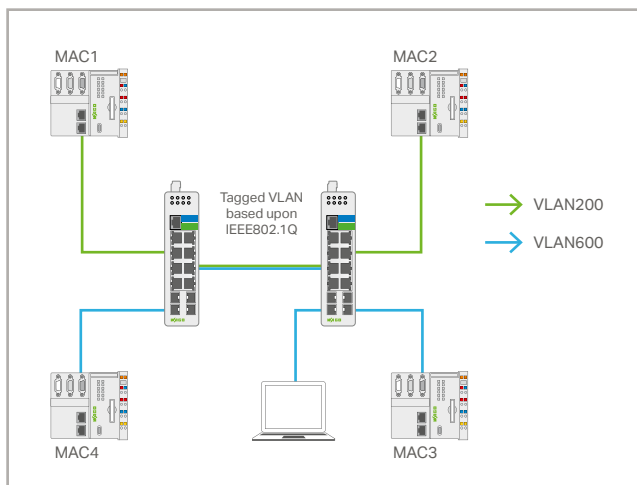
Logical Network Disconnection

- VLAN (e.g., per IEEE 802.1Q)
Segmentation in logical, virtual networks:
 - Broadcast limitation
 - Security improvement
 - Data flow prioritization
 - Subdivision of machines and office networks, for example



IP-Based VLAN

- Routing of data packets between VLANs via IP address
- Communication from one participant to two or more VLANs
- Economic connection of networks to higher-level routers
- Prioritization of data packets via IP address

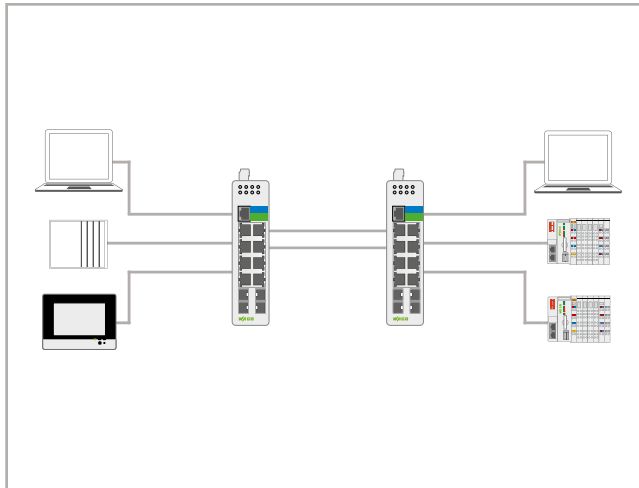


MAC-Based VLAN

- Assignment of data packets to a VLAN via MAC address
- Prioritization of data packets via MAC address

PERFORMANCE

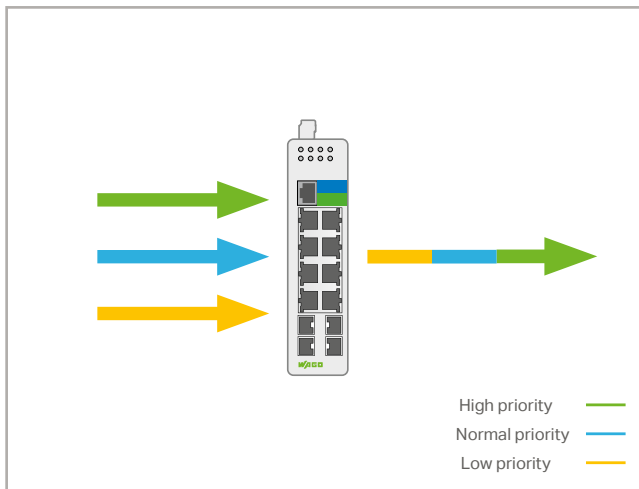
Streamlined ETHERNET Networks



Link aggregation

Network Optimization

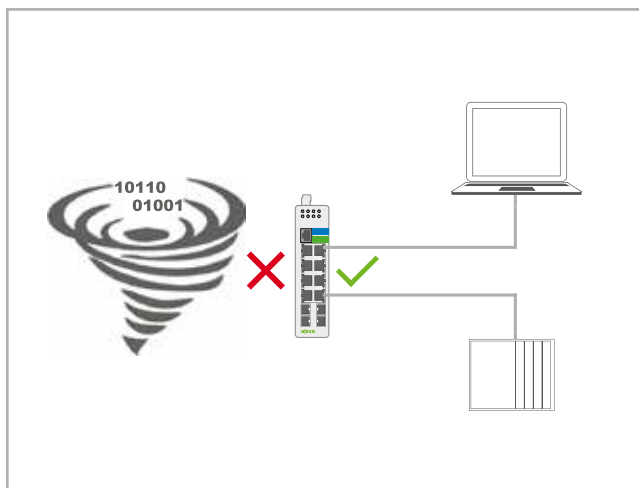
- LACP link aggregation
Merge multiple data connections into a single logical link:
 - Increase transmission rate
 - Link redundancy



QoS

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



Storm control

Mastering the Data Traffic

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

Insertion during operation


Mechanical locking mechanism

Adaptable to the fiber type



SFP MODULES

Interfaces for Fiber Optic Cables

	SFP Modules, 100BASE		SFP Modules, 1000BASE		
					
	100BASE-FX	100BASE-FX	1000BASE-SX	1000BASE-LX	1000BASE-ZX
Laser type	Multimode	Single-mode	Multimode	Single-mode	Single-mode
Wavelength	1310 nm	1310 nm	850 nm	1310 nm	1550 nm
Connector	LC duplex	LC duplex	LC duplex	LC duplex	LC duplex
Max. line length	2 km	30 km	550 m, 300 m	10 km	80 km
Operating temperature	-40 ... +70 °C	0 ... +60 °C	-40 ... +85 °C	-40 ... +85 °C	-40 ... +85 °C
DDM ¹	-	-	■	■	■
Item number	852-201/107-002	852-201/107-030	852-1200	852-1210	852-1280
Compatible with	852-103 852-104 852-303 ²	852-103 852-104 852-303 ²	852-303 852-1305 852-1505 852-1417	852-303 852-1305 852-1505 852-1417	852-303 852-1305 852-1505 852-1417

¹ Digital Diagnostic Monitoring: More information on page 9

² must be configured via DIP switch



EPSITRON® CLASSIC Power

- Integrated TopBoost (787-16xx with ≥ 120 W)
- DC OK signal/contact
- Up to 93 % efficiency
- Ambient operating temperature:
-25 ... +70 °C



EPSITRON® ECO Power

- Budget-friendly for basic applications
- Flexible mounting via DIN-rail adapter
- Flexible installation via screw-mount clips

EPSITRON® COMPACT Power

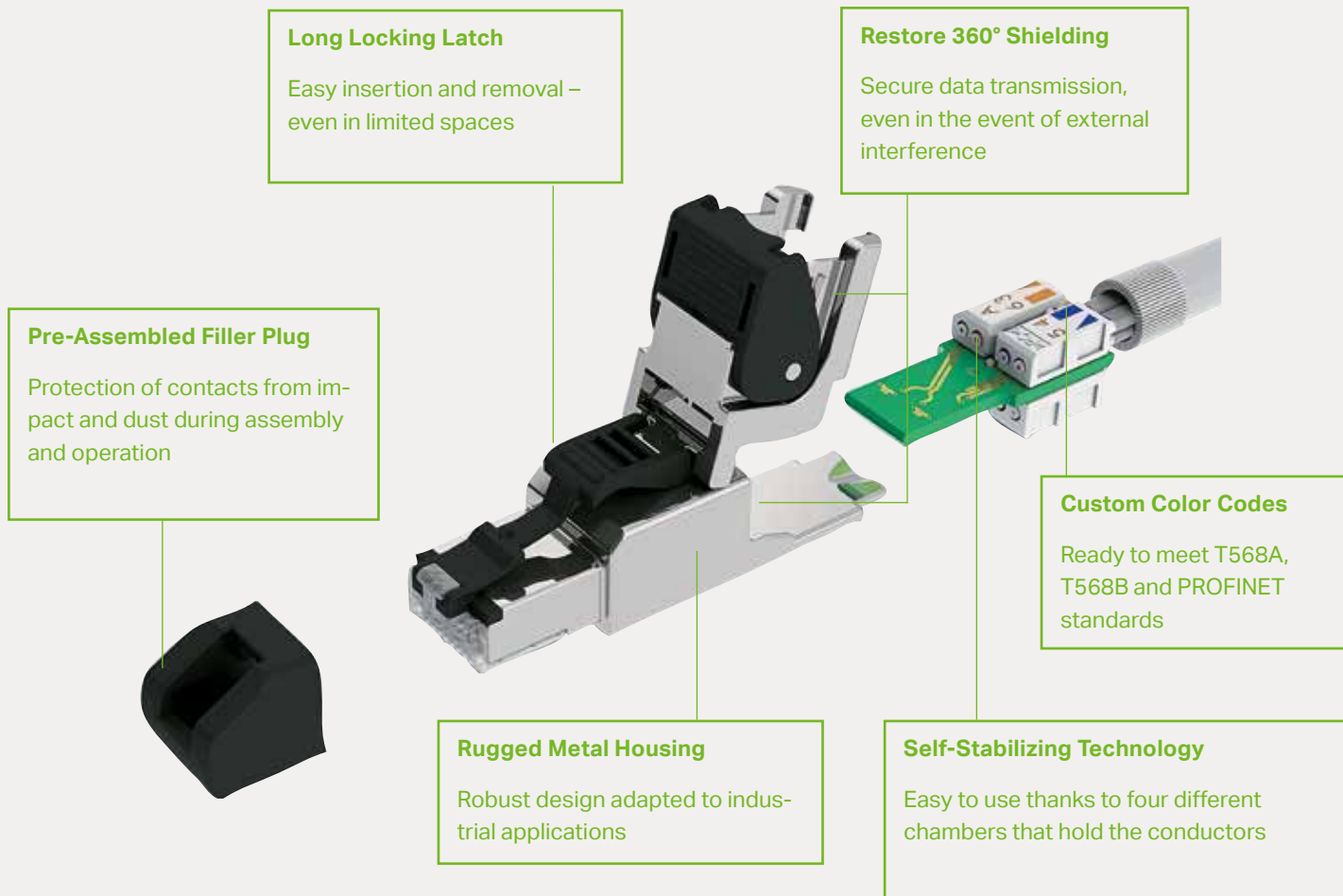
- Compact, low-profile design
- Ideal for decentralized applications
- Ambient operating temperature:
-25 ... +60 °C



POWER SUPPLIES

EPSITRON®	CLASSIC Power							ECO Power			COMPACT Power Family			
														
Nominal voltage output [DC]	24 V	24 V	24 V	24 V	48 V	48 V	48 V	24 V	24 V	24 V	24 V	24 V	24 V	24 V
Nominal output current [DC]	1 A	2 A	5 A	10 A	2 A	5 A	10 A	1.25 A	2.5 A	5 A	1.3 A	2.5 A	4 A	6 A
Industrial ECO Switches 852-111, 852-112, 852-1111, 852-1112								x	x	x	x	x	x	x
Industrial ECO Switches (PoE) 852-1411, 852-1417						x	x			x				x
Industrial Switches 852-101, 852-102, 852-103/040-000, 852-1102, 852-1106	x	x	x	x				x	x	x	x	x	x	
Industrial Managed Switches 852-303, 852-1305	x	x	x	x	x	x	x							
Industrial Managed Switches (PoE) 852-1505						x	x							
Item number	787-1602	787-1606	787-1622	787-1632	787-1623	787-1633	787-1635	787-1702	787-1712	787-1722	787-1102	787-1112	787-1122	787-1226

More devices at www.wago.com/epsitron



RJ45 CONNECTORS

Fast and Tool-Free Installation

RJ45 Connectors



Category	Cat. 6a	Cat. 6a	Cat. 6a
Max. rate	10 Gbit/s	10 Gbit/s	10 Gbit/s
Housing material	Metal	Metal	Metal
Ambient operating temperature	-40 ... +85 °C	-40 ... +85 °C	-40 ... +85 °C
Cable clamp	-	Straight output	Angled output
Conductor cross-section¹	0.21 ... 0.32 mm ²	0.21 ... 0.32 mm ²	0.21 ... 0.32 mm ²
ETHERNET T568B²	750-977/000-012	750-978/000-012	750-979/000-012
PROFINET³	750-977/000-013	750-978/000-013	750-979/000-013

¹ also available for conductors ranging from 0.13 to 0.21 mm², Item No. 750-97x/000-02x

² also available for ETHERNET T568A, Item No. 750-97x/000-011

³ Max. rate for PROFINET: 100 Mbit/s



Features

- Category 6
- Compatible with PoE and PoE+

Easy and Tool-Free Operation

- Self-stabilizing technology
- Double identification: T568A and T568B



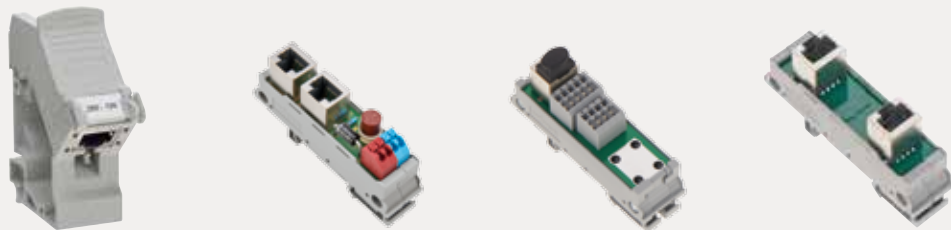
Restore Shielding

Secure data transmission

INTERFACE MODULES

ETHERNET Cabling on DIN-Rail

RJ45 Interface Modules



Category	Cat. 6	Cat. 5	Cat. 5	Cat. 5
Max. rate	10 Gbit/s	100 Mbit/s	100 Mbit/s	100 Mbit/s
Function	Cable on RJ45	Passive PoE injector	Cable on RJ45	RJ45 to RJ45
Dimensions (W x H x D)	26.8 x 64.4 x 81.4 mm	20.5 x 51 x 85 mm	24 x 40 x 85 mm	20.5 x 51 x 85 mm
Connection	IDC	CAGE CLAMP®	CAGE CLAMP®	-
Ambient operating temperature	-10 ... +60 °C	-40 ... +85 °C	-40 ... +85 °C	-40 ... +85 °C
Conductor cross-section	0.2 ... 0.32 mm ²	-	0.08 ... 1.5 mm ²	-
Item number	289-195	289-196	289-175	289-172

More devices at www.wago.com/interface-modules



Version with External Antenna

Use in a control cabinet or with a poor radio connection



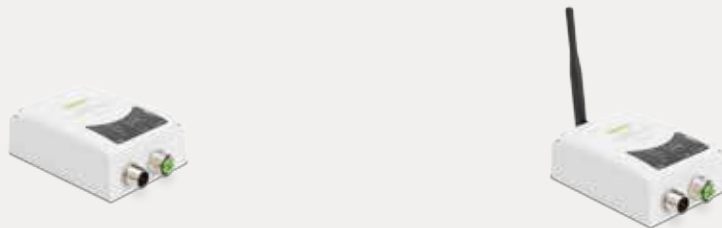
WLAN 802.11 a/b/g/d/e/i/h and Bluetooth® 4.0
Robust communication with high data throughput

High IP65 Protection Class
For direct on-machine use

Access Point Functionality
Build a network of up to 7 clients

WIRELESS ETHERNET GATEWAY

Wireless ETHERNET Gateway



Antenna	Internal directional antenna	External antenna
Security encryption	WEP64, WEP128, TKIP, AES/CCMP	
Transmission range	400 m	
Frequency band	ISM band, 2.4 GHz (<i>Bluetooth®</i> , WLAN); ISM band, 5 GHz (WLAN)	
Security authentication	WPA/WPA2 PSK, LEAP, PEAP	
Power supply	24 VDC (9 ... 30 V)	
Ambient operating temperature	-30 ... +65 °C	
Protection type	IP65	
Item number	758-918	758-918/000-0001

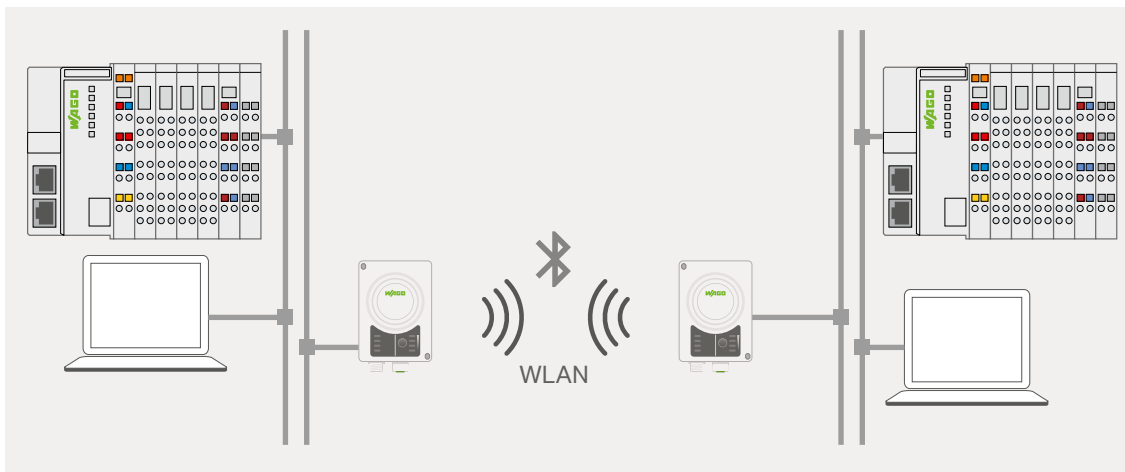
Bluetooth® and WLAN for Industrial Applications

Wireless data transmission is now commonplace in machinery and equipment applications. WAGO's Wireless ETHERNET Gateway, which meets the IP65 degree of protection and has an internal directional antenna, is ideal for harsh industrial environments. In addition to the standard

current WLAN standards, it also allows communication via *Bluetooth*® 4.0. The integrated access point functionality makes it possible to set up a WLAN or *Bluetooth*® network. The gateway can be easily configured with a button on the device or via Web server.

Configuration Examples

Easy Configuration: ETHERNET Bridge via WLAN or Bluetooth®



Connecting the ETHERNET Network to an Existing WLAN



WAGO Kontakttechnik GmbH & Co. KG

Postfach 2880 · 32385 Minden
Hansastraße 27 · 32423 Minden
info@wago.com
www.wago.com

Headquarters	+49 571/ 887 - 0
Sales	+49 571/ 887 - 44 222
Orders	+49 571/ 887 - 44 333
Fax	+49 571/ 887 - 844 169

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