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Industrial Wireless Communication

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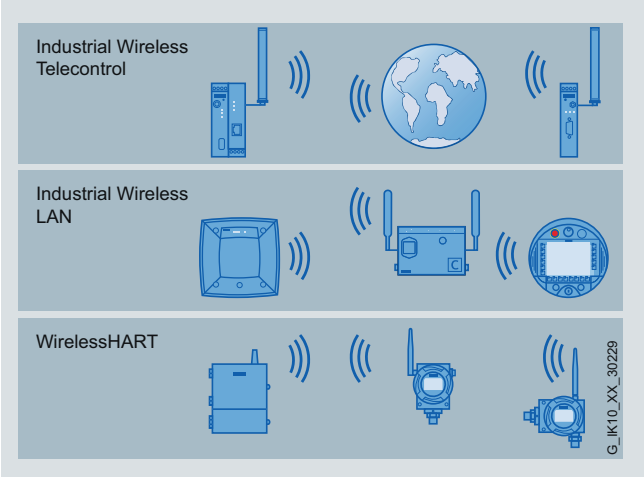
Introduction

Overview

Wireless communications offer multiple new opportunities to the industry for the development of highly flexible and efficient automation solutions. Whether Industrial Wireless Telecontrol, IWLAN, or WirelessHART, the Siemens product line for Industrial Wireless Communications is reliable, robust and secure. The components are used under the toughest indoors and outdoors conditions. Their multiple applications in crane systems, automatic guided vehicle systems, or in remote operation / remote maintenance systems are a testimonial to their exceptional reliability.



Wireless data transmission via Industrial Wireless TeleControl, Industrial Wireless LAN, and WirelessHART

Further information can be found under the product entries for GSM, GPRS and UMTS modems and routers in the section on Industrial Remote Communication.

Further information on WirelessHART can be found under the product entries for WirelessHART as well as in Catalog FI 01 and at www.siemens.com/wirelesshart

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Overview

SCALANCE W – wireless communication with Industrial Wireless LAN

The SCALANCE W products offer the combination of reliability, ruggedness and security in one product:

- For implementation at industrial and automation customer sites
- For outdoor environments with demanding climatic requirements
- For low-cost integration in the control cabinet or in devices

The Industrial Wireless LAN (IWLAN) technology provides an extension to the IEEE 802.11 standard that is particularly suited to demanding industrial applications with real-time and redundancy requirements. This provides customers with a unique wireless network, both for process-critical data and for uncritical communication. SCALANCE W products distinguish themselves by the reliability of their radio channel and the rugged type of construction with high requirements with respect to mechanical durability for which SIMATIC is known. To protect against unauthorized access, the products provide modern standard mechanisms for user identification (authentication) and encryption of data, and can at the same time be easily integrated into existing security concepts.

Radio infrastructure

Instead of copper cables and fiber-optic cables, wireless transmission techniques use radio waves. The propagation characteristics of the electromagnetic waves can differ considerably and depend on the spatial environment with the installed wireless infrastructure.

SCALANCE W modules use techniques such as antenna switchover (antenna diversity), high-quality receivers and fault-tolerant modulation procedures to enhance reception and to prevent interruption of radio communication. Extensions to the IEEE 802.11 standard also permit reliable, wireless transmission from PROFINET, form the basis for wireless safety applications and the transmission of video data with extremely short reply and update data.

Network solution with IWLAN

With mobile data terminals, for example, a continuous information flow from the management level down to the production level is possible.

The SINEMA E software is available for simplified planning and configuration of an IWLAN network with the help of simulation functions. It visualizes clearly and details wireless and device properties, thus reducing the configuring and startup overhead and helping to avoid configuring errors.

The IWLAN/PB Link PN IO is available for wireless-based connection of PROFIBUS devices.

This means that information can be provided quickly, reliably and easily at the right place and at the right time wirelessly.

Ruggedness and industrial suitability

The SCALANCE W products can be exposed to fluctuations in the extended temperature range, or continuous contact with dust and water. Rugged housing and design protection against shock and vibration enable use in harsh industrial environments.

The accessories such as antennas, power supplies and cabling are also part of this concept and suitable for use in industry.

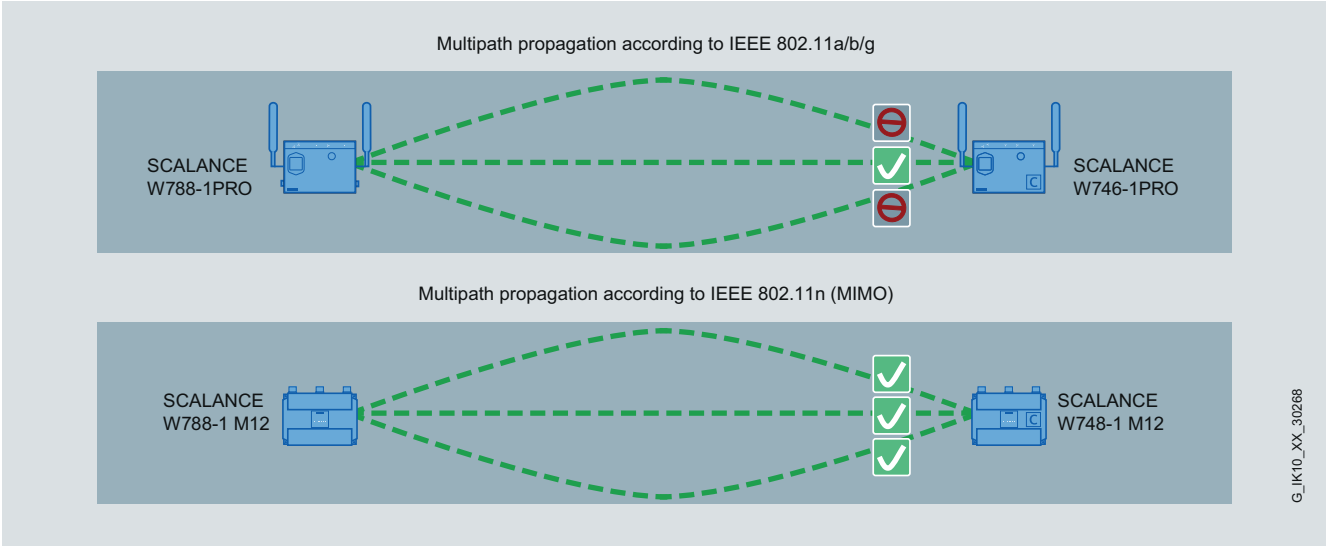
Power and data are transferred over one cable with Power-over-Ethernet, thus saving investment and maintenance costs.

The swap medium C-PLUG (Configuration Plug) saves configuring data, making device replacement possible in a short time and without specially trained personnel. This minimizes standstill times and saves training costs.

Reliability of data communication

The international standard IEEE 802.11n makes wireless communication via IWLAN even more robust. Maximum benefit derives from using multiple path propagation (**M**ultiple **I**nput, **M**ultiple **O**utput (MIMO)). This allows the devices to use several antennas in parallel. A higher data transfer rate is thus achieved and fault susceptibility in environments with a high number of reflections is reduced.

SCALANCE W products with IWLAN in accordance with IEEE 802.11n support up to three "streams" in the send and receive directions.



Multiple path propagation (MIMO) with SCALANCE W788-1PRO and SCALANCE W788-1 M12

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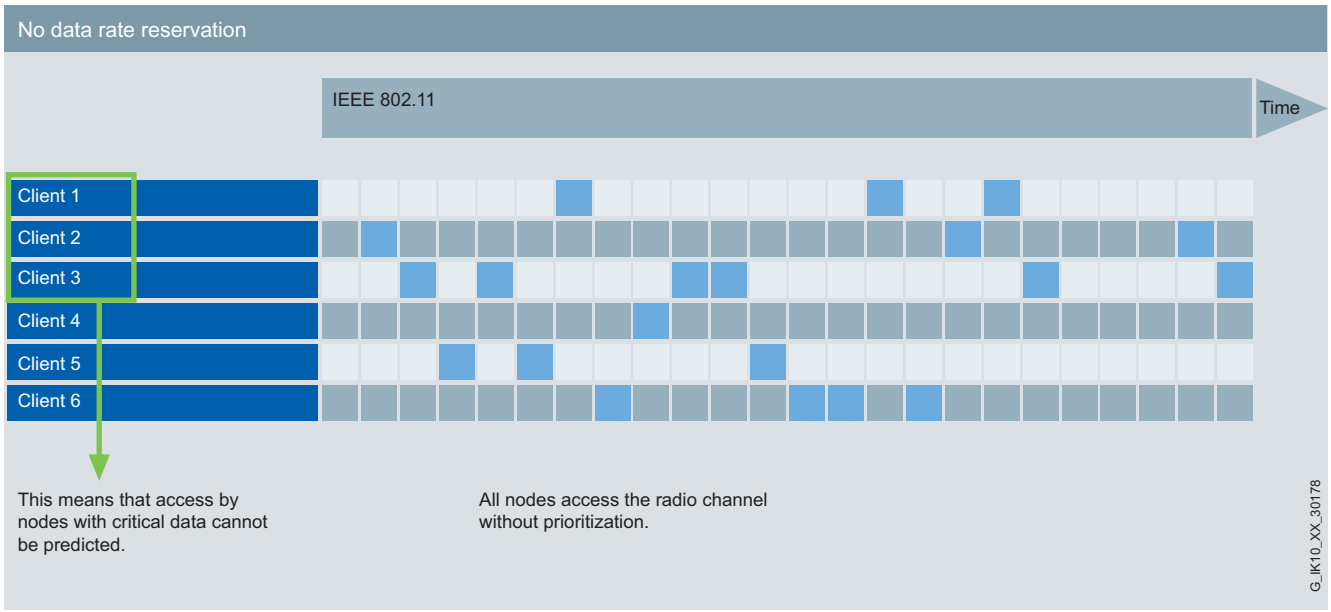
Introduction

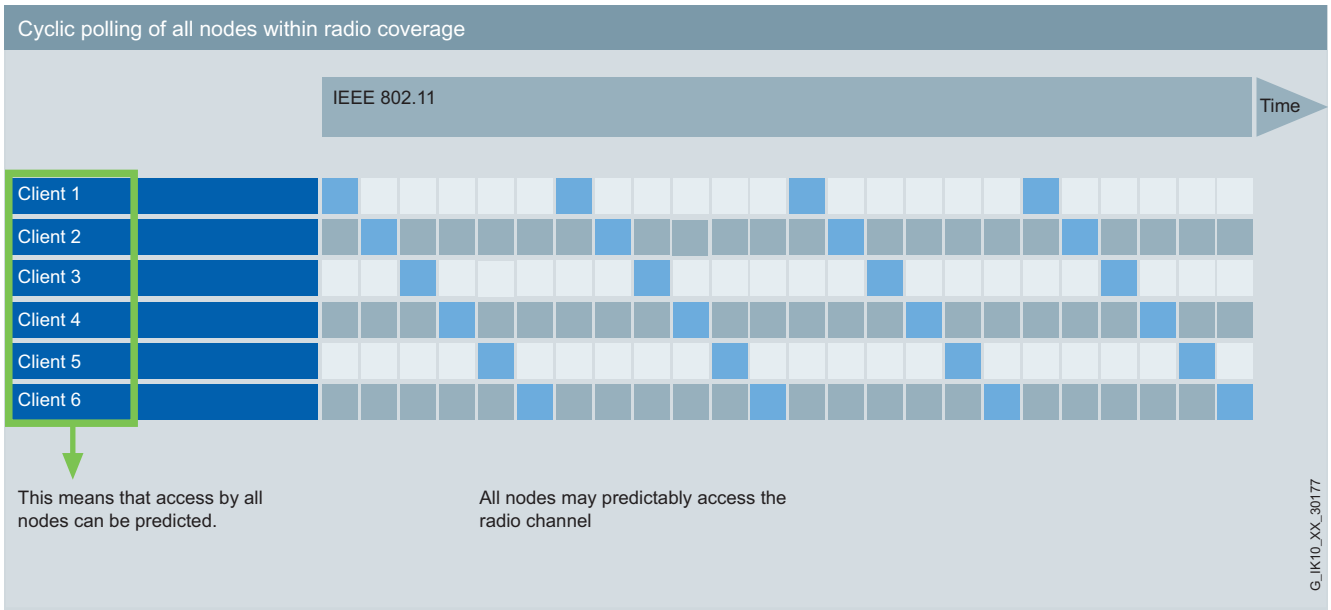
Overview (continued)

Redundant network concepts can also be implemented wirelessly. Wireless channels are designed redundantly for this purpose, with a changeover time of a few milliseconds, so that the application is not influenced by packet repetitions or interference in the radio channel.



In standard WLAN, **all stations access** the radio channel in an uncoordinated manner. This means that access by stations with critical data cannot be predicted.

The iPCF function (support from device types with i features) permits cyclic data traffic in real time for several wirelessly linked PROFINET IO devices. In addition, this enables mobile stations to be transferred quickly from one radio field to another (roaming) so that PROFINET IO communication is not interrupted.



However, WLAN also provides a transmission mechanism based on standard WLAN in accordance with IEEE 802.11, which makes a defined data rate available to all stations. This means that access **by all stations** can be predicted.

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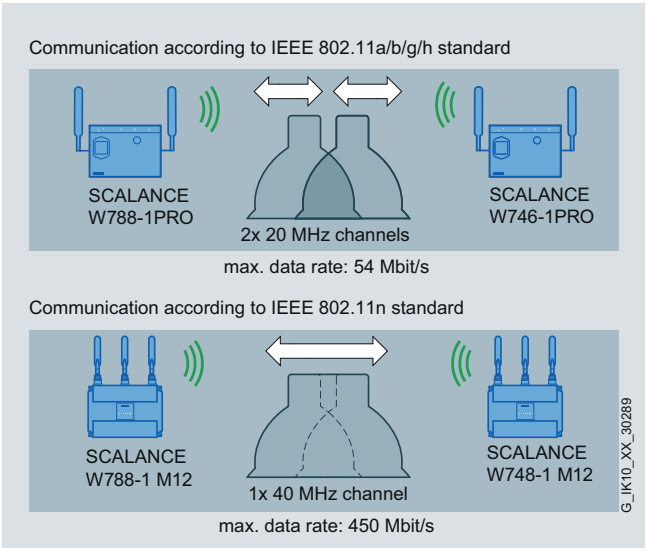
Overview (continued)

Increased transmission rate

WLAN systems in accordance with IEEE 802.11a/b/g/h use a single channel for sending and receiving data. This achieves a maximum gross transmission rate of 54 Mbit/s.

Two channels are used simultaneously with the help of channel bonding. Gross transmission rates of up to 450 Mbit/s can be achieved in conjunction with the MIMO technology in accordance with IEEE 802.11n.



Increased transmission rate on IWLAN in accordance with IEEE 802.11n with the help of channel bonding

Benefits

get Designed for Industry

- High level of investment protection, as all products comply with the universally recognized IEEE 802.11 standard and are suitable for 2.4 GHz and 5 GHz
- Wear-free – saves maintenance and repair costs for connectors, trailing cables, sliding contacts or winding devices
- Reliable wireless connection, e.g. due to redundant connection, automatic roaming if there is a break in the cable connection from the access point (forced roaming), cyclic monitoring of the wireless link (link check), or monitoring for IP connections (IP Alive)
- Predictable data traffic (deterministic) and defined response times on the radio link
- Wireless transmission of standard and failsafe signals by means of PROFINET and PROFIsafe
- More economical installation in hazardous areas of Zone 2
- Rapid commissioning thanks to reduced overhead for installing the communication network when using the SINEMA E engineering tool. This provides support for planning, simulating and measuring an IWLAN radio link on-site (site survey)
- Integrated wireless network for data, voice and video beyond corporate divisions thanks to interfacing with the SCALANCE WL**C** IWLAN **c**ontroller (support from SCALANCE W78x**C** device types)

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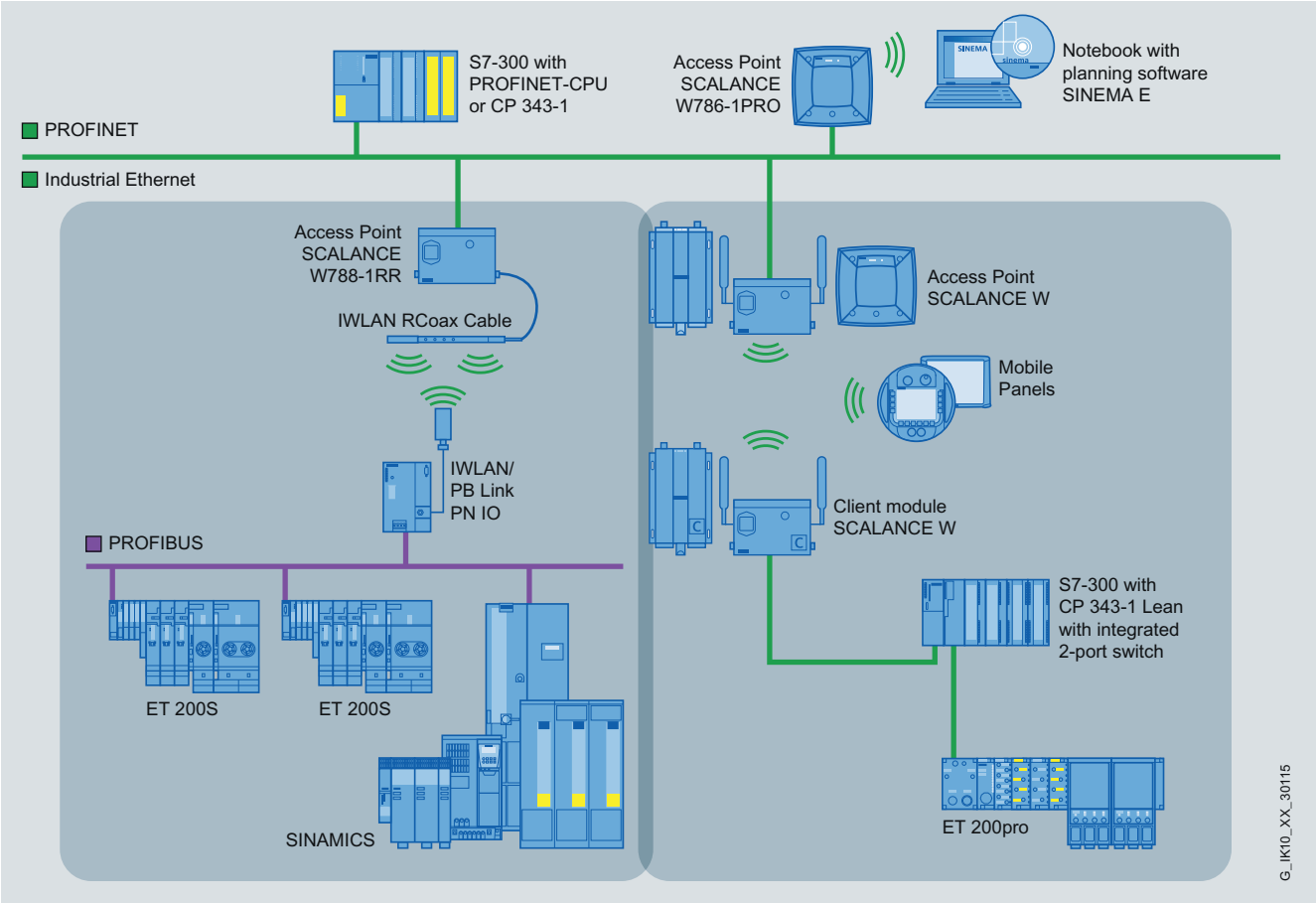
Application examples

Overview



Wireless integration of PROFIBUS segments and PROFINET stations into an existing Industrial Ethernet network

An existing Ethernet network can be expanded by a wireless network without increased overhead.

With this, even an existing PROFIBUS line can be connected via the IWLAN/PB Link PN IO to an access point.

The radio connection is established to the mobile stations by connecting a SCALANCE W access point to the Ethernet network. The mobile stations are connected wirelessly, e.g. via the SCALANCE W746-1PRO Client Module, to which the mobile station is connected with a cable.

Access to the existing controllers or processes is possible without an excessive additional wiring overhead.

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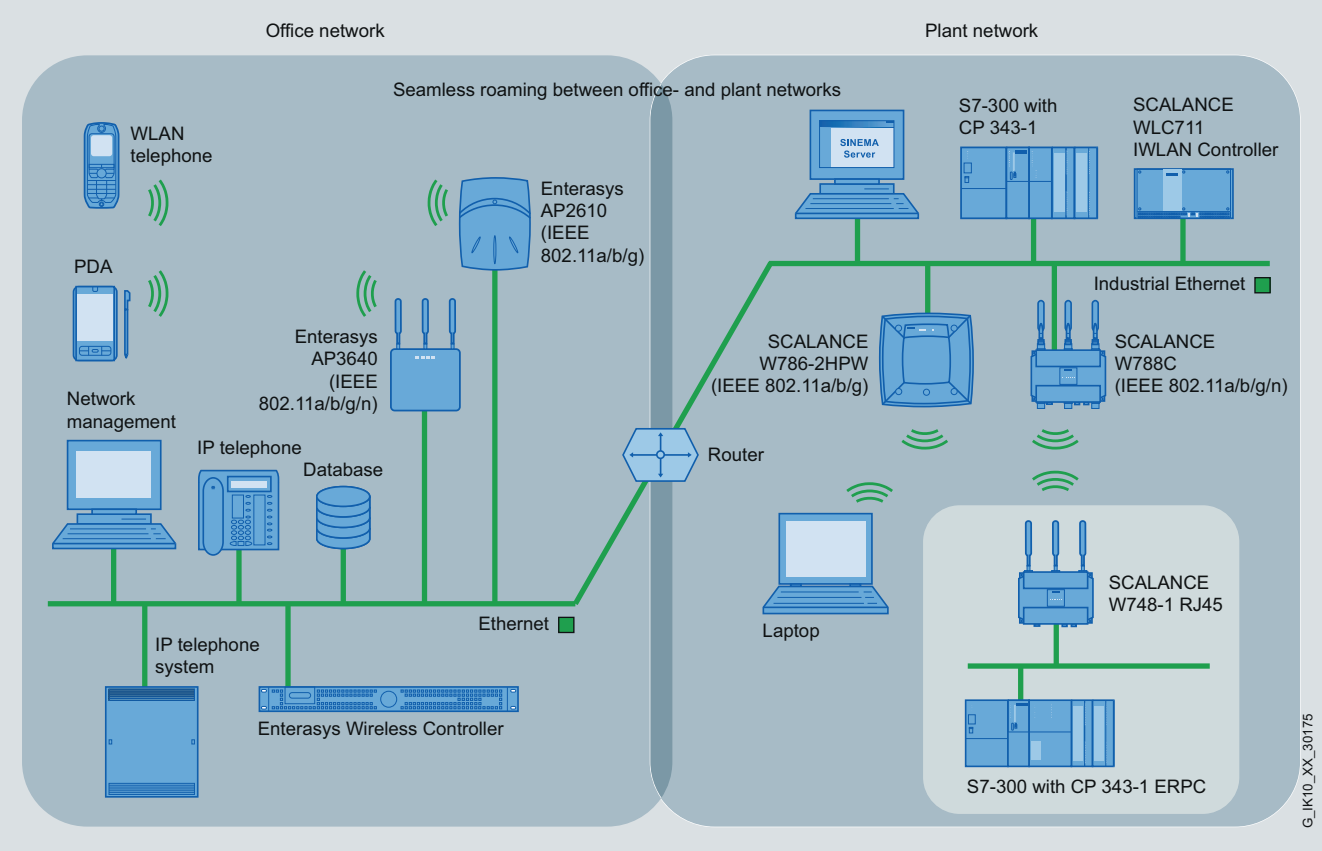
Overview (continued)



Uninterruptible roaming between the office and automation network by using wireless LAN controllers and industrial wireless LAN controllers

By using the SCALANCE WLC Industrial Wireless LAN Controller together with controller-based access points, it is possible to establish a single wireless infrastructure for the entire company. This achieves a high level of flexibility, as mobile stations (e.g. laptop, PDA, WLAN telephone) can move anywhere, switching seamlessly between the office and automation networks (roaming). This allows wireless access to data from any location within the company. Thanks to the use of a centralized security mechanism for each user group (Virtual Network Services VNS), the data here is protected against unauthorized access and manipulation.

The SCALANCE W78xC controller-based access points support the WLAN standards IEEE 802.11a/b/g and 802.11n, and they are connected via Gigabit Ethernet to the SCALANCE WLC IWLAN Controller.

The SCALANCE W786-2HPW controller-based access points support the WLAN standards IEEE 802.11a/b/g, and they are connected via Fast Ethernet to the SCALANCE WLC IWLAN Controller.

Operation always requires the SCALANCE WLC IWLAN Controller, which permits the configuration of access points in groups. This significantly increases the manageability of an extensive IWLAN infrastructure. Central management with the IWLAN controller also permits fault recording, monitoring and documentation of statistics.

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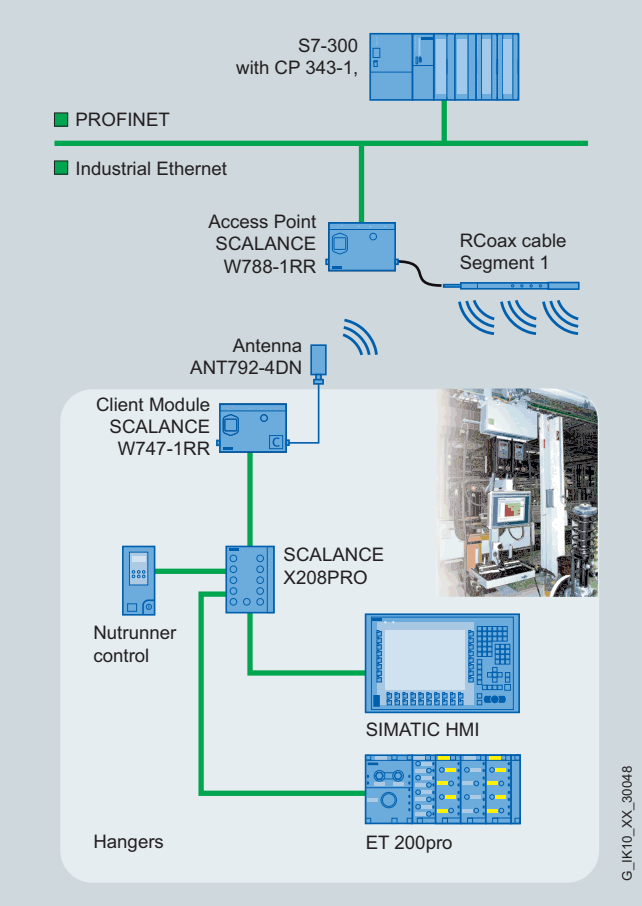
Application examples

Overview (continued)



System solution for nutrunner controls with RCoax cable and SCALANCE W747-1RR

Wireless solutions with RCoax cable are typically used in the following applications:

- Crane control
- Overhead monorail conveyors
- Storage and retrieval systems
- Automated guided vehicle systems (AGVS)

An example of an application with a suspended monorail is a nutrunner controller in a car assembly plant.

An RCoax radiating cable is used along the coding rail to establish wireless data transfer between the monorail and the central controller. It generates a defined, spherical and reliable wireless field and is easy to lay.

The RCoax Cable is connected as an antenna to a stationary SCALANCE W788-1RR access point. This means the same mobile unit can be used for all applications and so a mobile nutrunner can be used for several cycles resulting in lower investment costs.

Maintenance costs and downtimes are reduced by reliable wireless and therefore wear-resistant data transmission to mobile communication partners

Downtimes are reduced because in the event of a fault, devices can be replaced without a programming device or specialist personnel by using the swap medium C-PLUG.

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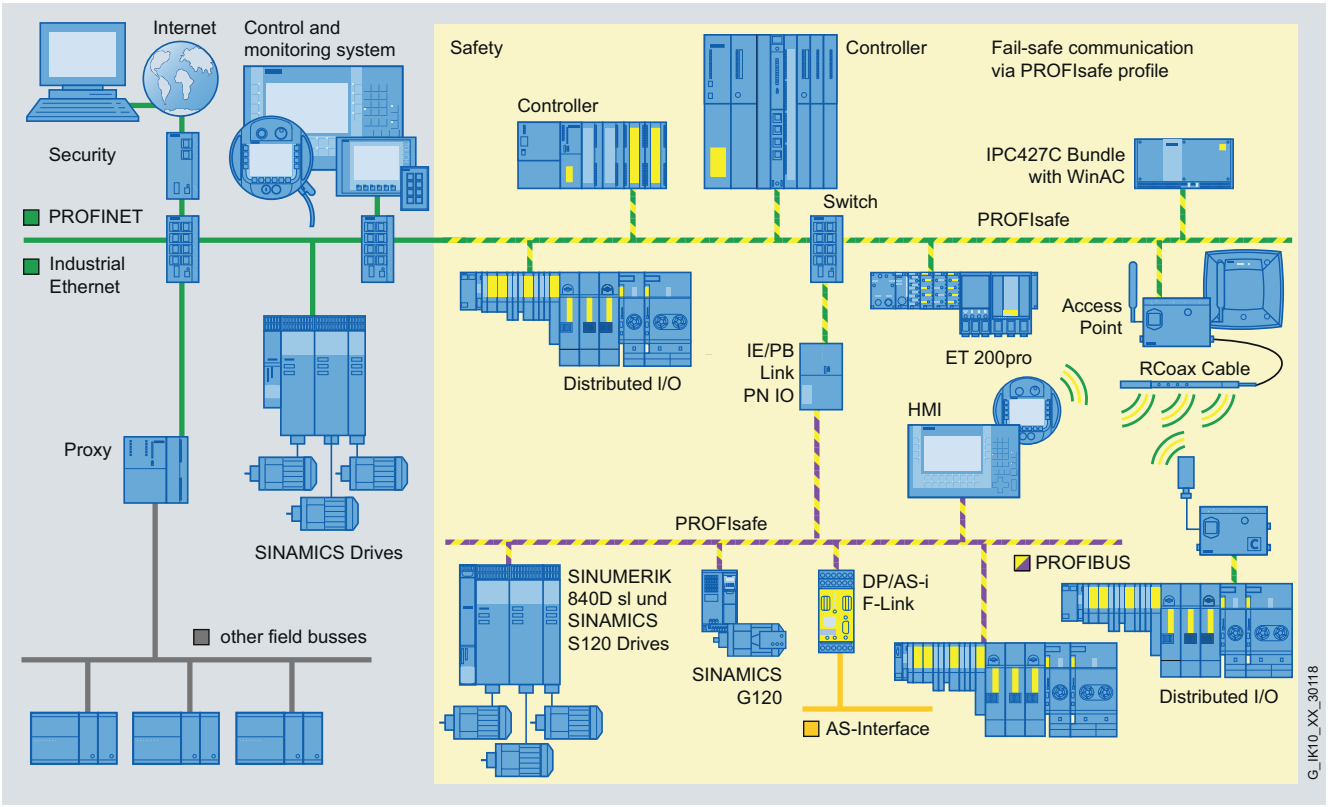
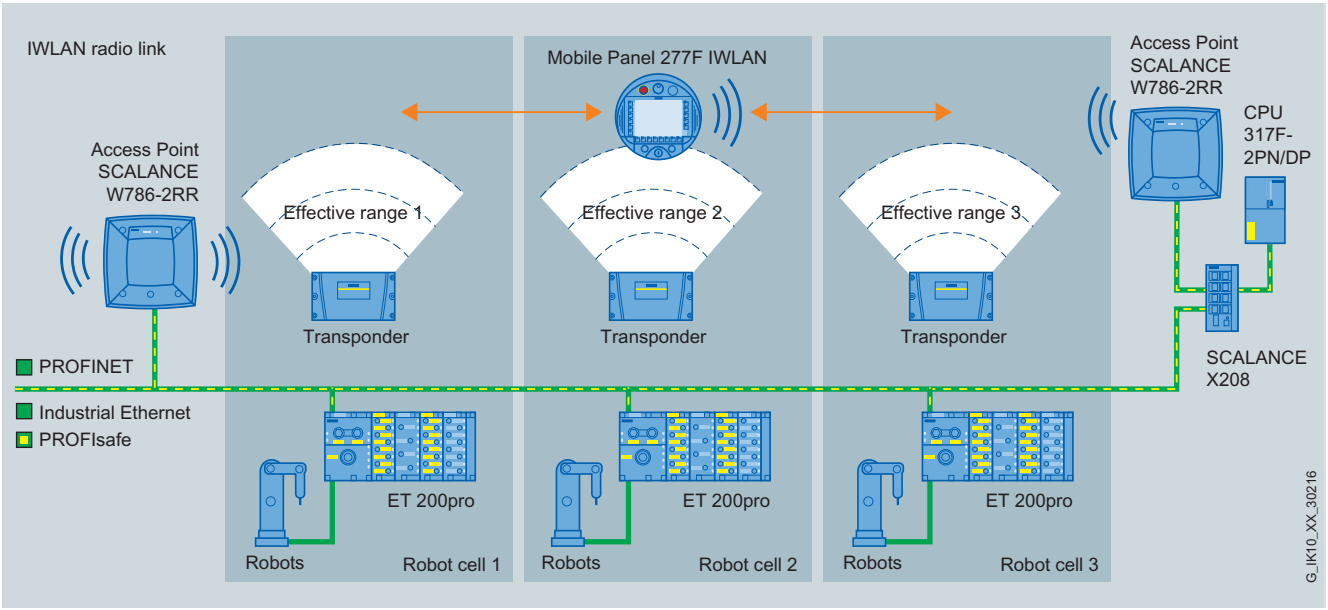
Overview (continued)



Fail-safe communication with PROFIsafe – via PROFIBUS, PROFINET and even wirelessly via Industrial Wireless LAN



Programming of robots in the safety-related environment

For a number of years, standard automation has incorporated safety engineering - on the basis of SIMATIC S7 controllers, PROFIBUS and PROFIsafe.

This range has been expanded by PROFINET-enabled components, thus providing a complete product range with fail-safe controllers, fails I/O and a corresponding engineering environment.

PROFIsafe prevents errors such as address corruption, loss, delay, etc. when transmitting messages through continuous numbering of the PROFIsafe data, time monitoring, and authenticity monitoring using passwords and optimized CRC backup.

Fail-safe communication is thus also supported via industrial wireless LAN.

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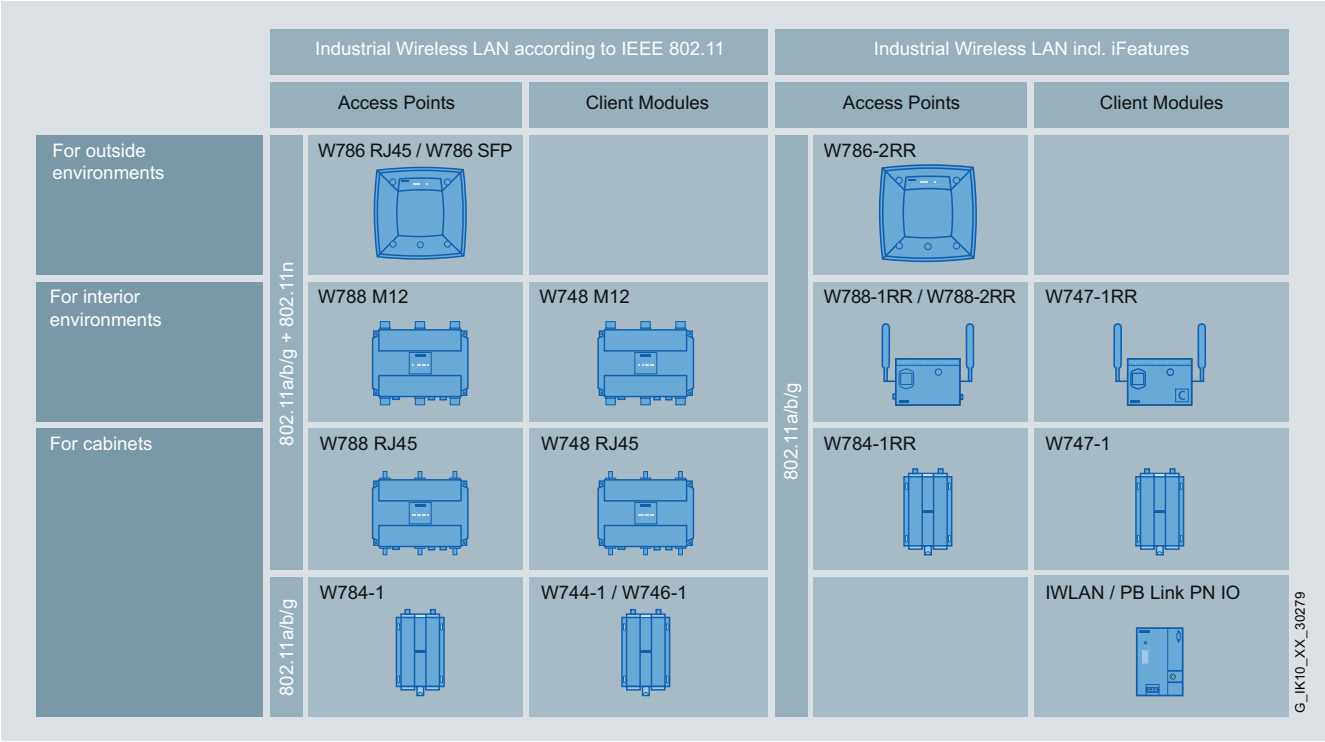
Overview of network components

Overview



SCALANCE W access points and client modules

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Overview (continued)

		Operation with SCALANCE WLC IWLAN controller	Operation with Enteasy WLAN controller	IEEE 802.11a/ b/ g/ h	IEEE 802.11n MIMO (Input x Output Streams)	Number of radio interfaces	Internal antennas	Connections for external antennas (R-SMA)	Connections for external antennas (N-Connect)	Cable-dependent interface	PoE (Power-over-Ethernet) IEEE 802.3at Type 1 (previously 802.3af)	Redundant power supply	Minimum operating temperature (°C)	Maximum operating temperature (°C)	IP protection class	Resistant to condensation	Resistant against salt spray	UV-resistant	For use in Ex zone 2[1]	Slot for removable storage (PLUG)	SSH/ HTTPS/ AAdmin password	WEP/ WPA/ WPA2 IEEE 802.11i; Hidden SSID	IEEE 802.1x (RADIUS) EAP-TLS, EAP-TTLS, PEAP	IEEE 802.11e (QoS/WMM)	STP/ RSTP (IEEE 802.1d/w)	WDS (Wireless Distribution System)	IWLAN client operation possible	VLANs (Multi-SSID)	PROFINET IO Diagnostics	SNMP	Syslog
	SCALANCE W788-1 M12			•	3x3	1			3	M12	•	•	-20	+60	65					•	•	•	•	•	•	•	8	•	•	•
	SCALANCE W788-2 M12			•	3x3	2			6	M12	•	•	-20	+60	65					•	•	•	•	•	•	•	16	•	•	•
	SCALANCE W788-1 RJ45			•	3x3	1		3		RJ45	•	•	-20	+60	30					•	•	•	•	•	•	•	8	•	•	•
	SCALANCE W788-2 RJ45			•	3x3	2		6		RJ45	•	•	-20	+60	30					•	•	•	•	•	•	•	16	•	•	•
	SCALANCE W786-1 RJ45			•	3x3	1		3		RJ45	•	•	-40	+60	65	•	•	•		•	•	•	•	•	•	•	8	•	•	•
	SCALANCE W786-2 RJ45			•	3x3	2		6		RJ45	•	•	-40	+60	65	•	•	•		•	•	•	•	•	•	•	16	•	•	•
	SCALANCE W786-2IA RJ45			•	3x3	2	6			RJ45	•	•	-40	+60	65	•	•	•		•	•	•	•	•	•	•	16	•	•	•
	SCALANCE W786-2 SFP			•	3x3	2		6		SFP			-40	+60	65	•	•	•		•	•	•	•	•	•	•	16	•	•	•
	SCALANCE W788C-2 RJ45	•	•	•	3x3	2		6		RJ45	•	•	-20	+60	30						•	•	•	•		•		•			
	SCALANCE W788C-2 M12	•	•	•	3x3	2		6		M12	•	•	-20	+60	65						•	•	•	•		•		•			
	SCALANCE W786C-2 RJ45	•	•	•	3x3	2		6		RJ45	•	•	-40	+60	65	•	•	•			•	•	•	•		•		•			
	SCALANCE W786C-2IA RJ45	•	•	•	3x3	2	6			RJ45	•	•	-40	+60	65	•	•	•			•	•	•	•		•		•			

• suitable

1) please follow installation instructions

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Function overview of the SCALANCE W access points in accordance with IEEE 802.11n standard

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Overview of network components

Overview (continued)

		Operation with SCALANCE WLC IWLAN controller	Operation with Enteresy WLAN controller	IEEE 802.11a/ b/ g/ h	IEEE 802.11n MIMO	Number of radio interfaces	Internal antennas	Connections for external antennas (R-SMA)	Connections for external antennas (N-Connect)	Antenna diversity	Cable-dependent interface	PoE (Power-over-Ethernet) IEEE 802.3at Type 1 (previously 802.3af)	Redundant power supply	Minimum operating temperature (°C)	Maximum operating temperature (°C)	IP protection class	Resistant to condensation	Resistant against salt spray	UV-resistant	For use in Ex zone 2 [1]	Slot for removable storage (PLUG)	iPCF-capable wireless interface	Supports forced roaming	SSH/ HTTPS/ AAdmin password	WEP/ WPA/ WPA2 IEEE 802.11i, Hidden SSID	IEEE 802.1x (RADIUS) EAP-TLS, EAP-TTLS, PEAP	IEEE 802.11e (QoS/WMM)	STP/ RSTP (IEEE 802.1d/w)	WDS (Wireless Distribution System)	Wireless redundancy between access points	IWLAN client operation possible	VLANs (Multi-SSID)	PROFINET IO Diagnostics	SNMP	Syslog
	SCALANCE W788-1PRO			•		1		2		•	RJ45	•	•	-20	+60	65	•			•	•		•	•	•	•	•	•	•		•	8	•	•	•
	SCALANCE W788-2PRO			•		2		4		•	RJ45	•	•	-20	+60	65	•			•	•		•	•	•	•	•	•	•	•	•	16	•	•	•
	SCALANCE W788-1RR			•		1		2		•	RJ45	•	•	-20	+60	65	•			•	•	1	•	•	•	•	•	•	•		•	8	•	•	•
	SCALANCE W788-2RR			•		2		4		•	RJ45	•	•	-20	+60	65	•			•	•	1	•	•	•	•	•	•	•	•	•	16	•	•	•
	SCALANCE W786-1PRO internal antenna			•		1	2			•	RJ45/ BFOC	•	•	-40	+70	65	•	•	•	•	•		•	•	•	•	•	•	•		•	8	•	•	•
	SCALANCE W786-1PRO external antenna			•		1		4		•	RJ45/ BFOC	•	•	-40	+70	65	•	•	•	•	•		•	•	•	•	•	•	•		•	8	•	•	•
	SCALANCE W786-2PRO internal antenna			•		2	4			•	RJ45/ BFOC	•	•	-40	+70	65	•	•	•	•	•		•	•	•	•	•	•	•	•	•	16	•	•	•
	SCALANCE W786-2PRO external antenna			•		2		4		•	RJ45/ BFOC	•	•	-40	+70	65	•	•	•	•	•		•	•	•	•	•	•	•	•	•	16	•	•	•
	SCALANCE W786-2RR internal antenna			•		2	4			•	RJ45	•	•	-40	+70	65	•	•	•	•	•	1	•	•	•	•	•	•	•	•	•	16	•	•	•
	SCALANCE W786-2RR external antenna			•		2		4		•	RJ45	•	•	-40	+70	65	•	•	•	•	•	1	•	•	•	•	•	•	•	•	•	16	•	•	•
	SCALANCE W786-2HPW internal antenna	•	•	•		2	4			•	RJ45/ BFOC	•	•	-40	+70	65	•	•	•	•				•	•	•	•	•	•			16			
	SCALANCE W786-2HPW external antenna	•	•	•		2		4		•	RJ45/ BFOC	•	•	-40	+70	65	•	•	•	•				•	•	•	•	•	•			16			
	SCALANCE W786-3PRO			•		3		6		•	RJ45/ BFOC	•	•	-40	+70	65	•	•	•	•	•		•	•	•	•	•	•	•	•	•	24	•	•	•
	SCALANCE W784-1			•		1		2		•	RJ45	•	•	-20	+60	30				•	•		•	•	•	•	•	•	•		•	8	•	•	•
	SCALANCE W784-1RR			•		1		2		•	RJ45	•	•	-20	+60	30				•	•	1	•	•	•	•	•	•	•		•	8	•	•	•

• suitable

1) please follow installation instructions

G_IK10_XX_30183

Function overview of the SCALANCE W access points in accordance with IEEE 802.11a/b/g standard

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Overview (continued)

		IEEE 802.11a/ b/ g/ h	IEEE 802.11n MIMO (Input x Output Streams)	Number of radio interfaces	Connections for external antennas (R-SMA)	Connections for external antennas (N-Connect)	Cable-dependent interface	PoE (Power-over-Ethernet) IEEE 802.3at Type 1 (previously 802.3af)	Redundant power supply	Minimum operating temperature (°C)	Maximum operating temperature (°C)	IP protection class	Resistant to condensation	For use in Ex zone 2 1)	Slot for removable storage (PLUG)	SSH/ HTTPS/ AAdmin password	WEP/ WPA/ WPA2 IEEE 802.11i	Number of connectable devices	DHCP Server	NAT/ PAT	PROFINET IO Diagnostics	SNMP	Syslog
	SCALANCE W748-1 M12	•	3x3	1		3	M12	•	•	-20	+60	65			•	•	•	8	•		•	•	•
	SCALANCE W748-1 RJ45	•	3x3	1	3		RJ45	•	•	-20	+60	65			•	•	•	8	•		•	•	•

• suitable

1) please follow installation instructions

G_IK10_XX_30281

Function overview of the SCALANCE W client modules in accordance with IEEE 802.11n standard

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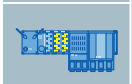
Overview of network components

Overview (continued)

		IEEE 802.11a/ b/ g/ h	IEEE 802.11n MIMO	Number of radio interfaces	Internal antennas	Connections for external antennas (R-SMA)	Connections for external antennas (N-Connect)	Antenna diversity	Cable-dependent interface	PoE (Power-over-Ethernet) IEEE 802.3at Type 1 (previously 802.3af)	Redundant power supply	Minimum operating temperature (°C)	Maximum operating temperature (°C)	IP protection class	Resistant to condensation	For use in Ex zone 2[1]	Slot for removable storage (PLUG)	iPCF-capable wireless interface	SSH / HTTPS / Admin password	WEP/ WPA/ WPA2 IEEE 802.11i	Number of connectable devices	DHCP-Server	NAT/ PAT	PROFINET IO Diagnostics	SNMP	Syslog
	SCALANCE W744-1PRO	•		1		2		•	RJ45	•	•	-20	+60	65	•	•	•		•	•	1				•	•
	SCALANCE W746-1PRO	•		1		2		•	RJ45	•	•	-20	+60	65	•	•	•		•	•	8	•	•	•	•	•
	SCALANCE W747-1RR	•		1		2		•	RJ45	•	•	-20	+60	65	•		•	1	•	•	8	•	•	•	•	•
	SCALANCE W744-1	•		1		2		•	RJ45	•	•	-20	+60	30		•	•		•	•	1				•	•
	SCALANCE W746-1	•		1		2		•	RJ45	•	•	-20	+60	30		•	•		•	•	8	•	•	•	•	•
	SCALANCE W747-1	•		1		2		•	RJ45	•	•	-20	+60	30		•	•	1	•	•	8	•	•	•	•	•
	IWLAN/PB Link PN IO	•		1		1			RS485 (DP-Master)		•	0	+60	20		•	•	1	•[3]	•	8				•	•
	Mobile Panel 277 IWLAN	•		1	2			•	RJ45[2]		•	0	+40	65				1	•	•				•	•	
	ET 200pro IWLAN	•		1		2		•	RJ45[2]			0	+55	67	•			1	•	•				•	•	

G_IK10_XX_30184

• suitable

1) please follow installation instructions

2) only for configuration download

3) no HTTPS

Function overview of the SCALANCE W client modules in accordance with IEEE 802.11a/b/g standard

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Overview

The Access Points of the SCALANCE W780 product line are ideally suited for setting up Industrial Wireless LANs (IWLAN) for 2.4 GHz or 5 GHz. They can be used in all applications that require a high degree of operational reliability, even in extremely harsh ambient conditions.

- High transmission rates (up to 450 Mbit/s in conjunction with Channel Bonding) due to 3x3 MIMO technology (**M**ultiple **I**nput, **M**ultiple **O**utput);
  for this purpose, SCALANCE W Access Points use three streams each for simultaneous sending and receiving
- Suitable for any application:
  - SCALANCE W788 RJ45 for installation in a control cabinet
  - SCALANCE W788 M12 for cabinet-free installation indoors
  - SCALANCE W786 for outdoor environments with demanding climatic requirements
- Reliable thanks to rugged, impact-resistant housing, protected from water and dust (IP65), resistant to shock, vibration and electromagnetic fields
- Complex applications with redundancy requirements and high bandwidths, e.g. for video, by using IEEE 802.11n
- Configuration support by means of wizards and online help; easy management via web server and SNMP
- Fast replacement of devices in event of failure by means of optional C-PLUG (**C**onfiguration **P**lug)

Benefits

get Designed for Industry

- Reliable radio link, e.g. by using MIMO technology and monitoring of the radio link
- Cost savings due to one single radio network both for process-critical data and for non-critical communication
- Investment security because all products are compatible with the internationally recognized WLAN standard IEEE 802.11, suitable for the unlicensed frequency bands of 2.4 GHz and 5 GHz (ISM bands)
- Implementation of data-intensive applications such as video streaming through the support of the IEEE 802.11n standard including Channel Bonding
- Reduced operating costs, because there is no wear of rotating and moving plant sections
- Cost-effective connection to devices which are remote, difficult to access or mounted in hostile environments

Application

The Access Points of the SCALANCE W780 product line are designed for both industrial use and for demanding climatic requirements outdoors. Versions for low-cost integration in cabinets are also available. They offer a reliable radio connection, versatile redundancy mechanisms, and fast transfer of stations from one access point to the next (roaming). In this manner, processes can be monitored and production failures through machine downtimes avoided.

Due to the high degree of protection (IP65) and the extended temperature range from -40 °C to +60 °C, the Access Points are ideally suited for use in the outdoor area. SCALANCE W products are silicone-free and can therefore also be used in paint shops.

When using the RCoax cable (radiating cable), operation is particularly reliable in conveying technology and all track applications (e.g. storage and retrieval systems).

SCALANCE W786 versions are available with internal antennas for demanding environmental requirements.

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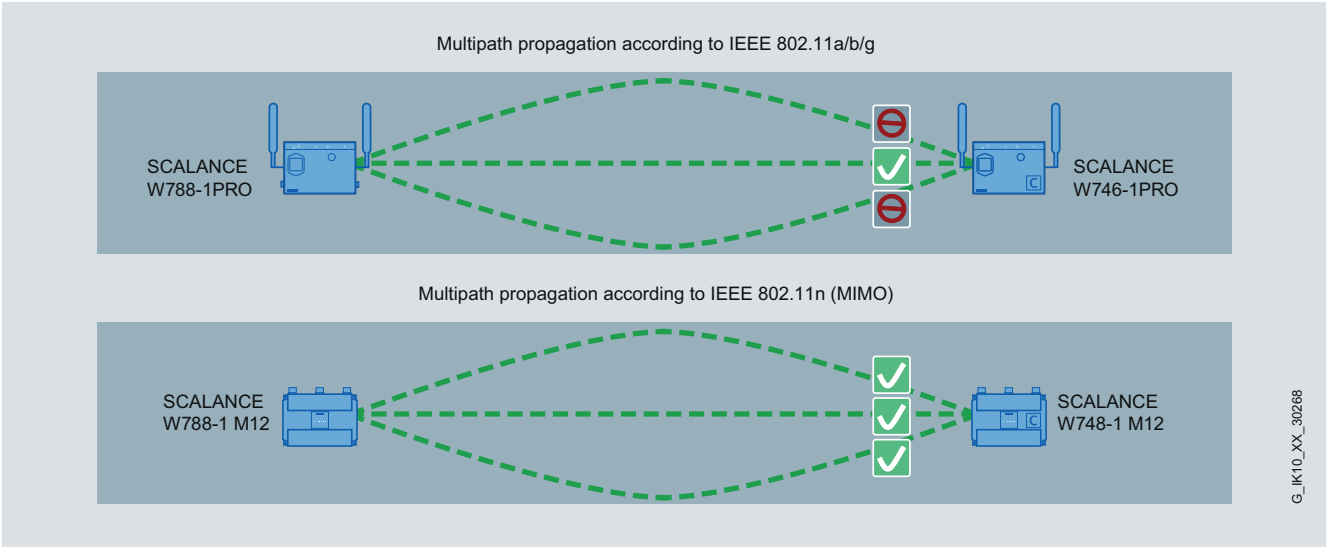
Overview

Application (continued)

Application examples:

- Automated guided vehicle systems (AGVS) and suspended monorails;
  prevention of wear and high flexibility in the choice of route thanks to wireless transmission of data to the vehicles
- Crane;
  high flexibility through access to data communication with the moving unit independent of the location
- Mobile control console;
  reliable intervention in the process thanks to data communication over IWLAN with mobile units (e.g. Mobile Panel 277(F) IWLAN); the number of operator panels is therefore determined by the number of personnel and no longer by the number of control desks.
- Wireless access to field devices for configuration and testing
- Passenger transportation systems;
  transmission of high-quality video streams between the control center and buses or trains.
- Tunnel application;
  reliable radio link since the devices can handle multiple path propagation better by using the MIMO technology.
- Communication with moving stations (e.g. mobile controls and devices), container logistics, storage and retrieval machines, conveyor systems, conveyor belts, rotating machines, trucks
- Wireless coupling of communication segments and bridging of large distances for fast commissioning and for cost-effective networks in which cable routing would be extremely expensive (e.g. on public roads, rivers, lakes, train lines)



Multiple path propagation (MIMO) with SCALANCE W788-1PRO and SCALANCE W788-1 M12

8

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Overview

Design

- Radio card (compatible with IEEE 802.11a/b/g/h/n) permanently installed in the device
- Designed without rotating parts (operation without fans)
- Antennas can either be connected by means of a screw connection (R-SMA, N-Connect) or they are integrated in the device
- Function LEDs for optical signaling of faults and operating states
- 1x PLUG slot

Function

A simple radio link can be established with a single Access Point (infrastructure mode). The Access Point provides an Industrial Ethernet interface for connection to the wireline network. Stations such as mobile controllers or a Field PG can move freely within the radio link and exchange data with other stations through this Access Point.

If the radio link of a single Access Point (radio cell) is insufficient, it can be expanded by further Access Points. The individual radio cells must overlap so that moving stations can be passed seamlessly from one Access Point to the next (roaming). This is performed invisibly to the application. The Access Points must be able to exchange data via Industrial Ethernet or a Wireless Distribution System (WDS).

If the Access Points are not connected to Industrial Ethernet using a wired connection (e.g. no cable tray available for data line), the operating mode "Wireless Distribution System" must be selected. An Access Point from the SCALANCE W780 product line can communicate via WDS with up to eight other Access Points which are not connected to the data network by a direct wired connection. Directional additional antennas can be used to achieve ranges of several thousand meters outdoors.

Apart from a reliable radio link, the SCALANCE W780 Access Points are characterized by their support of IT mechanisms:

- IEEE 802.11a/b/g/n for different frequency ranges
- IEEE 802.11h for use in the 5 GHz range outdoors
- IEEE 802.11e for Wireless Multimedia (WMM)
- IEEE 802.11i for security
- Construction of redundant networks with the Rapid Spanning Tree Protocol (RSTP)
- Virtual networks (VLAN) to logically separate, for example, different user groups
- Sending the log entries of the SCALANCE W devices to a Syslog server
- Modern security mechanisms (e.g. network security such as IEEE 802.1x, RADIUS, EAP mechanisms)
- In client mode:
  Network and Port Address Translation (NAT/PAT):
  Mapping of private IP addresses and ports to public addresses

Security

A high degree of data security is achieved by means of the WPA2/IEEE 802.11i mechanisms. These define modern procedures that control a regular exchange of the complete 128-bit code as well as performing the access check (authentication) of a station. The Advanced Encryption Standard (AES) is available for data encryption.

Access to the devices (HTTPS) is encrypted and secure logon (SSH) is possible. If a security concept with Virtual Private Networks (VPN) or the SCALANCE S range is required, the products can be integrated without any difficulty.

Diagnostics and management

- Web-based (HTTP/HTTPS) management tool for configuration and diagnostics using a standard browser
- LEDs for signaling operating states and fault conditions
- Signaling of faults by means of SNMP trap or e-mail to a network management tool, e.g. SINEMA-Server

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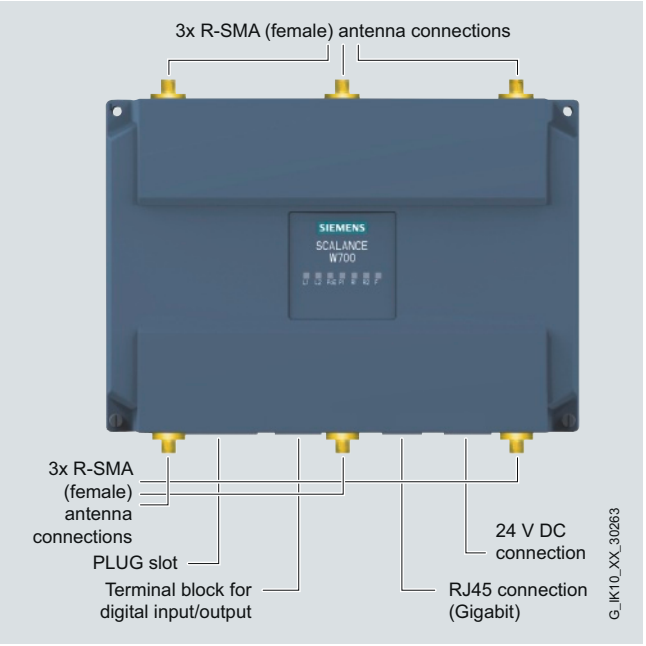
SCALANCE W788 RJ45 for use in control cabinet

Overview

- Especially suitable for applications where the access point is to be mounted in the control cabinet
- Low-cost alternative for use indoors with less severe environmental conditions
- The rugged aluminum enclosure with degree of protection IP30 nevertheless provides protection against mechanical and electromagnetic stress in industrial areas

Design

- Rugged aluminum enclosure, shock and vibration-proof, for high mechanical requirements
- Dust protection with IP30 degree of protection
- For use at ambient temperatures from -20 °C to +60 °C
- Resistant to condensation
- Design suitable for installation in control cabinet
- 3 x R-SMA sockets for the connection of remote antennas (6 x R-SMA sockets for the versions with two wireless modules)
- Antenna placement optimized for the 3x3 MIMO technology; the antennas do not interfere with each other when they are mounted direct on the device
- 1 x RJ45 connection for 10/100/1000 Mbit/s with Power-over-Ethernet according to IEEE 802.3at Type 1 (corresponds to IEEE 802.3af)
- 2 x 24 V DC connection for redundant power infeed
- 1 x PLUG slot
- Function LEDs for optical signaling of faults and operating states
- Digital input for feeding in a signal from a sensor, for example, to an SNMP-based network management system
- Digital output for converting a command received over SNMP into a signal and switching a hardware function
- Mounting: Wall, S7 mounting rail or on 35 mm standard mounting rail



Design and interfaces of the SCALANCE W788-2 RJ45 Access Points

Product versions

SCALANCE W788-1 RJ45

- A wireless card permanently installed in the device

SCALANCE W788-2 RJ45

- Two wireless cards permanently installed in the device

Function

SCALANCE W788 RJ45 access points can also be operated as client modules. As an alternative, the SCALANCE W748 RJ45 Client Modules can be used for this mode.

In combination with the SCALANCE W748 RJ45 Client Modules with degree of protection IP30, an infrastructure can be set up in which great temperature differences and protection against dust and water play a somewhat less prominent role.

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Technical specifications

Order No.	6GK5 788-1FC00-0AA0 6GK5 788-1FC00-0AB0 [1]	6GK5 788-2FC00-0AA0 6GK5 788-2FC00-0AB0 [1]
Product type designation	**SCALANCE W788-1 RJ45**	**SCALANCE W788-2 RJ45**
Transmission rate		
Transmission rate		
• with W-LAN, maximum	450 Mbit/s	450 Mbit/s
• with Industrial Ethernet	10 … 1 000 Mbit/s	10 … 1 000 Mbit/s
• Note	-	-
Interfaces		
Number of electrical connections		
• for network components or terminal equipment	1	1
• for power supply	1	1
• for redundant power supply	1	1
Design of electrical connection		
• for network components or terminal equipment	RJ45 socket	RJ45 socket
• for power supply	4-pin screw terminal, PoE	4-pin screw terminal, PoE
Number of optical connections for fiber-optic cables at 100 Mbit/s	-	-
Design of optical connection for fiber-optic cables at 100 Mbit/s	-	-
Design of swap medium C-Plug	Yes	Yes
Interfaces wireless		
Number of permanently installed wireless cards	1	2
Number of internal antennas	-	-
Number of electrical connections for external antenna(s)	3	6
Design of electrical connection for external antenna(s)	R-SMA female (socket)	R-SMA female (socket)
Inputs/outputs		
Number of digital inputs	1	1
Number of digital outputs	1	1
Design of electrical connection at the digital inputs/outputs	4-pin screw terminal	4-pin screw terminal
Signal range		
• at the digital input	24 V DC, safety extra low voltage	24 V DC, safety extra low voltage
• at the digital output	24 V DC/ 1 A	24 V DC/ 1 A
Supply voltage, current consumption, power loss		
Type of power supply	DC	DC
Power supply		
• 1 from terminal block	19.2 V	19.2 V
• 2 from terminal block	28.8 V	28.8 V
• From Power-over-Ethernet according to IEEE802.3at for Type 1 and IEEE802.3af	48 V	48 V
• From Power-over-Ethernet according to IEEE802.3at for Type 2	48 V	48 V

[1] Wireless approval in the USA

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SCALANCE W788 RJ45 for use in control cabinet

Technical specifications (continued)

Order No.	6GK5 788-1FC00-0AA0 6GK5 788-1FC00-0AB0 [1]	6GK5 788-2FC00-0AA0 6GK5 788-2FC00-0AB0 [1]
Product type designation	**SCALANCE W788-1 RJ45**	**SCALANCE W788-2 RJ45**
Permissible ambient conditions		
Ambient temperature		
• During operation	-20 … +60 °C	-20 … +60 °C
• During storage	-40 … +70 °C	-40 … +70 °C
• During transport	-40 … +70 °C	-40 … +70 °C
Relative humidity at 25 °C without condensation during operation, maximum	90 %	90 %
IP degree of protection	IP30	IP30
Ambient conditions for operation	-	-
Design, dimensions and weights		
Width of enclosure without antenna	200 mm	200 mm
Height of enclosure without antenna	158 mm	158 mm
Depth of enclosure without antenna	79 mm	79 mm
Net weight	1.7 kg	1.7 kg
Type of mounting: wall mounting	Yes	Yes
Wireless frequencies		
Wireless frequency		
• With WLAN in the 2.4 GHz frequency band	2.41 … 2.48 GHz	2.41 … 2.48 GHz
• with WLAN in the 5 GHz frequency band	4.9 … 5.8 GHz	4.9 … 5.8 GHz
Product properties, functions, components General		
Number of SSIDs	8	16
Product function		
• Dual client	-	-
• iHOP	-	-
• iPCF	-	-
• iPCF-MC	-	-
Number of iPCF-capable radio modules	-	-
Product functions Management, configuration, programming		
Number of manageable IP addresses in the client	8	8
Product function		
• CLI	Yes	Yes
• Web-based management	Yes	Yes
• MIB support	Yes	Yes
• TRAPs via e-mail	Yes	Yes
• Configuration with STEP 7	No	No
• Configuration with STEP 7 in the TIA Portal	No	No
• SMTP server	Yes	Yes
• Operation with IWLAN controller	No	No
• Operation with Enterasys WLAN controller	No	No
• Forced roaming with IWLAN	Yes	Yes
• WDS	Yes	Yes

[1] Wireless approval in the USA

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Technical specifications (continued)

Order No.	6GK5 788-1FC00-0AA0 6GK5 788-1FC00-0AB0 [1]	6GK5 788-2FC00-0AA0 6GK5 788-2FC00-0AB0 [1]
Product type designation	**SCALANCE W788-1 RJ45**	**SCALANCE W788-2 RJ45**
Protocol is supported		
• Address Resolution Protocol (ARP)	Yes	Yes
• ICMP	Yes	Yes
• Telnet	Yes	Yes
• HTTP	Yes	Yes
• HTTPS	Yes	Yes
• TFTP	Yes	Yes
• SNMP v1	Yes	Yes
• SNMP v2	Yes	Yes
• SNMP v3	Yes	Yes
• DCP	Yes	Yes
• LLDP	Yes	Yes
Identification & maintenance		
• I&M0 - device-specific information	Yes	Yes
• I&M1 - higher-level designation/ location designation	Yes	Yes
Product functions Diagnostics		
Product function		
• PROFINET IO diagnostics	Yes	Yes
• Link check	No	No
• Connection monitoring IP-Alive	No	No
• Localization by means of Aeroscout	No	No
• SysLog	Yes	Yes
Product functions VLAN		
Product function VLAN with IWLAN	Yes	Yes
Product functions DHCP		
Product function DHCP client	Yes	Yes
Product functions Redundancy		
STP/RSTP protocol is supported	Yes	Yes
Product functions Security		
Product function		
• ACL - MAC based	Yes	Yes
• IEEE 802.1x (radius)	Yes	Yes
• NAT/NAPT	No	No
• Access protection according to IEEE802.11i	Yes	Yes
• WPA/WPA2	Yes	Yes
• TKIP/AES	Yes	Yes
Protocol is supported SSH	Yes	Yes
Product functions Time		
SNTP protocol is supported	Yes	Yes

[1] Wireless approval in the USA

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SCALANCE W788 RJ45 for use in control cabinet

Technical specifications (continued)

Order No.	6GK5 788-1FC00-0AA0 6GK5 788-1FC00-0AB0 [1]	6GK5 788-2FC00-0AA0 6GK5 788-2FC00-0AB0 [1]
Product type designation	**SCALANCE W788-1 RJ45**	**SCALANCE W788-2 RJ45**
Standards, specifications, approvals		
Standard		
• for EMC of FM	-	-
• for hazardous zone	-	-
• for CSA and UL safety	UL 60950-1 CSA C22.2 No. 60950-1	UL 60950-1 CSA C22.2 No. 60950-1
• for hazardous zone of CSA and UL	-	-
Certificate of suitability		
• CE marking	Yes	Yes
• EC Declaration of Conformity	Yes	Yes
• C-Tick	Yes	Yes
• CCC	No	No
• Railroad application according to EN 50155	No	No
• e1 approval	No	No
• E1 approval	No	No
• NEMA4X	No	No
Standard for wireless communication		
• IEEE 802.11a	Yes	Yes
• IEEE 802.11b	Yes	Yes
• IEEE 802.11e	Yes	Yes
• IEEE 802.11g	Yes	Yes
• IEEE 802.11h	Yes	Yes
• IEEE 802.11i	Yes	Yes
• IEEE 802.11n	Yes	Yes
Wireless approval	You can find the latest list of countries at: www.siemens.com/simatic-net/ik-info	You can find the latest list of countries at: www.siemens.com/simatic-net/ik-info
Marine classification association		
• American Bureau of Shipping Europe Ltd. (ABS)	No	No
• Bureau Veritas (BV)	No	No
• Det Norske Veritas (DNV)	No	No
• Germanischer Lloyd (GL)	No	No
• Lloyds Register of Shipping (LRS)	No	No
• Nippon Kaiji Kyokai (NK)	No	No
• Polski Rejestr Statkow (PRS)	No	No
Accessories		
Accessories	24 V DC screw terminal and screw terminal for digital input and output included in scope of delivery	24 V DC screw terminal and screw terminal for digital input and output included in scope of delivery

[1] Wireless approval in the USA

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Odering data

	Order No.
SCALANCE W788 RJ45 access points	
IWLAN access points with built-in wireless interfaces; wireless networks IEEE 802.11a/b/g/h/n at 2.4/5 GHz up to 450 Mbit/s; WPA2/AES; Power over Ethernet (PoE), IP30 degree of protection (-20 °C to +60 °C); scope of supply: Mounting hardware, 4-pin screw terminal for 24 V DC; 4-pin screw terminal for digital input and output; manual on CD-ROM; German/English	
SCALANCE W788-1 RJ45	
IWLAN Access Point with one built-in radio interface	
• National approvals for operation outside the USA	**6GK5 788-1FC00-0AA0**
• National approvals for operation within the USA [1]	**6GK5 788-1FC00-0AB0**
SCALANCE W788-2 RJ45	
IWLAN Dual Access Point with two built-in radio interfaces	
• National approvals for operation outside the USA	**6GK5 788-2FC00-0AA0**
• National approvals for operation within the USA [1]	**6GK5 788-2FC00-0AB0**

[1] Please note national approvals at www.siemens.com/wireless-approvals

	Order No.
Accessories	
C-PLUG Swap medium for simple replacement of devices in the event of a fault; for storing configuration data; can be used in SIMATIC NET products with PLUG slot	**6GK1 900-0AB00**
DIN rail mounting adapter DIN rail mounting adapter for SCALANCE W788 M12 and SCALANCE W788 RJ45; screw fixing for mounting on a 35 mm DIN rail to EN 50 022; scope of supply: 3 units per pack	**6GK5 798-8ML00-0AB3**
IE FC RJ45 Plug 4 x 2 RJ45 plug connector for Industrial Ethernet (10/100/1000 Mbit/s) with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface	
• 1 pack = 1 unit	**6GK1 901-1BB11-2AA0**
• 1 pack = 10 units	**6GK1 901-1BB11-2AB0**
• 1 pack = 50 units	**6GK1 901-1BB11-2AE0**
IE FC Standard Cable GP 4x2 8-core, shielded TP installation cable for connection to IE FC RJ45 Plug 4x2 and IE M12 Plug PRO 4x2; PROFINET-compliant; with UL approval; sold by the meter; max. length 1000 m, minimum order 20 m	**6XV1 878-2A**
IE FC Stripping Tool Preadjusted stripping tool for fast stripping of the Industrial Ethernet FC cables	**6GK1 901-1GA00**
Antennas and miscellaneous IWLAN accessories	see Industrial Wireless LAN/ accessories

More information

Wireless approvals:

Current approvals can be found on the Internet at:
www.siemens.com/wireless-approvals

To assist in selecting the right products for Industrial Wireless Communication, the SIMATIC NET Selection Tool is available:

Online version:
www.siemens.com/snst

Offline version:
www.siemens.com/snst-download

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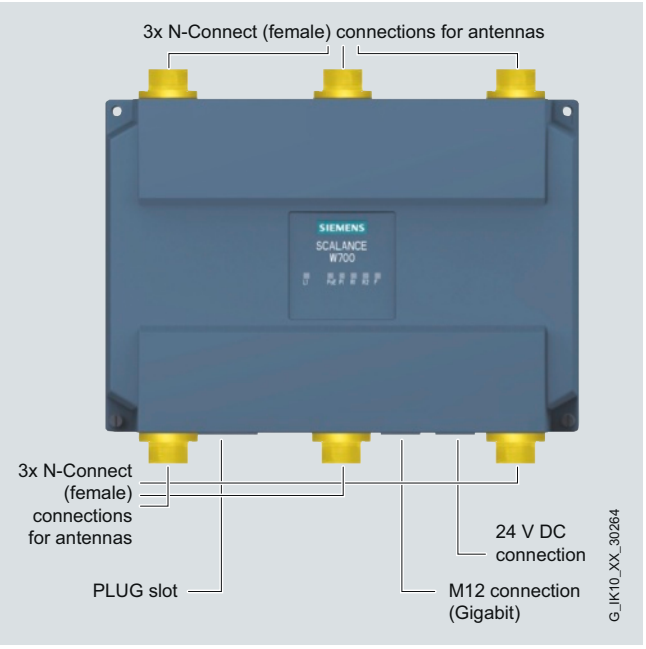
SCALANCE W788 M12 for the indoor area

Overview

- Particularly suitable for industrial applications without control cabinets

Design

- Rugged aluminum enclosure, shock and vibration-proof, for high mechanical requirements
- High IP65 degree of protection against dust and water jets
- For use at ambient temperatures from -20 °C to +60 °C
- Resistant to condensation
- 3 x N-Connect sockets for the connection of remote antennas (6 x N-Connect sockets for the versions with two radio modules)
- Antenna placement optimized for the 3x3 MIMO technology; the antennas do not interfere with each other when they are mounted direct on the device
- 1 x M12 connection for 10/100/1000 Mbit/s with Power-over-Ethernet according to IEEE 802.3at Type 1 (corresponds to IEEE 802.3af)
- 1 x M12 socket for energy supply (24 V DC)
- 1 x PLUG slot
- Function LEDs for optical signaling of faults and operating states
- Mounting: Wall, S7 mounting rail or on 35 mm standard mounting rail



Design and interfaces of the SCALANCE W788-2 M12 Access Points

Product versions

SCALANCE W788-1 M12

- A radio card permanently installed in the device

SCALANCE W788-2 M12

- Two radio cards permanently installed in the device

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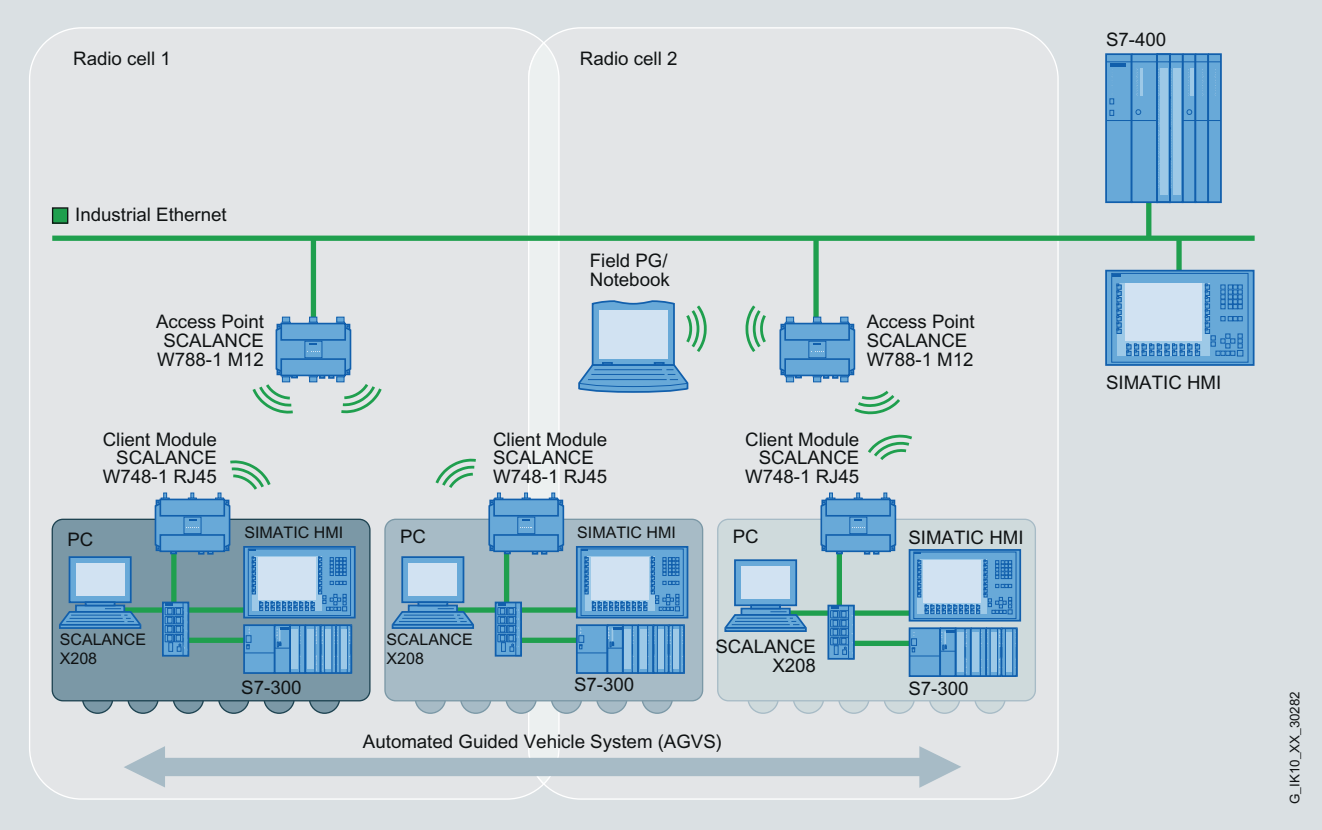
Function

The devices can be installed at the location that is most favorable for the radio link. The housing and the connectors resist high levels of shock and vibration loading because all the connections are screwed or latched. To achieve optimal illumination for special applications, the supplied antennas can be replaced.

SCALANCE W788 M12 Access Points can also be operated as client modules. As an alternative, the SCALANCE W748 M12 client modules can be used for this mode.

The devices with two interfaces have two separate radio modules and behave like two separate devices in the radio network. This feature can be used to implement cost-effective solutions, e.g. when a radio interface is used for wireless connection of a distant production site and the second radio interface provides a radio link at the Access Point. Local stations can log in here and move around freely. Two separate radio modules, however, also permit the setup of redundant radio links so that a high level of availability can be achieved.



Roaming of moving units (e.g. Field PG and mobile controller) in a radio network with two Access Points

Stations, e.g. a Field PG M, can move freely in the RF field of the SCALANCE W788-1 M12 Access Points for mobile HMI. In addition, SCALANCE W748-1 M12 Client Modules connect mobile units with HMI, controller and PC wirelessly to the data network.

Provided that a delay (several 100 ms) caused by roaming in accordance with IEEE 802.11 is tolerated by all communication stations when switching the radio cells, the communication continues uninterrupted.

The Dual Access Point, SCALANCE W788-2 M12, can provide two separate radio links. For example, a Field PG can use one radio link for configuration. For a clear separation of the applications, the communication that is required for the application, e.g. S7 communication with a controller, can take place via the second radio link.

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SCALANCE W788 M12 for the indoor area

Technical specifications

Order No.	6GK5 788-1GD00-0AA0 6GK5 788-1GD00-0AB0 [1]	6GK5 788-2GD00-0AA0 6GK5 788-2GD00-0AB0 [1]
Product type designation	**SCALANCE W788-1 M12**	**SCALANCE W788-2 M12**
Transmission rate		
Transmission rate		
• with W-LAN, maximum	450 Mbit/s	450 Mbit/s
• with Industrial Ethernet	10 … 1 000 Mbit/s	10 … 1 000 Mbit/s
• Note	-	-
Interfaces		
Number of electrical connections		
• for network components or terminal equipment	1	1
• for power supply	1	1
• for redundant power supply	1	1
Design of electrical connection		
• for network components or terminal equipment	M12 interface (8-pin, A-coded), PoE	M12 interface (8-pin, A-coded), PoE
• for power supply	M12 interface (4-pin, A-coded), PoE	M12 interface (4-pin, A-coded), PoE
Number of optical connections for fiber-optic cables at 100 Mbit/s	-	-
Design of optical connection for fiber-optic cables at 100 Mbit/s	-	-
Design of swap medium C-Plug	Yes	Yes
Interfaces wireless		
Number of permanently installed radio cards	1	2
Number of internal antennas	-	-
Number of electrical connections for external antenna(s)	3	6
Design of electrical connection for external antenna(s)	N-Connect female (socket)	N-Connect female (socket)
Supply voltage, current consumption, power loss		
Type of power supply	DC	DC
Power supply		
• 1 from M12 power connector (A-coded) for redundant power supply	19.2 V	19.2 V
• 2 from M12 power connector (A-coded) for redundant power supply	28.8 V	28.8 V
• From Power-over-Ethernet according to IEEE802.3at for Type 1 and IEEE802.3af	48 V	48 V
• From Power-over-Ethernet according to IEEE802.3at for Type 2	48 V	48 V

[1] Wireless approval in the USA

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Technical specifications (continued)

Order No.	6GK5 788-1GD00-0AA0 6GK5 788-1GD00-0AB0 [1]	6GK5 788-2GD00-0AA0 6GK5 788-2GD00-0AB0 [1]
Product type designation	**SCALANCE W788-1 M12**	**SCALANCE W788-2 M12**
Permissible ambient conditions		
Ambient temperature		
• During operation	-20 … +60 °C	-20 … +60 °C
• During storage	-40 … +70 °C	-40 … +70 °C
• During transport	-40 … +70 °C	-40 … +70 °C
Relative humidity at 25 °C without condensation during operation, maximum	90 %	90 %
IP degree of protection	IP65	IP65
Ambient conditions for operation	-	-
Design, dimensions and weights		
Width of enclosure without antenna	200 mm	200 mm
Height of enclosure without antenna	176 mm	176 mm
Depth of enclosure without antenna	79 mm	79 mm
Net weight	1.7 kg	1.7 kg
Type of mounting: wall mounting	Yes	Yes
Type of mounting	-	-
Radio frequencies		
Radio frequency		
• with WLAN in the 2.4 GHz frequency band	2.41 … 2.48 GHz	2.41 … 2.48 GHz
• with WLAN in the 5 GHz frequency band	4.9 … 5.8 GHz	4.9 … 5.8 GHz
Product properties, functions, components General		
Number of SSIDs	8	16
Product function		
• Dual client	-	-
• iHOP	-	-
• iPCF	-	-
• iPCF-MC	-	-
Number of iPCF-capable radio modules	-	-

[1] Wireless approval in the USA

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SCALANCE W788 M12 for the indoor area

Technical specifications (continued)

Order No.	6GK5 788-1GD00-0AA0 6GK5 788-1GD00-0AB0 [1]	6GK5 788-2GD00-0AA0 6GK5 788-2GD00-0AB0 [1]
Product type designation	**SCALANCE W788-1 M12**	**SCALANCE W788-2 M12**
Product functions Management, configuration, programming		
Number of manageable IP addresses in the client	8	8
Product function		
• CLI	Yes	Yes
• Web-based management	Yes	Yes
• MIB support	Yes	Yes
• TRAPS via e-mail	Yes	Yes
• Configuration with STEP 7	No	No
• Configuration with STEP 7 in the TIA Portal	No	No
• SMTP server	Yes	Yes
• Operation with IWLAN controller	No	No
• Operation with Enterasys WLAN controller	No	No
• Forced roaming with IWLAN	Yes	Yes
• WDS	Yes	Yes
Protocol is supported		
• Address Resolution Protocol (ARP)	Yes	Yes
• ICMP	Yes	Yes
• Telnet	Yes	Yes
• HTTP	Yes	Yes
• HTTPS	Yes	Yes
• TFTP	Yes	Yes
• SNMP v1	Yes	Yes
• SNMP v2	Yes	Yes
• SNMP v3	Yes	Yes
• DCP	Yes	Yes
• LLDP	Yes	Yes
Identification & Maintenance		
• I&M0 - device-specific information	Yes	Yes
• I&M1 - higher-level designation/ location designation	Yes	Yes
Product functions Diagnostics		
Product function		
• PROFINET IO diagnostics	Yes	Yes
• Link check	No	No
• Connection monitoring IP-Alive	No	No
• Localization by means of Aeroscout	No	No
• SysLog	Yes	Yes
Product functions VLAN		
Product function VLAN with IWLAN	Yes	Yes
Product functions DHCP		
Product function DHCP client	Yes	Yes
Product functions Redundancy		
STP/RSTP protocol is supported	Yes	Yes

[1] Wireless approval in the USA

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Technical specifications (continued)

Order No.	6GK5 788-1GD00-0AA0 6GK5 788-1GD00-0AB0 [1]	6GK5 788-2GD00-0AA0 6GK5 788-2GD00-0AB0 [1]
Product type designation	**SCALANCE W788-1 M12**	**SCALANCE W788-2 M12**
Product functions Security		
Product function		
• ACL - MAC based	Yes	Yes
• IEEE 802.1x (radius)	Yes	Yes
• NAT/NAPT	No	No
• Access protection according to IEEE802.11i	Yes	Yes
• WPA/WPA2	Yes	Yes
• TKIP/AES	Yes	Yes
SSH protocol is supported	Yes	Yes
Product functions Time		
SNTP protocol is supported	Yes	Yes
Standards, specifications, approvals		
Standard		
• for EMC of FM	-	-
• for hazardous zone	-	-
• for CSA and UL safety	UL 60950-1 CSA C22.2 No. 60950-1	UL 60950-1 CSA C22.2 No. 60950-1
• for hazardous zone of CSA and UL	-	-
Certificate of suitability		
• CE mark	Yes	Yes
• EC Declaration of Conformity	Yes	Yes
• C-Tick	Yes	Yes
• CCC	No	No
• Railroad application according to EN 50155	No	No
• e1 approval	No	No
• E1 approval	No	No
• NEMA4X	No	No
• Power-over-Ethernet according to IEEE802.3at for Type 1 and IEEE802.3af	Yes	Yes
• Power-over-Ethernet according to IEEE802.3at for Type 2	Yes	Yes
Standard for wireless communication		
• IEEE 802.11a	Yes	Yes
• IEEE 802.11b	Yes	Yes
• IEEE 802.11e	Yes	Yes
• IEEE 802.11g	Yes	Yes
• IEEE 802.11h	Yes	Yes
• IEEE 802.11i	Yes	Yes
• IEEE 802.11n	Yes	Yes
Wireless approval	You can find the latest list of countries at: www.siemens.com/simatic-net/ik-info	You can find the latest list of countries at: www.siemens.com/simatic-net/ik-info
Marine classification association		
• American Bureau of Shipping Europe Ltd. (ABS)	No	No
• Bureau Veritas (BV)	No	No
• Det Norske Veritas (DNV)	No	No
• Germanischer Lloyd (GL)	No	No
• Lloyds Register of Shipping (LRS)	No	No
• Nippon Kaiji Kyokai (NK)	No	No
• Polski Rejestr Statkow (PRS)	No	No
Accessories		
Accessories	-	-

[1] Wireless approval in the USA

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SCALANCE W788 M12 for the indoor area

Ordering data

	Order No.
SCALANCE W788 M12 Access Points	
IWLAN access points with built-in radio interfaces; radio networks IEEE 802.11a/b/g/h/n at 2.4/5 GHz up to 450 Mbit/s; WPA2/AES; Power over Ethernet (PoE), IP65 degree of protection (-20 °C to +60 °C); scope of supply: Mounting hardware; manual on CD-ROM, German/English	
SCALANCE W788-1 M12	
IWLAN Access Point with one built-in radio interface	
• National approvals for operation outside the USA	**6GK5 788-1GD00-0AA0**
• National approvals for operation within the USA [1]	**6GK5 788-1GD00-0AB0**
SCALANCE W788-2 M12	
IWLAN Dual Access Point with two built-in radio interfaces	
• National approvals for operation outside the USA	**6GK5 788-2GD00-0AA0**
• National approvals for operation within the USA [1]	**6GK5 788-2GD00-0AB0**

[1] Please note national approvals at www.siemens.com/wireless-approvals

	Order No.
Accessories	
C-PLUG Swap medium for simple replacement of devices in the event of a fault; for storing configuration data; can be used in SIMATIC NET products with PLUG slot	**6GK1 900-0AB00**
DIN rail mounting adapter DIN rail mounting adapter for SCALANCE W788 M12 and SCALANCE W788 RJ45; screw fixing for mounting on a 35 mm DIN rail to EN 50 022; scope of supply: 3 units per pack	**6GK5 798-8ML00-0AB3**
IE FC M12 Plug PRO 4 x 2 M12 plug-in connector suitable for on-site assembly (X-coded, IP65/IP67), metal enclosure, insulation/displacement fast connection method, for SCALANCE W	
• 1 unit	**6GK1 901-0DB30-6AA0**
• 8 units	**6GK1 901-0DB30-6AA8**
IE FC Standard Cable GP 4 x 2 8-core, shielded TP installation cable for connection to IE FC RJ45 Plug 4 x 2 and IE M12 Plug PRO 4 x 2; PROFINET-compliant; with UL approval; sold by the meter; max. length 1000 m, minimum order 20 m	**6XV1 878-2A**
IE FC Stripping Tool Preadjusted stripping tool for fast stripping of the Industrial Ethernet FC cables	**6GK1 901-1GA00**
Antennas and miscellaneous IWLAN accessories	see Industrial Wireless LAN/ accessories

More information

Wireless approvals:

Current approvals can be found on the Internet at:
www.siemens.com/wireless-approvals

To assist in selecting the right products for Industrial Wireless Communication, the SIMATIC NET Selection Tool is available:

Online version:
www.siemens.com/snst

Offline version:
www.siemens.com/snst-download

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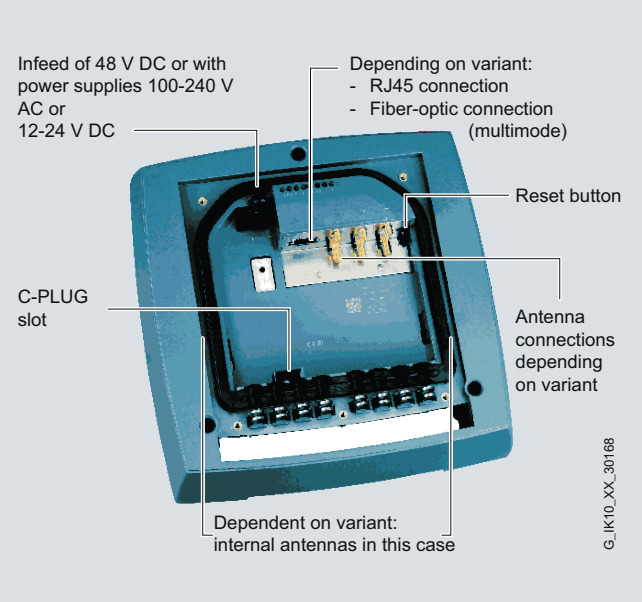
Overview

- Especially well suited to applications with high climatic requirements when installed outdoors and in areas accessible to the public

Design

- Rugged plastic enclosure (plexi-glass type), shock and vibration-proof for severe mechanical loading
- High IP65 degree of protection against dust and water jets
- For use at ambient temperatures from -40 °C to +60 °C
- Resistant to condensation
- Resistant to UV radiation and saltwater spray
- Design for use outdoors
- 3 x R-SMA sockets for the connection of remote antennas (6 x R-SMA sockets or six internal antennas for the versions with two wireless modules)
- Version with 1 x RJ45 connection for 10/100/1000 Mbit/s with Power-over-Ethernet according to IEEE 802.3at Type 1 (corresponds to IEEE 802.3af)
- Version with two slots for SFP plug-in transceivers (optical 2-port switch)
- 1 x 24 V DC connection, optional operation with 12 to 24 V DC or 100 to 240 V AC with power supply integrated into device
- 1 x PLUG slot
- Function LEDs for optical signaling of faults and operating states
- Mounting: Wall or, with optional mounting set, on S7 mounting rail, 35 mm standard mounting rail, or on a pole



Design and interfaces of the SCALANCE W786 access points

Product versions

SCALANCE W786-1 RJ45

- A wireless card permanently installed in the device

SCALANCE W786-2 RJ45

- Two wireless cards permanently installed in the device
- Versions with:
  - Six internal antennas
  - Six connections for external antennas

SCALANCE W786-2 SFP

- Two wireless cards permanently installed in the device

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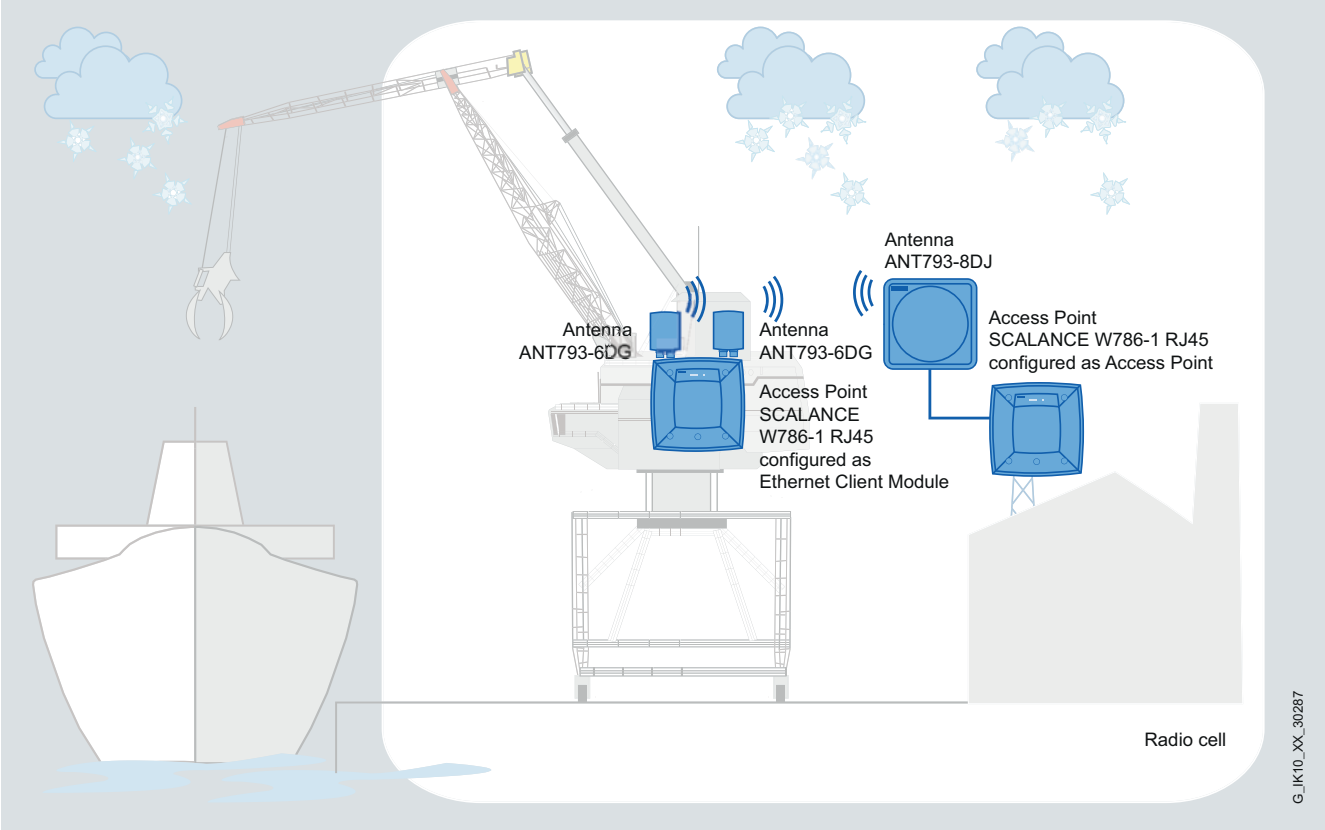
SCALANCE W786 RJ45 for the outdoor area

Function

In the case of access points with two wireless modules, one module implements communication of the access points with each other. The wireless field for the station, e.g. an automated guided vehicle, is established by the second wireless module. Wireless coverage of larger areas can therefore be provided with the same device.

If the minimum length of standard Ethernet cables is insufficient due to the large distance of the access points from the wired network, SCALANCE W-786 can also be used in a version with SFP plug-in transceivers. Depending on the optical SFP plug-in transceiver used, ranges of up to 120 km can then be achieved.



Use of the SCALANCE W786 product line in sectors subject to high climatic requirements

In the case of SCALANCE W786, this only concerns access points which can, however, be configured as client modules through Web-based management. Then, depending on the selected versions, a maximum of one wireless module will be available as a client.

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Technical specifications

Order No.	6GK5 786-1FC00-0AA0 6GK5 786-1FC00-0AB0 [1]	6GK5 786-2HC00-0AA0 6GK5 786-2HC00-0AB0 [1]	6GK5 786-2FC00-0AA0 6GK5 786-2FC00-0AB0 [1]	6GK5 786-2FE00-0AA0
Product type designation	**SCALANCE W786-1 RJ45**	**SCALANCE W786-2IA RJ45**	**SCALANCE W786-2 RJ45**	**SCALANCE W786-2 SFP**
Transmission rate				
Transmission rate				
• with W-LAN, maximum	450 Mbit/s	450 Mbit/s	450 Mbit/s	450 Mbit/s
• with Industrial Ethernet	10 … 1 000 Mbit/s	10 … 1 000 Mbit/s	10 … 1 000 Mbit/s	100 … 1 000 Mbit/s
• Note	-	-	-	-
Interfaces				
Number of electrical connections				
• for network components or terminal equipment	1	1	1	-
• for power supply	1	1	1	1
• for redundant power supply	1	1	1	0
Design of electrical connection				
• for network components or terminal equipment	RJ45 socket	RJ45 socket	RJ45 socket	-
• for power supply	2-pin connector (24 V DC) or optionally available power supply adapter (4-pin 24 V DC or 3-pin 110 to 230 V AC)	2-pin connector (24 V DC) or optionally available power supply adapter (4-pin 24 V DC or 3-pin 110 to 230 V AC)	2-pin connector (24 V DC) or optionally available power supply adapter (4-pin 24 V DC or 3-pin 110 to 230 V AC)	2-pin connector (24 V DC) or optionally available power supply adapter (4-pin 24 V DC or 3-pin 110 to 230 V AC)
Number of optical connections for fiber-optic cables at 100 Mbit/s	-	-	-	2
Design of optical connection for fiber-optic cables at 100 Mbit/s	-	-	-	SFP slot
Number of optical connections for fiber-optic cables at 1000 Mbit/s	-	-	-	2
Design of optical connection for fiber-optic cables at 1000 Mbit/s	-	-	-	SFP slot
Design of swap medium C-Plug	Yes	Yes	Yes	Yes
Interfaces wireless				
Number of permanently installed wireless cards	1	2	2	2
Number of internal antennas	-	6	-	-
Number of electrical connections for external antenna(s)	3	-	6	6
Design of electrical connection for external antenna(s)	R-SMA female (socket)	-	R-SMA female (socket)	R-SMA female (socket)
Supply voltage, current consumption, power loss				
Type of power supply	DC	DC	DC	DC
Power supply				
• 1 from terminal block	19.2 V	19.2 V	19.2 V	19.2 V
• 2 from terminal block	28.8 V	28.8 V	28.8 V	28.8 V
• From Power-over-Ethernet ac-cording to IEEE802.3at for Type 1 and IEEE802.3af	48 V	48 V	48 V	-
• From Power-over-Ethernet ac-cording to IEEE802.3at for Type 2	48 V	48 V	48 V	-
• From optionally integrated power supply				
- With AC	100 … 240 V	100 … 240 V	100 … 240 V	100 … 240 V
- With DC	12 … 24 V	12 … 24 V	12 … 24 V	12 … 24 V

[1] Wireless approval in the USA

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SCALANCE W786 RJ45 for the outdoor area

Technical specifications (continued)

Order No.	6GK5 786-1FC00-0AA0 6GK5 786-1FC00-0AB0 [1]	6GK5 786-2HC00-0AA0 6GK5 786-2HC00-0AB0 [1]	6GK5 786-2FC00-0AA0 6GK5 786-2FC00-0AB0 [1]	6GK5 786-2FE00-0AA0
Product type designation	**SCALANCE W786-1 RJ45**	**SCALANCE W786-2IA RJ45**	**SCALANCE W786-2 RJ45**	**SCALANCE W786-2 SFP**
Permissible ambient conditions				
Ambient temperature				
• During operation	-40 … +60 °C	-40 … +60 °C	-40 … +60 °C	-40 … +60 °C
• During storage	-40 … +85 °C	-40 … +85 °C	-40 … +85 °C	-40 … +85 °C
• During transport	-40 … +85 °C	-40 … +85 °C	-40 … +85 °C	-40 … +85 °C
Relative humidity at 25 °C without condensation during operation, maximum	100 %	100 %	100 %	100 %
IP degree of protection	IP65	IP65	IP65	IP65
Ambient conditions for operation	When using the 100 … 240 V AC power supply, an operating temperature of -40 °C to +60 °C is permissible	When using the 100 … 240 V AC power supply, an operating temperature of -40 °C to +60 °C is permissible	When using the 100 … 240 V AC power supply, an operating temperature of -40 °C to +60 °C is permissible	When using the 100 … 240 V AC power supply, an operating temperature of -40 °C to +60 °C is permissible
Design, dimensions and weights				
Width of enclosure without antenna	251 mm	251 mm	251 mm	251 mm
Height of enclosure without antenna	251 mm	251 mm	251 mm	251 mm
Depth of enclosure without antenna	72 mm	72 mm	72 mm	72 mm
Net weight	2.24 kg	2.24 kg	2.24 kg	2.24 kg
Type of mounting: wall mounting	Yes	Yes	Yes	Yes
Type of mounting	For mast mounting, 35 mm DIN rail mounting and S7-300 rail mounting, an additional retaining plate is required	For mast mounting, 35 mm DIN rail mounting and S7-300 rail mounting, an additional retaining plate is required	For mast mounting, 35 mm DIN rail mounting and S7-300 rail mounting, an additional retaining plate is required	For mast mounting, 35 mm DIN rail mounting and S7-300 rail mounting, an additional retaining plate is required
Wireless frequencies				
Wireless frequency				
• With WLAN in the 2.4 GHz frequency band	2.41 … 2.48 GHz	2.41 … 2.48 GHz	2.41 … 2.48 GHz	2.41 … 2.48 GHz
• With WLAN in the 5 GHz frequency band	4.9 … 5.8 GHz	4.9 … 5.8 GHz	4.9 … 5.8 GHz	4.9 … 5.8 GHz
Product properties, functions, components General				
Number of SSIDs	8	16	16	16
Product function				
• Dual client	-	-	-	-
• iHOP	-	-	-	-
• iPCF	-	-	-	-
• iPCF-MC	-	-	-	-
Number of iPCF-capable radio modules	-	-	-	-

[1] Wireless approval in the USA

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Technical specifications (continued)

Order No.	6GK5 786-1FC00-0AA0 6GK5 786-1FC00-0AB0 [1]	6GK5 786-2HC00-0AA0 6GK5 786-2HC00-0AB0 [1]	6GK5 786-2FC00-0AA0 6GK5 786-2FC00-0AB0 [1]	6GK5 786-2FE00-0AA0
Product type designation	**SCALANCE W786-1 RJ45**	**SCALANCE W786-2IA RJ45**	**SCALANCE W786-2 RJ45**	**SCALANCE W786-2 SFP**
Product functions Management, configuration, programming				
Number of manageable IP addresses in the client	8	8	8	8
Product function				
• CLI	Yes	Yes	Yes	Yes
• Web-based management	Yes	Yes	Yes	Yes
• MIB support	Yes	Yes	Yes	Yes
• TRAPs via e-mail	Yes	Yes	Yes	Yes
• Configuration with STEP 7	No	No	No	No
• Configuration with STEP 7 in the TIA Portal	No	No	No	No
• SMTP server	Yes	Yes	Yes	Yes
• Operation with IWLAN controller	No	No	No	No
• Operation with Enterasys WLAN controller	No	No	No	No
• Forced roaming with IWLAN	Yes	Yes	Yes	Yes
• WDS	Yes	Yes	Yes	Yes
Protocol is supported				
• Address Resolution Protocol (ARP)	Yes	Yes	Yes	Yes
• ICMP	Yes	Yes	Yes	Yes
• Telnet	Yes	Yes	Yes	Yes
• HTTP	Yes	Yes	Yes	Yes
• HTTPS	Yes	Yes	Yes	Yes
• TFTP	Yes	Yes	Yes	Yes
• SNMP v1	Yes	Yes	Yes	Yes
• SNMP v2	Yes	Yes	Yes	Yes
• SNMP v3	Yes	Yes	Yes	Yes
• DCP	Yes	Yes	Yes	Yes
• LLDP	Yes	Yes	Yes	Yes
Identification & maintenance				
• I&M0 - device-specific information	Yes	Yes	Yes	Yes
• I&M1 - higher-level designation/ location designation	Yes	Yes	Yes	Yes
Product functions Diagnostics				
Product function				
• PROFINET IO diagnostics	Yes	Yes	Yes	Yes
• Link check	No	No	No	No
• Connection monitoring IP-Alive	No	No	No	No
• Localization by means of Aeroscout	No	No	No	No
• SysLog	Yes	Yes	Yes	Yes
Product functions VLAN				
Product function VLAN with IWLAN	Yes	Yes	Yes	Yes
Product functions DHCP				
Product function DHCP client	Yes	Yes	Yes	Yes
Product functions Redundancy				
STP/RSTP protocol is supported	Yes	Yes	Yes	Yes

[1] Wireless approval in the USA

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SCALANCE W786 RJ45 for the outdoor area

Technical specifications (continued)

Order No.	6GK5 786-1FC00-0AA0 6GK5 786-1FC00-0AB0 [1]	6GK5 786-2HC00-0AA0 6GK5 786-2HC00-0AB0 [1]	6GK5 786-2FC00-0AA0 6GK5 786-2FC00-0AB0 [1]	6GK5 786-2FE00-0AA0
Product type designation	**SCALANCE W786-1 RJ45**	**SCALANCE W786-2IA RJ45**	**SCALANCE W786-2 RJ45**	**SCALANCE W786-2 SFP**
Product functions Security				
Product function				
• ACL - MAC based	Yes	Yes	Yes	Yes
• IEEE 802.1x (radius)	Yes	Yes	Yes	Yes
• NAT/NAPT	No	No	No	No
• Access protection according to IEEE802.11i	Yes	Yes	Yes	Yes
• WPA/WPA2	Yes	Yes	Yes	Yes
• TKIP/AES	Yes	Yes	Yes	Yes
Protocol is supported SSH	Yes	Yes	Yes	Yes
Product functions Time				
SNTP protocol is supported	Yes	Yes	Yes	Yes
Standards, specifications, approvals				
Standard				
• for EMC of FM	-	-	-	-
• for hazardous zone	-	-	-	-
• for CSA and UL safety	UL 60950-1 CSA C22.2 No. 60950-1	UL 60950-1 CSA C22.2 No. 60950-1	UL 60950-1 CSA C22.2 No. 60950-1	UL 60950-1 CSA C22.2 No. 60950-1
• for hazardous zone of CSA and UL	-	-	-	-
Certificate of suitability				
• CE marking	Yes	Yes	Yes	Yes
• EC Declaration of Conformity	Yes	Yes	Yes	Yes
• C-Tick	Yes	Yes	Yes	Yes
• CCC	No	No	No	No
• Railroad application according to EN 50155	No	No	No	No
• e1 approval	No	No	No	No
• E1 approval	No	No	No	No
• NEMA4X	Yes	Yes	Yes	Yes
Standard for wireless communication				
• IEEE 802.11a	Yes	Yes	Yes	Yes
• IEEE 802.11b	Yes	Yes	Yes	Yes
• IEEE 802.11e	Yes	Yes	Yes	Yes
• IEEE 802.11g	Yes	Yes	Yes	Yes
• IEEE 802.11h	Yes	Yes	Yes	Yes
• IEEE 802.11i	Yes	Yes	Yes	Yes
• IEEE 802.11n	Yes	Yes	Yes	Yes
Wireless approval	You can find the latest list of countries at: www.siemens.com/simatic-net/ik-info	You can find the latest list of countries at: www.siemens.com/simatic-net/ik-info	You can find the latest list of countries at: www.siemens.com/simatic-net/ik-info	You can find the latest list of countries at: www.siemens.com/simatic-net/ik-info
Marine classification association				
• American Bureau of Shipping Europe Ltd. (ABS)	No	No	No	No
• Bureau Veritas (BV)	No	No	No	No
• Det Norske Veritas (DNV)	No	No	No	No
• Germanischer Lloyd (GL)	No	No	No	No
• Lloyds Register of Shipping (LRS)	No	No	No	No
• Nippon Kaiji Kyokai (NK)	No	No	No	No
• Polski Rejestr Statkow (PRS)	No	No	No	No
Accessories				
Accessories	24 V DC screw terminal included in scope of delivery	24 V DC screw terminal included in scope of delivery	24 V DC screw terminal included in scope of delivery	24 V DC screw terminal included in scope of delivery

[1] Wireless approval in the USA

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Ordering data	Order No.
SCALANCE W786 access points	
IWLAN access points with built-in radio interfaces; radio networks IEEE 802.11a/b/g/h/n at 2.4/ 5 GHz up to 450 Mbit/s; WPA2/ AES; Power over Ethernet (PoE), IP65 degree of protection (-40°C to +60°C); scope of supply: Mounting hardware, 2-pin screw terminal for 24 V DC; manual on CD-ROM; German/English	
SCALANCE W786-1 RJ45	
IWLAN access points with one integrated wireless interface and RJ45 connection	
• Connections for two external antennas	
- National approvals for operation outside the USA	**6GK5 786-1FC00-0AA0**
- National approvals for operation within the USA [1]	**6GK5 786-1FC00-0AB0**
SCALANCE W786-2IA RJ45	
IWLAN access points with two integrated wireless interfaces and RJ45 connection	
• Six internal antennas	
- National approvals for operation outside the USA	**6GK5 786-2HC00-0AA0**
- National approvals for operation within the USA [1]	**6GK5 786-2HC00-0AB0**
SCALANCE W786-2 RJ45	
IWLAN access points with two integrated wireless interfaces and RJ45 connection	
• Six connections for external antennas	
- National approvals for operation outside the USA	**6GK5 786-2FC00-0AA0**
- National approvals for operation within the USA [1]	**6GK5 786-2FC00-0AB0**
SCALANCE W786-2 SFP	
IWLAN access points with two integrated wireless interfaces and RJ45 connection	
• Six internal antennas	
- National approvals for operation outside the USA	**6GK5 786-2FE00-0AA0**

[1] Please note national approvals at www.siemens.com/wireless-approvals

	Order No.
Accessories	
C-PLUG	**6GK1 900-0AB00**
Swap medium for simple replacement of devices in the event of a fault; for storing configuration data; can be used in SIMATIC NET products with PLUG slot	
Power supply PS791-2DC	**6GK5 791-2DC00-0AA0**
24 V DC power supply for installation in SCALANCE W786 products; operating instructions in German/English	
Power supply PS791-2AC	**6GK5 791-2AC00-0AA0**
110 V AC to 230 V AC power supply for installation in the SCALANCE W786 products; operating instructions in German/English	
MS1 mounting set	**6GK5 798-8MG00-0AA0**
Mounting set for fixing the SCALANCE W786 products onto an S7-300 mounting rail or a 35 mm standard DIN rail	
IE FC RJ45 Plug 4 x 2	
RJ45 plug connector for Industrial Ethernet (10/100/1000 Mbit/s) with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface	
• 1 pack = 1 unit	**6GK1 901-1BB11-2AA0**
• 1 pack = 10 units	**6GK1 901-1BB11-2AB0**
• 1 pack = 50 units	**6GK1 901-1BB11-2AE0**

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SCALANCE W786 RJ45 for the outdoor area

Ordering data

	Order No.
Accessories (continued)	
IE FC Standard Cable GP 4 x 2 8-core, shielded TP installation cable for connection to IE FC RJ45 Plug 4 x 2 and IE M12 Plug PRO 4 x 2; PROFINET-compliant; with UL approval; sold by the meter; max. length 1000 m, minimum order 20 m	**6XV1 878-2A**
IE FC Stripping Tool Preadjusted stripping tool for fast stripping of the Industrial Ethernet FC cables	**6GK1 901-1GA00**
Antennas and miscellaneous IWLAN accessories	see Industrial Wireless LAN/ accessories
SFP plug-in transceiver and fiber-optic cables	see Media modules for modular SCALANCE X-300 managed

More information

Wireless approvals:

Current approvals can be found on the Internet at:
www.siemens.com/wireless-approvals

To assist in selecting the right products for Industrial Wireless Communication, the SIMATIC NET Selection Tool is available:

Online version:
www.siemens.com/snst

Offline version:
www.siemens.com/snst-download

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Overview

The network infrastructures in the industrial and office areas are coming ever-closer together. This applies also in the area of wireless communication, causing a constant increase in the number of access points and WLAN clients to be managed. If such networks are established with a large number of stand-alone access points, with each one having to be configured separately, this results in huge costs for initial configuration and operation.

Central wireless LAN controllers enable low-cost, user-friendly and secure operation of large WLAN infrastructures here. Management of the WLAN clients connected to such WLANs is significantly simplified thanks to their division into user groups with different security policies.

The SCALANCE WLC711 Wireless LAN Controller is an IWLAN controller for centralized management of a wireless LAN in the industrial environment (configuration, diagnostics, firmware updates, access control, security settings, coordination).

- Fast establishment of a new WLAN or expansion of an existing WLAN with the help of the SCALANCE W786C, SCALANCE W788C and SCALANCE W786-2HPW controller-based access points
- Parallel operation of different services (e.g. communication between programmable controllers, Internet access, Voice-over-IP telephony and video transmission) on the same controller-based WLAN infrastructure
- Seamless transition between production WLAN and corporate WLAN
- Cost savings in commissioning and operation as well as increased reliability and security thanks to the central management functions of the IWLAN controller in comparison to a WLAN comprising stand-alone access points that have to be configured individually

Benefits

get Designed for Industry

- Cost reductions and thus significant cost savings in commissioning and operating larger IWLAN installations (ten access points and more) thanks to configuring from a central location
- Investment protection thanks to seamless integration into existing IWLAN installations or into an existing corporate WLAN
- Saving on redundant infrastructures (e.g. separate network for Internet access and voice transmission) thanks to multiple use of the same infrastructure for different services
- Avoidance of a single point of failure thanks to optional parallel operation of two controllers; the WLAN remains functional even if the controller(s) fail(s)
- Increased reliability when operating the IWLAN through complete, coordinated portfolio of controllers, industrial access points and SCALANCE W Client Modules, as well as the suitable accessories (antennas, connecting cables, power supplies)

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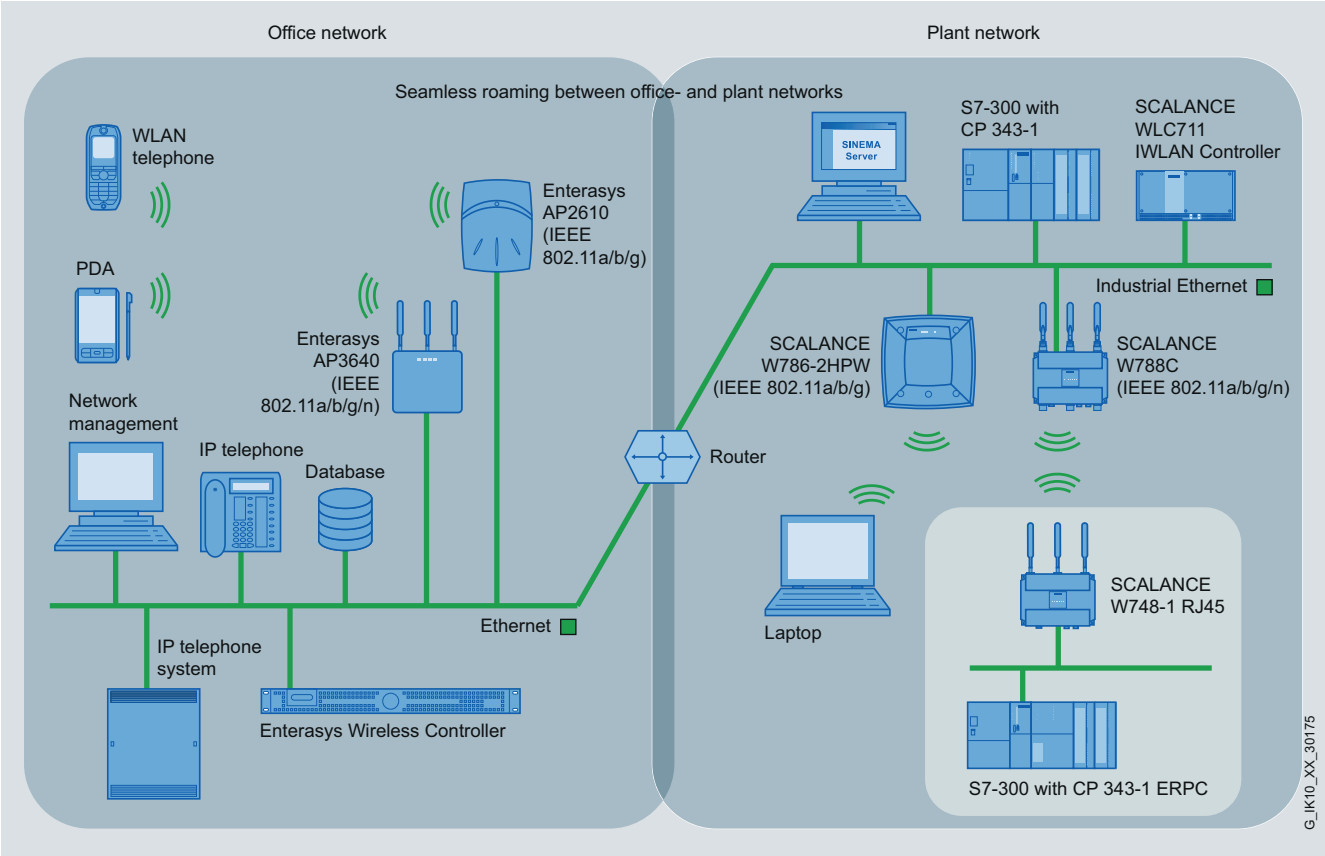
Overview

Application



Company-wide WLAN based on Enterasys Wireless Controller and SCALANCE WLC IWLAN Controller

The SCALANCE WLC711 IWLAN Controller is the optimal solution for IWLAN installations from 10 up to 32 access points. Through the use of the SCALANCE W Access Points and Client Modules, different applications in the industrial environment or a comparable environment can communicate via a centrally managed IWLAN. SCALANCE W Access Points for controller operation are available for use both outdoors and for cabinet-free use in the industrial environment (e.g. in the production hall).

The WLC711 IWLAN Controller can be integrated into the corporate WLAN and thus enables the implementation of an integrated WLAN in the office, outdoor and industrial areas. This allows operation of mobile WLAN phones and laptops in the same wireless network, while complying with security policies for different user groups, and guaranteeing defined quality of service (QoS) for different devices.

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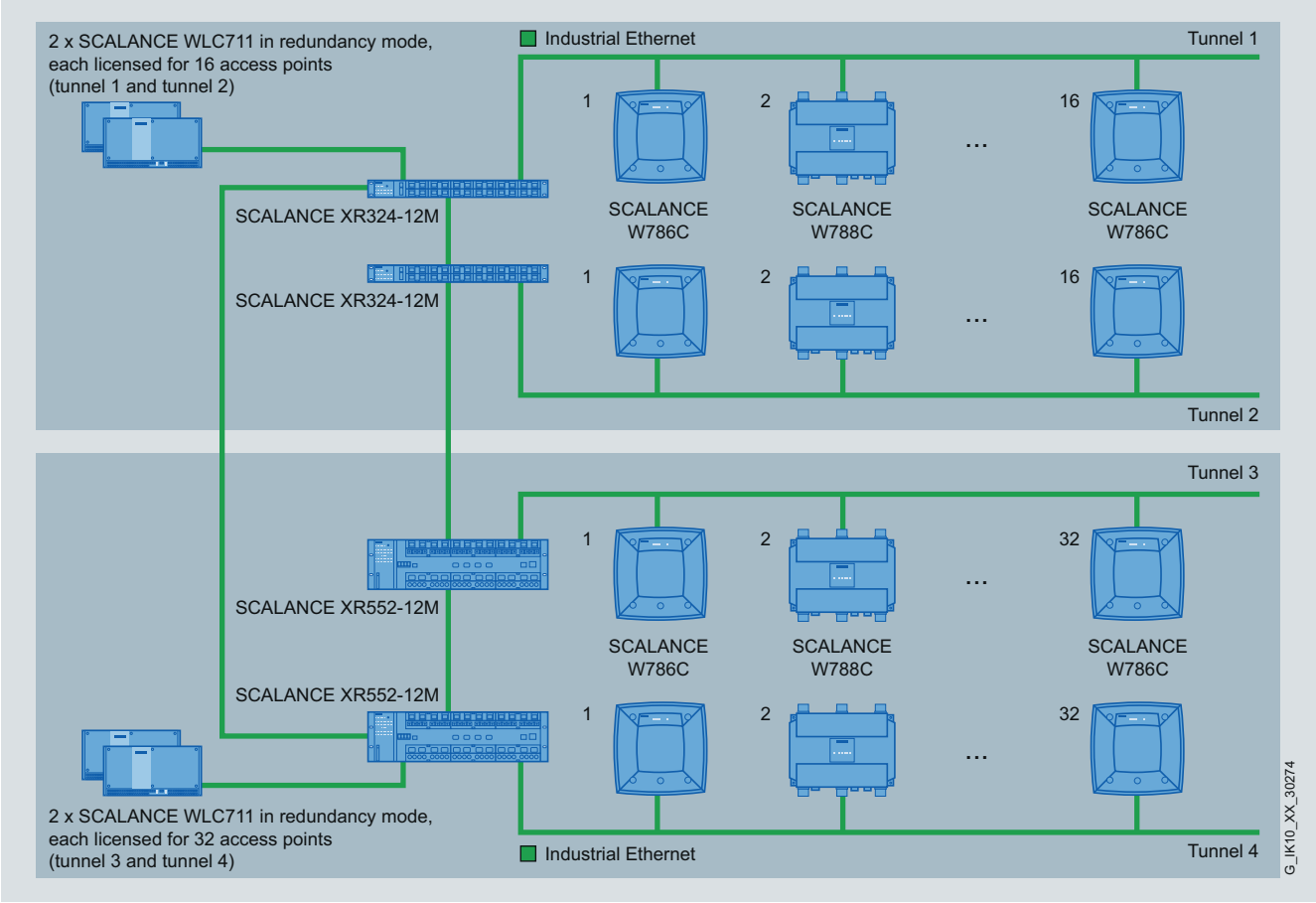
Application (continued)

Application examples

With the SCALANCE WLC711 IWLAN Controller, the benefits of a controller solution, long-familiar in corporate networks, now also become available to typical industrial and industry-related applications:

- Plant-wide wireless infrastructures in factory automation and process automation, e.g. for mobile operator input or logistics applications
- Industry-related applications, e.g. crane systems and road/ underground rail tunnels where IWLAN is required for transmitting visualization, video, and voice data



SCALANCE WLC711 IWLAN Controller in redundancy mode

Design

WLC711 IWLAN Controller

- 24 V DC power supply
- Enclosure in the design of the SIMATIC Microbox IPC, in degree or protection IP20 for installation in the control cabinet
- Two 10/100/1000 Mbit/s electrical RJ45 ports
- DIN rail and wall mounting possible
- Ambient temperature in operation 5 °C to 40 °C

Controller-based access points

- Radio card permanently installed in the device
- Versions available that support the WLAN standards IEEE 802.11a/b/g/n and IEEE 802.11a/b/g
- Versions available with RJ45 electrical port and BFOC optical port
- Antennas can either be connected by means of a screw connection (R-SMA, N-Connect) or they are integrated in the device. The antennas can be replaced within the IWLAN range
- Function LEDs for optical signaling of faults and operating states

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Overview

Function

Fundamental principles of the controller-based Industrial Wireless LAN

The IWLAN controller enables centralized management of an Industrial Wireless LAN. It automatically detects new access points, establishes the connection to these, and manages and coordinates access points and clients. Thanks to the Layer 3 architecture, access points located in different Layer 2 subnetworks can also be managed. This function allows wireless expansion of an existing Ethernet network without having to make changes to the existing network topology.

With the IWLAN controller, the IWLAN wireless infrastructure can be divided into logical, service-based networks (**V**irtual **N**etwork **S**ervices). Different services, security requirements and access criteria can thus be reliably managed, and different user groups such as administrators, commissioning engineers, or visitors can use the same wireless network.

In the same way, different applications such as Voice-over-IP (VoIP), video and Internet access can use the same infrastructure. The result is optimal capacity utilization of the IWLAN network.

If applications with high reliability and availability requirements are to communicate wirelessly, two IWLAN controllers can be operated redundantly.

The controller-based access points of the SCALANCE W78xC series can only be used with the IWLAN controller and can only be configured using the IWLAN controller.

The IWLAN controller connects, manages and coordinates all access point and clients such that the WLAN environment appears like several IP subnetworks with central management. The individual connections are additionally managed here, and the stations can therefore move securely and reliably throughout the complete radio network.

Diagnostics and management functions

As well as centralized management and wireless network configuration, the WLC711 IWLAN controller also offers error recording, wireless network monitoring, and documentation of network statistics.

More information

Supplementary WLAN solutions for office environments can be found on the Internet at:
www.enterasys.com

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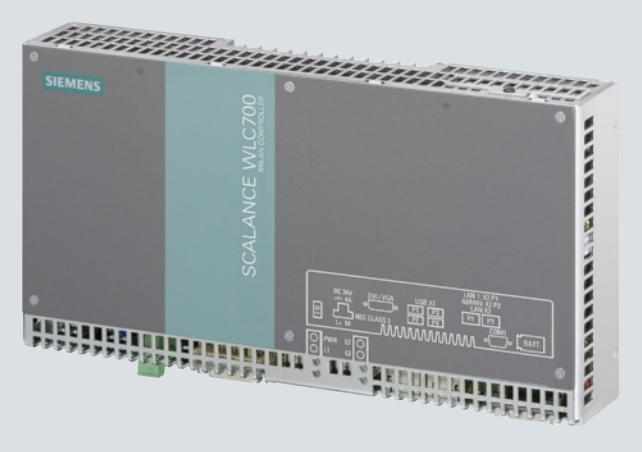
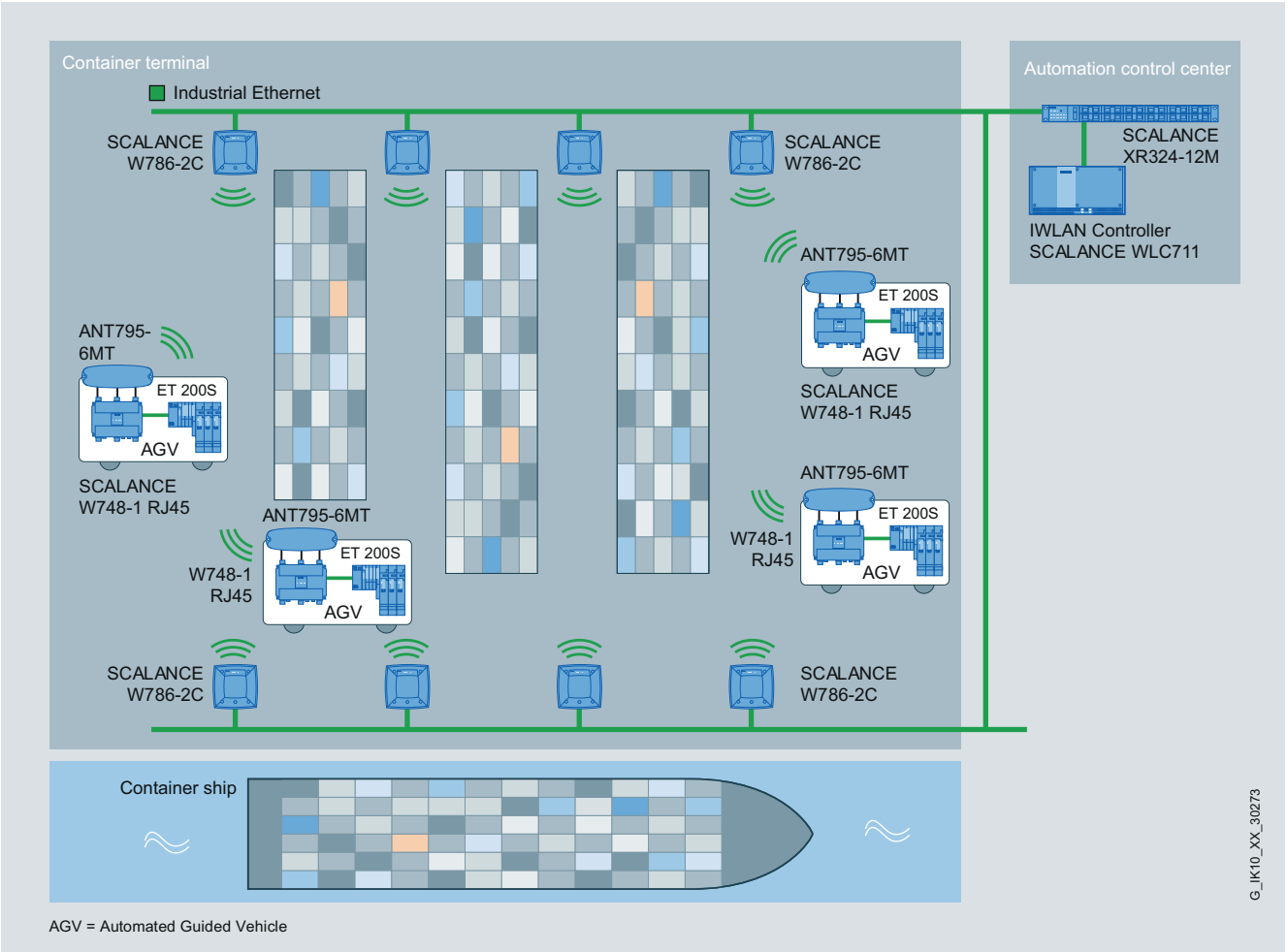
Overview



- Support for up to 32 access points in standard operation
- Support for up to 64 access points in redundant operation with two IWLAN controllers
- Supplied with license for 16 access points; expandable with license to 32 access points in standard operation
- Simultaneous support for up to 512 WLAN clients
- Support for up to 8 VNS segments
- Automatic detection of new access points
- Support for the SCALANCE W78xC controller-based access points (IEEE 802.11a/b/g/n) and W786-2HPW (IEEE 802.11a/ b/ g)

Application



Controller-based IWLAN for applications with a large number of access points, e.g. in a container terminal

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Industrial Wireless LAN Controller SCALANCE WLC711

Design

Product versions

SCALANCE WLC711 IWLAN Controller

- IWLAN controller licensed for the connection of up to 16 SCALANCE W78xC and SCALANCE W786-2HPW controller-based access points

License Key WLC-700

- Capacity upgrade for SCALANCE WLC-700 for supporting up to 32 SCALANCE W78xC and SCALANCE W786-2HPW controller-based access points

Technical specifications

Order No.	6GK5 711-0XC00-1AA0 6GK5 711-0XC00-1AB0 [1] 6GK5 711-0XC00-1AD0 [2]
Product type designation	**SCALANCE WLC711**
Transmission rate	
Transmission rate with Industrial Ethernet	10 … 1 000 Mbit/s
Interfaces	
Number of electrical connections	
• for network components or terminal equipment	2
• for power supply	1
Design of electrical connection	
• for network components or terminal equipment	RJ45 socket
• for power supply	2-pin screw terminal
Supply voltage, current consumption, power loss	
Type of power supply	DC
Supply voltage 1 from terminal block	24 V
Typical current consumed at 24 V DC	4 A
Effective power loss at 24 V DC, typically	20 W
Permissible ambient conditions	
Ambient temperature	
• During operation	5 … 40 °C
• During storage	-40 … +60 °C
• During transport	-40 … +60 °C
Relative humidity at 25 °C without condensation during operation, maximum	95 %
IP degree of protection	IP20
Ambient conditions for operation	-
Design, dimensions and weights	
Width	262 mm
Height	142 mm
Depth	47 mm
Net weight	2 kg
Type of mounting	
• 35 mm DIN rail mounting	Yes
• Wall mounting	Yes
Type of mounting	Wall mounting using supplied cabinet brackets

Order No.	6GK5 711-0XC00-1AA0 6GK5 711-0XC00-1AB0 [1] 6GK5 711-0XC00-1AD0 [2]
Product type designation	**SCALANCE WLC711**
Product functions Management, configuration, programming	
Product function	
• CLI	Yes
• Web-based management	Yes
• MIB support	Yes
• WDS	Yes
Protocol is supported	
• Address Resolution Protocol (ARP)	No
• ICMP	Yes
• Telnet	Yes
• HTTP	Yes
• HTTPS	Yes
• TFTP	Yes
• SNMP v1	-
• SNMP v2	Yes
• SNMP v3	Yes
• DCP	No
• LLDP	No
Product functions Diagnostics	
Product function SysLog	Yes
Product functions VLAN	
Product function VLAN with IWLAN	Yes
Product functions DHCP	
Product function DHCP client	No
Product functions Security	
Product function	
• IEEE 802.1x (radius)	Yes
• NAT/NAPT	No
• Access protection according to IEEE802.11i	Yes
• WPA/WPA2	Yes
• TKIP/AES	Yes
Protocol is supported SSH	Yes
Product functions Time	
Protocol is supported	
• NTP	Yes
• SNTP	No

[1] Wireless approval in the USA
[2] Wireless approval in Japan

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Technical specifications (continued)

Order No.	6GK5 711-0XC00-1AA0 6GK5 711-0XC00-1AB0 [1] 6GK5 711-0XC00-1AD0 [2]
Product type designation	**SCALANCE WLC711**
Product functions IWLAN controller	
Number of supported access points	
• in standard mode with an IWLAN controller	16
• in redundancy mode with two IWLAN controllers	32
Product function of the IWLAN controller:	When supplied with basic license, 16 access points are supported in standard mode and 32 access points in redundancy mode. With capacity upgrade, 32 access points are supported in standard mode and 64 access points in redundancy mode.
Number of supported WLAN clients per IWLAN controller	512
Number of VNS segments per IWLAN controller	8
Product function	
• Pre-standard (CAPWAP)	Yes
• Integral VLAN-VNS	Yes
• Auto detection of new access points	Yes
• CDR/RADIUS accounting	Yes
• Dynamic Radio Management	Yes
• VoIP QoS mapping (DSCP/TCP-on-WMM)	Yes
• VoIP roaming between IP subnetworks	Yes
• VoIP roaming between several IWLAN controllers	Yes
Load distribution function	DRM (Dynamic Radio/ RF Management), Packet Fairness, Flexible Client Access (Airtime Fairness), Load Balancing, Band-Steering
Backup function for IWLAN controller	Redundancy mode with two IWLAN controllers (64 access points in total)
Switching function	Traffic bridged at controller/ traffic bridged locally at wireless access point
Design of the interface for public network access	Internal captive portal (Web redirection)
Product function of the IWLAN controller	

Order No.	6GK5 711-0XC00-1AA0 6GK5 711-0XC00-1AB0 [1] 6GK5 711-0XC00-1AD0 [2]
Product type designation	**SCALANCE WLC711**
Standards, specifications, approvals	
Certificate of suitability	
• CE marking	Yes
• EC Declaration of Conformity	Yes
• C-Tick	Yes
• CCC	No
• Railroad application according to EN 50155	No
• e1 approval	No
• E1 approval	No
• NEMA4X	No
• Power-over-Ethernet according to IEEE802.3at for Type 1 and IEEE802.3af	No
• Power-over-Ethernet according to IEEE802.3at for Type 2	No
Standard for wireless communication	
• IEEE 802.11a	Yes
• IEEE 802.11b	Yes
• IEEE 802.11e	Yes
• IEEE 802.11g	Yes
• IEEE 802.11h	Yes
• IEEE 802.11i	Yes
• IEEE 802.11n	Yes
Wireless approval	You can find the latest list of countries at: www.siemens.com/simatic-net/ik-info
Accessories	
Accessories	24 V DC screw terminal and 2 cabinet brackets included in scope of delivery

[1] Wireless approval in the USA
[2] Wireless approval in Japan

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Industrial Wireless LAN Controller SCALANCE WLC711

Ordering data

	Order No.
SCALANCE WLC711 IWLAN Controller	
IWLAN controller licensed for the connection of up to 16 SCALANCE W78xC and SCALANCE W786-2HPW controller-based access points	
• National approvals for operation outside North America, Canada, and Japan (RoW)	**6GK5 711-0XC00-1AA0**
• National approvals for operation in North America, including Canada (NAM) [1]	**6GK5 711-0XC00-1AB0**
• National approvals for operation in Japan (JP) [1]	**6GK5 711-0XC00-1AD0**
License Key WLC-700 Capacity upgrade for SCALANCE WLC-700 for supporting up to 32 SCALANCE W78xC and SCALANCE W786-2HPW controller-based access points	**6GK5 907-1SB00**
Accessories	
IE TP Cord RJ45/RJ45	
TP cable 4 x 2 with 2 RJ45 connectors	
• 0.5 m	**6XV1 870-3QE50**
• 1 m	**6XV1 870-3QH10**
• 2 m	**6XV1 870-3QH20**
• 6 m	**6XV1 870-3QH60**
• 10 m	**6XV1 870-3QN10**
LOGO!Power 24 V/4 A Stabilized power supply; Input: 100 … 240 V AC, output: 24 V DC/4 A	**6EP1 332-1SH52**

[1] Please note national approvals at www.siemens.com/wireless-approvals

More information

Wireless approvals:

Current approvals can be found on the Internet at:
www.siemens.com/wireless-approvals

To assist in selecting the right products for Industrial Wireless Communication, the SIMATIC NET Selection Tool is available:

Online version:
www.siemens.com/snst

Offline version:
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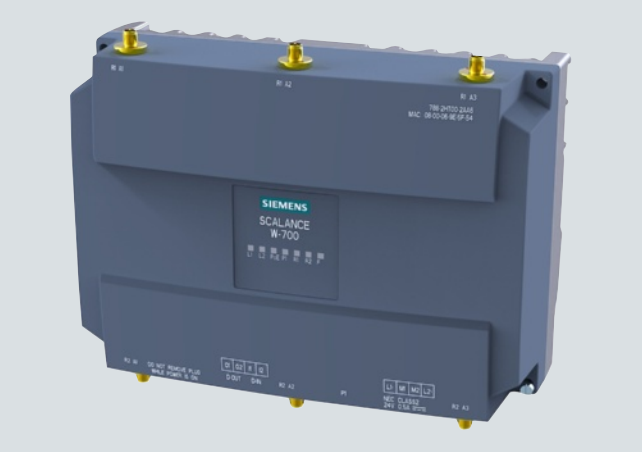
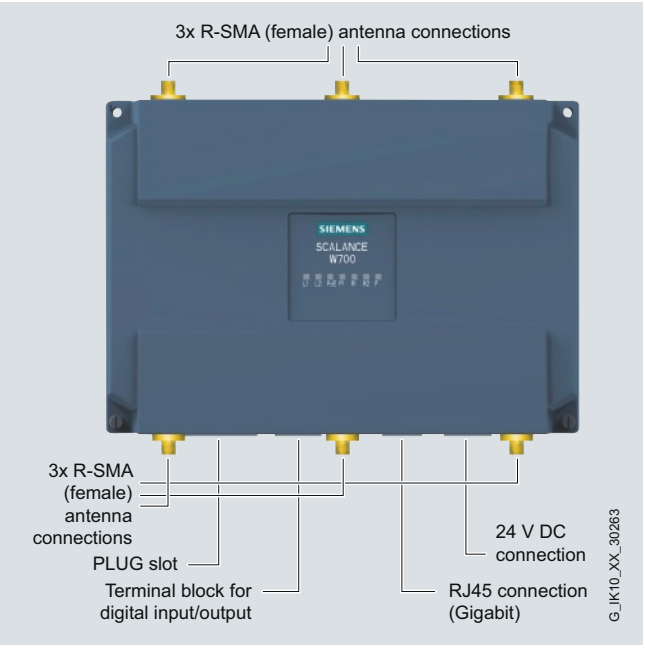
Overview



- SCALANCE W788C-2 RJ45 controller-based access points can only be operated on the SCALANCE WLC IWLAN Controller
- Support for the WLAN standard IEEE 802.11n, 3x3 MIMO (compatible with IEEE 802.11a/b/g/h)
- Especially suitable for applications where the access point is to be mounted in the control cabinet
- Low-cost alternative for use indoors with less severe environmental conditions
- The rugged aluminum enclosure with degree of protection IP30 nevertheless provides protection against mechanical and electromagnetic stress in industrial areas

Design

- Rugged aluminum enclosure, shock and vibration-proof, for high mechanical requirements
- Dust protection with IP30 degree of protection
- For use at ambient temperatures from -20 °C to +60 °C
- Resistant to condensation
- Design suitable for installation in control cabinet
- Two built-in wireless cards
- 6 x R-SMA (female) sockets for the connection of remote antennas
- Antenna placement optimized for the 3x3 MIMO technology; the antennas do not interfere with each other when they are mounted direct on the device
- 1 x RJ45 connection for 10/100/1000 Mbit/s with Power-over-Ethernet according to IEEE 802.3at Type 1 (corresponds to IEEE 802.3af)
- 2 x 24 V DC connection for redundant power infeed
- Mounting: Wall, S7 mounting rail or on 35 mm standard mounting rail



Design and interfaces of the SCALANCE W788C-2 RJ45 controller-based access points

Product versions

SCALANCE W788C-2 RJ45 (controller-based)

- Two wireless cards permanently installed in the device

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Controller Access Points
SCALANCE W788C RJ45 for control cabinet

Technical specifications

Order No.	6GK5 788-2FC00-1AA0
Product type designation	**SCALANCE W788C-2 RJ45**
Transmission rate	
Transmission rate	
• with W-LAN, maximum	450 Mbit/s
• with Industrial Ethernet	10 … 1 000 Mbit/s
• Note	-
Interfaces	
Number of electrical connections	
• for network components or terminal equipment	1
• for power supply	1
• for redundant power supply	1
Design of electrical connection	
• for network components or terminal equipment	RJ45 socket
• for power supply	4-pin screw terminal, PoE
Number of optical connections for fiber-optic cables at 100 Mbit/s	-
Design of optical connection for fiber-optic cables at 100 Mbit/s	-
Design of swap medium C-Plug	No
Interfaces wireless	
Number of permanently installed wireless cards	2
Number of internal antennas	-
Number of electrical connections for external antenna(s)	6
Design of electrical connection for external antenna(s)	R-SMA female (socket)
Supply voltage, current consumption, power loss	
Type of power supply	DC
Power supply	
• 1 from terminal block	19.2 V
• 2 from terminal block	28.8 V
• From Power-over-Ethernet according to IEEE802.3at for Type 1 and IEEE802.3af	48 V
• From Power-over-Ethernet according to IEEE802.3at for Type 2	48 V
Permissible ambient conditions	
Ambient temperature	
• During operation	-20 … +60 °C
• During storage	-40 … +70 °C
• During transport	-40 … +70 °C
Relative humidity at 25 °C without condensation during operation, maximum	90 %
IP degree of protection	IP30
Ambient conditions for operation	-

Order No.	6GK5 788-2FC00-1AA0
Product type designation	**SCALANCE W788C-2 RJ45**
Design, dimensions and weights	
Width of enclosure without antenna	200 mm
Height of enclosure without antenna	158 mm
Depth of enclosure without antenna	79 mm
Net weight	1.7 kg
Type of mounting: wall mounting	Yes
Type of mounting	-
Wireless frequencies	
Wireless frequency	
• With WLAN in the 2.4 GHz frequency band	2.41 … 2.48 GHz
• With WLAN in the 5 GHz frequency band	4.9 … 5.8 GHz
Product functions Management, configuration, programming	
Product function	
• Operation with IWLAN controller	Yes
• Operation with Enterasys WLAN controller	Yes
Standards, specifications, approvals	
Standard	
• for EMC of FM	-
• for hazardous zone	-
• for CSA and UL safety	UL 60950-1 CSA C22.2 No. 60950-1
• for hazardous zone of CSA and UL	-
Certificate of suitability	
• CE marking	Yes
• EC Declaration of Conformity	Yes
• C-Tick	Yes
• CCC	No
• Railroad application according to EN 50155	No
• e1 approval	No
• E1 approval	No
• NEMA4X	No
Standard for wireless communication	
• IEEE 802.11a	Yes
• IEEE 802.11b	Yes
• IEEE 802.11g	Yes
• IEEE 802.11h	Yes
• IEEE 802.11n	Yes
Wireless approval	You can find the latest list of countries at: www.siemens.com/simatic-net/ik-info
Marine classification association	
• American Bureau of Shipping Europe Ltd. (ABS)	No
• Bureau Veritas (BV)	No
• Det Norske Veritas (DNV)	No
• Germanischer Lloyd (GL)	No
• Lloyds Register of Shipping (LRS)	No
• Nippon Kaiji Kyokai (NK)	No
• Polski Rejestr Statkow (PRS)	No
Accessories	
Accessories	24 V DC screw terminal and screw terminal for digital input and output included in scope of delivery

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Ordering data

	Order No.
SCALANCE W788C RJ45 Controller access points	
IWLAN access points for operating with the SCALANCE WLC IWLAN Controller; with two built-in wireless interfaces; wireless networks IEEE 802.11a/b/g/h/n at 2.4/5 GHz up to 450 Mbit/s; WPA2/AES; Power over Ethernet (PoE), IP65 degree of protection (-20 °C to +60 °C); scope of delivery: Mounting hardware; manual on CD-ROM, German/English	
• **SCALANCE W788C-2 RJ45** with R-SMA female connections for six external antennas	**6GK5 788-2FC00-1AA0**
Accessories	
DIN rail mounting adapter	**6GK5798-8ML00-0AB3**
DIN rail mounting adapter for SCALANCE W788 M12 and SCALANCE W788 RJ45; screw fixing for mounting on a 35 mm DIN rail to EN 50 022; scope of supply: 3 units per pack	
IE FC RJ45 Plug 4 x 2	
RJ45 plug connector for Industrial Ethernet (10/100/1000 Mbit/s) with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface	
• 1 pack = 1 unit	**6GK1 901-1BB11-2AA0**
• 1 pack = 10 units	**6GK1 901-1BB11-2AB0**
• 1 pack = 50 units	**6GK1 901-1BB11-2AE0**
IE FC Standard Cable GP 4 x 2	**6XV1 878-2A**
8-core, shielded TP installation cable for connection to IE FC RJ45 Plug 4 x 2 and IE M12 Plug PRO 4 x 2; PROFINET-compliant; with UL approval; sold by the meter; max. length 1000 m, minimum order 20 m	
IE FC Stripping Tool	**6GK1 901-1GA00**
Preadjusted stripping tool for fast stripping of the Industrial Ethernet FC cables	
Antennas and miscellaneous IWLAN accessories	see Industrial Wireless LAN/ accessories

More information

Wireless approvals:

Current approvals can be found on the Internet at:
www.siemens.com/wireless-approvals

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Online version:
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Offline version:
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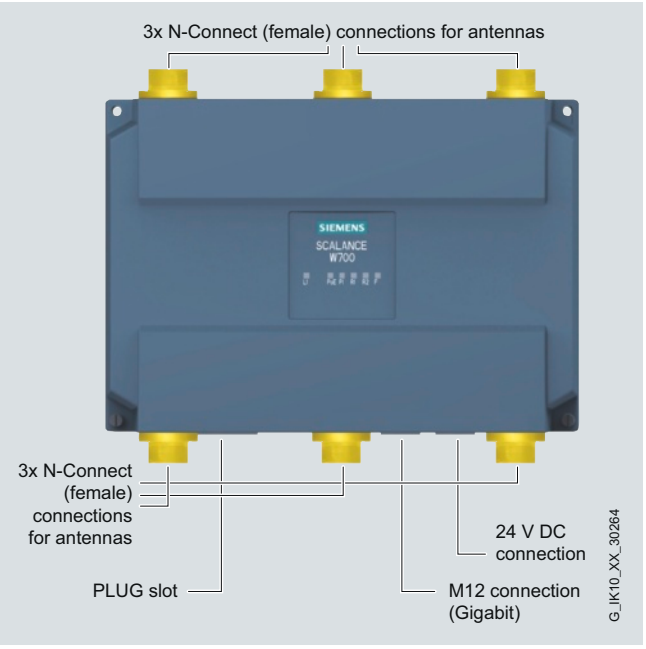
Controller Access Points
SCALANCE W788C M12 for the indoor area

Overview

- SCALANCE W788C-2 M12 controller-based access points can only be operated on the SCALANCE WLC IWLAN Controller
- Support for the WLAN standard IEEE 802.11n, 3x3 MIMO (compatible with IEEE 802.11a/b/g/h)
- Particularly suitable for industrial applications without control cabinets

Design

- Rugged aluminum enclosure, shock and vibration-proof, for high mechanical requirements
- High IP65 degree of protection against dust and water jets
- For use at ambient temperatures from -20 °C to +60 °C
- Resistant to condensation
- 6 x N-Connect (female) sockets for the connection of remote antennas
- Antenna placement optimized for the 3x3 MIMO technology; the antennas do not interfere with each other when they are mounted direct on the device
- 1 x M12 connection for 10/100/1000 Mbit/s with Power-over-Ethernet according to IEEE 802.3at Type 1 (corresponds to IEEE 802.3af)
- 1 x M12 socket for energy supply (24 V DC)
- Mounting: Wall, S7 mounting rail or on 35 mm standard mounting rail



Design and interfaces of the SCALANCE W788C-2 M12 controller-based access points

Product versions

SCALANCE W786C-2 M12 (controller-based)

- Two wireless cards permanently installed in the device

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Technical specifications

Order No.	6GK5 788-2GD00-1AA0
Product type designation	**SCALANCE W788C-2 M12**
Transmission rate	
Transmission rate	
• with W-LAN, maximum	450 Mbit/s
• with Industrial Ethernet	10 … 1 000 Mbit/s
• Note	-
Interfaces	
Number of electrical connections	
• for network components or terminal equipment	1
• for power supply	1
• for redundant power supply	1
Design of electrical connection	
• for network components or terminal equipment	M12 interface (8-pin, A-coded), PoE
• for power supply	M12 interface (4-pin, A-coded), PoE
Number of optical connections for fiber-optic cables at 100 Mbit/s	-
Design of optical connection for fiber-optic cables at 100 Mbit/s	-
Design of swap medium C-Plug	No
Interfaces wireless	
Number of permanently installed wireless cards	2
Number of internal antennas	-
Number of electrical connections for external antenna(s)	6
Design of electrical connection for external antenna(s)	N-Connect female (socket)
Supply voltage, current consumption, power loss	
Type of power supply	DC
Power supply	
• 1 from M12 power connector (A-coded) for redundant power supply	19.2 V
• 2 from M12 power connector (A-coded) for redundant power supply	28.8 V
• From Power-over-Ethernet according to IEEE802.3at for Type 1 and IEEE802.3af	48 V
• From Power-over-Ethernet according to IEEE802.3at for Type 2	48 V
Permissible ambient conditions	
Ambient temperature	
• During operation	-20 … +60 °C
• During storage	-40 … +70 °C
• During transport	-40 … +70 °C
Relative humidity at 25 °C without condensation during operation, maximum	90 %
IP degree of protection	IP65
Ambient conditions for operation	-

Order No.	6GK5 788-2GD00-1AA0
Product type designation	**SCALANCE W788C-2 M12**
Design, dimensions and weights	
Width of enclosure without antenna	200 mm
Height of enclosure without antenna	176 mm
Depth of enclosure without antenna	79 mm
Net weight	1.7 kg
Type of mounting: wall mounting	Yes
Wireless frequencies	
Wireless frequency	
• With WLAN in the 2.4 GHz frequency band	2.41 … 2.48 GHz
• with WLAN in the 5 GHz frequency band	4.9 … 5.8 GHz
Product functions Management, configuration, programming	
Product function	
• Operation with IWLAN controller	Yes
• Operation with Enterasys WLAN controller	Yes
Standards, specifications, approvals	
Standard	
• for EMC of FM	-
• for hazardous zone	-
• for CSA and UL safety	UL 60950-1 CSA C22.2 No. 60950-1
• for hazardous zone of CSA and UL	-
Certificate of suitability	
• CE marking	Yes
• EC Declaration of Conformity	Yes
• C-Tick	Yes
• CCC	No
• Railroad application according to EN 50155	No
• e1 approval	No
• E1 approval	No
• NEMA4X	No
Standard for wireless communication	
• IEEE 802.11a	Yes
• IEEE 802.11b	Yes
• IEEE 802.11g	Yes
• IEEE 802.11h	Yes
• IEEE 802.11n	Yes
Wireless approval	You can find the latest list of countries at: www.siemens.com/simatic-net/ik-info
Marine classification association	
• American Bureau of Shipping Europe Ltd. (ABS)	No
• Bureau Veritas (BV)	No
• Det Norske Veritas (DNV)	No
• Germanischer Lloyd (GL)	No
• Lloyds Register of Shipping (LRS)	No
• Nippon Kaiji Kyokai (NK)	No
• Polski Rejestr Statkow (PRS)	No

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Controller Access Points
SCALANCE W788C M12 for the indoor area

Ordering data

	Order No.
SCALANCE W788C M12 Controller Access Points	
IWLAN access points for operating with the SCALANCE WLC IWLAN Controller; with two built-in wireless interfaces; wireless networks IEEE 802.11a/b/g/h/n at 2.4/5 GHz up to 450 Mbit/s; WPA2/AES; Power over Ethernet (PoE), IP65 degree of protection (-20 °C to +60 °C); scope of delivery: Mounting hardware; manual on CD-ROM, German/English	
• **SCALANCE W788C-2 M12** with N-Connect female connections for six external antennas	**6GK5 788-2GD00-1AA0**
Accessories	
IE FC M12 Plug PRO 4 x 2 M12 plug-in connector suitable for on-site assembly (X-coded, IP65/IP67), metal enclosure, insulation/displacement fast connection method, for SCALANCE W	
• 1 unit	**6GK1 901-0DB30-6AA0**
• 8 units	**6GK1 901-0DB30-6AA8**
DIN rail mounting adapter DIN rail mounting adapter for SCALANCE W788 M12 and SCALANCE W788 RJ45; screw fixing for mounting on a 35 mm DIN rail to EN 50 022; scope of supply: 3 units per pack	**6GK5 798-8ML00-0AB3**
IE FC Standard Cable GP 4 x 2 8-core, shielded TP installation cable for connection to IE FC RJ45 Plug 4 x 2 and IE M12 Plug PRO 4 x 2; PROFINET-compliant; with UL approval; sold by the meter; max. length 1000 m, minimum order 20 m	**6XV1 878-2A**
IE FC Flexible Cable GP 4 x 2 8-core, shielded TP installation cable for connection to IE FC RJ45 Plug 4 x 2 and IE M12 Plug PRO 4 x 2 for occasional movement; PROFINET-compliant; with UL approval; sold by the meter; max. length 1000 m, minimum order 20 m	**6XV1 878-2B**
IE FC Stripping Tool Preadjusted stripping tool for fast stripping of the Industrial Ethernet FC cables	**6GK1 901-1GA00**
Antennas and miscellaneous IWLAN accessories	see Industrial Wireless LAN/ accessories

More information

Wireless approvals:

Current approvals can be found on the Internet at:
www.siemens.com/wireless-approvals

To assist in selecting the right products for Industrial Wireless Communication, the SIMATIC NET Selection Tool is available:

Online version:
www.siemens.com/snst

Offline version:
www.siemens.com/snst-download

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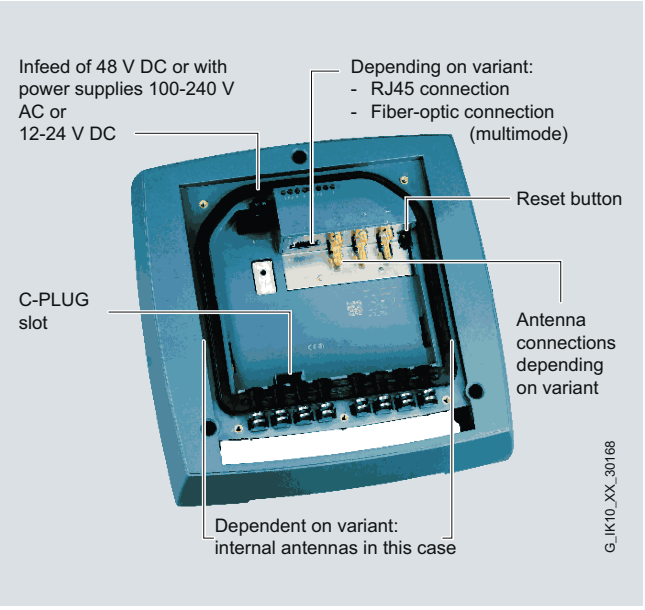
Overview

- SCALANCE W786C-2 controller-based access points can only be operated on the SCALANCE WLC IWLAN Controller
- Support for the WLAN standard IEEE 802.11n, 3x3 MIMO (compatible with IEEE 802.11a/b/g/h)
- Especially well suited to applications with high climatic requirements when installed outdoors and in areas accessible to the public

Design

- Rugged plastic enclosure (plexi-glass type), shock and vibration-proof for severe mechanical loading
- High IP65 degree of protection against dust and water jets
- For use at ambient temperatures from -40 °C to +60 °C
- Resistant to condensation
- Resistant to UV radiation and saltwater spray
- Design for use outdoors
- 6 x R-SMA sockets for the connection of remote antennas or six internal antennas
- Version with 1 x RJ45 connection for 10/100/1000 Mbit/s with Power-over-Ethernet according to IEEE 802.3at Type 1 (corresponds to IEEE 802.3af)
- 1 x 24 V DC connection, optional operation with 12 to 24 V DC or 100 to 240 V AC with power supply integrated into device
- Mounting: Wall or, with optional mounting set, on S7 mounting rail, 35 mm standard mounting rail, or on a pole



Design and interfaces of the SCALANCE W786C-2 controller-based access points

Product versions

SCALANCE W786C-2 (controller-based)

- Two wireless cards permanently installed in the device
- Versions with:
  - Six internal antennas
  - Six connections for external antennas

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Technical specifications

Order No.	6GK5 786-2HC00-1AA0	6GK5 786-2FC00-1AA0
Product type designation	**SCALANCE W786C-2IA RJ45**	**SCALANCE W786C-2 RJ45**
Transmission rate		
Transmission rate		
• with W-LAN, maximum	450 Mbit/s	450 Mbit/s
• with Industrial Ethernet	10 … 1 000 Mbit/s	10 … 1 000 Mbit/s
• Note	-	-
Interfaces		
Number of electrical connections		
• for network components or terminal equipment	1	1
• for power supply	1	1
• for redundant power supply	1	1
Design of electrical connection		
• for network components or terminal equipment	RJ45 socket	RJ45 socket
• for power supply	2-pin connector (24 V DC) or optionally available power supply adapter (4-pin 24 V DC or 3-pin 110 to 230 V AC)	2-pin connector (24 V DC) or optionally available power supply adapter (4-pin 24 V DC or 3-pin 110 to 230 V AC)
Number of optical connections for fiber-optic cables at 100 Mbit/s	-	-
Design of optical connection for fiber-optic cables at 100 Mbit/s	-	-
Number of optical connections for fiber-optic cables at 1000 Mbit/s	-	-
Design of optical connection for fiber-optic cables at 1000 Mbit/s	-	-
Design of swap medium C-Plug	No	No
Interfaces wireless		
Number of permanently installed wireless cards	2	2
Number of internal antennas	6	-
Number of electrical connections for external antenna(s)	-	6
Design of electrical connection for external antenna(s)	-	R-SMA female (socket)
Supply voltage, current consumption, power loss		
Type of power supply	DC	DC
Power supply		
• 1 from terminal block	19.2 V	19.2 V
• 2 from terminal block	28.8 V	28.8 V
• From Power-over-Ethernet according to IEEE802.3at for Type 1 and IEEE802.3af	48 V	48 V
• From Power-over-Ethernet according to IEEE802.3at for Type 2	48 V	48 V
• From optionally integrated power supply		
- With AC	100 … 240 V	100 … 240 V
- With DC	12 … 24 V	12 … 24 V

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Technical specifications (continued)

Order No.	6GK5 786-2HC00-1AA0	6GK5 786-2FC00-1AA0
Product type designation	**SCALANCE W786C-2IA RJ45**	**SCALANCE W786C-2 RJ45**
Permissible ambient conditions		
Ambient temperature		
• During operation	-40 … +60 °C	-40 … +60 °C
• During storage	-40 … +85 °C	-40 … +85 °C
• During transport	-40 … +85 °C	-40 … +85 °C
Relative humidity at 25 °C without condensation during operation, maximum	100 %	100 %
IP degree of protection	IP65	IP65
Ambient conditions for operation	When using the 100 … 240 V AC power supply, an operating temperature of -40 °C to +60 °C is permissible	When using the 100 … 240 V AC power supply, an operating temperature of -40 °C to +60 °C is permissible
Design, dimensions and weights		
Width of enclosure without antenna	251 mm	251 mm
Height of enclosure without antenna	251 mm	251 mm
Depth of enclosure without antenna	72 mm	72 mm
Net weight	2.24 kg	2.24 kg
Type of mounting: wall mounting	Yes	Yes
Type of mounting	For mast mounting, 35 mm DIN rail mounting and S7-300 rail mounting, an additional retaining plate is required	For mast mounting, 35 mm DIN rail mounting and S7-300 rail mounting, an additional retaining plate is required
Wireless frequencies		
Wireless frequency		
• With WLAN in the 2.4 GHz frequency band	2.41 … 2.48 GHz	2.41 … 2.48 GHz
• With WLAN in the 5 GHz frequency band	4.9 … 5.8 GHz	4.9 … 5.8 GHz
Product functions Management, configuration, programming		
Product function		
• Operation with IWLAN controller	Yes	Yes
• Operation with Enterasys WLAN controller	Yes	Yes

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Technical specifications (continued)

Order No.	6GK5 786-2HC00-1AA0	6GK5 786-2FC00-1AA0
Product type designation	**SCALANCE W786C-2IA RJ45**	**SCALANCE W786C-2 RJ45**
Standards, specifications, approvals		
Standard		
• for EMC of FM	-	-
• for hazardous zone	-	-
• for CSA and UL safety	UL 60950-1 CSA C22.2 No. 60950-1	UL 60950-1 CSA C22.2 No. 60950-1
• for hazardous zone of CSA and UL	-	-
Certificate of suitability		
• CE marking	Yes	Yes
• EC Declaration of Conformity	Yes	Yes
• C-Tick	Yes	Yes
• CCC	No	No
• Railroad application according to EN 50155	No	No
• e1 approval	No	No
• E1 approval	No	No
• NEMA4X	Yes	Yes
• Power-over-Ethernet according to IEEE802.3at for Type 1 and IEEE802.3af	Yes	Yes
• Power-over-Ethernet according to IEEE802.3at for Type 2	Yes	Yes
Standard for wireless communication		
• IEEE 802.11a	Yes	Yes
• IEEE 802.11b	Yes	Yes
• IEEE 802.11g	Yes	Yes
• IEEE 802.11h	Yes	Yes
• IEEE 802.11n	Yes	Yes
Wireless approval	You can find the latest list of countries at: www.siemens.com/simatic-net/ik-info	You can find the latest list of countries at: www.siemens.com/simatic-net/ik-info
Marine classification association		
• American Bureau of Shipping Europe Ltd. (ABS)	No	No
• Bureau Veritas (BV)	No	No
• Det Norske Veritas (DNV)	No	No
• Germanischer Lloyd (GL)	No	No
• Lloyds Register of Shipping (LRS)	No	No
• Nippon Kaiji Kyokai (NK)	No	No
• Polski Rejestr Statkow (PRS)	No	No
Accessories		
Accessories	24 V DC screw terminal included in scope of delivery	24 V DC screw terminal included in scope of delivery

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Ordering data

	Order No.
SCALANCE W786C Controller access points	
IWLAN access points for operating with the SCALANCE WLC IWLAN Controller; with two built-in wireless interfaces; wireless networks IEEE 802.11a/b/g/h/n at 2.4/ 5 GHz up to 450 Mbit/s; WPA2/ AES; Power over Ethernet (PoE), IP65 degree of protection (-40°C to +60°C); scope of delivery: Mounting hardware, 2-pin screw terminal for 24 V DC; manual on CD-ROM; German/English	
• **SCALANCE W786C-2IA RJ45** with six internal antennas	**6GK5 786-2HC00-1AA0**
• **SCALANCE W786C-2 RJ45** with R-SMA female connections for six external antennas	**6GK5 786-2FC00-1AA0**
Accessories	
Power supply PS791-2DC 12 to 24 V DC power supply for installation in SCALANCE W786C-2 products; operating instructions in German/English	**6GK5 791-2DC00-0AA0**
Power supply PS791-2AC 110 to 230 V C power supply for installation in SCALANCE W786C-2 products; operating instructions in German/English	**6GK5 791-2AC00-0AA0**
MS1 mounting set Mounting set for fixing the SCALANCE W786C-2 products onto an S7-300 mounting rail or a 35 mm standard mounting rail	**6GK5 798-8MG00-0AA0**

	Order No.
IE FC RJ45 Plug 4 x 2 RJ45 plug connector for Industrial Ethernet (10/100/1000 Mbit/s) with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface	
• 1 pack = 1 unit	**6GK1 901-1BB11-2AA0**
• 1 pack = 10 units	**6GK1 901-1BB11-2AB0**
• 1 pack = 50 units	**6GK1 901-1BB11-2AE0**
IE FC Standard Cable GP 4 x 2 8-core, shielded TP installation cable for connection to IE FC RJ45 Plug 4 x 2 and IE M12 Plug PRO 4 x 2; PROFINET-compliant; with UL approval; sold by the meter; max. length 1000 m, minimum order 20 m	**6XV1 878-2A**
IE FC Stripping Tool Preadjusted stripping tool for fast stripping of the Industrial Ethernet FC cables	**6GK1 901-1GA00**
Antennas and miscellaneous IWLAN accessories	See Industrial Wireless LAN/ accessories

More information

Wireless approvals:

Current approvals can be found on the Internet at:
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Offline version:
www.siemens.com/snst-download

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Overview

Overview

The access points of the SCALANCE W780 product line are optimized for the configuration of Industrial Wireless LAN (IWLAN) wireless networks for 2.4 GHz or 5 GHz with data transmission rates up to 54 Mbit/s. They can be used in all applications that require a high degree of operational reliability,even under extremely harsh environmental conditions.

- Suitable for any application:
  - SCALANCE W784 for installation in a cabinet or integration in devices
  - SCALANCE W788 for cabinet-free installation indoors
  - SCALANCE W786 for outdoor environments with demanding climatic requirements
- Reliable thanks to rugged, impact-resistant housing, protected from water and dust (IP65), resistant to shock, vibration and electromagnetic fields
- Approved for operation in hazardous areas in Zone 2
- Demanding applications with real-time and redundancy requirements, such as PROFINET with PROFIsafe
- In conformance with standards, as it supports IEEE 802.11; expansions with software functions, especially for applications demanding high reliability, e.g. channel hopping procedure (iHOP), cyclic real-time data traffic, and very high-speed roaming (iPCF)
- Support with planning, simulation, configuration, site survey and documentation with the SINEMA E engineering tool, wizards and online help; easy management with Web server and SNMP
- Quick commissioning of Access Points with the optional swap medium PRESET-PLUG and quick device exchange in case of faults with the optional swap medium C-PLUG (Configuration Plug)

Benefits

get Designed for Industry

- Predictable data traffic (strict real-time requirements) and defined response times on the wireless link
- Reliable wireless link, e.g. due to redundant connection and cyclic monitoring of the wireless path
- Cost savings due to one single radio network both for process-critical data and for non-critical communication
- Investment security because all products are compatible with the internationally recognized WLAN standard IEEE 802.11, suitable for the unlicensed frequency bands of 2.4 GHz and 5 GHz (ISM bands)
- Reduced operating costs, because there is no wear of rotating and moving plant sections
- Cost-effective connection to devices which are remote, difficult to access or in hostile environments

Application

The Access Points of the SCALANCE W780 product line are designed for both industrial use and for demanding climatic requirements outdoors. Versions for the inexpensive integration in cabinets or in devices are also available. They offer a reliable radio connection, versatile redundancy mechanisms, and fast transfer of stations from one access point to the next (roaming). In this manner, processes can be monitored and production failures through machine downtimes avoided. In addition, Industrial Wireless LAN (IWLAN) can be used in time-critical applications associated with production automation (PROFINET IO) or for safety-related signals (PROFIsafe).

Due to the high degree of protection (IP65) and the extended temperature range from -40 °C to +70 °C, the Access Points are ideally suited for use in the outdoor area. SCALANCE W products are silicone-free and can therefore also be used in paint plants.

When using the RCoax cable (radiating cable), operation is particularly reliable in conveying technology and all track applications (e.g. storage and retrieval systems).

SCALANCE W786 versions are available with internal antennas for demanding environmental requirements.

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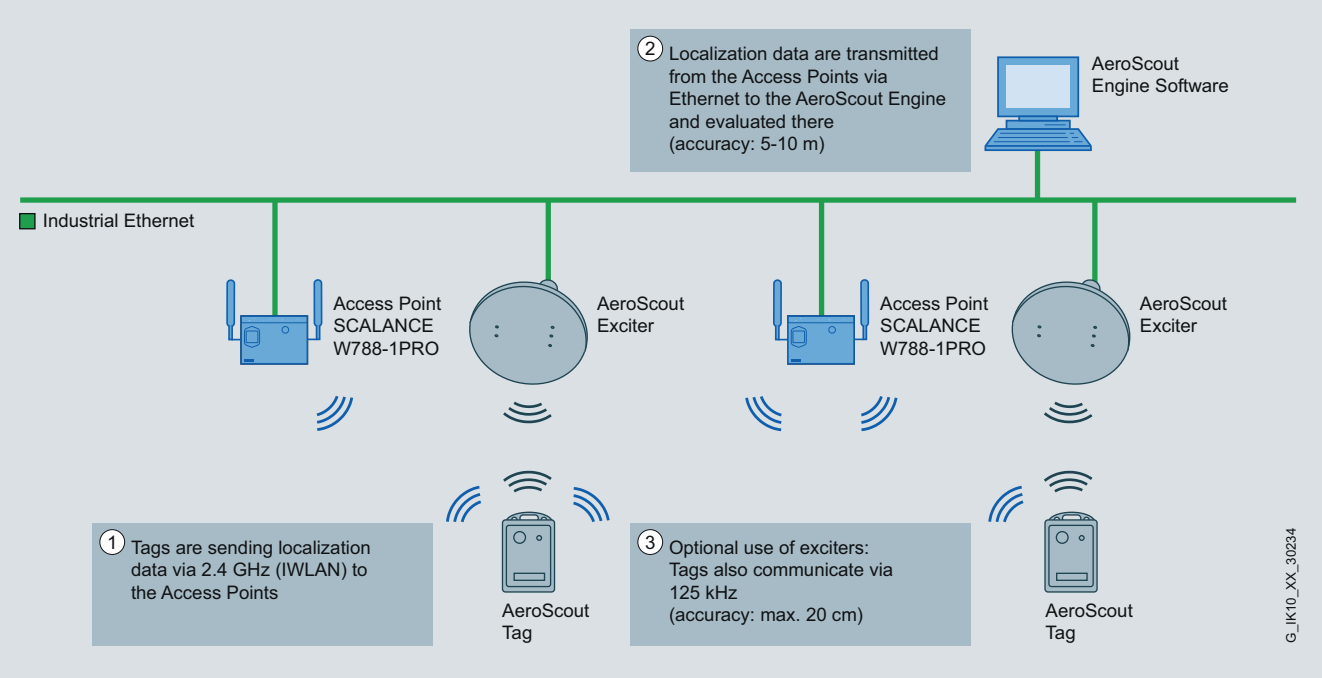
Application (continued)

Application examples:

- Automated guided vehicles and suspended monorails; prevention of wear and high flexibility in the choice of route thanks to wireless transmission of data to the vehicles
- Crane; high flexibility through access to data communication with the moving unit independent of the location
- Mobile control console; reliable intervention in the process thanks to data communication over IWLAN with mobile units (e.g. Mobile Panel 277(F) IWLAN); the number of operator panels is therefore determined by the number of personnel and no longer by the number of control desks.
- Wireless access to field devices for configuration and testing
- Communication with moving stations (e.g. mobile controls and devices), container logistics, storage and retrieval machines, conveyor systems, conveyor belts, rotating machines, trucks
- Wireless coupling of communication segments and bridging of large distances for fast commissioning and for cost-effective networks in which cable routing would be extremely expensive (e.g. on public roads, rivers, lakes, train lines)
- Localization of personnel and machines using WLAN tags and localization software from AeroScout



Localization of personnel and machines via an IWLAN infrastructure

Design

- Wireless card (compatible with IEEE 802.11a/b/g/h) permanently installed in the device
- Designed without rotating parts (operation without fans)
- Antennas can either be connected by means of a screw connection (R-SMA) or integrated into a device (SCALANCE W786 only)
- Function LEDs for optical signaling of faults and operating states
- 1 x C-PLUG/PRESET-PLUG slot

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Overview

Function

A simple wireless link can be constructed from a single access point (infrastructure mode). The access point provides an Industrial Ethernet interface for connection to the wireline network. Stations, such as mobile controllers or a Field PG can move freely within the wireless link and exchange data with other stations through this access point.

If the wireless link of a single access point (wireless cell) is insufficient, it can be expanded by further access points. The individual wireless cells must overlap so that moving stations can be passed seamlessly from one access point to the next (roaming). This is performed invisibly to the application. The access points must be able to exchange data via Industrial Ethernet or a Wireless Distribution System (WDS).

If the Access Points are not connected to Industrial Ethernet using a wired connection (e.g. no cable tray available for data line), the operating mode "Wireless Distribution System" must be selected. An Access Point from the SCALANCE W780 product line can communicate via WDS with up to eight other Access Points which are not connected to the data network by a direct wired connection. Directional additional antennas can be used to achieve ranges of several thousand meters outdoors.

Apart from a reliable radio link, the SCALANCE W780 Access Points are characterized by their support of IT mechanisms:

- IEEE 802.11a/b/g for different frequency ranges
- IEEE 802.11h for use in the 5 GHz range outdoors
- IEEE 802.11e for Wireless Multimedia (WMM)
- IEEE 802.11i for security
- Construction of redundant networks with the Rapid Spanning Tree Protocol (RSTP)
- Virtual networks (VLAN) to logically separate, for example, different user groups
- Sending the log entries of the SCALANCE W devices to a Syslog server
- Modern security mechanisms (e.g. network security such as IEEE 802.1x, RADIUS, EAP mechanisms)
- In client mode:
  Network and Port Address Translation (NAT/PAT):
  Mapping of private IP addresses and ports to public addresses

Security

A high degree of data security is achieved by means of the WPA2/IEEE 802.11i mechanisms. These define modern procedures that control a regular exchange of the complete 128-bit code as well as performing the access check (authentication) of a station. The Advanced Encryption Standard (AES) is available for data encryption.

Access to the devices (HTTPS) is encrypted and secure logon (SSH) is possible. If a security concept with Virtual Private Networks (VPN) or the SCALANCE S range is required, the products can be integrated without any difficulty.

iFeatures (only for RR versions of the access points)

iPCF (industrial Point Coordination Function)

The **iPCF** mode is recommendedfor applications with a requirement for real-time and predictable response times (deterministic response), even during roaming of moving stations from one access point to the next. This ensures that wireless PROFINET IO is supported and that safety-related signals, e.g. emergency stop, can be integrated into the wireless link. This means that even video signals from moving stations can be transmitted with a high level of quality.

The iPCF mechanism expands the IEEE 802.11 standard and must be available on both the station and the access point (e.g. SCALANCE W788-1RR). In a wireless link in which iPCF is used, no IEEE 802.11-compliant stations can be operated.

iPCF is recommended for applications where wireless network nodes move along predefined paths (e.g. suspended monorail). RCoax leaky wave cables or directional antennas must be used for this purpose.

Note:
The IWLAN/PB Link PN IO gateway also supports iPCF

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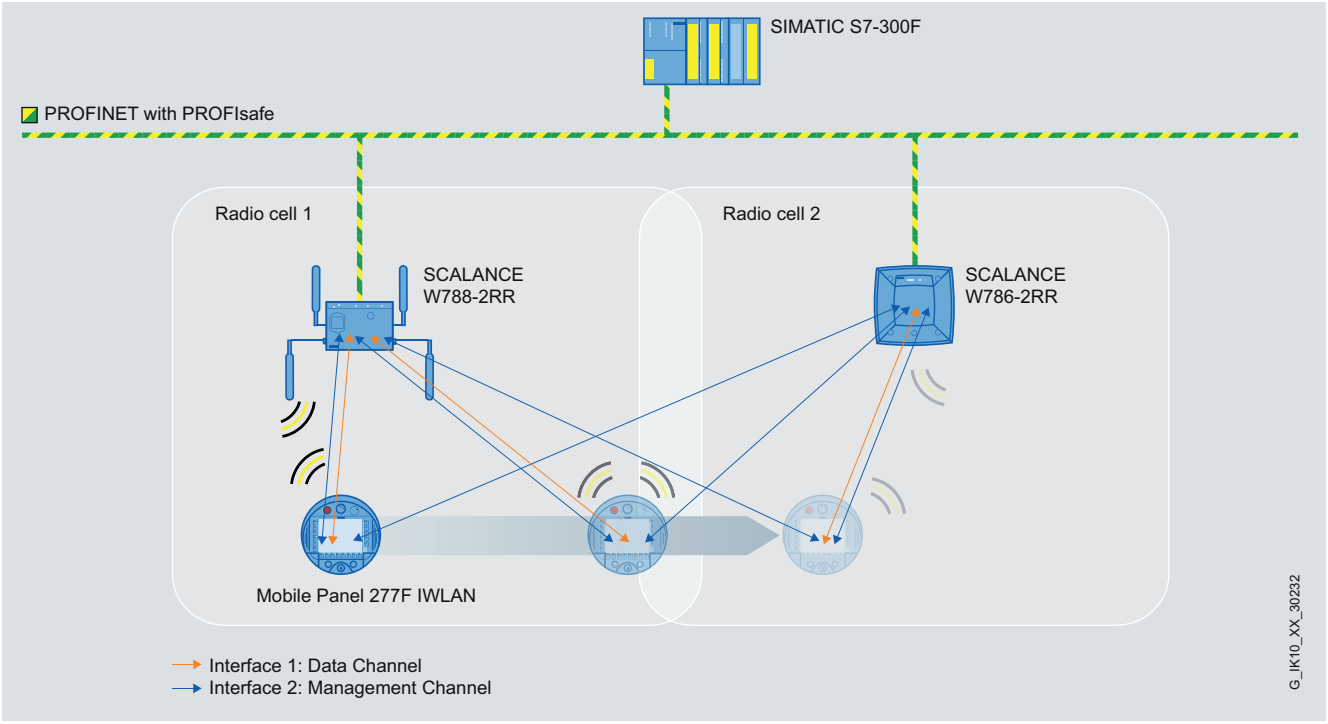
Function (continued)

iPCF-MC (iPCF Management Channel)

iPCF-MC is available as further development of iPCF. This mode should be used if IWLAN stations that also support iPCF-MC (e.g. Client Modules SCALANCE W747-1RR, Mobile Panel 277F IWLAN) move freely about in the coverage area (especially when using omni-directional antennas) and are to exchange data deterministically. This functionality can only be implemented in combination with RR access point versions with at least two wireless interfaces.

Note:
Due to the lower bandwidth when using iPCF-MC, we recommend the iPCF mode for transmitting video signals.



Roaming of a mobile panel between two access points while maintaining error-free communication with iPCF-MC

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Overview

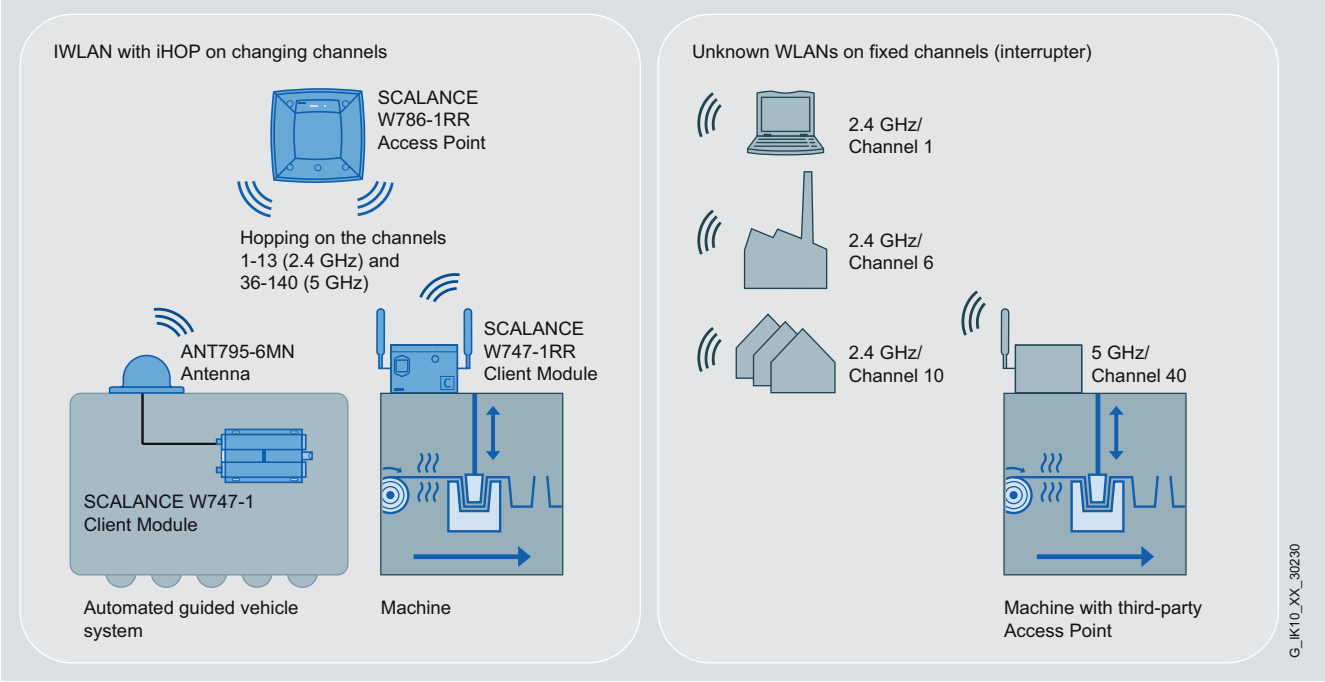
Function (continued)

iHOP

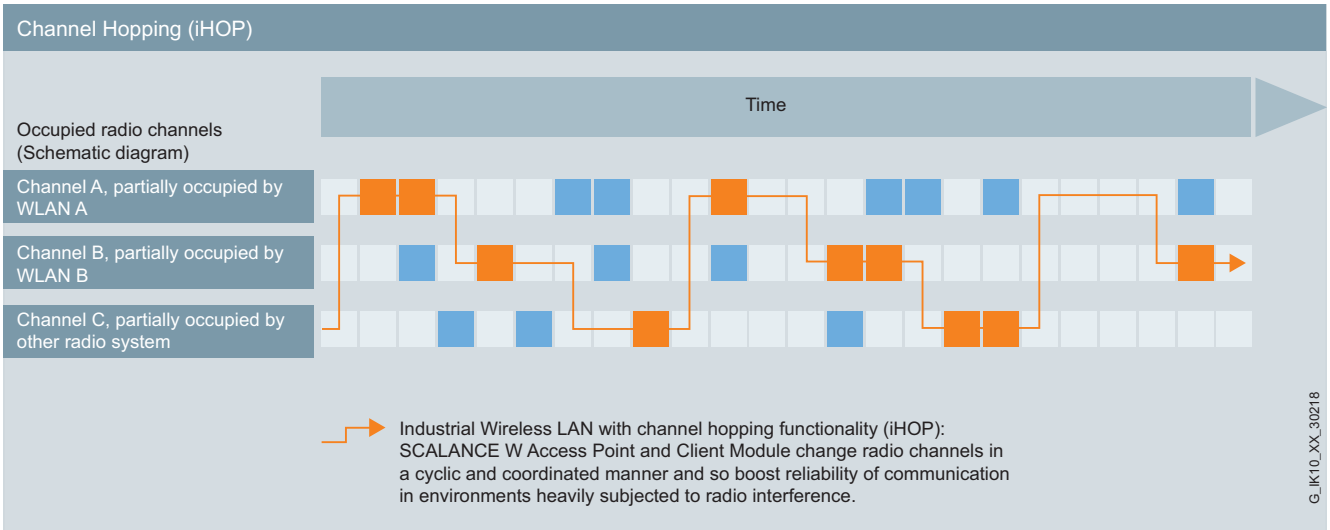
With the supplementary function **iHOP**, the access point changes the channel in coordination with its clients. If it detects interferences which are caused, for example, by sporadically active WLANs on a channel, it avoids the affected channel temporarily. Hopping to the other channel is carried out so rapidly that usually the application is not impaired by the channel change. If the interferences occur throughout the complete frequency band, it is even possible to change to another frequency band (e.g. from 2.4 to 5 GHz).

This guarantees reliable communication even with interferences in the wireless field.

Note:
These iFeatures cannot be used in parallel.



Coordinated changing of channels by means of a channel hopping procedure (iHOP) to avoid disrupters



iHOP function for SCALANCE W access points

Diagnostics and management

- Web-based (HTTP/HTTPS) management tool for configuration and diagnostics using a standard browser
- Planning, configuration, simulation and measurement of the wireless link on site (Site Survey) with SINEMA E
- LEDs for signaling operating states and fault conditions
- Signaling of faults by means of SNMP trap or e-mail to a network management tool, e.g. SINEMA-Server

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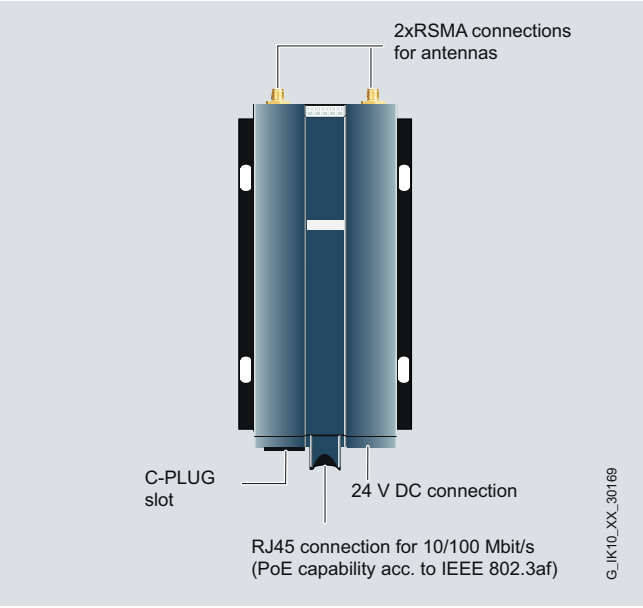
SCALANCE W784 for use in the control cabinet

Overview

- Especially suitable for applications where the access point is to be mounted in the control cabinet
- Low-cost alternative for use indoors with less severe environmental conditions
- The rugged aluminum enclosure with degree of protection IP30 nevertheless provides protection against mechanical and electromagnetic stress in industrial areas

Design

- Low-profile, compact aluminum enclosure, shock and vibration-proof for high mechanical requirements
- Dust protection with IP30 degree of protection
- For use at ambient temperatures from -20 °C to +60 °C
- Construction and design suitable for integration in a device or for installation in a cabinet
- 2 x R-SMA sockets for the connection of remote antennas
- 1 x RJ45 connection for 10/100 Mbit/s with Power-over-Ethernet according to IEEE 802.3at Type 1 (corresponds to IEEE 802.3af)
- 1 x 24 V DC connection for redundant power infeed
- 1 x C-PLUG slot
- Function LEDs for optical signaling of faults and operating states
- Mounting: Wall or, with optional mounting set, on S7 mounting rail, 35 mm standard mounting rail



Design and interfaces of the SCALANCE W784 access points

Product versions

SCALANCE W784-1

- A wireless card permanently installed in the device

SCALANCE W784-1RR

- A radio card permanently installed in the device for establishing wireless connections with iPCF

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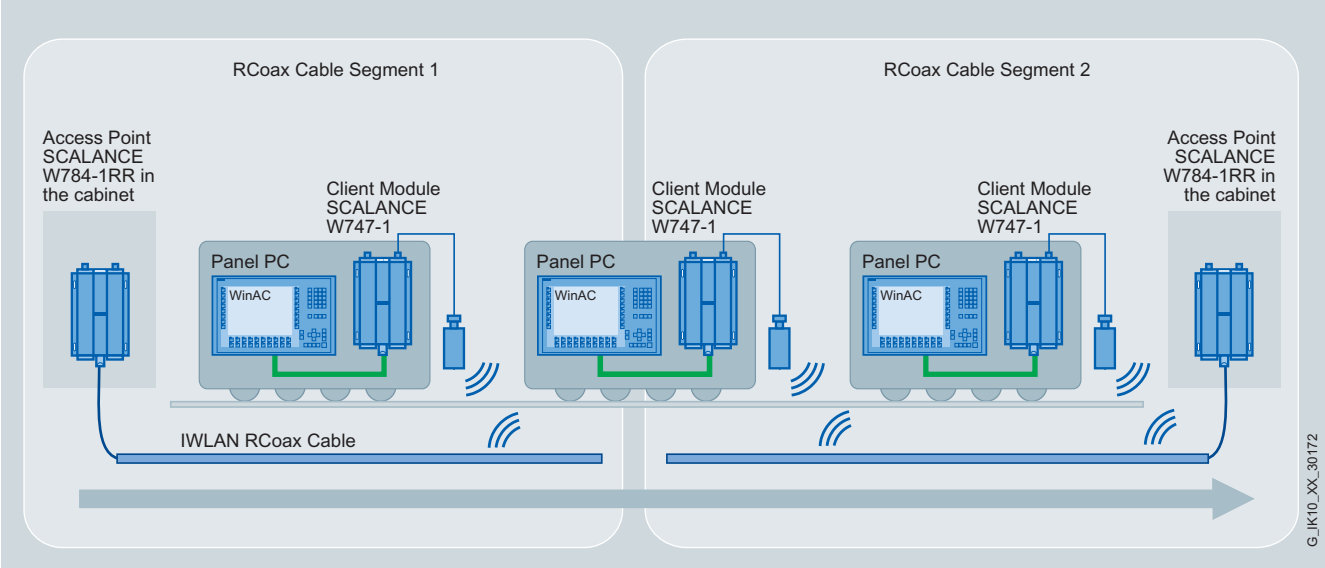
SCALANCE W784 for use in the control cabinet

Function

SCALANCE W784 access points for control cabinet installation can also be operated as client modules. As an alternative, the SCALANCE W740 client modules can be used for this mode.

In combination with the SCALANCE W740 Client Modules with degree of protection IP30, an infrastructure can be set up in which great temperature differences and protection against dust and water play a somewhat less prominent role.



Implementing an automatic guided transport system in a wireless link with SCALANCE W784-1RR and RCoax cable.

The mobile automated guided vehicles are integrated in the IWLAN wireless field over the SCALANCE W747-1 Ethernet Client Modules. Both the Access Points and the Client Modules are in the control cabinet.

Technical specifications

Order No.	**6GK5 784-1AA30-2AA0** **6GK5 784-1AA30-2AB0** [1]	**6GK5 784-1AA30-6AA0** **6GK5 784-1AA30-6AB0** [1]
Product type designation	**SCALANCE W784-1**	**SCALANCE W784-1RR**
Transmission rate		
Transmission rate		
• with W-LAN, maximum	54 Mbit/s	54 Mbit/s
• with Industrial Ethernet	10 … 100 Mbit/s	10 … 100 Mbit/s
• Note	Due to the simultaneous use of several radio channels, a transmission rate of 108 Mbit/s is possible (turbo mode)	Due to the simultaneous use of several radio channels, a transmission rate of 108 Mbit/s is possible (turbo mode)
Interfaces		
Number of electrical connections		
• for network components or terminal equipment	1	1
• for power supply	1	1
• for redundant power supply	1	1
Design of electrical connection		
• for network components or terminal equipment	RJ45 socket	RJ45 socket
• for power supply	4-pin screw terminal, PoE	4-pin screw terminal, PoE
Design of swap medium C-Plug	Yes	Yes

[1] Wireless approval in the USA

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Technical specifications (continued)

Order No.	6GK5 784-1AA30-2AA0 6GK5 784-1AA30-2AB0 [1]	6GK5 784-1AA30-6AA0 6GK5 784-1AA30-6AB0 [1]
Product type designation	**SCALANCE W784-1**	**SCALANCE W784-1RR**
Interfaceswireless		
Number of permanently installed wireless cards	1	1
Number of electrical connections for external antenna(s)	2	2
Design of electrical connection for external antenna(s)	R-SMA female (socket)	R-SMA female (socket)
Supply voltage, current consumption, power loss		
Type of power supply	DC	DC
Supply voltage		
• 1 from terminal block	24 V	24 V
• 2 from terminal block	48 V	48 V
• From Power-over-Ethernet according to IEEE802.3at for Type 1 and IEEE802.3af	48 V	48 V
Current consumed		
• At 24 V DC, typical	0.23 A	0.23 A
• At 48 V DC, typical	0.12 A	0.12 A
• With Power-over-Ethernet according to IEEE802.3at for Type 1 and IEEE802.3af, typical	0.12 A	0.12 A
Effective power loss		
• At 24 V DC, typical	6 W	6 W
• At 48 V DC, typical	6 W	6 W
• With Power-over-Ethernet according to IEEE802.3at for Type 1 and IEEE802.3af, typical	6 W	6 W
Permissible ambient conditions		
Ambient temperature		
• During operation	-20 … +60 °C	-20 … +60 °C
• During storage	-40 … +70 °C	-40 … +70 °C
• During transport	-40 … +70 °C	-40 … +70 °C
Relative humidity at 25 °C without condensation during operation, maximum	90 %	90 %
IP degree of protection	IP30	IP30
Ambient conditions for operation	-	-
Design, dimensions and weights		
Width of enclosure without antenna	100 mm	100 mm
Height of enclosure without antenna	205 mm	205 mm
Depth of enclosure without antenna	20 mm	20 mm
Net weight	0.29 kg	0.29 kg
Type of mounting		
• S7-300 rail mounting	-	-
• Wall mounting	Yes	Yes
Type of mounting	For mounting on 35 mm DIN rail and S7-300 rail, an additional adapter plate is required	For mounting on 35 mm DIN rail and S7-300 rail, an additional adapter plate is required

[1] Wireless approval in the USA

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SCALANCE W784 for use in the control cabinet

Technical specifications (continued)

Order No.	6GK5 784-1AA30-2AA0 6GK5 784-1AA30-2AB0 [1]	6GK5 784-1AA30-6AA0 6GK5 784-1AA30-6AB0 [1]
Product type designation	**SCALANCE W784-1**	**SCALANCE W784-1RR**
Wireless frequencies		
Wireless frequency		
• With WLAN in the 2.4 GHz frequency band	2.41 … 2.48 GHz	2.41 … 2.48 GHz
• With WLAN in the 5 GHz frequency band	4.9 … 5.8 GHz	4.9 … 5.8 GHz
Product properties, functions, components General		
Number of SSIDs	8	8
Product function		
• Dual client	No	Yes
• iHOP	No	Yes
• iPCF	No	Yes
• iPCF-MC	No	No
Number of iPCF-capable radio modules	0	1
Product functions Management, configuration, programming		
Number of manageable IP addresses in the client	8	8
Product function		
• CLI	Yes	Yes
• Web-based management	Yes	Yes
• MIB support	Yes	Yes
• TRAPs via e-mail	Yes	Yes
• Configuration with STEP 7	Yes	Yes
• Configuration with STEP 7 in the TIA Portal	Yes	Yes
• SMTP server	Yes	Yes
• Operation with IWLAN controller	No	No
• Operation with Enterasys WLAN controller	No	No
• iQoS	Yes	Yes
• Forced roaming with IWLAN	Yes	Yes
• WDS	Yes	Yes
Protocol is supported		
• Address Resolution Protocol (ARP)	Yes	Yes
• ICMP	Yes	Yes
• Telnet	Yes	Yes
• HTTP	Yes	Yes
• HTTPS	Yes	Yes
• TFTP	Yes	Yes
• SNMP v1	Yes	Yes
• SNMP v2	Yes	Yes
• SNMP v3	Yes	Yes
• DCP	Yes	Yes
• LLDP	Yes	Yes
Identification & maintenance		
• I&M0 – device-specific information	Yes	Yes
• I&M1 – higher-level designation/ location designation	Yes	Yes

[1] Wireless approval in the USA

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Technical specifications (continued)

Order No.	6GK5 784-1AA30-2AA0 6GK5 784-1AA30-2AB0 [1]	6GK5 784-1AA30-6AA0 6GK5 784-1AA30-6AB0 [1]
Product type designation	**SCALANCE W784-1**	**SCALANCE W784-1RR**
Product functions Diagnostics		
Product function		
• PROFINET IO diagnostics	Yes	Yes
• Link check	Yes	Yes
• Connection monitoring IP-Alive	Yes	Yes
• Localization by means of Aeroscout	Yes	Yes
• SysLog	Yes	Yes
Product functions VLAN		
Product function VLAN with IWLAN	Yes	Yes
Product functions DHCP		
Product function DHCP client	Yes	Yes
Product functions Redundancy		
STP/RSTP protocol is supported	Yes	Yes
Product functions Security		
Product function		
• ACL – MAC based	Yes	Yes
• IEEE 802.1x (radius)	Yes	Yes
• NAT/NAPT	Yes	Yes
• Access protection according to IEEE802.11i	Yes	Yes
• WPA/WPA2	Yes	Yes
• TKIP/AES	Yes	Yes
Protocol is supported SSH	Yes	Yes
Product functions Time		
SNTP protocol is supported	Yes	Yes
Standards, specifications, approvals		
Standard		
• for EMC of FM	FM 3611: Class I, Division 2, Groups A,B,C,D, T4 / Class 1, Zone 2, Group IIC, T4	FM 3611: Class I, Division 2, Groups A,B,C,D, T4 / Class 1, Zone 2, Group IIC, T4
• for hazardous zone	EN 60079-15:2005, EN 60079-0:2006, II 3 G Ex nA II T4 KEMA 07 ATEX 0145X (only approved in connection with an enclosure with degree of protection of at least IP 54)	EN 60079-15:2005, EN 60079-0:2006, II 3 G Ex nA II T4 KEMA 07 ATEX 0145X (only approved in connection with an enclosure with degree of protection of at least IP 54)
• for CSA and UL safety	UL 60950-1 CSA C22.2 No. 60950-1	UL 60950-1 CSA C22.2 No. 60950-1
• for hazardous zone of CSA and UL	ISA 12.12.01-2000, CSA C22.2 No. 213-M1987, CL. 1, Div. 2, GP. A,B,C,D, T4 / CL. 1, Zone 2, GP IIC, T4 / CL. 1, Zone 2, AEx nC IIC, T4 (only approved in connection with an enclosure with degree of protection of at least IP 54)	ISA 12.12.01-2000, CSA C22.2 No. 213-M1987, CL. 1, Div. 2, GP. A,B,C,D, T4 / CL. 1, Zone 2, GP IIC, T4 / CL. 1, Zone 2, AEx nC IIC, T4 (only approved in connection with an enclosure with degree of protection of at least IP 54)
Certificate of suitability		
• CE marking	Yes	Yes
• EC Declaration of Conformity	Yes	Yes
• C-Tick	Yes	Yes
• CCC	No	No
• Railroad application according to EN 50155	Yes	Yes
• e1 approval	Yes	Yes
• E1 approval	Yes	Yes
• Power-over-Ethernet according to IEEE802.3at for Type 1 and IEEE802.3af	Yes	Yes

[1] Wireless approval in the USA

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SCALANCE W784 for use in the control cabinet

Order No.	6GK5 784-1AA30-2AA0 6GK5 784-1AA30-2AB0 [1]	6GK5 784-1AA30-6AA0 6GK5 784-1AA30-6AB0 [1]
Product type designation	**SCALANCE W784-1**	**SCALANCE W784-1RR**
Standard for wireless communication		
• IEEE 802.11a	Yes	Yes
• IEEE 802.11b	Yes	Yes
• IEEE 802.11e	Yes	Yes
• IEEE 802.11g	Yes	Yes
• IEEE 802.11h	Yes	Yes
• IEEE 802.11i	Yes	Yes
• IEEE 802.11n	No	No
Wireless approval	You can find the latest list of countries at: www.siemens.com/simatic-net/ik-info	You can find the latest list of countries at: www.siemens.com/simatic-net/ik-info
Marine classification association		
• American Bureau of Shipping Europe Ltd. (ABS)	Yes	Yes
• Bureau Veritas (BV)	Yes	Yes
• Det Norske Veritas (DNV)	No	No
• Germanischer Lloyd (GL)	Yes	Yes
• Lloyds Register of Shipping (LRS)	Yes	Yes
• Nippon Kaiji Kyokai (NK)	Yes	Yes
• Polski Rejestr Statkow (PRS)	No	No
Accessories		
Accessories	24 V DC screw terminal included in scope of delivery	24 V DC screw terminal included in scope of delivery

[1] Wireless approval in the USA

Ordering data

	Order No.
SCALANCE W784 access points	
IWLAN access points with built-in wireless interfaces; wireless networks IEEE 802.11a/b/g/h at 2.4/5 GHz up to 54 Mbit/s; WPA2/AES; Power over Ethernet (PoE), IP30 degree of protection (-20 °C to +60 °C); scope of supply: Mounting hardware, 24 V DC screw terminal; manual on CD-ROM; German/English	
SCALANCE W784-1	
IWLAN Access Points with one built-in radio interface	
• National approvals for operation outside the USA	**6GK5 784-1AA30-2AA0**
• National approvals for operation within the USA[1]	**6GK5 784-1AA30-2AB0**

	Order No.
SCALANCE W784-1RR	
IWLAN Access Point with one built-in radio interface for establishment of radio links with iPCF	
• National approvals for operation outside the USA	**6GK5 784-1AA30-6AA0**
• National approvals for operation within the USA[1]	**6GK5 784-1AA30-6AB0**

[1] Please note national approvals at www.siemens.com/wireless-approvals

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Ordering data

	Order No.
Accessories	
C-PLUG Swap medium for simple replacement of devices in the event of a fault; for storing configuration data; can be used in SIMATIC NET products with PLUG slot	**6GK1 900-0AB00**
PRESET-PLUG Swap medium for simple initial startup of SCALANCE W access points and client modules, as well as IWLAN/PB Link PN IO	**6GK5 798-8AB00**
SIMATIC Mobile Panel 277F IWLAN	
• Communication via WLAN (PROFINET) with acknowledgement button and emergency stop button	**6AV6 645-0DB01-0AX0**
• Communication via WLAN (PROFINET) with acknowledgment button and emergency stop button with integrated handwheel, key-operated switch, and two illuminated pushbuttons	**6AV6 645-0DC01-0AX0**
Note: Please also order the desktop power supply or battery charger!	
• Table-top power supply incl. power cable for EU, US, UK, JP (only suitable for operation under laboratory/office conditions)	**6AV6 671-5CN00-0AX1**
• Charger for safe storage and charging the device incl. lock for securing the device in the charger. Charging capabilities for up to two additional batteries	**6AV6 671-5CE00-0AX0**
• Additional battery with LED indicator for indicating the charge status	**6AV6 671-5CL00-0AX0**
• Transponder incl. batteries (3x AA)	**6AV6 671-5CM00-0AX0**

	Order No.
IE FC RJ45 Plug 180 2x2 RJ45 plug connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation-displacement contacts for connecting Industrial Ethernet FC installation cables; with a 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface	
• 1 pack = 1 unit	**6GK1 901-1BB10-2AA0**
• 1 pack = 10 units	**6GK1 901-1BB10-2AB0**
• 1 pack = 50 units	**6GK1 901-1BB10-2AE0**
IE FC Standard Cable GP 2 x 2 4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/ IE FC RJ45 Plug; PROFINET-compliant; with UL approval; sold by the meter; max. length 1000 m, minimum order 20 m	**6XV1 840-2AH10**
IE FC Stripping Tool Preadjusted stripping tool for fast stripping of the Industrial Ethernet FC cables	**6GK1 901-1GA00**
IE TP Cord RJ45/RJ45 TP cable 4 x 2 with 2 RJ45 connectors	
• 0.5 m	**6XV1 870-3QE50**
• 1 m	**6XV1 870-3QH10**
• 2 m	**6XV1 870-3QH20**
• 6 m	**6XV1 870-3QH60**
• 10 m	**6XV1 870-3QN10**
MS2 mounting set Mounting set for fixing the SCALANCE W784 products onto an S7-300 mounting rail or a 35 mm standard DIN rail	**6GK5 798-8MJ00-0AA0**
Antennas and miscellaneous IWLAN accessories	See Industrial Wireless LAN/ accessories

More information

Wireless approvals:

Current approvals can be found on the Internet at:
www.siemens.com/wireless-approvals

To assist in selecting the right products for Industrial Wireless Communication, the SIMATIC NET Selection Tool is available:

Online version:
www.siemens.com/snst

Offline version:
www.siemens.com/snst-download

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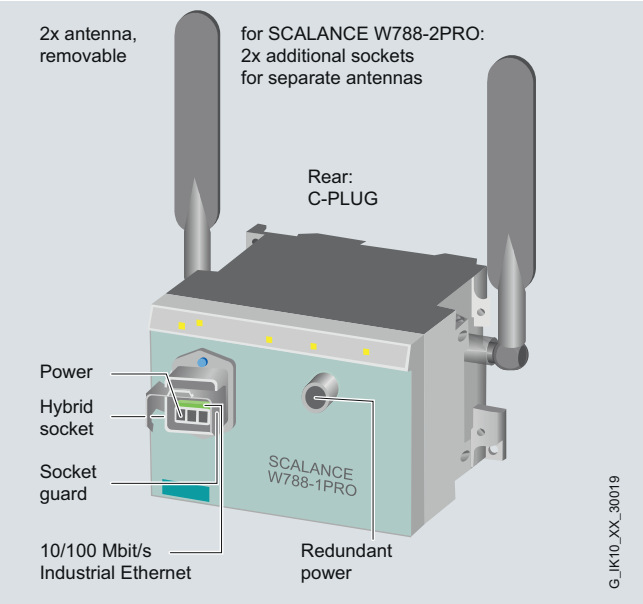
SCALANCE W788 for the indoor area

Overview

- Particularly suitable for industrial applications without control cabinets.

Design

- Rugged metal enclosure, shock and vibration-proof for high mechanical requirements in industrial applications designed without cabinets
- High IP65 degree of protection against dust and water jets
- For use at ambient temperatures from -20 °C to +60 °C
- Resistant to condensation
- 2 x R-SMA sockets for the connection of remote antennas (4 x R-SMA for the versions with two radio modules)
- 1 x hybrid socket for data and energy line for infeed over the IE FC Modular Outlet or for supplying with Power-over-Ethernet according to IEEE 802.3at Type 1 (corresponds to IEEE 802.3af)
- 1 x M12 socket for redundant power infeed (18 to 32 V DC, 48 V DC), e.g. in conjunction with the PS791-1PRO (90 to 265 V AC) power supply
- 1 x C-PLUG slot
- Function LEDs for optical signaling of faults and operating states
- Mounting: Wall, S7-300 mounting rail (90 mm length, vertically mounted, bolts included in scope of supply), or with optional mounting aid on 35 mm DIN rail



Design and interfaces of the SCALANCE W788 access points

Product versions

SCALANCE W788-1PRO

- A wireless card permanently installed in the device

SCALANCE W788-1RR

- A radio card permanently installed in the device for establishing wireless connections with iPCF

SCALANCE W788-2PRO

- Two wireless cards permanently installed in the device

SCALANCE W788-1RR

- Two wireless cards permanently installed in the device for establishing wireless connections with iPCF

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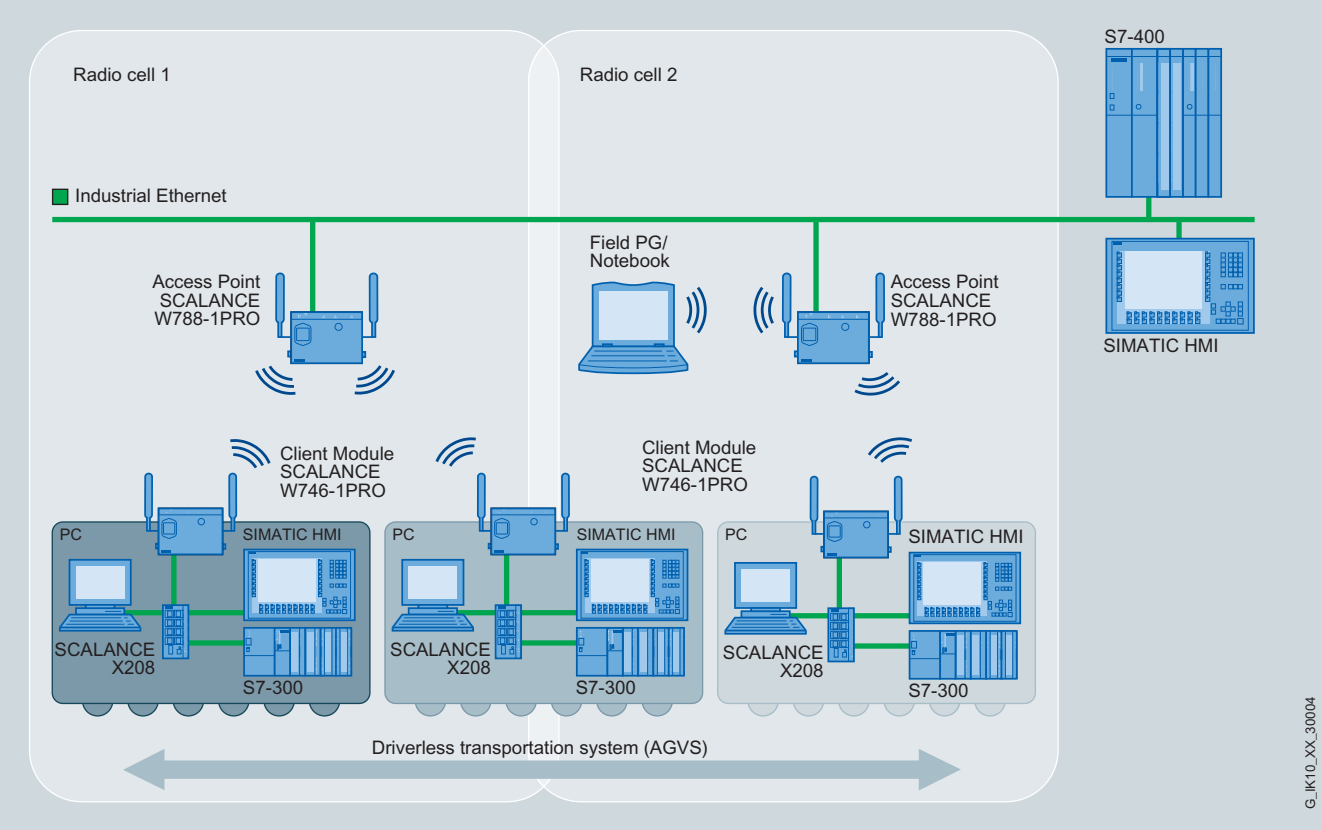
Function

The devices can be installed at the location that is most favorable for the wireless field. The enclosures and the connectors resist high levels of shock and vibration loading because all the connections are screwed or latched. To achieve optimal illumination for special applications, the supplied antennas can be replaced.

SCALANCE W788 access points can also be operated as client modules. As an alternative, the SCALANCE W740 client modules can be used for this mode.

The devices with two interfaces have two separate wireless modules and behave like two separate devices in the wireless network. This feature can be used to implement cost-effective solutions, e.g. when a wireless interface is used for wireless connection of a distant production site and the second wireless interface provides a wireless field at the access point. Local stations can log in here and move around freely. Two separate wireless modules, however, also permit the setup of redundant wireless fields so that a high level of operational reliability can be achieved.



Roaming of moving units (e.g. Field PG and mobile controller) in a wireless network with two access points

Stations, e.g. a Field PG M, can move freely in the wireless field of the SCALANCE W788-1PRO access points for mobile HMI. In addition, SCALANCE W746-1PRO connects mobile HMI, controller and PC units wirelessly to the data network.

The IWLAN wireless coverage of SCALANCE W788-1PRO permits S7 communication and open communication between the devices on the AGVs and stationary S7-400, as well as on the stationary SIMATIC HMI device.

Provided that a delay (several 100 ms) caused by roaming in accordance with IEEE 802.11 is tolerated by all communication stations when switching the wireless cells, the communication continues uninterrupted.

If very fast update times are necessary, e.g. for PROFINET IO communication, access points and client modules that support the iPCF function for very fast roaming and deterministic data traffic are to be used, for example SCALANCE W788-1RR and W747-1RR.

When an extremely reliable wireless field is essential, it is recommended that the RCoax Cable is used as an alternative to conventional antennas. This leaky-wave cable is a special antenna along which a wireless field propagates and which is therefore suitable for applications in which, for example, nodes move along a rail but must have non-contact connection to the data network to prevent wear from collector wires.

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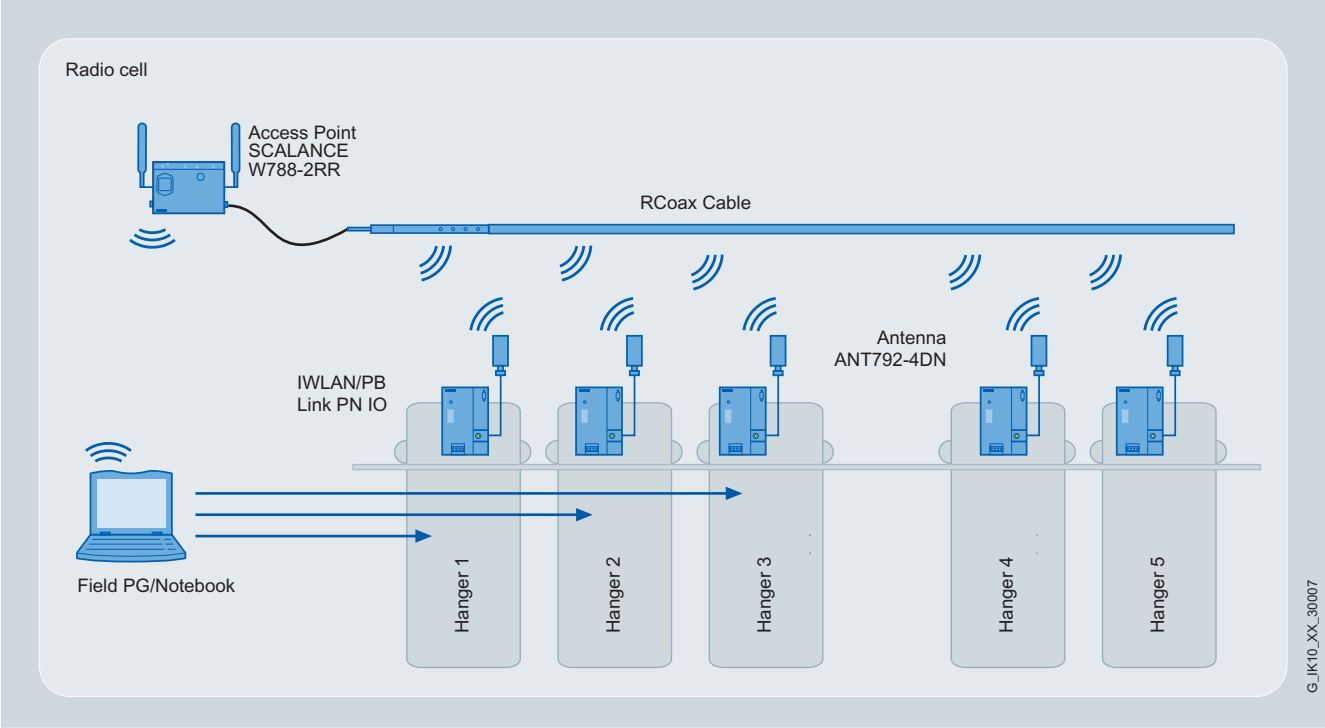
SCALANCE W788 for the indoor area

Function (continued)



The Field PG accesses a wireless interface of SCALANCE W788-2RR for configuring, the other interface carries out communication with the RCoax cable using iPCF

The dual access point, SCALANCE W788-2RR, can provide two separate wireless fields. For example, a Field PG can use one wireless field for configuration. For clear separation of the applications an RCoax cable can be used to implement contactless PROFINET I/O data communication with the mobile suspension gear over an IWLAN/PB Link.

Technical specifications

Order No.	6GK5 788-1AA60-2AA0 6GK5 788-1AA60-2AB0[1]	6GK5 788-2AA60-2AA0 6GK5 788-2AA60-2AB0[1]	6GK5 788-1AA60-6AA0 6GK5 788-1AA60-6AB0[1]	6GK5 788-2AA60-6AA0 6GK5 788-2AA60-6AB0[1]
Product type designation	**SCALANCE W788-1PRO**	**SCALANCE W788-2PRO**	**SCALANCE W788-1RR**	**SCALANCE W788-2RR**
Transmission rate				
Transmission rate				
• with W-LAN, maximum	54 Mbit/s	54 Mbit/s	54 Mbit/s	54 Mbit/s
• with Industrial Ethernet	10 … 100 Mbit/s	10 … 100 Mbit/s	10 … 100 Mbit/s	10 … 100 Mbit/s
• Note	Due to the simultaneous use of several radio channels, a transmission rate of 108 Mbit/s is possible (turbo mode)	Due to the simultaneous use of several radio channels, a transmission rate of 108 Mbit/s is possible (turbo mode)	Due to the simultaneous use of several radio channels, a transmission rate of 108 Mbit/s is possible (turbo mode)	Due to the simultaneous use of several radio channels, a transmission rate of 108 Mbit/s is possible (turbo mode)
Interfaces				
Number of electrical connections				
• for network components or terminal equipment	1	1	1	1
• for power supply	1	1	1	1
• for redundant power supply	1	1	1	1
Design of electrical connection				
• for network components or terminal equipment	Hybrid socket, RJ45 integrated	Hybrid socket, RJ45 integrated	Hybrid socket, RJ45 integrated	Hybrid socket, RJ45 integrated
• for power supply	M12 interface (4-pin, A-coded), hybrid socket, PoE	M12 interface (4-pin, A-coded), hybrid socket, PoE	M12 interface (4-pin, A-coded), hybrid socket, PoE	M12 interface (4-pin, A-coded), hybrid socket, PoE
Design of swap medium C-Plug	Yes	Yes	Yes	Yes

[1] Wireless approval in the USA

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Technical specifications (continued)

Order No.	6GK5 788-1AA60-2AA0 6GK5 788-1AA60-2AB0[1]	6GK5 788-2AA60-2AA0 6GK5 788-2AA60-2AB0[1]	6GK5 788-1AA60-6AA0 6GK5 788-1AA60-6AB0[1]	6GK5 788-2AA60-6AA0 6GK5 788-2AA60-6AB0[1]
Product type designation	**SCALANCE W788-1PRO**	**SCALANCE W788-2PRO**	**SCALANCE W788-1RR**	**SCALANCE W788-2RR**
Interfaceswireless				
Number of permanently installed wireless cards	1	2	1	2
Number of electrical connections for external antenna(s)	2	4	2	4
Design of electrical connection for external antenna(s)	R-SMA female (socket)	R-SMA female (socket)	R-SMA female (socket)	R-SMA female (socket)
Supply voltage, current consumption, power loss				
Type of power supply	DC	DC	DC	DC
Power supply				
• 1 from M12 power connector (A-coded) for redundant power supply	24 V	24 V	24 V	24 V
• 2 from M12 power connector (A-coded) for redundant power supply	48 V	48 V	48 V	48 V
• 1 from IE hybrid cable 2x2 + 4x0.34	24 V	24 V	24 V	24 V
• 2 from IE hybrid cable 2x2 + 4x0.34	48 V	48 V	48 V	48 V
• From Power-over-Ethernet according to IEEE802.3at for Type 1 and IEEE802.3af	48 V	48 V	48 V	48 V
Current consumed				
• At 24 V DC, typical	0.25 A	0.295 A	0.25 A	0.295 A
• At 48 V DC, typical	0.125 A	0.15 A	0.125 A	0.15 A
• With Power-over-Ethernet according to IEEE802.3at for Type 1 and IEEE802.3af, typical	0.125 A	0.15 A	0.125 A	0.15 A
Effective power loss				
• At 24 V DC, typical	7 W	7 W	7 W	9 W
• At 48 V DC, typical	7 W	7 W	7 W	9 W
• With Power-over-Ethernet according to IEEE802.3at for Type 1 and IEEE802.3af, typical	7 W	7 W	7 W	9 W
Permissible ambient conditions				
Ambient temperature				
• During operation	-20 … +60 °C	-20 … +60 °C	-20 … +60 °C	-20 … +60 °C
• During storage	-40 … +70 °C	-40 … +70 °C	-40 … +70 °C	-40 … +70 °C
• During transport	-40 … +70 °C	-40 … +70 °C	-40 … +70 °C	-40 … +70 °C
Relative humidity at 25 °C without condensation during operation, maximum	100 %	100 %	100 %	100 %
IP degree of protection	IP65	IP65	IP65	IP65
Ambient conditions for operation	When used under explosion protection conditions (Zone 2), the SCALANCE W788-xPRO/RR or W74x-1PRO/RR product must be installed in an enclosure that complies at least with IP54 according to EN 60529 within the scope of EN 50021.	When used under explosion protection conditions (Zone 2), the SCALANCE W788-xPRO/RR or W74x-1PRO/RR product must be installed in an enclosure that complies at least with IP54 according to EN 60529 within the scope of EN 50021.	When used under explosion protection conditions (Zone 2), the SCALANCE W788-xPRO/RR or W74x-1PRO/RR product must be installed in an enclosure that complies at least with IP54 according to EN 60529 within the scope of EN 50021.	When used under explosion protection conditions (Zone 2), the SCALANCE W788-xPRO/RR or W74x-1PRO/RR product must be installed in an enclosure that complies at least with IP54 according to EN 60529 within the scope of EN 50021.

[1] Wireless approval in the USA

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SCALANCE W788 for the indoor area

Technical specifications (continued)

Order No.	6GK5 788-1AA60-2AA0 6GK5 788-1AA60-2AB0[1]	6GK5 788-2AA60-2AA0 6GK5 788-2AA60-2AB0[1]	6GK5 788-1AA60-6AA0 6GK5 788-1AA60-6AB0[1]	6GK5 788-2AA60-6AA0 6GK5 788-2AA60-6AB0[1]
Product type designation	**SCALANCE W788-1PRO**	**SCALANCE W788-2PRO**	**SCALANCE W788-1RR**	**SCALANCE W788-2RR**
Design, dimensions and weights				
Width of enclosure without antenna	125 mm	125 mm	125 mm	125 mm
Height of enclosure without antenna	88 mm	88 mm	88 mm	88 mm
Depth of enclosure without antenna	108 mm	108 mm	108 mm	108 mm
Net weight	1.05 kg	1.05 kg	1.05 kg	1.05 kg
Type of mounting				
• S7-300 rail mounting	Yes	Yes	Yes	Yes
• Wall mounting	Yes	Yes	Yes	Yes
Wireless frequencies				
Wireless frequency				
• With WLAN in the 2.4 GHz frequency band	2.41 … 2.48 GHz	2.41 … 2.48 GHz	2.41 … 2.48 GHz	2.41 … 2.48 GHz
• With WLAN in the 5 GHz frequency band	4.9 … 5.8 GHz	4.9 … 5.8 GHz	4.9 … 5.8 GHz	4.9 … 5.8 GHz
Product properties, functions, components General				
Number of SSIDs	8	16	8	16
Product function				
• Dual client	No	No	Yes	Yes
• iHOP	No	No	Yes	Yes
• iPCF	No	No	Yes	Yes
• iPCF-MC	No	No	No	Yes
Number of iPCF-capable radio modules	0	0	1	1
Product functions Management, configuration, programming				
Number of manageable IP addresses in the client	8	8	8	8
Product function				
• CLI	Yes	Yes	Yes	Yes
• Web-based management	Yes	Yes	Yes	Yes
• MIB support	Yes	Yes	Yes	Yes
• TRAPs via e-mail	Yes	Yes	Yes	Yes
• Configuration with STEP 7	Yes	Yes	Yes	Yes
• Configuration with STEP 7 in the TIA Portal	Yes	Yes	Yes	Yes
• SMTP server	Yes	Yes	Yes	Yes
• Operation with IWLAN controller	No	No	No	No
• Operation with Enterasys WLAN controller	No	No	No	No
• iQoS	Yes	Yes	Yes	Yes
• Forced roaming with IWLAN	Yes	Yes	Yes	Yes
• WDS	Yes	Yes	Yes	Yes
Protocol is supported				
• Address Resolution Protocol (ARP)	Yes	Yes	Yes	Yes
• ICMP	Yes	Yes	Yes	Yes
• Telnet	Yes	Yes	Yes	Yes
• HTTP	Yes	Yes	Yes	Yes
• HTTPS	Yes	Yes	Yes	Yes
• TFTP	Yes	Yes	Yes	Yes
• SNMP v1	Yes	Yes	Yes	Yes
• SNMP v2	Yes	Yes	Yes	Yes
• SNMP v3	Yes	Yes	Yes	Yes
• DCP	Yes	Yes	Yes	Yes
• LLDP	Yes	Yes	Yes	Yes

[1] Wireless approval in the USA

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Technical specifications (continued)

Order No.	6GK5 788-1AA60-2AA0 6GK5 788-1AA60-2AB0[1]	6GK5 788-2AA60-2AA0 6GK5 788-2AA60-2AB0[1]	6GK5 788-1AA60-6AA0 6GK5 788-1AA60-6AB0[1]	6GK5 788-2AA60-6AA0 6GK5 788-2AA60-6AB0[1]
Product type designation	**SCALANCE W788-1PRO**	**SCALANCE W788-2PRO**	**SCALANCE W788-1RR**	**SCALANCE W788-2RR**
Identification & maintenance				
• I&M0 - device-specific information	Yes	Yes	Yes	Yes
• I&M1 - higher-level designation/ location designation	Yes	Yes	Yes	Yes
Product functions Diagnostics				
Product function				
• PROFINET IO diagnostics	Yes	Yes	Yes	Yes
• Link check	Yes	Yes	Yes	Yes
• Connection monitoring IP-Alive	Yes	Yes	Yes	Yes
• Localization by means of Aeroscout	Yes	Yes	Yes	Yes
• SysLog	Yes	Yes	Yes	Yes
Product functions VLAN				
Product function VLAN with IWLAN	Yes	Yes	Yes	Yes
Product functions DHCP				
Product function DHCP client	Yes	Yes	Yes	Yes
Product functions Redundancy				
STP/RSTP protocol is supported	Yes	Yes	Yes	Yes
Product functions Security				
Product function				
• ACL - MAC based	Yes	Yes	Yes	Yes
• IEEE 802.1x (radius)	Yes	Yes	Yes	Yes
• NAT/NAPT	Yes	Yes	Yes	Yes
• Access protection according to IEEE802.11i	Yes	Yes	Yes	Yes
• WPA/WPA2	Yes	Yes	Yes	Yes
• TKIP/AES	Yes	Yes	Yes	Yes
Protocol is supported SSH	Yes	Yes	Yes	Yes
Product functions Time				
SNTP protocol is supported	Yes	Yes	Yes	Yes
Standards, specifications, approvals				
Standard				
• for EMC of FM	FM 3611: Class I, Division 2, Groups A,B,C,D, T4 / Class 1, Zone 2, Group IIC, T4	FM 3611: Class I, Division 2, Groups A,B,C,D, T4 / Class 1, Zone 2, Group IIC, T4	FM 3611: Class I, Division 2, Groups A,B,C,D, T4 / Class 1, Zone 2, Group IIC, T4	FM 3611: Class I, Division 2, Groups A,B,C,D, T4 / Class 1, Zone 2, Group IIC, T4
• for hazardous zone	EN 60079-15:2005, EN 60079-0:2006, II 3 G Ex nA II T4 KEMA 07 ATEX 0145X	EN 60079-15:2005, EN 60079-0:2006, II 3 G Ex nA II T4 KEMA 07 ATEX 0145X	EN 60079-15:2005, EN 60079-0:2006, II 3 G Ex nA II T4 KEMA 07 ATEX 0145X	EN 60079-15:2005, EN 60079-0:2006, II 3 G Ex nA II T4 KEMA 07 ATEX 0145X
• for CSA and UL safety	UL 60950-1 CSA C22.2 No. 60950-1	UL 60950-1 CSA C22.2 No. 60950-1	UL 60950-1 CSA C22.2 No. 60950-1	UL 60950-1 CSA C22.2 No. 60950-1
• for hazardous zone of CSA and UL	ISA 12.12.01-2000, CSA C22.2 No. 213-M1987, CL. 1, Div. 2, GP. A,B,C,D, T4 / CL. 1, Zone 2, GP IIC, T4 / CL. 1, Zone 2, AEx nC IIC, T4	ISA 12.12.01-2000, CSA C22.2 No. 213-M1987, CL. 1, Div. 2, GP. A,B,C,D, T4 / CL. 1, Zone 2, GP IIC, T4 / CL. 1, Zone 2, AEx nC IIC, T4	ISA 12.12.01-2000, CSA C22.2 No. 213-M1987, CL. 1, Div. 2, GP. A,B,C,D, T4 / CL. 1, Zone 2, GP IIC, T4 / CL. 1, Zone 2, AEx nC IIC, T4	ISA 12.12.01-2000, CSA C22.2 No. 213-M1987, CL. 1, Div. 2, GP. A,B,C,D, T4 / CL. 1, Zone 2, GP IIC, T4 / CL. 1, Zone 2, AEx nC IIC, T4

[1] Wireless approval in the USA

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SCALANCE W788 for the indoor area

Technical specifications (continued)

Order No.	6GK5 788-1AA60-2AA0 6GK5 788-1AA60-2AB0[1]	6GK5 788-2AA60-2AA0 6GK5 788-2AA60-2AB0[1]	6GK5 788-1AA60-6AA0 6GK5 788-1AA60-6AB0[1]	6GK5 788-2AA60-6AA0 6GK5 788-2AA60-6AB0[1]
Product type designation	**SCALANCE W788-1PRO**	**SCALANCE W788-2PRO**	**SCALANCE W788-1RR**	**SCALANCE W788-2RR**
Certificate of suitability				
• CE marking	Yes	Yes	Yes	Yes
• EC Declaration of Conformity	Yes	Yes	Yes	Yes
• C-Tick	Yes	Yes	Yes	Yes
• CCC	No	No	No	No
• Railroad application according to EN 50155	Yes	Yes	Yes	Yes
• e1 approval	Yes	Yes	Yes	Yes
• E1 approval	Yes	Yes	Yes	Yes
• Power-over-Ethernet according to IEEE802.3at for Type 1 and IEEE802.3af	Yes	Yes	Yes	Yes
Standard for wireless communication				
• IEEE 802.11a	Yes	Yes	Yes	Yes
• IEEE 802.11b	Yes	Yes	Yes	Yes
• IEEE 802.11e	Yes	Yes	Yes	Yes
• IEEE 802.11g	Yes	Yes	Yes	Yes
• IEEE 802.11h	Yes	Yes	Yes	Yes
• IEEE 802.11i	Yes	Yes	Yes	Yes
• IEEE 802.11n	No	No	No	No
Wireless approval	You can find the latest list of countries at: www.siemens.com/simatic-net/ik-info	You can find the latest list of countries at: www.siemens.com/simatic-net/ik-info	You can find the latest list of countries at: www.siemens.com/simatic-net/ik-info	You can find the latest list of countries at: www.siemens.com/simatic-net/ik-info
Marine classification association				
• American Bureau of Shipping Europe Ltd. (ABS)	Yes	Yes	Yes	Yes
• Bureau Veritas (BV)	Yes	Yes	Yes	Yes
• Det Norske Veritas (DNV)	No	No	No	No
• Germanischer Lloyd (GL)	Yes	Yes	Yes	Yes
• Lloyds Register of Shipping (LRS)	Yes	Yes	Yes	Yes
• Nippon Kaiji Kyokai (NK)	Yes	Yes	Yes	Yes
• Polski Rejestr Statkow (PRS)	Yes	Yes	Yes	Yes
Accessories				
Accessories	2 antennas, hybrid connector included in scope of delivery	2 antennas, hybrid connector included in scope of delivery	2 antennas, hybrid connector included in scope of delivery	2 antennas, hybrid connector included in scope of delivery

[1] Wireless approval in the USA

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Ordering data	Order No.
SCALANCE W788 access points	
IWLAN access points with built-in wireless interfaces; wireless networks IEEE 802.11a/b/g/h at 2.4/5 GHz up to 54 Mbit/s; WPA2/AES; Power over Ethernet (PoE), IP65 degree of protection (-20°C to +60°C); scope of supply: two ANT795-4MR antennas, IP67 hybrid plug-in connector, mounting hardware, manual on CD-ROM, German/English	
SCALANCE W788-1PRO	
IWLAN Access Point with one built-in radio interface	
• National approvals for operation outside the USA	**6GK5 788-1AA60-2AA0**
• National approvals for operation within the USA[1)]	**6GK5 788-1AA60-2AB0**
SCALANCE W788-2PRO	
IWLAN Dual Access Point with two built-in radio interfaces	
• National approvals for operation outside the USA	**6GK5 788-2AA60-2AA0**
• National approvals for operation within the USA[1)]	**6GK5 788-2AA60-2AB0**
SCALANCE W788-1RR	
IWLAN Access Point with one built-in radio interface for establishment of radio links with iPCF	
• National approvals for operation outside the USA	**6GK5 788-1AA60-6AA0**
• National approvals for operation within the USA[1)]	**6GK5 788-1AA60-6AB0**
SCALANCE W788-2RR	
IWLAN Dual Access Point with two built-in radio interfaces for establishment of radio links with iPCF	
• National approvals for operation outside the USA	**6GK5 788-2AA60-6AA0**
• National approvals for operation within the USA[1)]	**6GK5 788-2AA60-6AB0**

[1)] Please note national approvals at www.siemens.com/wireless-approvals

	Order No.
Accessories	
C-PLUG	
Swap medium for simple replacement of devices in the event of a fault; for storing configuration data; can be used in SIMATIC NET products with PLUG slot	**6GK1 900-0AB00**
PRESET-PLUG	**6GK5 798-8AB00**
Swap medium for simple initial startup of SCALANCE W access points and client modules, as well as IWLAN/PB Link PN IO	
SIMATIC Mobile Panel 277F IWLAN	
• Communication via WLAN (PROFINET) with acknowledgement button and emergency stop button	**6AV6 645-0DB01-0AX0**
• Communication via WLAN (PROFINET) with acknowledgment button and emergency stop button with integrated handwheel, key-operated switch, and two illuminated pushbuttons	**6AV6 645-0DC01-0AX0**
Note: Please also order the desktop power supply or battery charger!	
• Table-top power supply incl. power cable for EU, US, UK, JP (only suitable for operation under laboratory/office conditions)	**6AV6 671-5CN00-0AX1**
• Charger for safe storage and charging the device incl. lock for securing the device in the charger. Charging capabilities for up to two additional batteries	**6AV6 671-5CE00-0AX0**
• Additional battery with LED indicator for indicating the charge status	**6AV6 671-5CL00-0AX0**
• Transponder incl. batteries (3x AA)	**6AV6 671-5CM00-0AX0**

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SCALANCE W788 for the indoor area

Ordering data

	Order No.
Accessories (continued)	
IE FC RJ45 modular outlet with power insert FastConnect RJ45 modular outlet for Industrial Ethernet with a replaceable insert for 1 x 24 V and 1 x 100 Mbit/s interface	**6GK1 901-1BE00-0AA3**
IE Hybrid Cable 2x2 + 4x0.34 4-wire, shielded installation cable; sold by the meter; up to 1000 m, minimum order 20 m	**6XV1 870-2J**
IE FC RJ45 Plug 180 2x2 RJ45 plug connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation-displacement contacts for connecting Industrial Ethernet FC installation cables; with a 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface	
• 1 pack = 1 unit	**6GK1 901-1BB10-2AA0**
• 1 pack = 10 units	**6GK1 901-1BB10-2AB0**
• 1 pack = 50 units	**6GK1 901-1BB10-2AE0**
IE FC Standard Cable GP 2 x 2 4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/ IE FC RJ45 Plug; PROFINET-compliant; with UL approval; sold by the meter; max. length 1000 m, minimum order 20 m	**6XV1 840-2AH10**
IE FC Stripping Tool Preadjusted stripping tool for fast stripping of the Industrial Ethernet FC cables	**6GK1 901-1GA00**
IE TP Cord RJ45/RJ45 TP cable 4 x 2 with 2 RJ45 connectors	
• 0.5 m	**6XV1 870-3QE50**
• 1 m	**6XV1 870-3QH10**
• 2 m	**6XV1 870-3QH20**
• 6 m	**6XV1 870-3QH60**
• 10 m	**6XV1 870-3QN10**

	Order No.
IP 67 hybrid connector Connector for connecting SCALANCE W700 to Industrial Ethernet and Power over Ethernet (PoE), with assembly instructions, 1 unit	**09 45 125 1300.00** Order directly from: HARTING Deutschland GmbH & Co. KG P.O. Box 24-51 32381 Minden, Germany Phone: +49 (0)571-8896-0 Fax: +49 (0)571-8896-354 E-mail: de.sales@HARTING.com Internet: www.HARTING.com
Power M12 Cable Connector PRO Terminal socket for connection of SCALANCE W700 for 24 V DC supply voltage; 4-pole, A-coded, with assembly instructions, 3 units	**6GK1 907-0DC10-6AA3**
PS791-1PRO Power Supply AC/DC power supply, 10 W, IP65 (-20 to +60 °C), input: 90 V - 265 V AC, output: 24 V DC, metal housing; scope of supply: AC power 3+PE cable connector, DC power cord M12, mounting hardware; operating instructions German/English	**6GK5 791-1PS00-0AA6**
IE Hybrid RJ45 Socket Dust Cover Dust cap for RJ45 connection socket (Industrial Ethernet/PoE) of SCALANCE W700	**6ES7 194-1JB10-0XA0**
Antennas and miscellaneous IWLAN accessories	See Industrial Wireless LAN/ accessories

More information

Wireless approvals:

Current approvals can be found on the Internet at:
www.siemens.com/wireless-approvals

To assist in selecting the right products for Industrial Wireless Communication, the SIMATIC NET Selection Tool is available:

Online version:
www.siemens.com/snst

Offline version:
www.siemens.com/snst-download

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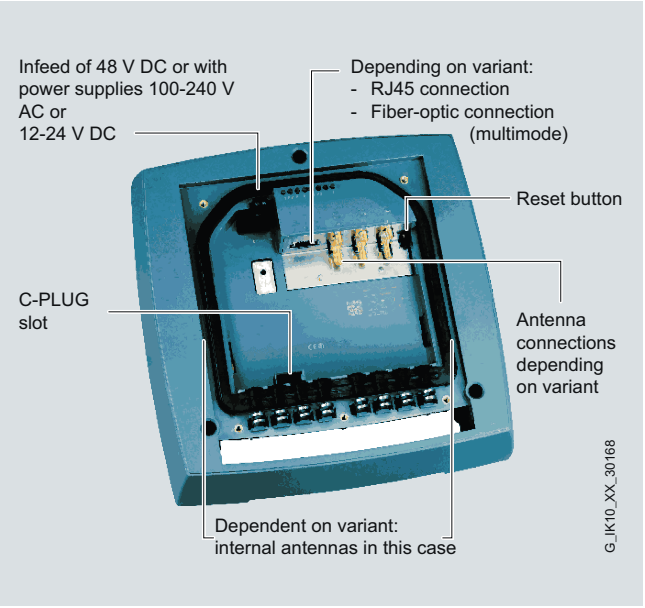
SCALANCE W786 for the outdoor area

Overview

- Especially well suited to applications with high climatic requirements when installed outdoors and in areas accessible to the public

Design

- Rugged plastic enclosure (plexi-glass type), shock and vibration-proof for severe mechanical loading
- High IP65 degree of protection against dust and water jets
- For use at ambient temperatures from -40 °C to +70 °C
- Resistant to condensation
- Resistant to UV radiation and saltwater spray
- Up to 6 x R-SMA sockets for the connection of remote antennas
- Version with 1 x RJ45 connection for 10/100 Mbit/s with Power-over-Ethernet according to IEEE 802.3at Type 1 (corresponds to IEEE 802.3af)
- Version with 1 x BFOC connection for 10/100 Mbit/s multimode FOC
- 1 x 48 V DC connection (also redundant power infeed), optional operation on 12 … 24 V DC or 100 … 240 V AC with power supply integrated into device
- 1 x C-PLUG slot
- Function LEDs for optical signaling of faults and operating states
- Mounting: Wall or, with optional mounting set, on S7 mounting rail, 35 mm standard mounting rail, or on a pole



Design and interfaces of the SCALANCE W786 access points

Product versions

SCALANCE W786-1PRO

- A wireless card permanently installed in the device
- Versions with:
  - RJ45 connection and two internal antennas
  - RJ45 connection and two connections for external antennas
  - Fiber-optic connection and two internal antennas
  - Fiber-optic connection and two connections for external antennas

SCALANCE W786-2PRO

- Two wireless cards permanently installed in the device
- Versions with:
  - RJ45 connection and four internal antennas
  - RJ45 connection and four connections for external antennas
  - Fiber-optic connection and four internal antennas
  - Fiber-optic connection and four connections for external antennas

SCALANCE W786-3PRO

- Three wireless cards permanently installed in the device
- Versions with:
  - RJ45 connection and six connections for external antennas
  - Fiber-optic connection and six connections for external antennas

SCALANCE W786-2RR

- Two wireless cards permanently installed in the device; for establishing wireless connections with iPCF
- Versions with:
  - RJ45 connection and four internal antennas
  - RJ45 connection and four connections for external antennas

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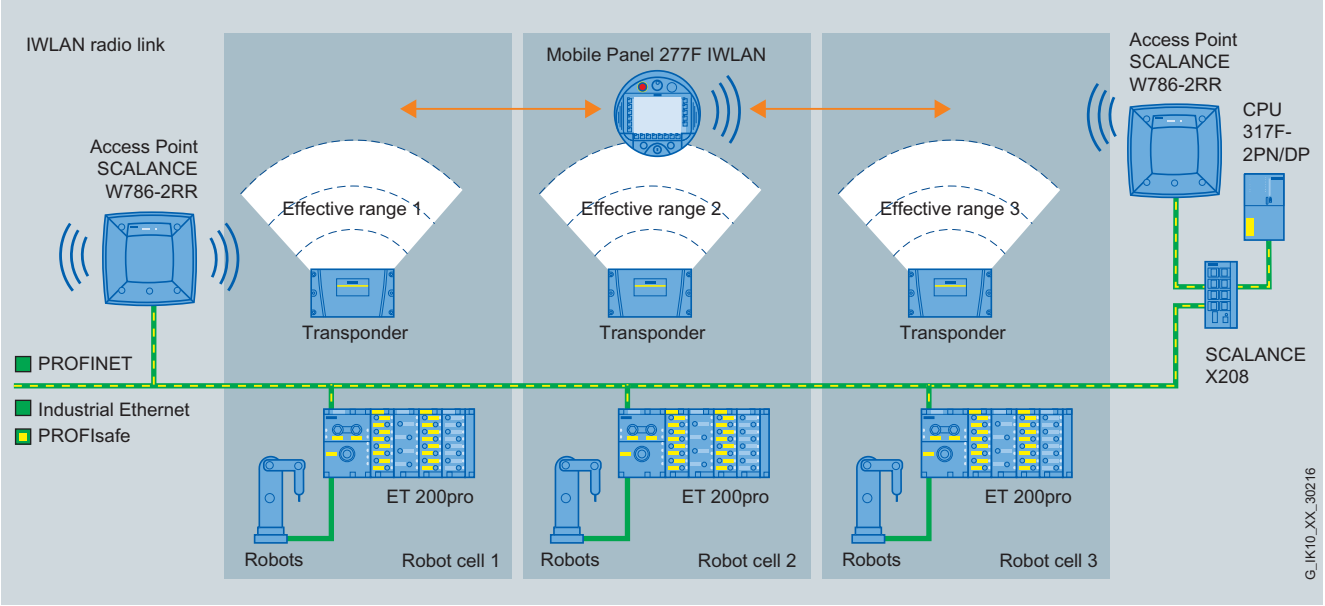
SCALANCE W786 for the outdoor area

Function

Where access points with three wireless modules (e.g. W786-3PRO) are used, communication between the access points is implemented with two modules each. The wireless field for the station, e.g. an automated guided vehicle, is established by the third wireless module. This means that larger directional radio paths can be established and communication with the stations is also possible.



Programming of robots in the safety-related environment

In this configuration three effective ranges are defined, in which robots can be programmed using the Mobile Panel 277(F) IWLAN (teaching). If a fault occurs during the programming, e.g. on leaving the safety-related areas or in the case of unforeseen incidents, the plant is brought to the safe state with the aid of the integrated emergency-stop procedure using the IWLAN structure implemented with SCALANCE W786-2RR. The safety of the entire plant is achieved by means of PROFINET with the PROFIsafe protocol which is implemented not only on the PROFINET controller (CPU 317F-2 PN/DP), but also on the PROFINET device (Mobile Panel 277(F) IWLAN). The SCALANCE W786-2RR that has the iPCF mechanism ensures that the response times necessary for the functional safety are adhered to.

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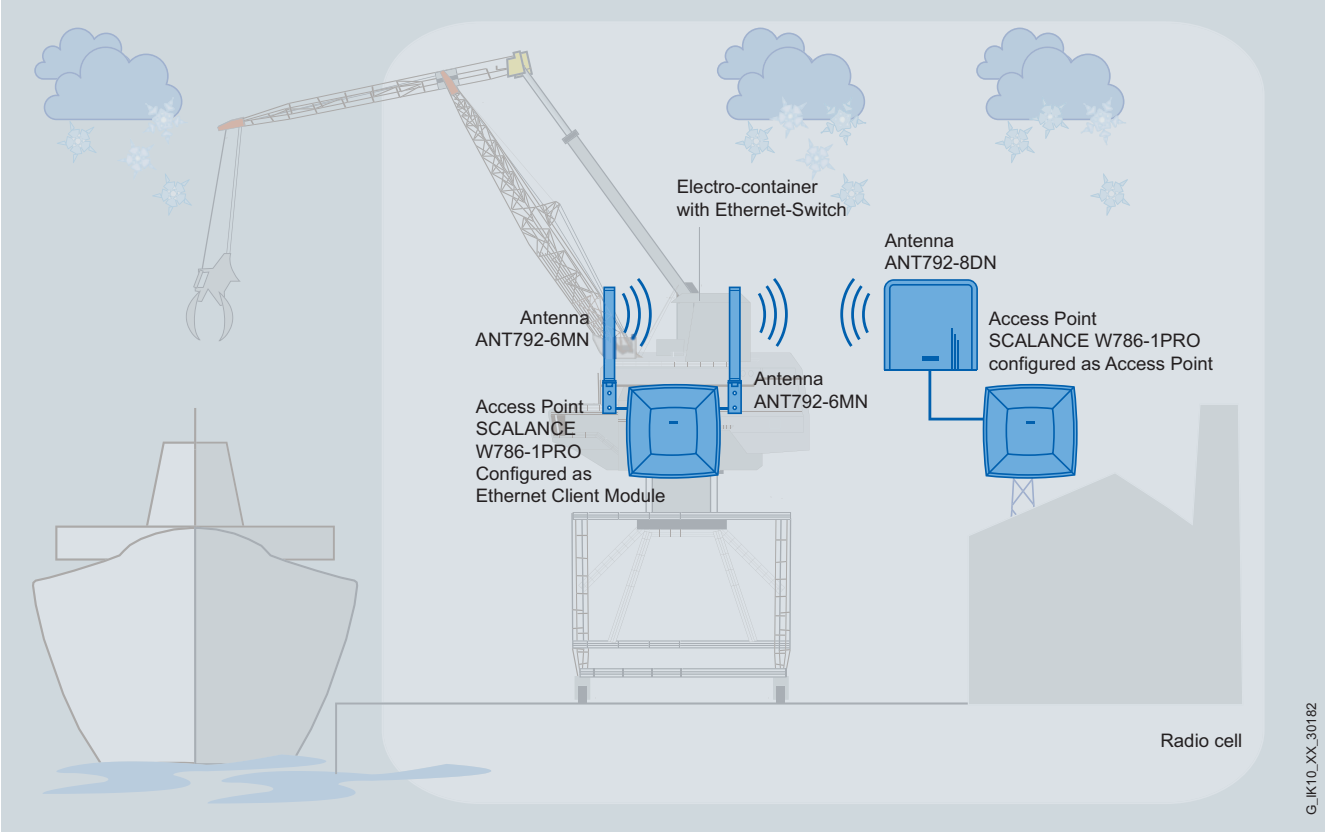
Function (continued)

If the minimum length of standard Ethernet cables is insufficient due to the large distance of the access points from the wired network, SCALANCE W786 can also be used in a version with BFOC connectors (multimode fiber-optic cable).



Use of the SCALANCE W786 product line in sectors subject to high climatic requirements

In the case of SCALANCE W786, this only concerns access points which can, however, be configured as client modules through Web-based management. Then, depending on the selected version, a maximum of one wireless module will be available as a client.

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SCALANCE W786 for the outdoor area

Technical specifications

Order No.	6GK5 786-1BA60-2AA0 6GK5 786-1BA60-2AB0[1]	6GK5 786-1AA60-2AA0 6GK5 786-1AA60-2AB0[1]	6GK5 786-1BB60-2AA0 6GK5 786-1BB60-2AB0[1]	6GK5 786-1AB60-2AA0 6GK5 786-1AB60-2AB0[1]
Product type designation	**SCALANCE W786-1PRO**	**SCALANCE W786-1PRO**	**SCALANCE W786-1PRO**	**SCALANCE W786-1PRO**
Data transfer rate				
Data transfer rate				
• with W-LAN, maximum	54 Mbit/s	54 Mbit/s	54 Mbit/s	54 Mbit/s
• with Industrial Ethernet	10 … 100 Mbit/s	10 … 100 Mbit/s	10 … 100 Mbit/s	10 … 100 Mbit/s
• Note	Due to the simultaneous use of several radio channels, a transmission rate of 108 Mbit/s is possible (turbo mode)	Due to the simultaneous use of several radio channels, a transmission rate of 108 Mbit/s is possible (turbo mode)	Due to the simultaneous use of several radio channels, a transmission rate of 108 Mbit/s is possible (turbo mode)	Due to the simultaneous use of several radio channels, a transmission rate of 108 Mbit/s is possible (turbo mode)
Interfaces				
Number of electrical connections				
• for network components or terminal equipment	1	1	-	-
• for power supply	1	1	1	1
• For redundant power supply	1	1	1	1
Design of electrical connection				
• for network components or terminal equipment	RJ45 socket	RJ45 socket	-	-
• for power supply	2-pin connector (48 V DC) or optionally available power supply adapter (4-pin 12 to 24 V DC or 3-pin 100 to 240 V AC)	2-pin connector (48 V DC) or optionally available power supply adapter (4-pin 12 to 24 V DC or 3-pin 100 to 240 V AC)	2-pin connector (48 V DC) or optionally available power supply adapter (4-pin 12 to 24 V DC or 3-pin 100 to 240 V AC)	2-pin connector (48 V DC) or optionally available power supply adapter (4-pin 12 to 24 V DC or 3-pin 100 to 240 V AC)
Number of optical connections for fiber-optic cables at 100 Mbit/s	-	-	1	1
Design of optical connection for fiber-optic cables at 100 Mbit/s	-	-	Duplex multimode FOC (ST)	Duplex multimode FOC (ST)
Design of swap medium C-Plug	Yes	Yes	Yes	Yes
Interfaces wireless				
Number of permanently installed wireless cards	1	1	1	1
Number of internal antennas	2	-	2	-
Number of electrical connections for external antenna(s)	-	2	-	2
Design of electrical connection for external antenna(s)	-	R-SMA female (socket)	-	R-SMA female (socket)
Supply voltage, current consumption, power loss				
Type of supply voltage	DC	DC	DC	DC
Supply voltage				
• 1 from terminal block	48 V	48 V	48 V	48 V
• 2 from terminal block	-	-	-	-
• From Power-over-Ethernet according to IEEE802.3at for Type 1 and IEEE802.3af	48 V	48 V	48 V	48 V
• From optionally integrated power supply				
- With AC	100 … 240 V	100 … 240 V	100 … 240 V	100 … 240 V
- With DC	12 … 24 V	12 … 24 V	12 … 24 V	12 … 24 V

[1] Wireless approval in the USA

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Technical specifications (continued)

Order No.	6GK5 786-1BA60-2AA0 6GK5 786-1BA60-2AB0[1)]	6GK5 786-1AA60-2AA0 6GK5 786-1AA60-2AB0[1)]	6GK5 786-1BB60-2AA0 6GK5 786-1BB60-2AB0[1)]	6GK5 786-1AB60-2AA0 6GK5 786-1AB60-2AB0[1)]
Product type designation	**SCALANCE W786-1PRO**	**SCALANCE W786-1PRO**	**SCALANCE W786-1PRO**	**SCALANCE W786-1PRO**
Current consumed				
• At 24 V DC, typical	0.28 A	0.28 A	0.34 A	0.34 A
• At 48 V DC, typical	0.14 A	0.14 A	0.17 A	0.17 A
• At 230 V AC, typical	0.03 A	0.03 A	0.04 A	0.04 A
• With Power-over-Ethernet according to IEEE802.3at for Type 1 and IEEE802.3af, typical	0.14 A	0.14 A	0.34 A	0.34 A
Effective power loss				
• At 24 V DC, typical	6.5 W	6.5 W	8 W	8 W
• At 48 V DC, typical	6.5 W	6.5 W	8 W	8 W
• At 230 V AC, typical	6.5 W	6.5 W	8 W	8 W
• With Power-over-Ethernet according to IEEE802.3at for Type 1 and IEEE802.3af, typical	6.5 W	6.5 W	8 W	8 W
Permissible ambient conditions				
Ambient temperature				
• During operation	-40 … +70 °C	-40 … +70 °C	-40 … +70 °C	-40 … +70 °C
• During storage	-40 … +85 °C	-40 … +85 °C	-40 … +85 °C	-40 … +85 °C
• During transport	-40 … +85 °C	-40 … +85 °C	-40 … +85 °C	-40 … +85 °C
Relative humidity at 25 °C without condensation during operation, maximum	100 %	100 %	100 %	100 %
IP degree of protection	IP65	IP65	IP65	IP65
Ambient conditions for operation	When using the 100 … 240 V AC power supply, an operating temperature of -40 °C to +60 °C is permissible	When using the 100 … 240 V AC power supply, an operating temperature of -40 °C to +60 °C is permissible	When using the 100 … 240 V AC power supply, an operating temperature of -40 °C to +60 °C is permissible	When using the 100 … 240 V AC power supply, an operating temperature of -40 °C to +60 °C is permissible
Design, dimensions and weights				
Width of enclosure without antenna	251 mm	251 mm	251 mm	251 mm
Height of enclosure without antenna	251 mm	251 mm	251 mm	251 mm
Depth of enclosure without antenna	72 mm	72 mm	72 mm	72 mm
Net weight	2.24 kg	2.24 kg	2.24 kg	2.24 kg
Type of mounting				
• S7-300 rail mounting	-	-	-	-
• Wall mounting	Yes	Yes	Yes	Yes
Type of mounting	For mast mounting, 35 mm DIN rail mounting and S7-300 rail mounting, an additional retaining plate is required	For mast mounting, 35 mm DIN rail mounting and S7-300 rail mounting, an additional retaining plate is required	For mast mounting, 35 mm DIN rail mounting and S7-300 rail mounting, an additional retaining plate is required	For mast mounting, 35 mm DIN rail mounting and S7-300 rail mounting, an additional retaining plate is required
Wireless frequencies				
Wireless frequency				
• With WLAN in the 2.4 GHz frequency band	2.41 … 2.48 GHz	2.41 … 2.48 GHz	2.41 … 2.48 GHz	2.41 … 2.48 GHz
• with WLAN in the 5 GHz frequency band	4.9 … 5.8 GHz	4.9 … 5.8 GHz	4.9 … 5.8 GHz	4.9 … 5.8 GHz
Product properties, functions, components General				
Number of SSIDs	8	8	8	8
Product function				
• Dual client	No	No	No	No
• iHOP	No	No	No	No
• iPCF	No	No	No	No
• iPCF-MC	No	No	No	No
Number of iPCF-capable radio modules	0	0	0	0

[1)] Wireless approval in the USA

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Technical specifications (continued)

Order No.	6GK5 786-1BA60-2AA0 6GK5 786-1BA60-2AB0[1)]	6GK5 786-1AA60-2AA0 6GK5 786-1AA60-2AB0[1)]	6GK5 786-1BB60-2AA0 6GK5 786-1BB60-2AB0[1)]	6GK5 786-1AB60-2AA0 6GK5 786-1AB60-2AB0[1)]
Product type designation	**SCALANCE W786-1PRO**	**SCALANCE W786-1PRO**	**SCALANCE W786-1PRO**	**SCALANCE W786-1PRO**
Product functions Management, configuration, programming				
Number of manageable IP addresses in the client	8	8	8	8
Product function				
• CLI	Yes	Yes	Yes	Yes
• Web-based management	Yes	Yes	Yes	Yes
• MIB support	Yes	Yes	Yes	Yes
• TRAPs via e-mail	Yes	Yes	Yes	Yes
• Configuration with STEP 7	Yes	Yes	Yes	Yes
• Configuration with STEP 7 in the TIA Portal	Yes	Yes	Yes	Yes
• SMTP server	Yes	Yes	Yes	Yes
• Operation with IWLAN controller	No	No	No	No
• Operation with Enterasys WLAN controller	No	No	No	No
• iQoS	Yes	Yes	Yes	Yes
• Forced roaming with IWLAN	Yes	Yes	Yes	Yes
• WDS	Yes	Yes	Yes	Yes
Protocol is supported				
• Address Resolution Protocol (ARP)	Yes	Yes	Yes	Yes
• ICMP	Yes	Yes	Yes	Yes
• Telnet	Yes	Yes	Yes	Yes
• HTTP	Yes	Yes	Yes	Yes
• HTTPS	Yes	Yes	Yes	Yes
• TFTP	Yes	Yes	Yes	Yes
• SNMP v1	Yes	Yes	Yes	Yes
• SNMP v2	Yes	Yes	Yes	Yes
• SNMP v3	Yes	Yes	Yes	Yes
• DCP	Yes	Yes	Yes	Yes
• LLDP	Yes	Yes	Yes	Yes
Identification & maintenance				
• I&M0 - device-specific information	Yes	Yes	Yes	Yes
• I&M1 - higher-level designation/ location designation	Yes	Yes	Yes	Yes
Product functions Diagnostics				
Product function				
• PROFINET IO diagnostics	Yes	Yes	Yes	Yes
• Link check	Yes	Yes	Yes	Yes
• Connection monitoring IP-Alive	Yes	Yes	Yes	Yes
• Localization by means of Aeroscout	Yes	Yes	Yes	Yes
• SysLog	Yes	Yes	Yes	Yes
Product functions VLAN				
Product function VLAN with IWLAN	Yes	Yes	Yes	Yes
Product functions DHCP				
Product function DHCP client	Yes	Yes	Yes	Yes
Product functions Redundancy				
STP/RSTP protocol is supported	Yes	Yes	Yes	Yes

1) Wireless approval in the USA

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Technical specifications (continued)

Order No.	6GK5 786-1BA60-2AA0 6GK5 786-1BA60-2AB0[1]	6GK5 786-1AA60-2AA0 6GK5 786-1AA60-2AB0[1]	6GK5 786-1BB60-2AA0 6GK5 786-1BB60-2AB0[1]	6GK5 786-1AB60-2AA0 6GK5 786-1AB60-2AB0[1]
Product type designation	**SCALANCE W786-1PRO**	**SCALANCE W786-1PRO**	**SCALANCE W786-1PRO**	**SCALANCE W786-1PRO**
Product functions Security				
Product function				
• ACL - MAC based	Yes	Yes	Yes	Yes
• IEEE 802.1x (radius)	Yes	Yes	Yes	Yes
• NAT/NAPT	Yes	Yes	Yes	Yes
• Access protection according to IEEE802.11i	Yes	Yes	Yes	Yes
• WPA/WPA2	Yes	Yes	Yes	Yes
• TKIP/AES	Yes	Yes	Yes	Yes
Protocol is supported SSH	Yes	Yes	Yes	Yes
Product functions Time				
SNTP protocol is supported	Yes	Yes	Yes	Yes
Standards, specifications, approvals				
Standard				
• for EMC of FM	FM 3611: Class I, Division 2, Groups A,B,C,D, T4 / Class 1, Zone 2, Group IIC, T4	FM 3611: Class I, Division 2, Groups A,B,C,D, T4 / Class 1, Zone 2, Group IIC, T4	FM 3611: Class I, Division 2, Groups A,B,C,D, T4 / Class 1, Zone 2, Group IIC, T4	FM 3611: Class I, Division 2, Groups A,B,C,D, T4 / Class 1, Zone 2, Group IIC, T4
• for hazardous zone	EN 60079-15:2005, EN 60079-0:2006, II 3 G Ex nA II T4 KEMA 07 ATEX 0145X	EN 60079-15:2005, EN 60079-0:2006, II 3 G Ex nA II T4 KEMA 07 ATEX 0145X	EN 60079-15:2005, EN 60079-0:2006, II 3 G Ex nA II T4 KEMA 07 ATEX 0145X	EN 60079-15:2005, EN 60079-0:2006, II 3 G Ex nA II T4 KEMA 07 ATEX 0145X
• for CSA and UL safety	UL 60950-1 CSA C22.2 No. 60950-1	UL 60950-1 CSA C22.2 No. 60950-1	UL 60950-1 CSA C22.2 No. 60950-1	UL 60950-1 CSA C22.2 No. 60950-1
• for hazardous zone of CSA and UL	UL 1604, CSA C22.2 No. 213-M1987, CL. 1, Div. 2, GP. A,B,C,D, T4 / CL. 1, Zone 2, GP IIC, T4	UL 1604, CSA C22.2 No. 213-M1987, CL. 1, Div. 2, GP. A,B,C,D, T4 / CL. 1, Zone 2, GP IIC, T4	UL 1604, CSA C22.2 No. 213-M1987, CL. 1, Div. 2, GP. A,B,C,D, T4 / CL. 1, Zone 2, GP IIC, T4	UL 1604, CSA C22.2 No. 213-M1987, CL. 1, Div. 2, GP. A,B,C,D, T4 / CL. 1, Zone 2, GP IIC, T4
Certificate of suitability				
• CE marking	Yes	Yes	Yes	Yes
• EC Declaration of Conformity	Yes	Yes	Yes	Yes
• C-Tick	Yes	Yes	Yes	Yes
• CCC	No	No	No	No
• Railroad application according to EN 50155	No	No	No	No
• e1 approval	Yes	Yes	Yes	Yes
• E1 approval	Yes	Yes	Yes	Yes
• NEMA4X	Yes	Yes	Yes	Yes
• Power-over-Ethernet according to IEEE802.3at for Type 1 and IEEE802.3af	Yes	Yes	Yes	Yes
Standard for wireless communication				
• IEEE 802.11a	Yes	Yes	Yes	Yes
• IEEE 802.11b	Yes	Yes	Yes	Yes
• IEEE 802.11e	Yes	Yes	Yes	Yes
• IEEE 802.11g	Yes	Yes	Yes	Yes
• IEEE 802.11h	Yes	Yes	Yes	Yes
• IEEE 802.11i	Yes	Yes	Yes	Yes
• IEEE 802.11n	No	No	No	No
Wireless approval	You can find the latest list of countries at: www.siemens.com/simatic-net/ik-info	You can find the latest list of countries at: www.siemens.com/simatic-net/ik-info	You can find the latest list of countries at: www.siemens.com/simatic-net/ik-info	You can find the latest list of countries at: www.siemens.com/simatic-net/ik-info

[1] Wireless approval in the USA

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Technical specifications (continued)

Order No.	6GK5 786-1BA60-2AA0 6GK5 786-1BA60-2AB0[1]	6GK5 786-1AA60-2AA0 6GK5 786-1AA60-2AB0[1]	6GK5 786-1BB60-2AA0 6GK5 786-1BB60-2AB0[1]	6GK5 786-1AB60-2AA0 6GK5 786-1AB60-2AB0[1]
Product type designation	**SCALANCE W786-1PRO**	**SCALANCE W786-1PRO**	**SCALANCE W786-1PRO**	**SCALANCE W786-1PRO**
Marine classification association				
• American Bureau of Shipping Europe Ltd. (ABS)	Yes	Yes	Yes	Yes
• Bureau Veritas (BV)	Yes	Yes	Yes	Yes
• Det Norske Veritas (DNV)	No	No	No	No
• Germanischer Lloyd (GL)	Yes	Yes	Yes	Yes
• Lloyds Register of Shipping (LRS)	Yes	Yes	Yes	Yes
• Nippon Kaiji Kyokai (NK)	Yes	Yes	Yes	Yes
• Polski Rejestr Statkow (PRS)	No	No	No	No
Accessories				
Accessories	48 V DC screw terminal included in scope of delivery	48 V DC screw terminal included in scope of delivery	48 V DC screw terminal included in scope of delivery	48 V DC screw terminal included in scope of delivery

[1] Wireless approval in the USA

Order No.	6GK5 786-2BA60-2AA0 6GK5 786-2BA60-2AB0[1]	6GK5 786-2AA60-2AA0 6GK5 786-2AA60-2AB0[1]	6GK5 786-2BB60-2AA0 6GK5 786-2BB60-2AB0[1]	6GK5 786-2AB60-2AA0 6GK5 786-2AB60-2AB0[1]
Product type designation	**SCALANCE W786-2PRO**	**SCALANCE W786-2PRO**	**SCALANCE W786-2PRO**	**SCALANCE W786-2PRO**
Data transfer rate				
Data transfer rate				
• with W-LAN, maximum	54 Mbit/s	54 Mbit/s	54 Mbit/s	54 Mbit/s
• with Industrial Ethernet	10 … 100 Mbit/s	10 … 100 Mbit/s	10 … 100 Mbit/s	10 … 100 Mbit/s
• Note	Due to the simultaneous use of several radio channels, a transmission rate of 108 Mbit/s is possible (turbo mode)	Due to the simultaneous use of several radio channels, a transmission rate of 108 Mbit/s is possible (turbo mode)	Due to the simultaneous use of several radio channels, a transmission rate of 108 Mbit/s is possible (turbo mode)	Due to the simultaneous use of several radio channels, a transmission rate of 108 Mbit/s is possible (turbo mode)
Interfaces				
Number of electrical connections				
• for network components or terminal equipment	1	1	-	-
• for power supply	1	1	1	1
• for redundant power supply	1	1	1	1
Design of electrical connection				
• for network components or terminal equipment	RJ45 socket	RJ45 socket	-	-
• for power supply	2-pin connector (48 V DC) or optionally available power supply adapter (4-pin 12 to 24 V DC or 3-pin 100 to 240 V AC)	2-pin connector (48 V DC) or optionally available power supply adapter (4-pin 12 to 24 V DC or 3-pin 100 to 240 V AC)	2-pin connector (48 V DC) or optionally available power supply adapter (4-pin 12 to 24 V DC or 3-pin 100 to 240 V AC)	2-pin connector (48 V DC) or optionally available power supply adapter (4-pin 12 to 24 V DC or 3-pin 100 to 240 V AC)
Number of optical connections for fiber-optic cables at 100 Mbit/s	-	-	1	1
Design of optical connection for fiber-optic cables at 100 Mbit/s	-	-	Duplex multimode FOC (ST)	Duplex multimode FOC (ST)
Design of swap medium C-Plug	Yes	Yes	Yes	Yes

[1] Wireless approval in the USA

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Technical specifications (continued)

Order No.	6GK5 786-2BA60-2AA0 6GK5 786-2BA60-2AB0[1)]	6GK5 786-2AA60-2AA0 6GK5 786-2AA60-2AB0[1)]	6GK5 786-2BB60-2AA0 6GK5 786-2BB60-2AB0[1)]	6GK5 786-2AB60-2AA0 6GK5 786-2AB60-2AB0[1)]
Product type designation	**SCALANCE W786-2PRO**	**SCALANCE W786-2PRO**	**SCALANCE W786-2PRO**	**SCALANCE W786-2PRO**
Interfaces wireless				
Number of permanently installed wireless cards	2	2	2	2
Number of internal antennas	4	-	4	-
Number of electrical connections for external antenna(s)	-	4	-	4
Design of electrical connection for external antenna(s)	-	R-SMA female (socket)	-	R-SMA female (socket)
Supply voltage, current consumption, power loss				
Type of supply voltage	DC	DC	DC	DC
Supply voltage				
• 1 from terminal block	48 V	48 V	48 V	48 V
• 2 from terminal block	-	-	-	-
• From Power-over-Ethernet according to IEEE802.3at for Type 1 and IEEE802.3af	48 V	48 V	48 V	48 V
• From optionally integrated power supply				
- With AC	100 … 240 V	100 … 240 V	100 … 240 V	100 … 240 V
- With DC	12 … 24 V	12 … 24 V	12 … 24 V	12 … 24 V
Current consumed				
• At 24 V DC, typical	0.34 A	0.34 A	0.4 A	0.4 A
• At 48 V DC, typical	0.17 A	0.17 A	0.2 A	0.2 A
• At 230 V AC, typical	0.04 A	0.04 A	0.05 A	0.05 A
• With Power-over-Ethernet according to IEEE802.3at for Type 1 and IEEE802.3af, typical	0.34 A	0.34 A	0.2 A	0.2 A
Effective power loss				
• At 24 V DC, typical	8 W	8 W	9.5 W	9.5 W
• At 48 V DC, typical	8 W	8 W	9.5 W	9.5 W
• At 230 V AC, typical	8 W	8 W	9.5 W	9.5 W
• With Power-over-Ethernet according to IEEE802.3at for Type 1 and IEEE802.3af, typical	8 W	8 W	9.5 W	9.5 W
Permissible ambient conditions				
Ambient temperature				
• During operation	-40 … +70 °C	-40 … +70 °C	-40 … +70 °C	-40 … +70 °C
• During storage	-40 … +85 °C	-40 … +85 °C	-40 … +85 °C	-40 … +85 °C
• During transport	-40 … +85 °C	-40 … +85 °C	-40 … +85 °C	-40 … +85 °C
Relative humidity at 25 °C without condensation during operation, maximum	100 %	100 %	100 %	100 %
IP degree of protection	IP65	IP65	IP65	IP65
Ambient conditions for operation	When using the 100 … 240 V AC power supply, an operating temperature of -40 °C to +60 °C is permissible	When using the 100 … 240 V AC power supply, an operating temperature of -40 °C to +60 °C is permissible	When using the 100 … 240 V AC power supply, an operating temperature of -40 °C to +60 °C is permissible	When using the 100 … 240 V AC power supply, an operating temperature of -40 °C to +60 °C is permissible

1) Wireless approval in the USA

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SCALANCE W786 for the outdoor area

Technical specifications (continued)

Order No.	6GK5 786-2BA60-2AA0 6GK5 786-2BA60-2AB0[1)]	6GK5 786-2AA60-2AA0 6GK5 786-2AA60-2AB0[1)]	6GK5 786-2BB60-2AA0 6GK5 786-2BB60-2AB0[1)]	6GK5 786-2AB60-2AA0 6GK5 786-2AB60-2AB0[1)]
Product type designation	**SCALANCE W786-2PRO**	**SCALANCE W786-2PRO**	**SCALANCE W786-2PRO**	**SCALANCE W786-2PRO**
Design, dimensions and weights				
Width of enclosure without antenna	251 mm	251 mm	251 mm	251 mm
Height of enclosure without antenna	251 mm	251 mm	251 mm	251 mm
Depth of enclosure without antenna	72 mm	72 mm	72 mm	72 mm
Net weight	2.24 kg	2.24 kg	2.24 kg	2.24 kg
Type of mounting				
• S7-300 rail mounting	-	-	-	-
• Wall mounting	Yes	Yes	Yes	Yes
Type of mounting	For mast mounting, 35 mm DIN rail mounting and S7-300 rail mounting, an additional retaining plate is required	For mast mounting, 35 mm DIN rail mounting and S7-300 rail mounting, an additional retaining plate is required	For mast mounting, 35 mm DIN rail mounting and S7-300 rail mounting, an additional retaining plate is required	For mast mounting, 35 mm DIN rail mounting and S7-300 rail mounting, an additional retaining plate is required
Wireless frequencies				
Wireless frequency				
• With WLAN in the 2.4 GHz frequency band	2.41 … 2.48 GHz	2.41 … 2.48 GHz	2.41 … 2.48 GHz	2.41 … 2.48 GHz
• with WLAN in the 5 GHz frequency band	4.9 … 5.8 GHz	4.9 … 5.8 GHz	4.9 … 5.8 GHz	4.9 … 5.8 GHz
Product properties, functions, components General				
Number of SSIDs	16	16	16	16
Product function				
• Dual client	No	No	No	No
• iHOP	No	No	No	No
• iPCF	No	No	No	No
• iPCF-MC	No	No	No	No
Number of iPCF-capable radio modules	0	0	0	0
Product functions Management, configuration, programming				
Number of manageable IP addresses in the client	8	8	8	8
Product function				
• CLI	Yes	Yes	Yes	Yes
• Web-based management	Yes	Yes	Yes	Yes
• MIB support	Yes	Yes	Yes	Yes
• TRAPs via e-mail	Yes	Yes	Yes	Yes
• Configuration with STEP 7	Yes	Yes	Yes	Yes
• Configuration with STEP 7 in the TIA Portal	Yes	Yes	Yes	Yes
• SMTP server	Yes	Yes	Yes	Yes
• Operation with IWLAN controller	No	No	No	No
• Operation with Enterasys WLAN controller	No	No	No	No
• iQoS	Yes	Yes	Yes	Yes
• Forced roaming with IWLAN	Yes	Yes	Yes	Yes
• WDS	Yes	Yes	Yes	Yes

1) Wireless approval in the USA

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Technical specifications (continued)

Order No.	6GK5 786-2BA60-2AA0 6GK5 786-2BA60-2AB0[1)]	6GK5 786-2AA60-2AA0 6GK5 786-2AA60-2AB0[1)]	6GK5 786-2BB60-2AA0 6GK5 786-2BB60-2AB0[1)]	6GK5 786-2AB60-2AA0 6GK5 786-2AB60-2AB0[1)]
Product type designation	**SCALANCE W786-2PRO**	**SCALANCE W786-2PRO**	**SCALANCE W786-2PRO**	**SCALANCE W786-2PRO**
Protocol is supported				
• Address Resolution Protocol (ARP)	Yes	Yes	Yes	Yes
• ICMP	Yes	Yes	Yes	Yes
• Telnet	Yes	Yes	Yes	Yes
• HTTP	Yes	Yes	Yes	Yes
• HTTPS	Yes	Yes	Yes	Yes
• TFTP	Yes	Yes	Yes	Yes
• SNMP v1	Yes	Yes	Yes	Yes
• SNMP v2	Yes	Yes	Yes	Yes
• SNMP v3	Yes	Yes	Yes	Yes
• DCP	Yes	Yes	Yes	Yes
• LLDP	Yes	Yes	Yes	Yes
Identification & maintenance				
• I&M0 - device-specific information	Yes	Yes	Yes	Yes
• I&M1 - higher-level designation/ location designation	Yes	Yes	Yes	Yes
Product functions Diagnostics				
Product function				
• PROFINET IO diagnostics	Yes	Yes	Yes	Yes
• Link check	Yes	Yes	Yes	Yes
• Connection monitoring IP-Alive	Yes	Yes	Yes	Yes
• Localization by means of Aeroscout	Yes	Yes	Yes	Yes
• SysLog	Yes	Yes	Yes	Yes
Product functionsVLAN				
Product function VLAN with IWLAN	Yes	Yes	Yes	Yes
Product functions DHCP				
Product function DHCP client	Yes	Yes	Yes	Yes
Product functions Redundancy				
STP/RSTP protocol is supported	Yes	Yes	Yes	Yes
Product functions Security				
Product function				
• ACL - MAC based	Yes	Yes	Yes	Yes
• IEEE 802.1x (radius)	Yes	Yes	Yes	Yes
• NAT/NAPT	Yes	Yes	Yes	Yes
• Access protection according to IEEE802.11i	Yes	Yes	Yes	Yes
• WPA/WPA2	Yes	Yes	Yes	Yes
• TKIP/AES	Yes	Yes	Yes	Yes
Protocol is supported SSH	Yes	Yes	Yes	Yes
Product functions Time				
SNTP protocol is supported	Yes	Yes	Yes	Yes

1) Wireless approval in the USA

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SCALANCE W786 for the outdoor area

Technical specifications (continued)

Order No.	6GK5 786-2BA60-2AA0 6GK5 786-2BA60-2AB0[1)]	6GK5 786-2AA60-2AA0 6GK5 786-2AA60-2AB0[1)]	6GK5 786-2BB60-2AA0 6GK5 786-2BB60-2AB0[1)]	6GK5 786-2AB60-2AA0 6GK5 786-2AB60-2AB0[1)]
Product type designation	**SCALANCE W786-2PRO**	**SCALANCE W786-2PRO**	**SCALANCE W786-2PRO**	**SCALANCE W786-2PRO**
Standards, specifications, approvals				
Standard				
• for EMC of FM	FM 3611: Class I, Division 2, Groups A,B,C,D, T4 / Class 1, Zone 2, Group IIC, T4	FM 3611: Class I, Division 2, Groups A,B,C,D, T4 / Class 1, Zone 2, Group IIC, T4	FM 3611: Class I, Division 2, Groups A,B,C,D, T4 / Class 1, Zone 2, Group IIC, T4	FM 3611: Class I, Division 2, Groups A,B,C,D, T4 / Class 1, Zone 2, Group IIC, T4
• for hazardous zone	EN 60079-15:2005, EN 60079-0:2006, II 3 G Ex nA II T4 KEMA 07 ATEX 0145X	EN 60079-15:2005, EN 60079-0:2006, II 3 G Ex nA II T4 KEMA 07 ATEX 0145X	EN 60079-15:2005, EN 60079-0:2006, II 3 G Ex nA II T4 KEMA 07 ATEX 0145X	EN 60079-15:2005, EN 60079-0:2006, II 3 G Ex nA II T4 KEMA 07 ATEX 0145X
• for CSA and UL safety	UL 60950-1 CSA C22.2 No. 60950-1	UL 60950-1 CSA C22.2 No. 60950-1	UL 60950-1 CSA C22.2 No. 60950-1	UL 60950-1 CSA C22.2 No. 60950-1
• for hazardous zone of CSA and UL	UL 1604, CSA C22.2 No. 213-M1987, CL. 1, Div. 2, GP. A,B,C,D, T4 / CL. 1, Zone 2, GP IIC, T4	UL 1604, CSA C22.2 No. 213-M1987, CL. 1, Div. 2, GP. A,B,C,D, T4 / CL. 1, Zone 2, GP IIC, T4	UL 1604, CSA C22.2 No. 213-M1987, CL. 1, Div. 2, GP. A,B,C,D, T4 / CL. 1, Zone 2, GP IIC, T4	UL 1604, CSA C22.2 No. 213-M1987, CL. 1, Div. 2, GP. A,B,C,D, T4 / CL. 1, Zone 2, GP IIC, T4
Certificate of suitability				
• CE marking	Yes	Yes	Yes	Yes
• EC Declaration of Conformity	Yes	Yes	Yes	Yes
• C-Tick	Yes	Yes	Yes	Yes
• CCC	No	No	No	No
• Railroad application according to EN 50155	No	No	No	No
• e1 approval	Yes	Yes	Yes	Yes
• E1 approval	Yes	Yes	Yes	Yes
• NEMA4X	Yes	Yes	Yes	Yes
• Power-over-Ethernet according to IEEE802.3at for Type 1 and IEEE802.3af	Yes	Yes	Yes	Yes
Standard for wireless communication				
• IEEE 802.11a	Yes	Yes	Yes	Yes
• IEEE 802.11b	Yes	Yes	Yes	Yes
• IEEE 802.11e	Yes	Yes	Yes	Yes
• IEEE 802.11g	Yes	Yes	Yes	Yes
• IEEE 802.11h	Yes	Yes	Yes	Yes
• IEEE 802.11i	Yes	Yes	Yes	Yes
• IEEE 802.11n	No	No	No	No
Wireless approval	You can find the latest list of countries at: www.siemens.com/simatic-net/ik-info	You can find the latest list of countries at: www.siemens.com/simatic-net/ik-info	You can find the latest list of countries at: www.siemens.com/simatic-net/ik-info	You can find the latest list of countries at: www.siemens.com/simatic-net/ik-info
Marine classification association				
• American Bureau of Shipping Europe Ltd. (ABS)	Yes	Yes	Yes	Yes
• Bureau Veritas (BV)	Yes	Yes	Yes	Yes
• Det Norske Veritas (DNV)	No	No	No	No
• Germanischer Lloyd (GL)	Yes	Yes	Yes	Yes
• Lloyds Register of Shipping (LRS)	Yes	Yes	Yes	Yes
• Nippon Kaiji Kyokai (NK)	Yes	Yes	Yes	Yes
• Polski Rejestr Statkow (PRS)	No	No	No	No
Accessories				
Accessories	48 V DC screw terminal included in scope of delivery	48 V DC screw terminal included in scope of delivery	48 V DC screw terminal included in scope of delivery	48 V DC screw terminal included in scope of delivery

1) Wireless approval in the USA

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Technical specifications (continued)

Order No.	6GK5 786-3AA60-2AA0 6GK5 786-3AA60-2AB0[1)]	6GK5 786-3AB60-2AA0 6GK5 786-3AB60-2AB0[1)]	6GK5 786-2BA60-6AA0 6GK5 786-2BA60-6AB0[1)]	6GK5 786-2AA60-6AA0 6GK5 786-2AA60-6AB0[1)]
Product type designation	**SCALANCE W786-3PRO**	**SCALANCE W786-3PRO**	**SCALANCE W786-2RR**	**SCALANCE W786-2RR**
Transmission rate				
Transmission rate				
• with W-LAN, maximum	54 Mbit/s	54 Mbit/s	54 Mbit/s	54 Mbit/s
• with Industrial Ethernet	10 … 100 Mbit/s	10 … 100 Mbit/s	10 … 100 Mbit/s	10 … 100 Mbit/s
• Note	Due to the simultaneous use of several radio channels, a transmission rate of 108 Mbit/s is possible (turbo mode)	Due to the simultaneous use of several radio channels, a transmission rate of 108 Mbit/s is possible (turbo mode)	Due to the simultaneous use of several radio channels, a transmission rate of 108 Mbit/s is possible (turbo mode)	Due to the simultaneous use of several radio channels, a transmission rate of 108 Mbit/s is possible (turbo mode)
Interfaces				
Number of electrical connections				
• for network components or terminal equipment	1	-	1	1
• for power supply	1	1	1	1
• for redundant power supply	1	1	1	1
Design of electrical connection				
• for network components or terminal equipment	RJ45 socket	-	RJ45 socket	RJ45 socket
• for power supply	2-pin connector (48 V DC) or optionally available power supply adapter (4-pin 12 to 24 V DC or 3-pin 100 to 240 V AC)	2-pin connector (48 V DC) or optionally available power supply adapter (4-pin 12 to 24 V DC or 3-pin 100 to 240 V AC)	2-pin connector (48 V DC) or optionally available power supply adapter (4-pin 12 to 24 V DC or 3-pin 100 to 240 V AC)	2-pin connector (48 V DC) or optionally available power supply adapter (4-pin 12 to 24 V DC or 3-pin 100 to 240 V AC)
Number of optical connections for fiber-optic cables at 100 Mbit/s	-	1	-	-
Design of optical connection for fiber-optic cables at 100 Mbit/s	-	Duplex multimode FOC (ST)	-	-
Design of swap medium C-Plug	Yes	Yes	Yes	Yes
Interfaceswireless				
Number of permanently installed wireless cards	3	3	2	2
Number of internal antennas	-	-	4	-
Number of electrical connections for external antenna(s)	6	6	-	4
Design of electrical connection for external antenna(s)	R-SMA female (socket)	R-SMA female (socket)	-	R-SMA female (socket)
Supply voltage, current consumption, power loss				
Type of power supply	DC	DC	DC	DC
Supply voltage				
• 1 from terminal block	48 V	48 V	48 V	48 V
• 2 from terminal block	-	-	-	-
• From Power-over-Ethernet according to IEEE802.3at for Type 1 and IEEE802.3af	48 V	48 V	48 V	48 V
• From optionally integrated power supply				
- With AC	100 … 240 V	100 … 240 V	100 … 240 V	100 … 240 V
- With DC	12 … 24 V	12 … 24 V	12 … 24 V	12 … 24 V

[1)] Wireless approval in the USA

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SCALANCE W786 for the outdoor area

Technical specifications (continued)

Order No.	6GK5 786-3AA60-2AA0 6GK5 786-3AA60-2AB0[1]	6GK5 786-3AB60-2AA0 6GK5 786-3AB60-2AB0[1]	6GK5 786-2BA60-6AA0 6GK5 786-2BA60-6AB0[1]	6GK5 786-2AA60-6AA0 6GK5 786-2AA60-6AB0[1]
Product type designation	**SCALANCE W786-3PRO**	**SCALANCE W786-3PRO**	**SCALANCE W786-2RR**	**SCALANCE W786-2RR**
Current consumed				
• At 24 V DC, typical	0.4 A	0.46 A	0.34 A	0.34 A
• At 48 V DC, typical	0.2 A	0.23 A	0.17 A	0.17 A
• At 230 V AC, typical	0.05 A	0.05 A	0.04 A	0.04 A
• With Power-over-Ethernet according to IEEE802.3at for Type 1 and IEEE802.3af, typical	0.2 A	0.23 A	0.34 A	0.34 A
Effective power loss				
• At 24 V DC, typical	9.5 W	11 W	8 W	8 W
• At 48 V DC, typical	9.5 W	11 W	8 W	8 W
• At 230 V AC, typical	9.5 W	11 W	8 W	8 W
• With Power-over-Ethernet according to IEEE802.3at for Type 1 and IEEE802.3af, typical	9.5 W	11 W	8 W	8 W
Permissible ambient conditions				
Ambient temperature				
• During operation	-40 … +70 °C	-40 … +70 °C	-40 … +70 °C	-40 … +70 °C
• During storage	-40 … +85 °C	-40 … +85 °C	-40 … +85 °C	-40 … +85 °C
• During transport	-40 … +85 °C	-40 … +85 °C	-40 … +85 °C	-40 … +85 °C
Relative humidity at 25 °C without condensation during operation, maximum	100 %	100 %	100 %	100 %
IP degree of protection	IP65	IP65	IP65	IP65
Ambient conditions for operation	When using the 100 … 240 V AC power supply, an operating temperature of -40 °C to +60 °C is permissible	When using the 100 … 240 V AC power supply, an operating temperature of -40 °C to +60 °C is permissible	When using the 100 … 240 V AC power supply, an operating temperature of -40 °C to +60 °C is permissible	When using the 100 … 240 V AC power supply, an operating temperature of -40 °C to +60 °C is permissible
Design, dimensions and weights				
Width of enclosure without antenna	251 mm	251 mm	251 mm	251 mm
Height of enclosure without antenna	251 mm	251 mm	251 mm	251 mm
Depth of enclosure without antenna	72 mm	72 mm	72 mm	72 mm
Net weight	2.24 kg	2.24 kg	2.24 kg	2.24 kg
Type of mounting				
• S7-300 rail mounting	-	-	-	-
• Wall mounting	Yes	Yes	Yes	Yes
Type of mounting	For mast mounting, 35 mm DIN rail mounting and S7-300 rail mounting, an additional retaining plate is required	For mast mounting, 35 mm DIN rail mounting and S7-300 rail mounting, an additional retaining plate is required	For mast mounting, 35 mm DIN rail mounting and S7-300 rail mounting, an additional retaining plate is required	For mast mounting, 35 mm DIN rail mounting and S7-300 rail mounting, an additional retaining plate is required
Wireless frequencies				
Wireless frequency				
• With WLAN in the 2.4 GHz frequency band	2.41 … 2.48 GHz	2.41 … 2.48 GHz	2.41 … 2.48 GHz	2.41 … 2.48 GHz
• with WLAN in the 5 GHz frequency band	4.9 … 5.8 GHz	4.9 … 5.8 GHz	4.9 … 5.8 GHz	4.9 … 5.8 GHz

[1] Wireless approval in the USA

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Technical specifications (continued)

Order No.	6GK5 786-3AA60-2AA0 6GK5 786-3AA60-2AB0[1)]	6GK5 786-3AB60-2AA0 6GK5 786-3AB60-2AB0[1)]	6GK5 786-2BA60-6AA0 6GK5 786-2BA60-6AB0[1)]	6GK5 786-2AA60-6AA0 6GK5 786-2AA60-6AB0[1)]
Product type designation	**SCALANCE W786-3PRO**	**SCALANCE W786-3PRO**	**SCALANCE W786-2RR**	**SCALANCE W786-2RR**
Product properties, functions, components General				
Number of SSIDs	24	24	16	16
Product function				
• Dual client	No	No	Yes	Yes
• iHOP	No	No	Yes	Yes
• iPCF	No	No	Yes	Yes
• iPCF-MC	No	No	Yes	Yes
Number of iPCF-capable radio modules	0	0	1	1
Product functions Management, configuration, programming				
Number of manageable IP addresses in the client	8	8	8	8
Product function				
• CLI	Yes	Yes	Yes	Yes
• Web-based management	Yes	Yes	Yes	Yes
• MIB support	Yes	Yes	Yes	Yes
• TRAPs via e-mail	Yes	Yes	Yes	Yes
• Configuration with STEP 7	Yes	Yes	Yes	Yes
• Configuration with STEP 7 in the TIA Portal	Yes	Yes	Yes	Yes
• SMTP server	Yes	Yes	Yes	Yes
• Operation with IWLAN controller	No	No	No	No
• Operation with Enterasys WLAN controller	No	No	No	No
• iQoS	Yes	Yes	Yes	Yes
• Forced roaming with IWLAN	Yes	Yes	Yes	Yes
• WDS	Yes	Yes	Yes	Yes
Protocol is supported				
• Address Resolution Protocol (ARP)	Yes	Yes	Yes	Yes
• ICMP	Yes	Yes	Yes	Yes
• Telnet	Yes	Yes	Yes	Yes
• HTTP	Yes	Yes	Yes	Yes
• HTTPS	Yes	Yes	Yes	Yes
• TFTP	Yes	Yes	Yes	Yes
• SNMP v1	Yes	Yes	Yes	Yes
• SNMP v2	Yes	Yes	Yes	Yes
• SNMP v3	Yes	Yes	Yes	Yes
• DCP	Yes	Yes	Yes	Yes
• LLDP	Yes	Yes	Yes	Yes
Identification & maintenance				
• I&M0 - device-specific information	Yes	Yes	Yes	Yes
• I&M1 - higher-level designation/ location designation	Yes	Yes	Yes	Yes

1) Wireless approval in the USA

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Technical specifications (continued)

Order No.	6GK5 786-3AA60-2AA0 6GK5 786-3AA60-2AB0[1)]	6GK5 786-3AB60-2AA0 6GK5 786-3AB60-2AB0[1)]	6GK5 786-2BA60-6AA0 6GK5 786-2BA60-6AB0[1)]	6GK5 786-2AA60-6AA0 6GK5 786-2AA60-6AB0[1)]
Product type designation	**SCALANCE W786-3PRO**	**SCALANCE W786-3PRO**	**SCALANCE W786-2RR**	**SCALANCE W786-2RR**
Product functions Diagnostics				
Product function				
• PROFINET IO diagnostics	Yes	Yes	Yes	Yes
• Link check	Yes	Yes	Yes	Yes
• Connection monitoring IP-Alive	Yes	Yes	Yes	Yes
• Localization by means of Aeroscout	Yes	Yes	Yes	Yes
• SysLog	Yes	Yes	Yes	Yes
Product functions VLAN				
Product function VLAN with IWLAN	Yes	Yes	Yes	Yes
Product functions DHCP				
Product function DHCP client	Yes	Yes	Yes	Yes
Product functions Redundancy				
STP/RSTP protocol is supported	Yes	Yes	Yes	Yes
Product functions Security				
Product function				
• ACL - MAC based	Yes	Yes	Yes	Yes
• IEEE 802.1x (radius)	Yes	Yes	Yes	Yes
• NAT/NAPT	Yes	Yes	Yes	Yes
• Access protection according to IEEE802.11i	Yes	Yes	Yes	Yes
• WPA/WPA2	Yes	Yes	Yes	Yes
• TKIP/AES	Yes	Yes	Yes	Yes
Protocol is supported SSH	Yes	Yes	Yes	Yes
Product functions Time				
SNTP protocol is supported	Yes	Yes	Yes	Yes
Standards, specifications, approvals				
Standard				
• for EMC of FM	FM 3611: Class I, Division 2, Groups A,B,C,D, T4 / Class 1, Zone 2, Group IIC, T4	FM 3611: Class I, Division 2, Groups A,B,C,D, T4 / Class 1, Zone 2, Group IIC, T4	FM 3611: Class I, Division 2, Groups A,B,C,D, T4 / Class 1, Zone 2, Group IIC, T4	FM 3611: Class I, Division 2, Groups A,B,C,D, T4 / Class 1, Zone 2, Group IIC, T4
• for hazardous zone	EN 60079-15:2005, EN 60079-0:2006, II 3 G Ex nA II T4 KEMA 07 ATEX 0145X	EN 60079-15:2005, EN 60079-0:2006, II 3 G Ex nA II T4 KEMA 07 ATEX 0145X	EN 60079-15:2005, EN 60079-0:2006, II 3 G Ex nA II T4 KEMA 07 ATEX 0145X	EN 60079-15:2005, EN 60079-0:2006, II 3 G Ex nA II T4 KEMA 07 ATEX 0145X
• for CSA and UL safety	UL 60950-1 CSA C22.2 No. 60950-1	UL 60950-1 CSA C22.2 No. 60950-1	UL 60950-1 CSA C22.2 No. 60950-1	UL 60950-1 CSA C22.2 No. 60950-1
• for hazardous zone of CSA and UL	UL 1604, CSA C22.2 No. 213-M1987, CL. 1, Div. 2, GP. A,B,C,D, T4 / CL. 1, Zone 2, GP IIC, T4	UL 1604, CSA C22.2 No. 213-M1987, CL. 1, Div. 2, GP. A,B,C,D, T4 / CL. 1, Zone 2, GP IIC, T4	UL 1604, CSA C22.2 No. 213-M1987, CL. 1, Div. 2, GP. A,B,C,D, T4 / CL. 1, Zone 2, GP IIC, T4	UL 1604, CSA C22.2 No. 213-M1987, CL. 1, Div. 2, GP. A,B,C,D, T4 / CL. 1, Zone 2, GP IIC, T4

1) Wireless approval in the USA

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Technical specifications (continued)

Order No.	6GK5 786-3AA60-2AA0 6GK5 786-3AA60-2AB0[1)]	6GK5 786-3AB60-2AA0 6GK5 786-3AB60-2AB0[1)]	6GK5 786-2BA60-6AA0 6GK5 786-2BA60-6AB0[1)]	6GK5 786-2AA60-6AA0 6GK5 786-2AA60-6AB0[1)]
Product type designation	**SCALANCE W786-3PRO**	**SCALANCE W786-3PRO**	**SCALANCE W786-2RR**	**SCALANCE W786-2RR**
Certificate of suitability				
• CE marking	Yes	Yes	Yes	Yes
• EC Declaration of Conformity	Yes	Yes	Yes	Yes
• C-Tick	Yes	Yes	Yes	Yes
• CCC	No	No	No	No
• Railroad application according to EN 50155	No	No	No	No
• e1 approval	Yes	Yes	Yes	Yes
• E1 approval	Yes	Yes	Yes	Yes
• NEMA4X	Yes	Yes	Yes	Yes
• Power-over-Ethernet according to IEEE802.3at for Type 1 and IEEE802.3af	Yes	Yes	Yes	Yes
Standard for wireless communication				
• IEEE 802.11a	Yes	Yes	Yes	Yes
• IEEE 802.11b	Yes	Yes	Yes	Yes
• IEEE 802.11e	Yes	Yes	Yes	Yes
• IEEE 802.11g	Yes	Yes	Yes	Yes
• IEEE 802.11h	Yes	Yes	Yes	Yes
• IEEE 802.11i	Yes	Yes	Yes	Yes
• IEEE 802.11n	No	No	No	No
Wireless approval	You can find the latest list of countries at: www.siemens.com/simatic-net/ik-info	You can find the latest list of countries at: www.siemens.com/simatic-net/ik-info	You can find the latest list of countries at: www.siemens.com/simatic-net/ik-info	You can find the latest list of countries at: www.siemens.com/simatic-net/ik-info
Marine classification association				
• American Bureau of Shipping Europe Ltd. (ABS)	Yes	Yes	Yes	Yes
• Bureau Veritas (BV)	Yes	Yes	Yes	Yes
• Det Norske Veritas (DNV)	No	No	No	No
• Germanischer Lloyd (GL)	Yes	Yes	Yes	Yes
• Lloyds Register of Shipping (LRS)	Yes	Yes	Yes	Yes
• Nippon Kaiji Kyokai (NK)	Yes	Yes	Yes	Yes
• Polski Rejestr Statkow (PRS)	No	No	No	No
Accessories				
Accessories	48 V DC screw terminal included in scope of delivery	48 V DC screw terminal included in scope of delivery	48 V DC screw terminal included in scope of delivery	48 V DC screw terminal included in scope of delivery

[1)] Wireless approval in the USA

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SCALANCE W786 for the outdoor area

Ordering data	Order No.
SCALANCE W786 access points	
IWLAN access points with built-in wireless interfaces; wireless networks IEEE 802.11a/b/g/h at 2.4/5 GHz up to 54 Mbit/s; WPA2/AES; Power over Ethernet (PoE), IP65 degree of protection (-40 °C to +70 °C); scope of supply: Mounting hardware, 2-pin screw terminal for 48 V DC; manual on CD-ROM; German/English;	
SCALANCE W786-1PRO	
IWLAN Access Points with one built-in radio interface	
RJ45 connection	
• Two internal antennas	
- National approvals for operation outside the USA	**6GK5 786-1BA60-2AA0**
- National approvals for operation within the USA[1)]	**6GK5 786-1BA60-2AB0**
• Connections for two external antennas	
- National approvals for operation outside the USA	**6GK5 786-1AA60-2AA0**
- National approvals for operation within the USA[1)]	**6GK5 786-1AA60-2AB0**
Fiber-optic cable connection	
• Two internal antennas	
- National approvals for operation outside the USA	**6GK5 786-1BB60-2AA0**
- National approvals for operation within the USA[1)]	**6GK5 786-1BB60-2AB0**
• Connections for two external antennas	
- National approvals for operation outside the USA	**6GK5 786-1AB60-2AA0**
- National approvals for operation within the USA[1)]	**6GK5 786-1AB60-2AB0**

Ordering data	Order No.
SCALANCE W786 access points (continued)	
SCALANCE W786-2PRO	
IWLAN Access Points with two built-in radio interfaces	
RJ45 connection	
• Four internal antennas	
- National approvals for operation outside the USA	**6GK5 786-2BA60-2AA0**
- National approvals for operation within the USA[1)]	**6GK5 786-2BA60-2AB0**
• Connections for four external antennas	
- National approvals for operation outside the USA	**6GK5 786-2AA60-2AA0**
- National approvals for operation within the USA[1)]	**6GK5 786-2AA60-2AB0**
Fiber-optic cable connection	
• Four internal antennas	
- National approvals for operation outside the USA	**6GK5 786-2BB60-2AA0**
- National approvals for operation within the USA[1)]	**6GK5 786-2BB60-2AB0**
• Connections for four external antennas	
- National approvals for operation outside the USA	**6GK5 786-2AB60-2AA0**
- National approvals for operation within the USA[1)]	**6GK5 786-2AB60-2AB0**
SCALANCE W786-3PRO	
IWLAN Access Points with three built-in radio interfaces	
RJ45 connection	
• Connections for six external antennas	
- National approvals for operation outside the USA	**6GK5 786-3AA60-2AA0**
- National approvals for operation within the USA[1)]	**6GK5 786-3AA60-2AB0**
Fiber-optic cable connection	
• Connections for six external antennas	
- National approvals for operation outside the USA	**6GK5 786-3AB60-2AA0**
- National approvals for operation within the USA[1)]	**6GK5 786-3AB60-2AB0**
SCALANCE W786-2RR	
IWLAN Dual Access Point with two built-in radio interfaces for establishment of radio links with iPCF	
RJ45 connection	
• Four internal antennas	
- National approvals for operation outside the USA	**6GK5 786-2BA60-6AA0**
- National approvals for operation within the USA[1)]	**6GK5 786-2BA60-6AB0**
• Connections for four external antennas	
- National approvals for operation outside the USA	**6GK5 786-2AA60-6AA0**
- National approvals for operation within the USA[1)]	**6GK5 786-2AA60-6AB0**

[1)] Please note national approvals at www.siemens.com/wireless-approvals

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Ordering data

	Order No.
Accessories	
C-PLUG Swap medium for simple replacement of devices in the event of a fault; for storing configuration data; can be used in SIMATIC NET products with PLUG slot	**6GK1 900-0AB00**
PRESET-PLUG Swap medium for simple initial startup of SCALANCE W access points and client modules, as well as IWLAN/PB Link PN IO	**6GK5 798-8AB00**
SIMATIC Mobile Panel 277F IWLAN	
• Communication via WLAN (PROFINET) with acknowledgement button and emergency stop button	**6AV6 645-0DB01-0AX0**
• Communication via WLAN (PROFINET) with acknowledgment button and emergency stop button with integrated handwheel, key-operated switch, and two illuminated pushbuttons	**6AV6 645-0DC01-0AX0**
Note: Please also order the desktop power supply or battery charger!	
• Table-top power supply incl. power cable for EU, US, UK, JP (only suitable for operation under laboratory/office conditions)	**6AV6 671-5CN00-0AX1**
• Charger for safe storage and charging the device incl. lock for securing the device in the charger. Charging capabilities for up to two additional batteries	**6AV6 671-5CE00-0AX0**
• Additional battery with LED indicator for indicating the charge status	**6AV6 671-5CL00-0AX0**
• Transponder incl. batteries (3x AA)	**6AV6 671-5CM00-0AX0**
IE FC RJ45 Plug 180 2x2 RJ45 plug connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation-displacement contacts for connecting Industrial Ethernet FC installation cables; with a 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface	
• 1 pack = 1 unit	**6GK1 901-1BB10-2AA0**
• 1 pack = 10 units	**6GK1 901-1BB10-2AB0**
• 1 pack = 50 units	**6GK1 901-1BB10-2AE0**

	Order No.
IE FC Standard Cable GP 2 x 2 4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/ IE FC RJ45 Plug; PROFINET-compliant; with UL approval; sold by the meter; max. length 1000 m, minimum order 20 m	**6XV1 840-2AH10**
FO standard cable GP 50/125/1400 [1] Multimode cable, sold by the meter; max. length 1000 m; minimum order 20 m;	**6XV1 873-2A**
IE FC Stripping Tool Preadjusted stripping tool for fast stripping of the Industrial Ethernet FC cables	**6GK1 901-1GA00**
IE TP Cord RJ45/RJ45 TP cable 4 x 2 with 2 RJ45 connectors	
• 0.5 m	**6XV1 870-3QE50**
• 1 m	**6XV1 870-3QH10**
• 2 m	**6XV1 870-3QH20**
• 6 m	**6XV1 870-3QH60**
• 10 m	**6XV1 870-3QN10**
Power supply PS791-2DC 24 V DC power supply for installation in SCALANCE W786 products; operating instructions in German/English	**6GK5 791-2DC00-0AA0**
Power supply PS791-2AC 110 V AC to 230 V AC power supply for installation in the SCALANCE W786 products; operating instructions in German/English	**6GK5 791-2AC00-0AA0**
MS1 mounting set Mounting set for fixing the SCALANCE W786 products onto an S7-300 mounting rail or a 35 mm standard DIN rail	**6GK5 798-8MG00-0AA0**
Antennas and miscellaneous IWLAN accessories	See Industrial Wireless LAN/ accessories

More information

Wireless approvals:

Current approvals can be found on the Internet at:
www.siemens.com/wireless-approvals

To assist in selecting the right products for Industrial Wireless Communication, the SIMATIC NET Selection Tool is available:

Online version:
www.siemens.com/snst

Offline version:
www.siemens.com/snst-download

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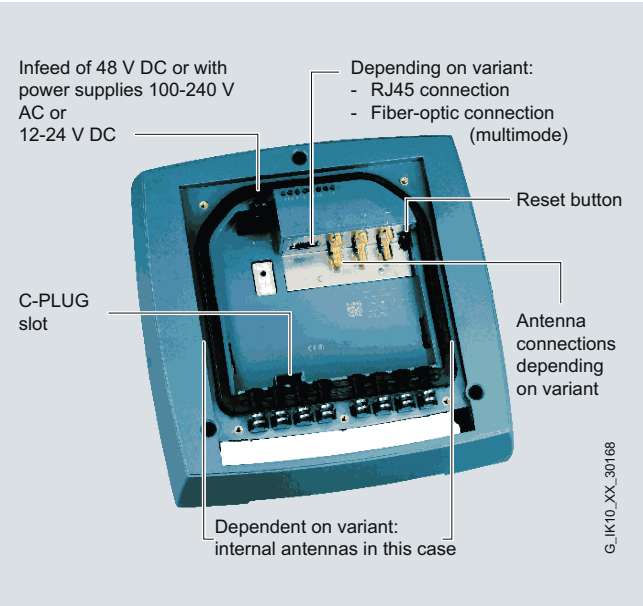
Controller Access Points SCALANCE W786 for the outdoor area

Overview

- SCALANCE W786-2HPW controller-based access points can only be operated on the SCALANCE WLC IWLAN Controller and Enterasys Wireless Controller (previously HiPath Wireless Controller)
- Support for the WLAN standards IEEE 802.11a/b/g/h
- Especially well suited to applications with high climatic requirements when installed outdoors and in areas accessible to the public

Design

- Rugged plastic enclosure (plexi-glass type), shock and vibration-proof for severe mechanical loading
- High IP65 degree of protection against dust and water jets
- For use at ambient temperatures from -40 °C to +70 °C
- Resistant to condensation
- Resistant to UV radiation and saltwater spray
- Design for use outdoors
- Version with 1 x RJ45 connection for 10/100 Mbit/s with Power-over-Ethernet according to IEEE 802.3at Type 1 (corresponds to IEEE 802.3af)
- Version with 1 x fiber-optic connection (multimode) for 100 Mbit/s
- Version with 1 x 48 V DC connection, optional operation with 12 to 24 V DC or 100 to 240 V AC with power supply integrated into device
- Mounting: Wall or, with optional mounting set, on S7 mounting rail, 35 mm standard mounting rail, or on a pole



Design and interfaces of the SCALANCE W786-2HPW controller-based access points

Product versions

SCALANCE W786-2HPW (controller-based)

- Two wireless cards permanently installed in the device
- Versions with:
  - RJ45 connection and four internal antennas
  - RJ45 connection and four connections for external antennas
  - Fiber-optic multimode connection (BFOC) and four internal antennas
  - Fiber-optic multimode connection (BFOC) and four connections for external antennas

Function

If the minimum length of standard Ethernet cables is insufficient due to the large distance of the access points from the wired network, SCALANCE W786-2HPW can also be used in a version with BFOC connectors (multimode fiber-optic cable).

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Technical specifications

Order No.	6GK5 786-2BA60-1CA0	6GK5 786-2AA60-1CA0	6GK5 786-2BB60-1CA0	6GK5 786-2AB60-1CA0
Product type designation	**SCALANCE W786-2HPW**	**SCALANCE W786-2HPW**	**SCALANCE W786-2HPW**	**SCALANCE W786-2HPW**
Transmission rate				
Transmission rate				
• with W-LAN, maximum	54 Mbit/s	54 Mbit/s	54 Mbit/s	54 Mbit/s
• with Industrial Ethernet	10 … 100 Mbit/s	10 … 100 Mbit/s	10 … 100 Mbit/s	10 … 100 Mbit/s
• Note	Due to the simultaneous use of several radio channels, a transmission rate of 108 Mbit/s is possible (turbo mode)	Due to the simultaneous use of several radio channels, a transmission rate of 108 Mbit/s is possible (turbo mode)	Due to the simultaneous use of several radio channels, a transmission rate of 108 Mbit/s is possible (turbo mode)	Due to the simultaneous use of several radio channels, a transmission rate of 108 Mbit/s is possible (turbo mode)
Interfaces				
Number of electrical connections				
• for network components or terminal equipment	1	1	-	-
• for power supply	1	1	1	1
• For redundant power supply	1	1	1	1
Design of electrical connection				
• for network components or terminal equipment	RJ45 socket	RJ45 socket	-	-
• for power supply	2-pin connector (48 VDC) or optionally available power supply adapter (3-pin 24 V DC or 4-pin 110 to 230 V AC)	2-pin connector (48 VDC) or optionally available power supply adapter (3-pin 24 V DC or 4-pin 110 to 230 V AC)	2-pin connector (48 VDC) or optionally available power supply adapter (3-pin 24 V DC or 4-pin 110 to 230 V AC)	2-pin connector (48 VDC) or optionally available power supply adapter (3-pin 24 V DC or 4-pin 110 to 230 V AC)
Number of optical connections for fiber-optic cables at 100 Mbit/s	-	-	1	1
Design of optical connection for fiber-optic cables at 100 Mbit/s	-	-	Duplex multi-mode FOC (ST)	Duplex multi-mode FOC (ST)
Design of swap medium C-Plug	Yes	Yes	Yes	Yes
Interfaces Wireless				
Number of permanently installed radio cards	2	2	2	2
Number of internal antennas	4	-	4	-
Number of electrical connections for external antenna(s)	-	4	-	4
Design of electrical connection for external antenna(s)	-	R-SMA female (socket)	-	R-SMA female (socket)
Supply voltage, current consumption, power loss				
Type of power supply	DC	DC	DC	DC
Power supply				
• From Power-over-Ethernet according to IEEE802.3at for Type 1 and IEEE802.3af	48 V	48 V	48 V	48 V
• From Power-over-Ethernet according to IEEE802.3at for Type 2	-	-	-	-

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Technical specifications (continued)

Order No.	6GK5 786-2BA60-1CA0	6GK5 786-2AA60-1CA0	6GK5 786-2BB60-1CA0	6GK5 786-2AB60-1CA0
Product type designation	**SCALANCE W786-2HPW**	**SCALANCE W786-2HPW**	**SCALANCE W786-2HPW**	**SCALANCE W786-2HPW**
Current consumed				
• At 24 V DC, typical	0.34 A	0.34 A	0.4 A	0.4 A
• With Power-over-Ethernet according to IEEE802.3at for Type 1 and IEEE802.3af, typical	0.34 A	0.34 A	0.2 A	0.2 A
• With Power-over-Ethernet according to IEEE802.3at for Type 2, typical	-	-	-	-
Effective power loss				
• At 24 V DC, typical	8 W	8 W	9.5 W	9.5 W
• With Power-over-Ethernet according to IEEE802.3at for Type 1 and IEEE802.3af, typical	8 W	8 W	9.5 W	9.5 W
• With Power-over-Ethernet according to IEEE802.3at for Type 2, typical	-	-	-	-
Permitted ambient conditions				
Ambient temperature				
• During operation	-40 … +70 °C	-40 … +70 °C	-40 … +70 °C	-40 … +70 °C
• During storage	-40 … +85 °C	-40 … +85 °C	-40 … +85 °C	-40 … +85 °C
• During transport	-40 … +85 °C	-40 … +85 °C	-40 … +85 °C	-40 … +85 °C
Relative humidity at 25 °C without condensation during operation, maximum	100 %	100 %	100 %	100 %
IP degree of protection	IP65	IP65	IP65	IP65
Ambient conditions for operation	When using the 100 … 240 V AC power supply, an operating temperature of -40 °C to +60 °C is permissible	When using the 100 … 240 V AC power supply, an operating temperature of -40 °C to +60 °C is permissible	When using the 100 … 240 V AC power supply, an operating temperature of -40 °C to +60 °C is permissible	When using the 100 … 240 V AC power supply, an operating temperature of -40 °C to +60 °C is permissible
Design, dimensions and weights				
Width of enclosure without antenna	251 mm	251 mm	251 mm	251 mm
Height of enclosure without antenna	251 mm	251 mm	251 mm	251 mm
Depth of enclosure without antenna	72 mm	72 mm	72 mm	72 mm
Net weight	2.24 kg	2.24 kg	2.24 kg	2.24 kg
Type of mounting: wall mounting	Yes	Yes	Yes	Yes
Type of mounting	For mast mounting, 35 mm DIN rail mounting and S7-300 rail mounting, an additional retaining plate is required	For mast mounting, 35 mm DIN rail mounting and S7-300 rail mounting, an additional retaining plate is required	For mast mounting, 35 mm DIN rail mounting and S7-300 rail mounting, an additional retaining plate is required	For mast mounting, 35 mm DIN rail mounting and S7-300 rail mounting, an additional retaining plate is required
Radio frequencies				
Radio frequency				
• with WLAN in the 2.4 GHz frequency band	2.41 … 2.48 GHz	2.41 … 2.48 GHz	2.41 … 2.48 GHz	2.41 … 2.48 GHz
• With WLAN in the 5 GHz frequency band	4.9 … 5.8 GHz	4.9 … 5.8 GHz	4.9 … 5.8 GHz	4.9 … 5.8 GHz
Product functions Management, configuration, programming				
Product function				
• Operation with IWLAN controller	Yes	Yes	Yes	Yes
• Operation with Enterasys WLAN controller	Yes	Yes	Yes	Yes

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Technical specifications (continued)

Order No.	6GK5 786-2BA60-1CA0	6GK5 786-2AA60-1CA0	6GK5 786-2BB60-1CA0	6GK5 786-2AB60-1CA0
Product type designation	**SCALANCE W786-2HPW**	**SCALANCE W786-2HPW**	**SCALANCE W786-2HPW**	**SCALANCE W786-2HPW**
Standards, specifications, approvals				
Standard				
• for EMC of FM	FM 3611: Class I, Division 2, Groups A,B,C,D, T4 / Class 1, Zone 2, Group IIC, T4	FM 3611: Class I, Division 2, Groups A,B,C,D, T4 / Class 1, Zone 2, Group IIC, T4	FM 3611: Class I, Division 2, Groups A,B,C,D, T4 / Class 1, Zone 2, Group IIC, T4	FM 3611: Class I, Division 2, Groups A,B,C,D, T4 / Class 1, Zone 2, Group IIC, T4
• For hazardous zone	EN 60079-15:2005, EN 60079-0:2006, II 3 G Ex nA II T4 KEMA 07 ATEX 0145X	EN 60079-15:2005, EN 60079-0:2006, II 3 G Ex nA II T4 KEMA 07 ATEX 0145X	EN 60079-15:2005, EN 60079-0:2006, II 3 G Ex nA II T4 KEMA 07 ATEX 0145X	EN 60079-15:2005, EN 60079-0:2006, II 3 G Ex nA II T4 KEMA 07 ATEX 0145X
• for CSA and UL safety	UL 60950-1 CSA C22.2 No. 60950-1	UL 60950-1 CSA C22.2 No. 60950-1	UL 60950-1 CSA C22.2 No. 60950-1	UL 60950-1 CSA C22.2 No. 60950-1
• for Ex zone of CSA and UL	UL 1604, CSA C22.2 No. 213-M1987, CL. 1, Div. 2, GP. A, B, C, D, T4 / CL. 1, Zone 2, GP IIC, T4	UL 1604, CSA C22.2 No. 213-M1987, CL. 1, Div. 2, GP. A, B, C, D, T4 / CL. 1, Zone 2, GP IIC, T4	UL 1604, CSA C22.2 No. 213-M1987, CL. 1, Div. 2, GP. A, B, C, D, T4 / CL. 1, Zone 2, GP IIC, T4	UL 1604, CSA C22.2 No. 213-M1987, CL. 1, Div. 2, GP. A, B, C, D, T4 / CL. 1, Zone 2, GP IIC, T4
Certificate of suitability				
• CE mark	Yes	Yes	Yes	Yes
• EC Declaration of Conformity	Yes	Yes	Yes	Yes
• C-Tick	Yes	Yes	Yes	Yes
• CCC	No	No	No	No
• Railroad application according to EN 50155	No	No	No	No
• e1 approval	Yes	Yes	Yes	Yes
• E1 approval	Yes	Yes	Yes	Yes
• NEMA4X	Yes	Yes	Yes	Yes
• Power-over-Ethernet according to IEEE802.3at for Type 1 and IEEE802.3af	Yes	Yes	Yes	Yes
Standard for wireless communication				
• IEEE 802.11a	Yes	Yes	Yes	Yes
• IEEE 802.11b	Yes	Yes	Yes	Yes
• IEEE 802.11g	Yes	Yes	Yes	Yes
• IEEE 802.11h	Yes	Yes	Yes	Yes
• IEEE 802.11n	No	No	No	No
Wireless approval	You can find the latest list of countries at: www.siemens.com/simatic-net/ik-info	You can find the latest list of countries at: www.siemens.com/simatic-net/ik-info	You can find the latest list of countries at: www.siemens.com/simatic-net/ik-info	You can find the latest list of countries at: www.siemens.com/simatic-net/ik-info
Marine classification corporation				
• American Bureau of Shipping Europe Ltd. (ABS)	Yes	Yes	Yes	Yes
• Bureau Veritas (BV)	Yes	Yes	Yes	Yes
• Det Norske Veritas (DNV)	No	No	No	No
• Germanischer Lloyd (GL)	Yes	Yes	Yes	Yes
• Lloyds Register of Shipping (LRS)	Yes	Yes	Yes	Yes
• Nippon Kaiji Kyokai (NK)	Yes	Yes	Yes	Yes
• Polski Rejestr Statkow (PRS)	No	No	No	No
Accessories				
Accessories	48 V DC screw terminal included in scope of delivery	48 V DC screw terminal included in scope of delivery	48 V DC screw terminal included in scope of delivery	48 V DC screw terminal included in scope of delivery

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Controller Access Points SCALANCE W786 for the outdoor area

Ordering data

	Order No.
SCALANCE W786-2HPW Controller Access Points	
IWLAN access points for operating with the SCALANCE WLC IWLAN Controller and Enterasys Wireless Controller (previously HiPath Wireless Controller); with two built-in wireless interfaces; wireless networks IEEE 802.11a/b/g/h at 2.4/5 GHz up to 54 Mbit/s; WPA2/ AES; Power over Ethernet (PoE), IP65 degree of protection (-40 °C to +70 °C); scope of delivery: Mounting hardware, 2-pin screw terminal for 48 V DC; manual on CD-ROM; German/English	
RJ45 connection	
• Four internal antennas	**6GK5 786-2BA60-1CA0**
• Connections for four external antennas	**6GK5 786-2AA60-1CA0**
Fiber-optic cable connection	
• Four internal antennas	**6GK5 786-2BB60-1CA0**
• Connections for four external antennas	**6GK5 786-2AB60-1CA0**
Accessories	
Power supply PS791-2DC 12 to 24 V DC power supply for installation in the SCALANCE W786-2HPW products; operating instructions in German/English	**6GK5 791-2DC00-0AA0**
Power supply PS791-2AC 110 V AC to 230 V AC power supply for installation in the SCALANCE W786-2HPW products; operating instructions in German/English	**6GK5 791-2AC00-0AA0**
MS1 mounting set Mounting set for fixing the SCALANCE W786-2HPW products onto an S7-300 mounting rail or a 35 mm standard DIN rail	**6GK5 798-8MG00-0AA0**
IE FC RJ45 Plug 4 x 2 RJ45 plug connector for Industrial Ethernet (10/100/1000 Mbit/s) with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface	
• 1 pack = 1 unit	**6GK1 901-1BB11-2AA0**
• 1 pack = 10 units	**6GK1 901-1BB11-2AB0**
• 1 pack = 50 units	**6GK1 901-1BB11-2AE0**
IE FC Standard Cable GP 4 x 2 8-core, shielded TP installation cable for connection to IE FC RJ45 Plug 4 x 2 and IE M12 Plug PRO 4 x 2; PROFINET-compatible; with UL approval; sold by the meter; max. length 1000 m, minimum order quantity 20 m	**6XV1 878-2A**
IE FC Stripping Tool Preadjusted stripping tool for fast stripping of the Industrial Ethernet FC cables	**6GK1 901-1GA00**
Antennas and miscellaneous IWLAN accessories	See Industrial Wireless LAN/ accessories

More information

Wireless approvals:

Current approvals can be found on the Internet at:
www.siemens.com/wireless-approvals

To assist in selecting the right products for Industrial Wireless Communication, the SIMATIC NET Selection Tool is available:

Online version:
www.siemens.com/snst

Offline version:
www.siemens.com/snst-download

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Overview

The Client Modules from the SCALANCE W748 product line are optimal for integrating Industrial Ethernet stations into Industrial Wireless LAN (IWLAN) for 2.4 GHz and 5 GHz.

- High transmission rates (up to 450 Mbit/s in conjunction with Channel Bonding) due to 3x3 MIMO technology (**M**ultiple **I**nput, **M**ultiple **O**utput);
  for this purpose, SCALANCE W Client Modules use three streams each for simultaneous sending and receiving
- Suitable for any application:
  - SCALANCE W748 RJ45 for installation in a control cabinet
  - SCALANCE W748 M12 for cabinet-free installation
- Reliable thanks to rugged enclosure, protected from water and dust (IP65), resistant to shock, vibration and electromagnetic fields
- Complex applications with redundancy requirements and high bandwidths, e.g. for video, by using IEEE 802.11n
- Configuration support by means of wizards and online help; easy management via web server and SNMP
- Fast replacement of devices in event of failure by means of optional C-PLUG (Configuration Plug)

Benefits

get Designed for Industry

- Reliable radio link, e.g. by using MIMO technology and monitoring of the radio link
- Cost savings due to one single radio network both for process-critical data and for non-critical communication
- Investment security because all products are compatible with the internationally recognized WLAN standard IEEE 802.11, suitable for the unlicensed frequency bands of 2.4 GHz and 5 GHz (ISM bands)
- Implementation of data-intensive applications such as video streaming through the support of the IEEE 802.11n standard including Channel Bonding
- Reduced operating costs, because there is no wear of rotating and moving plant sections
- Cost-effective connection to devices which are remote, difficult to access or mounted in hostile environments

Application

The Client Modules of the SCALANCE W748 product line are designed for indoor and outdoor industrial applications as well as for low-cost integration in control cabinets. They provide a reliable wireless link with fast transfer from one access point to the next (roaming). In this manner, processes can be monitored and production failures through machine downtimes avoided.

The client modules with high IP65 degree of protection and extended temperature range from -20 to +60 °C are especially suitable for use outdoors. SCALANCE W products are silicone-free and can therefore also be used in paint shops.

The client modules with IP30 degree of protection are especially suitable for use in automated guided vehicle systems or suspended monorails.

When using the RCoax cable (radiating cable), operation is particularly reliable in conveying technology and all track applications (e.g. storage and retrieval systems).

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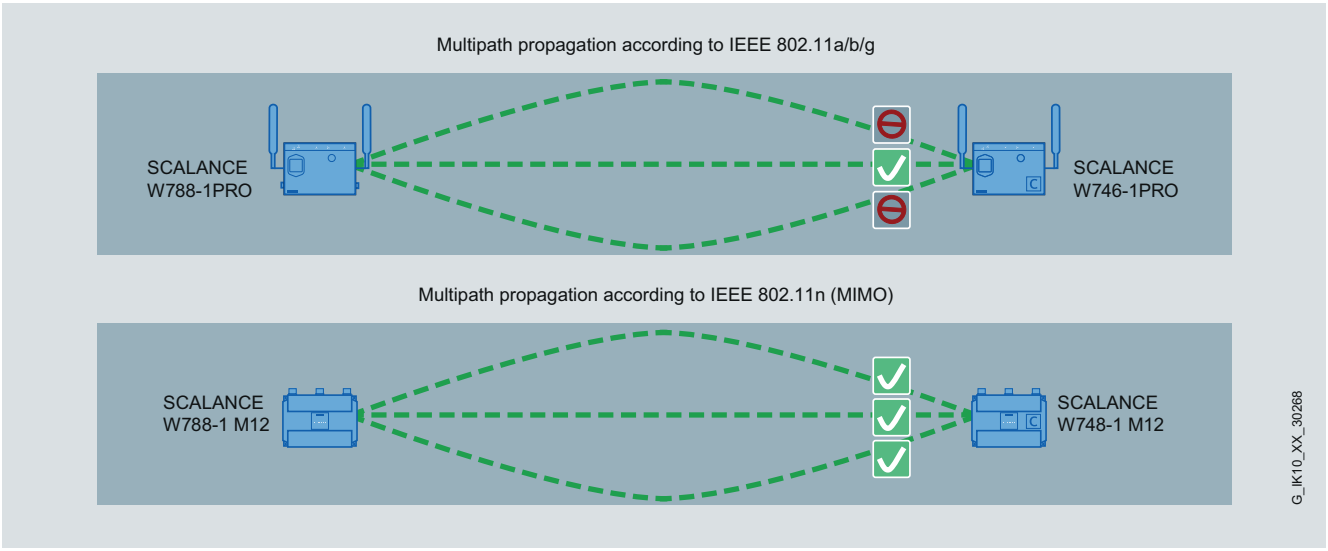
Overview

Application (continued)

Application examples:

- Automated guided vehicle systems (AGVS) and suspended monorails;
  prevention of wear and high flexibility in the choice of route thanks to wireless transmission of data to the vehicles
- Crane;
  high flexibility through access to data communication with the moving unit independent of the location
- Passenger transportation systems;
  transmission of high-quality video streams between the control center and buses or trains
- Tunnel application;
  reliable radio link since the devices can handle multiple path propagation better by using the MIMO technology
- Communication with moving stations (e.g. mobile controls and devices), container logistics, storage and retrieval machines, conveyor systems, conveyor belts, rotating machines, trucks
- Wireless coupling of communication segments and bridging of large distances for fast commissioning and for cost-effective networks in which cable routing would be extremely expensive (e.g. on public roads, rivers, lakes, train lines)



Multiple path propagation (MIMO) with SCALANCE W788-1PRO and SCALANCE W788-1 M12

Design

- Radio card (compatible with IEEE 802.11a/b/g/h/n) permanently installed in the device
- Designed without rotating parts (operation without fans)
- Antennas can either be connected by means of a screw connection (R-SMA, N-Connect) or they are integrated in the device
- Function LEDs for optical signaling of faults and operating states
- 1x PLUG slot

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Function

Infrastructure mode

SCALANCE W748 Client Modules make it possible for a station with an Industrial Ethernet interface (e.g. a controller) to move seamlessly and with no wear in an Industrial Wireless LAN wireless field. The station registers in the wireless field via the Client Module and can exchange information with the entire data network. If the Client Module moves, for example, on an automated guided vehicle system, it is automatically and transparently transferred from one access point to the next (roaming).

This is possible over distances of up to 30 m indoors (approx. 100 m outdoors). Directional additional antennas can be used outdoors to achieve ranges of several thousand meters.

Apart from a reliable wireless link, the SCALANCE W748 Client Modules are characterized by their support of IT mechanisms:

- IEEE 802.11a/b/g/n for different frequency ranges
- IEEE 802.11h for use in the 5 GHz range outdoors
- IEEE802.11e for wireless multimedia (WMM)
- IEEE802.11i for security
- Selectable operation in infrastructure or ad-hoc mode
- Sending the log entries of the SCALANCE W devices to a Syslog server
- Modern security mechanisms (e.g. network security such as IEEE 802.1x, RADIUS, EAP mechanisms)
- Network and Port Address Translation (NAT/PAT) for mapping of private IP addresses and ports onto public addresses

Security

A high degree of data security is achieved by means of the WPA2/IEEE 802.11i mechanisms. These define modern procedures that control a regular exchange of the complete 128-bit code as well as performing the access check (authentication) of a station. The Advanced Encryption Standard (AES) is available for data encryption.

Access to the devices (HTTPS) is encrypted and secure logon (SSH) is possible. If a security concept with Virtual Private Networks (VPN) or the SCALANCE S range is required, the products can be integrated without any difficulty.

Functional scope

The SCALANCE W748 Client Modules can manage the wireless connection for up to eight connected devices with Ethernet interface. It is possible to integrate mobile units with a small Ethernet network (up to eight devices) into an IWLAN wireless field.

Diagnostics and management

- Web-based (HTTP/HTTPS) management tool for configuration and diagnostics using a standard browser
- LEDs for signaling operating states and fault conditions
- Signaling of faults by means of SNMP trap or e-mail to a network management tool, e.g. SINEMA-Server

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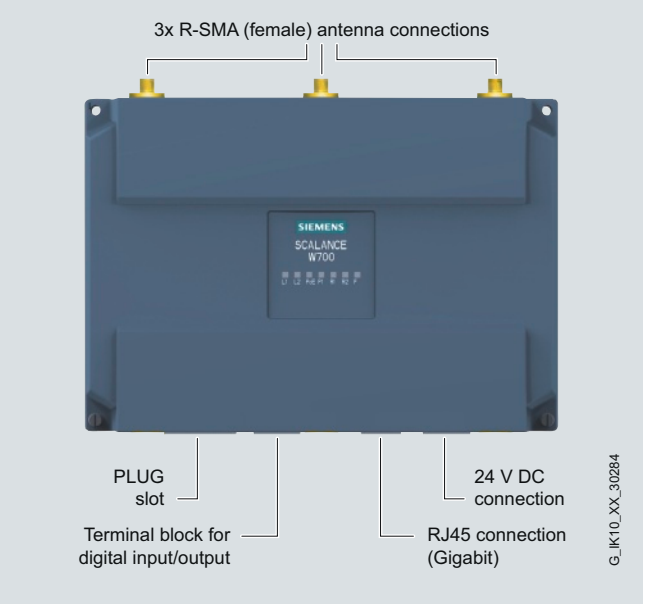
SCALANCE W748 RJ45 for use in the control cabinet

Overview

- Especially suitable for applications where the client module is to be mounted in the control cabinet
- Low-cost alternative for use indoors with less severe environmental conditions
- The rugged aluminum enclosure with degree of protection IP30 nevertheless provides protection against mechanical and electromagnetic stress in industrial areas

Design

- Rugged aluminum enclosure, shock and vibration-proof, for high mechanical requirements
- Dust protection with IP30 degree of protection
- For use at ambient temperatures from -20 °C to +60 °C
- Resistant to condensation
- Design suitable for installation in control cabinet
- 3 x R-SMA sockets for the connection of remote antennas
- Antenna placement optimized for the 3x3 MIMO technology; the antennas do not interfere with each other when they are mounted direct on the device
- 1 x RJ45 connection for 10/100/1000 Mbit/s with Power-over-Ethernet according to IEEE 802.3at Type 1 (corresponds to IEEE 802.3af)
- 2 x 24 V DC connection for redundant power infeed
- 1 x PLUG slot
- Function LEDs for optical signaling of faults and operating states
- Digital input for feeding in a signal from a sensor, for example, to an SNMP-based network management system
- Digital output for converting a command received over SNMP into a signal and switching a hardware function
- Mounting: Wall, S7 mounting rail or on 35 mm standard mounting rail



Design and interfaces of the SCALANCE W748-1 RJ45 Client Modules

Product versions

SCALANCE W748-1 RJ45

- A wireless card permanently installed in the device; for managing the wireless connection of up to eight connected devices

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Technical specifications

Order No.	6GK5 748-1FC00-0AA0 6GK5 748-1FC00-0AB0[1)]
Product type designation	**SCALANCE W748-1 RJ45**
Transmission rate	
Transmission rate	
• with W-LAN, maximum	450 Mbit/s
• with Industrial Ethernet	10 … 1 000 Mbit/s
• Note	-
Interfaces	
Number of electrical connections	
• for network components or terminal equipment	1
• for power supply	1
• for redundant power supply	1
Design of electrical connection	
• for network components or terminal equipment	RJ45 socket
• for power supply	4-pin screw terminal, PoE
Number of optical connections for fiber-optic cables at 100 Mbit/s	-
Design of optical connection for fiber-optic cables at 100 Mbit/s	-
Design of swap medium C-Plug	Yes
Interfaces wireless	
Number of permanently installed wireless cards	1
Number of internal antennas	-
Number of electrical connections for external antenna(s)	3
Design of electrical connection for external antenna(s)	R-SMA female (socket)
Inputs/outputs	
Number of digital inputs	1
Number of digital outputs	1
Design of electrical connection at the digital inputs/outputs	4-pin screw terminal
Signal range	
• at the digital input	24 V DC, safety extra low voltage
• at the digital output	24 V DC/ 1 A
Supply voltage, current consumption, power loss	
Type of power supply	DC
Power supply	
• 1 from terminal block	19.2 V
• 2 from terminal block	28.8 V
• From Power-over-Ethernet according to IEEE802.3at for Type 1 and IEEE802.3af	48 V
• From Power-over-Ethernet according to IEEE802.3at for Type 2	48 V

Order No.	6GK5 748-1FC00-0AA0 6GK5 748-1FC00-0AB0[1)]
Product type designation	**SCALANCE W748-1 RJ45**
Permissible ambient conditions	
Ambient temperature	
• During operation	-20 … +60 °C
• During storage	-40 … +70 °C
• During transport	-40 … +70 °C
Relative humidity at 25 °C without condensation during operation, maximum	90 %
IP degree of protection	IP30
Ambient conditions for operation	-
Design, dimensions and weights	
Width of enclosure without antenna	200 mm
Height of enclosure without antenna	158 mm
Depth of enclosure without antenna	79 mm
Net weight	1.7 kg
Type of mounting: wall mounting	Yes
Type of mounting	S7-300 rail mounting
Wireless frequencies	
Wireless frequency	
• With WLAN in the 2.4 GHz frequency band	2.41 … 2.48 GHz
• With WLAN in the 5 GHz frequency band	4.9 … 5.8 GHz
Product properties, functions, components General	
Number of SSIDs	1
Product function	
• Dual client	-
• iHOP	-
• iPCF	-
• iPCF-MC	-
Number of iPCF-capable radio modules	-

[1)] Wireless approval in the USA

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SCALANCE W748 RJ45 for use in the control cabinet

Technical specifications (continued)

Order No.	6GK5 748-1FC00-0AA0 6GK5 748-1FC00-0AB0[1)]
Product type designation	**SCALANCE W748-1 RJ45**
Product functions Management, configuration, programming	
Number of manageable IP addresses in the client	8
Product function	
• CLI	Yes
• Web-based management	Yes
• MIB support	Yes
• TRAPs via e-mail	Yes
• Configuration with STEP 7	No
• Configuration with STEP 7 in the TIA Portal	No
• SMTP server	Yes
• Operation with IWLAN controller	-
• Operation with Enterasys WLAN controller	-
• Forced roaming with IWLAN	No
• WDS	No
Protocol is supported	
• Address Resolution Protocol (ARP)	Yes
• ICMP	Yes
• Telnet	Yes
• HTTP	Yes
• HTTPS	Yes
• TFTP	Yes
• SNMP v1	Yes
• SNMP v2	Yes
• SNMP v3	Yes
• DCP	Yes
• LLDP	Yes
Identification & maintenance	
• I&M0 - device-specific information	Yes
• I&M1 - higher-level designation/ location designation	Yes
Product functions Diagnostics	
Product function	
• PROFINET IO diagnostics	Yes
• Link check	No
• Connection monitoring IP-Alive	No
• Localization by means of Aeroscout	No
• SysLog	Yes
Product functions VLAN	
Product function VLAN with IWLAN	No
Product functions DHCP	
Product function DHCP client	Yes
Product functions Redundancy	
STP/RSTP protocol is supported	No

Order No.	6GK5 748-1FC00-0AA0 6GK5 748-1FC00-0AB0[1)]
Product type designation	**SCALANCE W748-1 RJ45**
Product functions Security	
Product function	
• ACL - MAC based	No
• IEEE 802.1x (radius)	Yes
• NAT/NAPT	Yes
• Access protection according to IEEE802.11i	Yes
• WPA/WPA2	Yes
• TKIP/AES	Yes
Protocol is supported SSH	Yes
Product functions Time	
SNTP protocol is supported	Yes
Standards, specifications, approvals	
Standard	
• for EMC of FM	-
• for hazardous zone	-
• for CSA and UL safety	UL 60950-1 CSA C22.2 No. 60950-1
• for hazardous zone of CSA and UL	-
Certificate of suitability	
• CE marking	Yes
• EC Declaration of Conformity	Yes
• C-Tick	Yes
• CCC	No
• Railroad application according to EN 50155	No
• e1 approval	No
• E1 approval	No
• NEMA4X	No
• Power-over-Ethernet according to IEEE802.3at for Type 1 and IEEE802.3af	
• Power-over-Ethernet according to IEEE802.3at for Type 2	
Standard for wireless communication	
• IEEE 802.11a	Yes
• IEEE 802.11b	Yes
• IEEE 802.11e	Yes
• IEEE 802.11g	Yes
• IEEE 802.11h	Yes
• IEEE 802.11i	Yes
• IEEE 802.11n	Yes
Wireless approval	You can find the latest list of countries at: www.siemens.com/simatic-net/ik-info
Marine classification association	
• American Bureau of Shipping Europe Ltd. (ABS)	No
• Bureau Veritas (BV)	No
• Det Norske Veritas (DNV)	No
• Germanischer Lloyd (GL)	No
• Lloyds Register of Shipping (LRS)	No
• Nippon Kaiji Kyokai (NK)	No
• Polski Rejestr Statkow (PRS)	No
Accessories	
Accessories	24 V DC screw terminal and screw terminal for digital input and output included in scope of delivery

[1)] Wireless approval in the USA

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Ordering data

	Order No.
SCALANCE W748 Client Modules	
IWLAN Ethernet Client Modules with built-in wireless interface; wireless networks IEEE 802.11a/b/g/h/n at 2.4/5 GHz up to 450 Mbit/s; WPA2/AES; Power over Ethernet (PoE), IP30 degree of protection (-20 °C to +60 °C); scope of delivery: Mounting hardware, 4-pin screw terminal for 24 V DC; 4-pin screw terminal for digital input and output; manual on CD-ROM; German/English	
SCALANCE W748-1 RJ45	
For administration of the radio link of up to eight devices with Industrial Ethernet connection; IP30 degree of protection	
• National approvals for operation outside the USA	**6GK5 748-1FC00-0AA0**
• National approvals for operation within the USA[1)]	**6GK5 748-1FC00-0AB0**
Accessories	
C-PLUG	**6GK1 900-0AB00**
Swap medium for simple replacement of devices in the event of a fault; for storing configuration data; can be used in SIMATIC NET products with PLUG slot	
DIN rail mounting adapter	**6GK5 798-8ML00-0AB3**
DIN rail mounting adapter for SCALANCE W788 M12 and SCALANCE W788 RJ45; screw fixing for mounting on a 35 mm DIN rail to EN 50 022; scope of supply: 3 units per pack	

1) Please note national approvals at www.siemens.com/wireless-approvals

	Order No.
IE FC RJ45 Plug 4 x 2	
RJ45 plug connector for Industrial Ethernet (10/100/1000 Mbit/s) with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface	
• 1 pack = 1 unit	**6GK1 901-1BB11-2AA0**
• 1 pack = 10 units	**6GK1 901-1BB11-2AB0**
• 1 pack = 50 units	**6GK1 901-1BB11-2AE0**
IE FC Standard Cable GP 4 x 2	**6XV1 878-2A**
8-core, shielded TP installation cable for connection to IE FC RJ45 Plug 4 x 2 and IE M12 Plug PRO 4 x 2; PROFINET-compliant; with UL approval; sold by the meter; max. length 1000 m, minimum order 20 m	
IE FC Stripping Tool	**6GK1 901-1GA00**
Preadjusted stripping tool for fast stripping of the Industrial Ethernet FC cables	
Antennas and miscellaneous IWLAN accessories	See Industrial Wireless LAN/ accessories

More information

Wireless approvals:

Current approvals can be found on the Internet at:
www.siemens.com/wireless-approvals

To assist in selecting the right products for Industrial Wireless Communication, the SIMATIC NET Selection Tool is available:

Online version:
www.siemens.com/snst

Offline version:
www.siemens.com/snst-download

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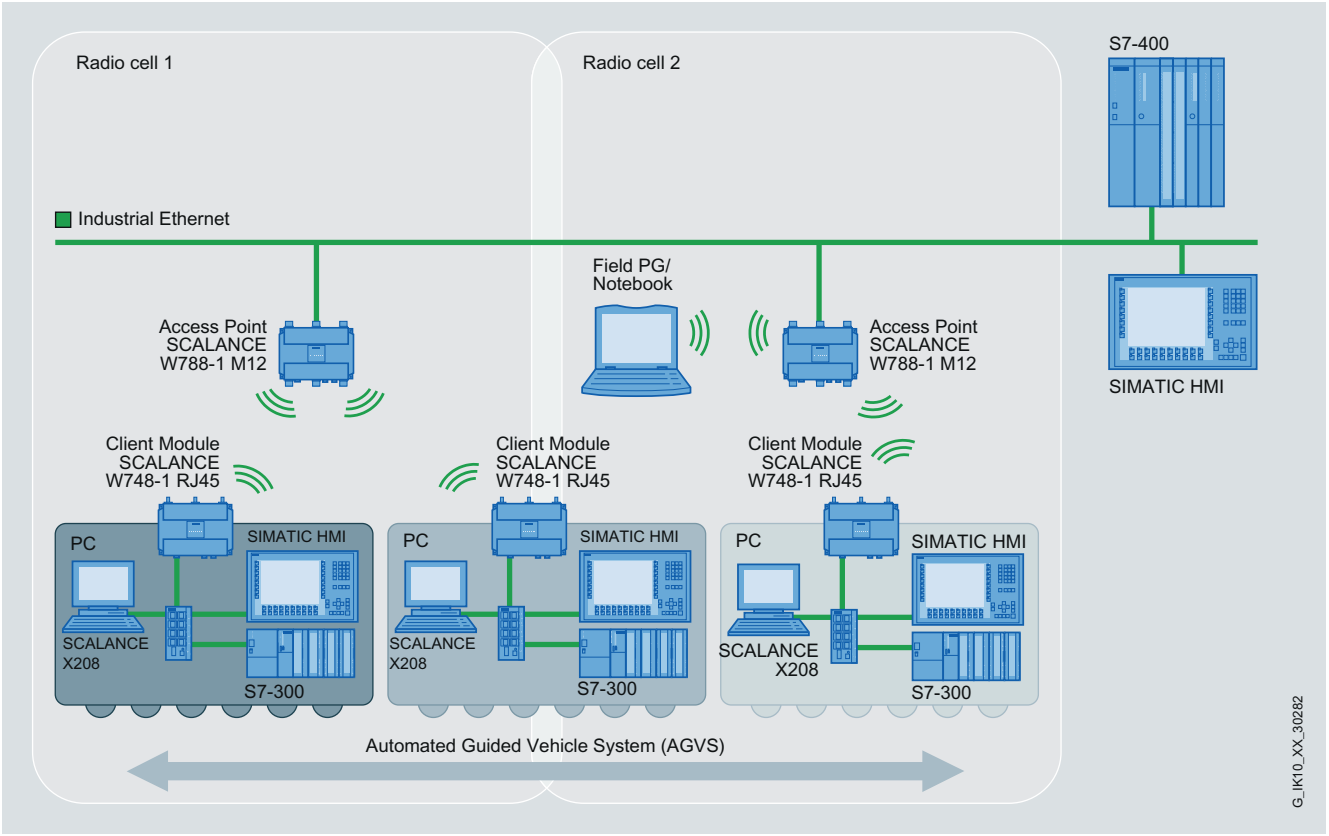
SCALANCE W748 M12 for use in the indoor area

Overview

- Particularly suitable for industrial applications without control cabinets

Application



Mobile controls in an automated guided vehicle system

The controllers register via the Ethernet Client Modules W748-1 M12 in the wireless field and can move around freely there. This makes it possible to operate an automated guided vehicle system, for example.

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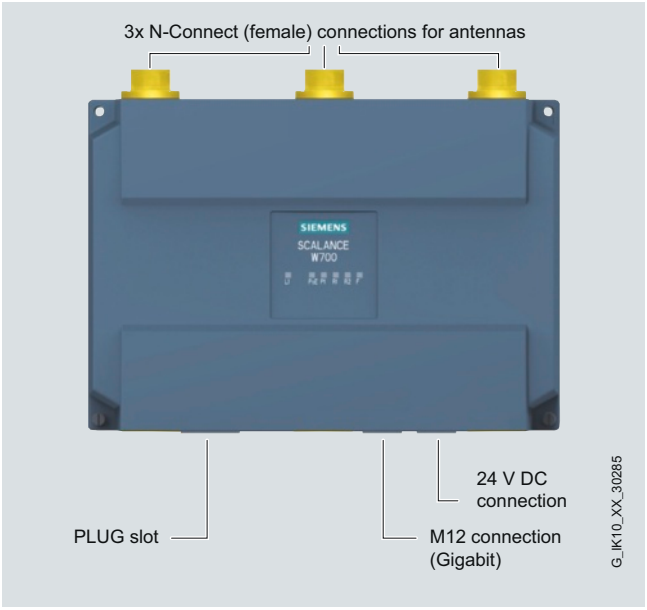
SCALANCE W748 M12 for use in the indoor area

Design

- Rugged aluminum enclosure, shock and vibration-proof, for high mechanical requirements
- High IP65 degree of protection against dust and water jets
- For use at ambient temperatures from -20 °C to +60 °C
- Resistant to condensation
- 3 x N-Connect sockets for the connection of remote antennas
- Antenna placement optimized for the 3x3 MIMO technology; the antennas do not interfere with each other when they are mounted direct on the device
- 1 x M125 connection for 10/100/1000 Mbit/s with Power-over-Ethernet according to IEEE 802.3at Type 1 (corresponds to IEEE 802.3af)
- 1 x M12 socket for energy supply (24 V DC)
- 1 x PLUG slot
- Function LEDs for optical signaling of faults and operating states
- Mounting: Wall, S7 mounting rail or on 35 mm standard mounting rail



Design and interfaces of the SCALANCE W748-1 M12 Client Modules

Product versions

SCALANCE W748-1 M12

- A wireless card permanently installed in the device; for managing the wireless connection of up to eight connected devices

Technical specifications

Order No.	**6GK5 748-1GD00-0AA0** **6GK5 748-1GD00-0AB0** [1]
Product type designation	**SCALANCE W748-1 M12**
Transmission rate	
Transmission rate	
• with W-LAN, maximum	450 Mbit/s
• with Industrial Ethernet	10 … 1 000 Mbit/s
• Note	-
Interfaces	
Number of electrical connections	
• for network components or terminal equipment	1
• for power supply	1
• for redundant power supply	1
Design of electrical connection	
• for network components or terminal equipment	M12 interface (8-pin, A-coded), PoE
• for power supply	M12 interface (4-pin, A-coded), PoE
Number of optical connections for fiber-optic cables at 100 Mbit/s	-
Design of optical connection for fiber-optic cables at 100 Mbit/s	-
Design of swap medium C-Plug	Yes
Interfaces wireless	
Number of permanently installed wireless cards	1
Number of internal antennas	-
Number of electrical connections for external antenna(s)	3
Design of electrical connection for external antenna(s)	N-Connect female
Supply voltage, current consumption, power loss	
Type of power supply	DC
Power supply	
• 1 from M12 power connector (A-coded) for redundant power supply	19.2 V
• 2 from M12 power connector (A-coded) for redundant power supply	28.8 V
• From Power-over-Ethernet according to IEEE802.3at for Type 1 and IEEE802.3af	48 V
• From Power-over-Ethernet according to IEEE802.3at for Type 2	48 V
Permissible ambient conditions	
Ambient temperature	
• During operation	-20 … +60 °C
• During storage	-40 … +70 °C
• During transport	-40 … +70 °C
Relative humidity at 25 °C without condensation during operation, maximum	100 %
IP degree of protection	IP65
Ambient conditions for operation	-

[1] Wireless approval in the USA

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SCALANCE W748 M12 for use in the indoor area

Technical specifications (continued)

Order No.	6GK5 748-1GD00-0AA0 6GK5 748-1GD00-0AB0 [1]
Product type designation	**SCALANCE W748-1 M12**
Design, dimensions and weights	
Width of enclosure without antenna	200 mm
Height of enclosure without antenna	176 mm
Depth of enclosure without antenna	79 mm
Net weight	1.7 kg
Type of mounting: wall mounting	Yes
Type of mounting	S7-300 rail mounting
Wireless frequencies	
Wireless frequency	
• With WLAN in the 2.4 GHz frequency band	2.41 … 2.48 GHz
• With WLAN in the 5 GHz frequency band	4.9 … 5.8 GHz
Product properties, functions, components General	
Number of SSIDs	1
Product function	
• Dual client	-
• iHOP	-
• iPCF	-
• iPCF-MC	-
Number of iPCF-capable radio modules	-
Product functions Management, configuration, programming	
Number of manageable IP addresses in the client	8
Product function	
• CLI	Yes
• Web-based management	Yes
• MIB support	Yes
• TRAPs via e-mail	Yes
• Configuration with STEP 7	No
• Configuration with STEP 7 in the TIA Portal	No
• SMTP server	Yes
• Operation with IWLAN controller	-
• Operation with Enterasys WLAN controller	-
• Forced roaming with IWLAN	No
• WDS	No

Order No.	6GK5 748-1GD00-0AA0 6GK5 748-1GD00-0AB0 [1]
Product type designation	**SCALANCE W748-1 M12**
Protocol is supported	
• Address Resolution Protocol (ARP)	Yes
• ICMP	Yes
• Telnet	Yes
• HTTP	Yes
• HTTPS	Yes
• TFTP	Yes
• SNMP v1	Yes
• SNMP v2	Yes
• SNMP v3	Yes
• DCP	Yes
• LLDP	Yes
Identification & maintenance	
• I&M0 - device-specific information	Yes
• I&M1 - higher-level designation/ location designation	Yes
Product functions Diagnostics	
Product function	
• PROFINET IO diagnostics	Yes
• Link check	No
• Connection monitoring IP-Alive	No
• Localization by means of Aeroscout	No
• SysLog	Yes
Product functions VLAN	
Product function VLAN with IWLAN	No
Product functions DHCP	
Product function DHCP client	Yes
Product functions Redundancy	
STP/RSTP protocol is supported	No
Product functions Security	
Product function	
• ACL – MAC based	No
• IEEE 802.1x (radius)	Yes
• NAT/NAPT	Yes
• Access protection according to IEEE802.11i	Yes
• WPA/WPA2	Yes
• TKIP/AES	Yes
Protocol is supported SSH	Yes
Product functions Time	
SNTP protocol is supported	Yes

[1] Wireless approval in the USA

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Technical specifications (continued)

Order No.	6GK5 748-1GD00-0AA0 6GK5 748-1GD00-0AB0 [1]
Product type designation	**SCALANCE W748-1 M12**
Standards, specifications, approvals	
Standard	
• for EMC of FM	-
• for hazardous zone	-
• for CSA and UL safety	UL 60950-1 CSA C22.2 No. 60950-1
• for hazardous zone of CSA and UL	-
Certificate of suitability	
• CE marking	Yes
• EC Declaration of Conformity	Yes
• C-Tick	Yes
• CCC	No
• Railroad application according to EN 50155	No
• e1 approval	No
• E1 approval	No
• NEMA4X	No
• Power-over-Ethernet according to IEEE802.3at for Type 1 and IEEE802.3af	Yes
• Power-over-Ethernet according to IEEE802.3at for Type 2	Yes
Standard for wireless communication	
• IEEE 802.11a	Yes
• IEEE 802.11b	Yes
• IEEE 802.11e	Yes
• IEEE 802.11g	Yes
• IEEE 802.11h	Yes
• IEEE 802.11i	Yes
• IEEE 802.11n	Yes
Wireless approval	You can find the latest list of countries at: www.siemens.com/simatic-net/ik-info
Marine classification association	
• American Bureau of Shipping Europe Ltd. (ABS)	No
• Bureau Veritas (BV)	No
• Det Norske Veritas (DNV)	No
• Germanischer Lloyd (GL)	No
• Lloyds Register of Shipping (LRS)	No
• Nippon Kaiji Kyokai (NK)	No
• Polski Rejestr Statkow (PRS)	No
Accessories	
Accessories	-

[1] Wireless approval in the USA

Ordering data

	Order No.
SCALANCE W748 Client Modules	
IWLAN Ethernet Client Modules with built-in wireless interface; wireless networks IEEE 802.11a/b/g/h/n at 2.4/5 GHz up to 450 Mbit/s; WPA2/AES; Power over Ethernet (PoE), IP65 degree of protection (-20 °C to +60 °C); scope of delivery: Mounting hardware; manual on CD-ROM, German/English	
SCALANCE W748-1 M12	
for managing of the wireless connection of up to eight linked devices with Industrial Ethernet connection	
• National approvals for operation outside the USA	**6GK5 748-1GD00-0AA0**
• National approvals for operation within the USA [1]	**6GK5 748-1GD00-0AB0**

[1] Please note national approvals at www.siemens.com/wireless-approvals

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SCALANCE W748 M12 for use in the indoor area

Ordering data

Ordering data	Order No.
Accessories	
C-PLUG Swap medium for simple replacement of devices in the event of a fault; for storing configuration data; can be used in SIMATIC NET products with PLUG slot	**6GK1 900-0AB00**
DIN rail mounting adapter DIN rail mounting adapter for SCALANCE W788 M12 and SCALANCE W788 RJ45; screw fixing for mounting on a 35 mm DIN rail to EN 50 022; scope of supply: 3 units per pack	**6GK5 798-8ML00-0AB3**
IE FC M12 Plug PRO 4 x 2 M12 plug-in connector suitable for on-site assembly (X-coded, IP65/IP67), metal enclosure, insulation/displacement fast connection method, for SCALANCE W	
• 1 unit	**6GK1 901-0DB30-6AA0**
• 8 units	**6GK1 901-0DB30-6AA8**
IE FC Standard Cable GP 4 x 2 8-core, shielded TP installation cable for connection to IE FC RJ45 Plug 4 x 2 and IE M12 Plug PRO 4 x 2; PROFINET-compliant; with UL approval; sold by the meter; max. length 1000 m, minimum order 20 m	**6XV1 878-2A**
IE FC Stripping Tool Preadjusted stripping tool for fast stripping of the Industrial Ethernet FC cables	**6GK1 901-1GA00**
Antennas and miscellaneous IWLAN accessories	See Industrial Wireless LAN/ accessories

More information

Wireless approvals:

Current approvals can be found on the Internet at:
www.siemens.com/wireless-approvals

To assist in selecting the right products for Industrial Wireless Communication, the SIMATIC NET Selection Tool is available:

Online version:
www.siemens.com/snst

Offline version:
www.siemens.com/snst-download

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Overview

The Ethernet Client Modules from the SCALANCE W740 product line are optimal for integrating Industrial Ethernet stations into Industrial Wireless LANs (IWLANs) for 2.4 GHz and 5 GHz with transmission rates of up to 54 Mbit/s.

- Suitable for any application:
  - SCALANCE W74x-1 for installation in a cabinet or integration in devices
  - SCALANCE W74x-1PRO for cabinet-free installation
- Reliable thanks to rugged housing, protected from water and dust (IP65), resistant to shock, vibration and electromagnetic fields
- Approved for operation in hazardous areas in Zone 2
- Demanding applications with real-time and redundancy requirements, such as PROFINET with PROFIsafe
- In conformance with standards, as it supports IEEE 802.11; additional functional expansions with software functions, especially for applications demanding high reliability, e.g. channel hopping procedure (iHOP), cyclic real-time data traffic, and very high-speed roaming (iPCF)
- The SINEMA E engineering tool, wizards and online help support planning, simulation, configuration, site survey and documentation; easy management with the web server and SNMP
- Quick commissioning of Client Modules with the optional swap medium PRESET-PLUG and quick device exchange in case of faults with the optional swap medium C-PLUG (Configuration Plug)

Benefits

get Designed for Industry

- Predictable data traffic (strict real-time requirements) and defined response times on the wireless link
- Reliable wireless link, e.g. due to redundant connection and cyclic monitoring of the wireless path
- Cost savings due to one single radio network both for process-critical data and for non-critical communication
- Investment security because all products are compatible with the internationally recognized WLAN standard IEEE 802.11, suitable for the unlicensed frequency bands of 2.4 GHz and 5 GHz (ISM bands)
- Reduced operating costs, because there is no wear of rotating and moving plant sections
- Cost-effective connection to devices which are remote, difficult to access or in hostile environments

Application

The Client Modules of the SCALANCE W740 product line are designed for indoor and outdoor industrial applications as well as for low-cost integration in control cabinets. They provide a reliable radio link, which will transfer quickly from one Access Point to the next (roaming). In this manner, processes can be monitored and production failures through machine downtimes avoided. In addition, Industrial Wireless LAN (IWLAN) can be used in time-critical applications associated with production automation (PROFINET IO) or for safety-related signals (PROFIsafe).

The client modules with high IP65 degree of protection and extended temperature range from -20 to +60 °C are especially suitable for use outdoors. SCALANCE W products are silicone-free and can therefore also be used in paint shops.

The client modules with IP30 degree of protection are especially suitable for use in automated guided vehicle systems or suspended monorails.

When using the RCoax cable (radiating cable), operation is particularly reliable in conveying technology and all track applications (e.g. storage and retrieval systems).

Application examples:

- Automated guided vehicle systems (AGVS) and suspended monorails;
  prevention of wear and high flexibility in the choice of route thanks to wireless transmission of data to the vehicles
- Cranes;
  high flexibility through access to data communication with the moving unit independent of the location
- Communication with moving stations (e.g. mobile controls and devices), container logistics, storage and retrieval machines, conveyor systems, conveyor belts, rotating machines, trucks
- Wireless coupling of communication segments and bridging of large distances for fast commissioning and for cost-effective networks in which cable routing would be extremely expensive (e.g. on public roads, rivers, lakes, train lines)

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Overview

Design

- Wireless card (compatible with IEEE 802.11a/b/g/h) permanently installed in the device
- Designed without rotating parts (e.g. operation without fans)
- Antennas can be connected via screw-type connection (R-SMA)
- Function LEDs for optical signaling of faults and operating states
- 1 x C-PLUG-/PRESET-PLUG slot

Function

Infrastructure mode

SCALANCE W740 Client Modules make it possible for a station with an Industrial Ethernet interface (e.g. a controller) to move seamlessly and with no wear in an Industrial Wireless LAN wireless field. The station registers in the wireless field via the Ethernet Client Module and can exchange information with the entire data network. If the Ethernet Client Module moves, for example, on an automated guided vehicle system, it is automatically and transparently transferred from one access point to the next (roaming).

This is possible over distances of up to 30 m indoors (approx. 100 m outdoors). Directional additional antennas can be used outdoors to achieve ranges of several thousand meters.

Apart from a reliable wireless connection, the SCALANCE W740 Client Modules are characterized by excellent support from IT mechanisms:

- IEEE 802.11 a/b/g for different frequency ranges
- IEEE 802.11h for use in the 5 GHz frequency range outdoors
- IEEE802.11e für multimedia, wireless multimedia (WMM)
- IEEE802.11i for security
- Selectable operation of infrastructure- and Ad-Hoc modes
- Sending the log entries of the SCALANCE W devices to a Syslog server
- Modern security mechanisms (e.g. network security such as IEEE 802.1x, RADIUS, EAP mechanisms)
- Network and Port Address Translation (NAT/PAT) (mapping of private IP addresses and ports onto public addresses)

Security

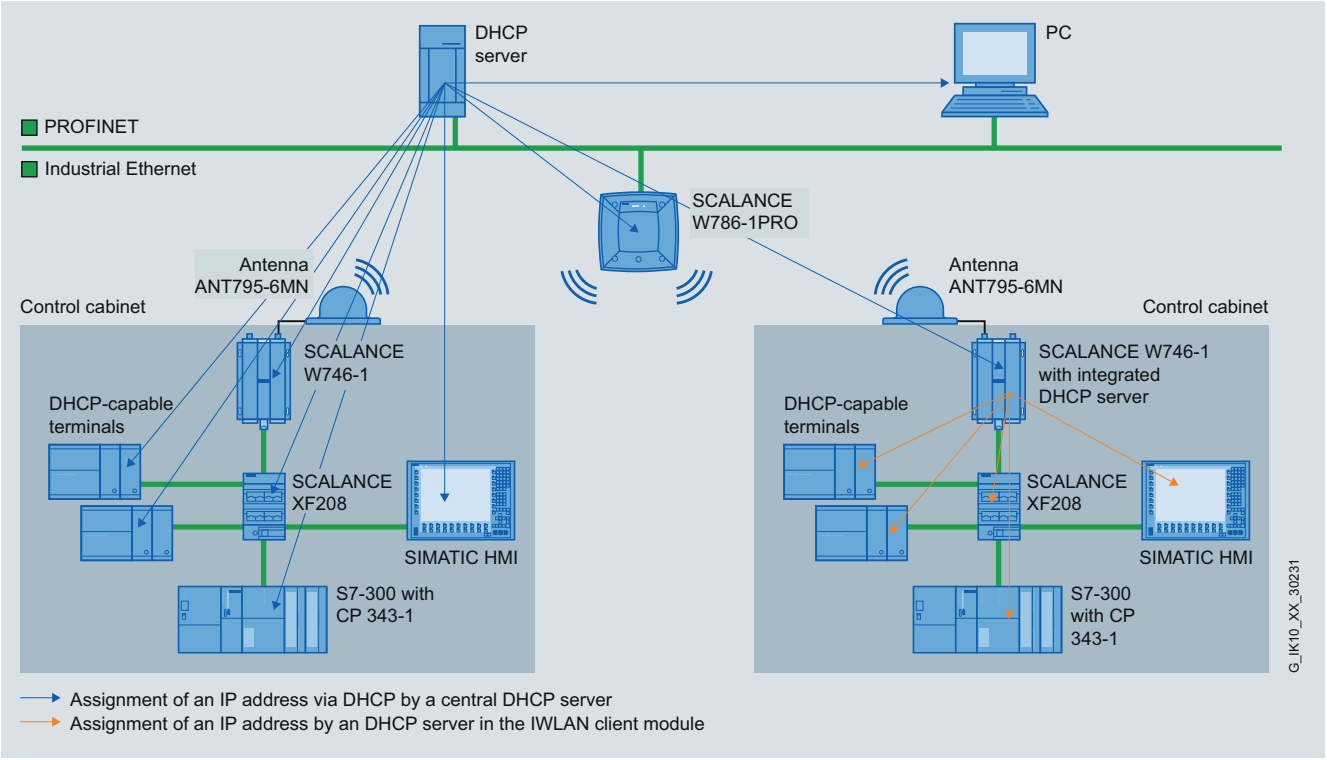
A high degree of data security is achieved by means of the WPA2/IEEE 802.11i mechanisms. These define modern procedures that control a regular exchange of the complete 128-bit code as well as performing the access check (authentication) of a station. The Advanced Encryption Standard (AES) is available for data encryption. All encryption mechanisms are integrated in the products and do not incur any additional costs.

Access to the devices (HTTPS) is encrypted and secure logon (SSH) is possible. If a security concept with Virtual Private Networks (VPN) or the SCALANCE S range is required, the products can be integrated without any difficulty.

Functional scope

SCALANCE W744-1PRO and SCALANCE W744-1 can administer one single IP address, namely that of the connected device. They establish a wireless connection precisely from this mobile device to the wireless network. If the connected device is replaced, the Ethernet Client Module recognizes this automatically, and registers the new address. This reduces plant downtimes and sources of error.

The SCALANCE W746-1PRO and SCALANCE W746-1 Ethernet Client Modules can administer the wireless connection for up to eight devices with an Ethernet interface. It is possible to integrate mobile units with a small Ethernet network (up to eight devices) into an IWLAN wireless field.



Assignment of dynamic IP addresses to wirelessly connected stations by a central DHCP server or integrated DHCP server of an IWLAN client module

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Function (continued)

iFeatures (only for SCALANCE W747-1RR and W747-1)

iPCF (industrial Point Coordination Function)

The **iPCF** mode is recommended for applications with a requirement for real-time and predictable response times (deterministic response), even during roaming of moving stations from one access point to the next. This ensures that wireless PROFINET IO is supported and that safety-related signals, e.g. emergency stop, can be integrated into the wireless link. This means that even video signals from moving stations can be transmitted with a high level of quality.

The iPCF mechanism expands the IEEE 802.11 standard and must be available on both the station and the access point (e.g. SCALANCE W788-1RR). In a wireless field in which iPCF is used, no IEEE 802.11-compliant stations can be operated.

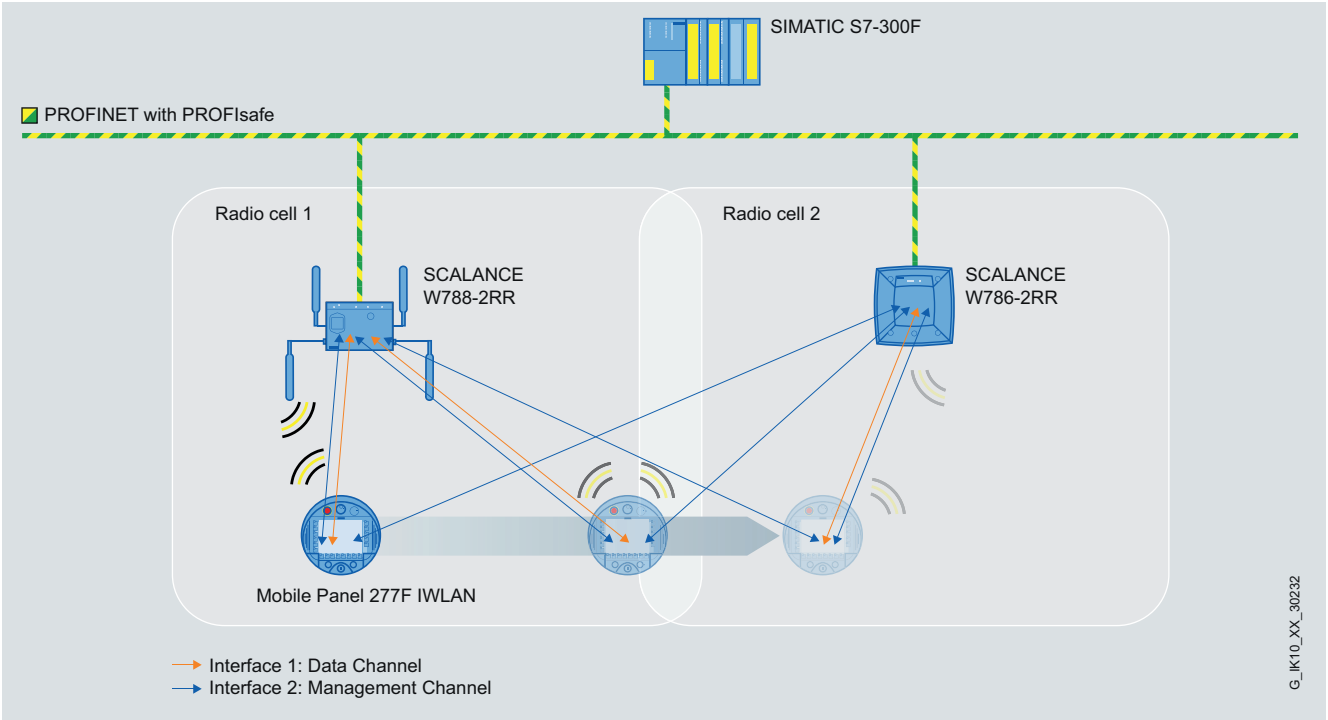
iPCF is recommended for applications where wireless network nodes move along predefined paths (e.g. suspended monorail). RCoax leaky wave cables or directional antennas must be used for this purpose.

Note:
The IWLAN/PB Link PN IO gateway also supports iPCF

iPCF-MC (iPCF Management Channel)

iPCF-MC is available as further development of iPCF. This mode should be used if IWLAN stations that also support iPCF-MC (e.g. Client Modules SCALANCE W747-1RR, Mobile Panel 277F IWLAN) move freely about in the coverage area (especially when using omni-directional antennas) and are to exchange data deterministically. This functionality can only be implemented in combination with RR Access Point versions with at least two radio interfaces.

Note:
Due to the lower bandwidth when using iPCF-MC, we recommend the iPCF mode for transmitting video signals.



Roaming of a mobile panel between two access points while maintaining error-free communication with iPCF-MC

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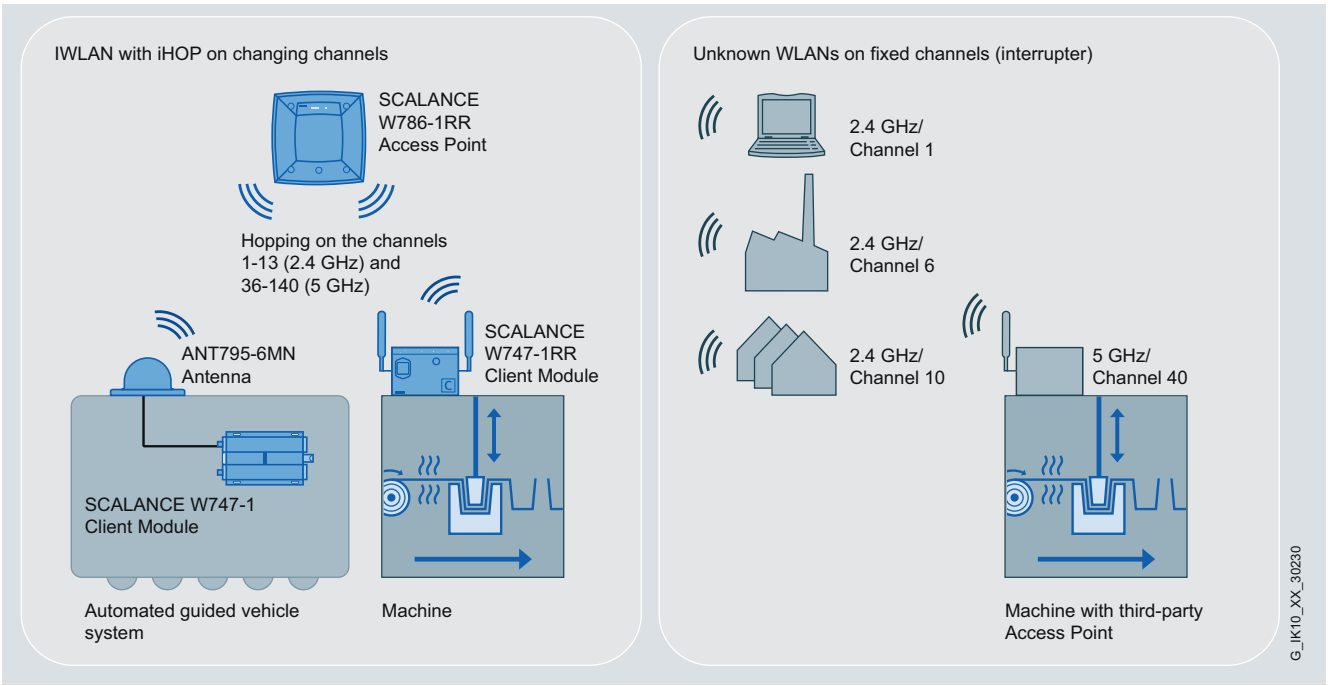
Overview

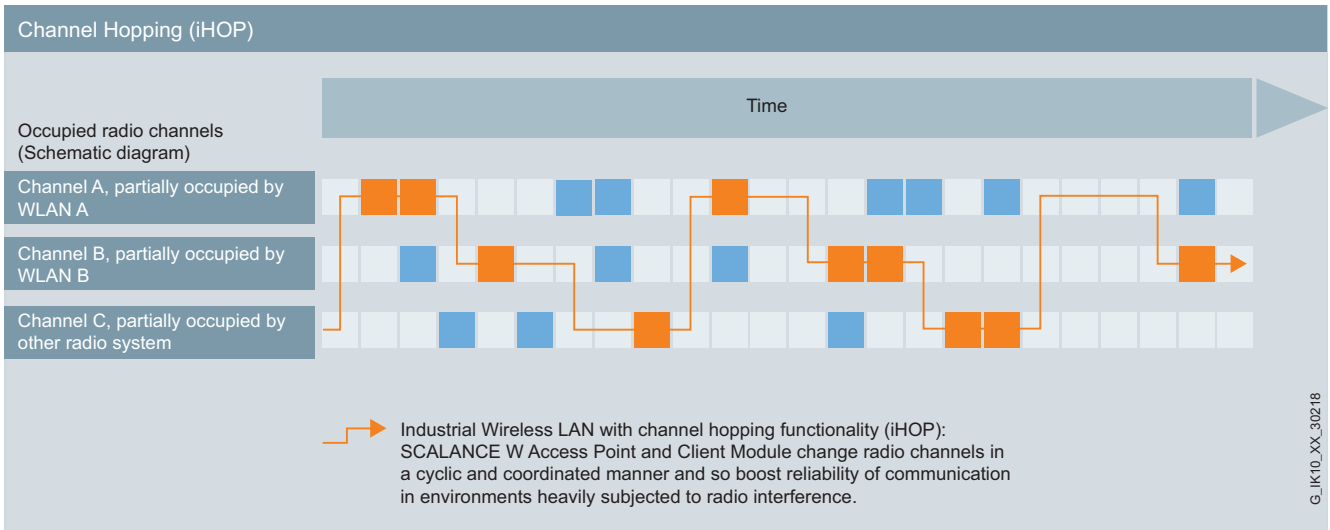
Function (continued)

iHOP

With the supplementary function **iHOP**, the Access Point changes the channel in coordination with its clients. If it detects interferences which are caused, for example, by sporadically active WLANs on a channel, it avoids the affected channel temporarily. Hopping to the other channel is carried out so rapidly that usually the application is not impaired by the channel change. If the interferences occur throughout the complete frequency band, it is even possible to change to another frequency band (e.g. from 2.4 to 5 GHz). This guarantees reliable communication even with interferences in the wireless field.



Coordinated changing of channels by means of a channel hopping procedure (iHOP) to avoid disrupters



iHOP function for SCALANCE W Client Modules

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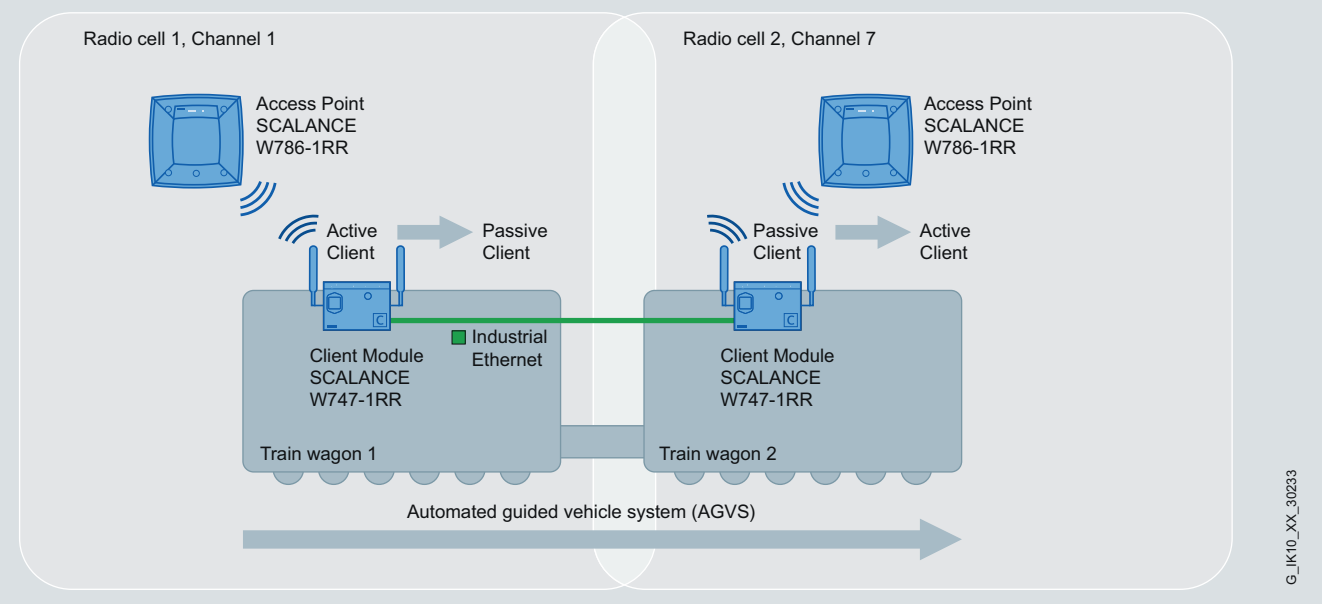
Function (continued)

Dual Client

This function permits coupling of two Client Modules via an Industrial Ethernet Switch (e.g. SCALANCE X-200). One client is actively connected to an Access Point via IWLAN. The other client is in standby mode and continuously searches for an Access Point with better signal strength. If it finds one, its status changes to active and the previously active client switches to standby mode. Changeover between the clients is implemented without interrupting communication (seamless roaming).



Two linked IWLAN client modules form a dual client to enable uninterrupted roaming, e.g. for fast moving vehicles

Note:
These iFeatures cannot be used in parallel.

Diagnostics and management

- Web-based (HTTP/HTTPS) management tool for configuration and diagnostics using a standard browser
- Planning, configuration, simulation and measurement of the wireless field on site (Site Survey) with SINEMA E
- LEDs for signaling operating states and fault conditions
- Signaling of faults by means of SNMP trap or e-mail to a network management tool, e.g. SINEMA-Server

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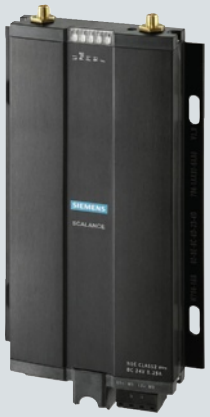
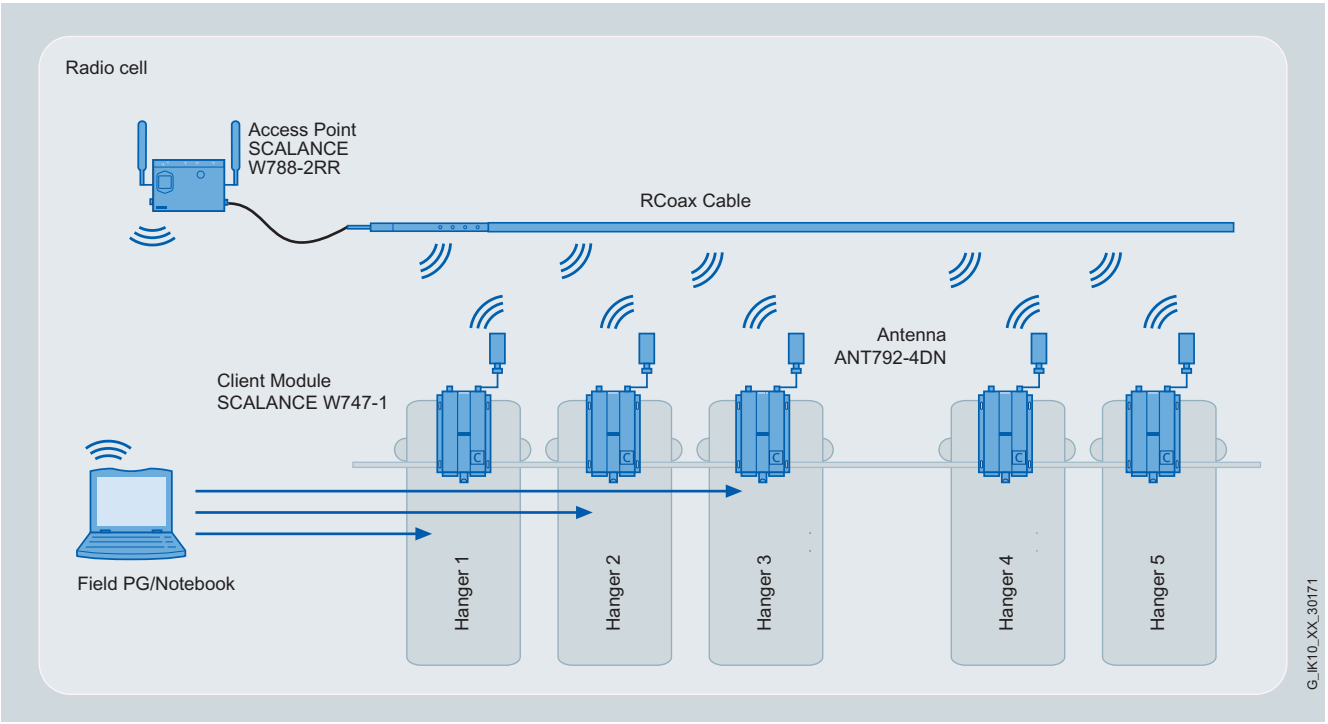
SCALANCE W740 for use in the control cabinet

Overview



- Especially suitable for applications where the client module is to be mounted in the control cabinet
- Low-cost alternative for use indoors with less severe environmental conditions
- The rugged aluminum enclosure with degree of protection IP30 nevertheless provides protection against mechanical and electromagnetic stress in industrial areas

Application



Use of the Ethernet Client Modules in a suspended monorail

The mobile units of a suspended monorail, for example, are linked to the IWLAN radio link via the Ethernet Client Modules SCALANCE W747-1. This is implemented by means of the SCALANCE W788-2RR Access Points and the RCoax cable. The Ethernet Client Modules are mounted in cabinets because of their mechanical characteristics.

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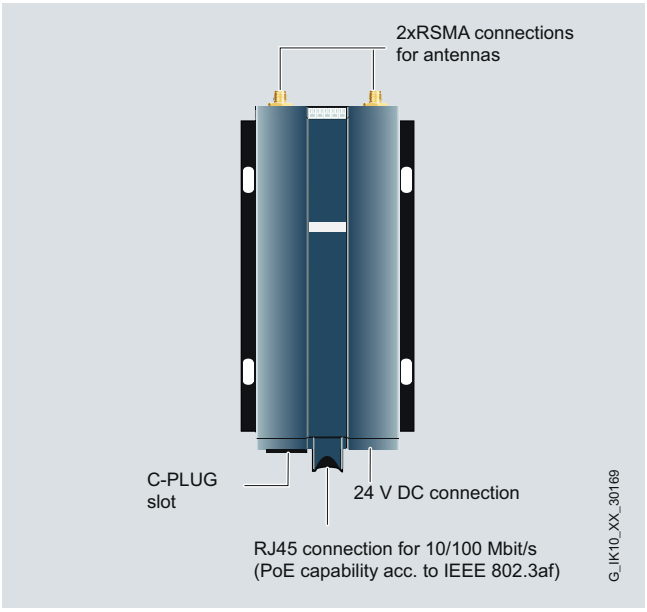
Design

- Low-profile, compact aluminum enclosure, shock and vibration-proof for high mechanical requirements
- Dust protection with IP30 degree of protection
- For use at ambient temperatures from -20 °C to +60 °C
- Construction and design suitable for integration in a device or for installation in a cabinet
- 2 x R-SMA sockets for the connection of remote antennas
- 1 x RJ45 connection for 10/100 Mbit/s with Power-over-Ethernet according to IEEE 802.3at Type 1 (corresponds to IEEE 802.3af)
- 1 x 24 V DC connection for redundant power infeed
- 1 x C-PLUG slot
- Function LEDs for optical signaling of faults and operating states
- Mounting: Wall or, with optional mounting set, on S7 mounting rail, 35 mm standard mounting rail



Configuration and interfaces for Client Modules SCALANCE W744-1, W746-1, W747-1

Product versions

SCALANCE W744-1

- A wireless card permanently installed in the device; for managing the wireless connection of a connected device

SCALANCE W746-1

- A wireless card permanently installed in the device for managing the wireless connection of up to eight connected devices

SCALANCE W747-1

- A wireless card permanently installed in the device for managing the wireless connection with iPCF of up to eight connected devices

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SCALANCE W740 for use in the control cabinet

Technical specifications

Order No.	6GK5 744-1AA30-2AA0 6GK5 744-1AA30-2AB0 [1]	6GK5 746-1AA30-4AA0 6GK5 746-1AA30-4AB0 [1]	6GK5 747-1AA30-6AA0 6GK5 747-1AA30-6AB0 [1]
Product type designation	**SCALANCE W744-1**	**SCALANCE W746-1**	**SCALANCE W747-1**
Transmission rate			
Transmission rate			
• with W-LAN, maximum	54 Mbit/s	54 Mbit/s	54 Mbit/s
• with Industrial Ethernet	10 … 100 Mbit/s	10 … 100 Mbit/s	10 … 100 Mbit/s
• Note	Due to the simultaneous use of several radio channels, a transmission rate of 108 Mbit/s is possible (turbo mode)	Due to the simultaneous use of several radio channels, a transmission rate of 108 Mbit/s is possible (turbo mode)	Due to the simultaneous use of several radio channels, a transmission rate of 108 Mbit/s is possible (turbo mode)
Interfaces			
Number of electrical connections			
• for network components or terminal equipment	1	1	1
• for power supply	1	1	1
• for redundant power supply	1	1	1
Design of electrical connection			
• for network components or terminal equipment	RJ45 socket	RJ45 socket	RJ45 socket
• for power supply	4-pin screw terminal, PoE	4-pin screw terminal, PoE	4-pin screw terminal, PoE
Design of swap medium C-Plug	Yes	Yes	Yes
Interfaces wireless			
Number of permanently installed wireless cards	1	1	1
Number of electrical connections for external antenna(s)	2	2	2
Design of electrical connection for external antenna(s)	R-SMA female (socket)	R-SMA female (socket)	R-SMA female (socket)
Supply voltage, current consumption, power loss			
Type of power supply	DC	DC	DC
Power supply			
• 1 from terminal block	24 V	24 V	24 V
• 2 from terminal block	48 V	48 V	48 V
• From Power-over-Ethernet according to IEEE802.3at for Type 1 and IEEE802.3af	48 V	48 V	48 V
Current consumed			
• At 24 V DC, typical	0.23 A	0.23 A	0.23 A
• At 48 V DC, typical	0.12 A	0.12 A	0.12 A
• With Power-over-Ethernet according to IEEE802.3at for Type 1 and IEEE802.3af, typical	0.12 A	0.12 A	0.12 A
Effective power loss			
• At 24 V DC, typical	6 W	6 W	6 W
• At 48 V DC, typical	6 W	6 W	6 W
• With Power-over-Ethernet according to IEEE802.3at for Type 1 and IEEE802.3af, typical	6 W	6 W	6 W

[1] Wireless approval in the USA

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Technical specifications (continued)

Order No.	6GK5 744-1AA30-2AA0 6GK5 744-1AA30-2AB0 [1]	6GK5 746-1AA30-4AA0 6GK5 746-1AA30-4AB0 [1]	6GK5 747-1AA30-6AA0 6GK5 747-1AA30-6AB0 [1]
Product type designation	**SCALANCE W744-1**	**SCALANCE W746-1**	**SCALANCE W747-1**
Permissible ambient conditions			
Ambient temperature			
• During operation	-20 … +60 °C	-20 … +60 °C	-20 … +60 °C
• During storage	-40 … +70 °C	-40 … +70 °C	-40 … +70 °C
• During transport	-40 … +70 °C	-40 … +70 °C	-40 … +70 °C
Relative humidity at 25 °C without condensation during operation, maximum	90 %	90 %	90 %
IP degree of protection	IP30	IP30	IP30
Ambient conditions for operation	-	-	-
Design, dimensions and weights			
Width of enclosure without antenna	100 mm	100 mm	100 mm
Height of enclosure without antenna	205 mm	205 mm	205 mm
Depth of enclosure without antenna	20 mm	20 mm	20 mm
Net weight	0.29 kg	0.29 kg	0.29 kg
Type of mounting			
• S7-300 rail mounting	-	-	-
• Wall mounting	Yes	Yes	Yes
Type of mounting	For mounting on 35 mm DIN rail and S7-300 rail, an additional adapter plate is required	For mounting on 35 mm DIN rail and S7-300 rail, an additional adapter plate is required	For mounting on 35 mm DIN rail and S7-300 rail, an additional adapter plate is required
Wireless frequencies			
Wireless frequency			
• With WLAN in the 2.4 GHz frequency band	2.41 … 2.48 GHz	2.41 … 2.48 GHz	2.41 … 2.48 GHz
• With WLAN in the 5 GHz frequency band	4.9 … 5.8 GHz	4.9 … 5.8 GHz	4.9 … 5.8 GHz
Product properties, functions, components General			
Number of SSIDs	1	1	1
Product function			
• Dual client	No	No	Yes
• iHOP	No	No	Yes
• iPCF	No	No	No
• iPCF-MC	No	No	Yes
Number of iPCF-capable radio modules	0	0	1
Product functions Management, configuration, programming			
Number of manageable IP addresses in the client	1	8	8
Product function			
• CLI	Yes	Yes	Yes
• Web-based management	Yes	Yes	Yes
• MIB support	Yes	Yes	Yes
• TRAPs via e-mail	Yes	Yes	Yes
• Configuration with STEP 7	No	Yes	Yes
• Configuration with STEP 7 in the TIA Portal	No	Yes	Yes
• SMTP server	Yes	Yes	Yes
• Operation with IWLAN controller	No	No	No
• Operation with Enterasys WLAN controller	No	No	No
• iQoS	No	No	No
• Forced roaming with IWLAN	No	No	No
• WDS	No	No	No

[1] Wireless approval in the USA

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Technical specifications (continued)

Order No.	6GK5 744-1AA30-2AA0 6GK5 744-1AA30-2AB0 [1]	6GK5 746-1AA30-4AA0 6GK5 746-1AA30-4AB0 [1]	6GK5 747-1AA30-6AA0 6GK5 747-1AA30-6AB0 [1]
Product type designation	**SCALANCE W744-1**	**SCALANCE W746-1**	**SCALANCE W747-1**
Protocol is supported			
• Address Resolution Protocol (ARP)	Yes	Yes	Yes
• ICMP	Yes	Yes	Yes
• Telnet	Yes	Yes	Yes
• HTTP	Yes	Yes	Yes
• HTTPS	Yes	Yes	Yes
• TFTP	Yes	Yes	Yes
• SNMP v1	Yes	Yes	Yes
• SNMP v2	Yes	Yes	Yes
• SNMP v3	Yes	Yes	Yes
• DCP	Yes	Yes	Yes
• LLDP	No	Yes	Yes
Identification & maintenance			
• I&M0 – device-specific information	Yes	Yes	Yes
• I&M1 – higher-level designation/location designation	Yes	Yes	Yes
Product functions Diagnostics			
Product function			
• PROFINET IO diagnostics	No	Yes	Yes
• Link check	No	No	No
• Connection monitoring IP-Alive	No	No	No
• Localization by means of Aeroscout	No	No	No
• SysLog	Yes	Yes	Yes
Product functions VLAN			
Product function VLAN with IWLAN	No	No	No
Product functions DHCP			
Product function DHCP client	Yes	Yes	Yes
Product functions Redundancy			
STP/RSTP protocol is supported	-	-	-
Product functions Security			
Product function			
• ACL - MAC based	No	No	No
• IEEE 802.1x (radius)	Yes	Yes	Yes
• NAT/NAPT	No	Yes	Yes
• Access protection according to IEEE802.11i	Yes	Yes	Yes
• WPA/WPA2	Yes	Yes	Yes
• TKIP/AES	Yes	Yes	Yes
Protocol is supported SSH	Yes	Yes	Yes
Product functionsTime			
SNTP protocol is supported	Yes	Yes	Yes

[1] Wireless approval in the USA

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Technical specifications (continued)

Order No.	6GK5 744-1AA30-2AA0 6GK5 744-1AA30-2AB0 [1]	6GK5 746-1AA30-4AA0 6GK5 746-1AA30-4AB0 [1]	6GK5 747-1AA30-6AA0 6GK5 747-1AA30-6AB0 [1]
Product type designation	**SCALANCE W744-1**	**SCALANCE W746-1**	**SCALANCE W747-1**
Standards, specifications, approvals			
Standard			
• for EMC of FM	FM 3611: Class I, Division 2, Groups A,B,C,D, T4 / Class 1, Zone 2, Group IIC, T4	FM 3611: Class I, Division 2, Groups A,B,C,D, T4 / Class 1, Zone 2, Group IIC, T4	FM 3611: Class I, Division 2, Groups A,B,C,D, T4 / Class 1, Zone 2, Group IIC, T4
• for hazardous zone	EN 60079-15:2005, EN 60079-0:2006, II 3 G Ex nA II T4 KEMA 07 ATEX 0145X (only approved in connection with an enclosure with degree of protection of at least IP 54)	EN 60079-15:2005, EN 60079-0:2006, II 3 G Ex nA II T4 KEMA 07 ATEX 0145X (only approved in connection with an enclosure with degree of protection of at least IP 54)	EN 60079-15:2005, EN 60079-0:2006, II 3 G Ex nA II T4 KEMA 07 ATEX 0145X (only approved in connection with an enclosure with degree of protection of at least IP 54)
• for CSA and UL safety	UL 60950-1 CSA C22.2 No. 60950-1	UL 60950-1 CSA C22.2 No. 60950-1	UL 60950-1 CSA C22.2 No. 60950-1
• for hazardous zone of CSA and UL	ISA 12.12.01-2000, CSA C22.2 No. 213-M1987, CL. 1, Div. 2, GP. A,B,C,D, T4 / CL. 1, Zone 2, GP IIC, T4 / CL. 1, Zone 2, AEx nC IIC, T4 (only approved in connection with an enclosure with degree of protection of at least IP 54)	ISA 12.12.01-2000, CSA C22.2 No. 213-M1987, CL. 1, Div. 2, GP. A,B,C,D, T4 / CL. 1, Zone 2, GP IIC, T4 / CL. 1, Zone 2, AEx nC IIC, T4 (only approved in connection with an enclosure with degree of protection of at least IP 54)	ISA 12.12.01-2000, CSA C22.2 No. 213-M1987, CL. 1, Div. 2, GP. A,B,C,D, T4 / CL. 1, Zone 2, GP IIC, T4 / CL. 1, Zone 2, AEx nC IIC, T4 (only approved in connection with an enclosure with degree of protection of at least IP 54)
Certificate of suitability			
• CE marking	Yes	Yes	Yes
• EC Declaration of Conformity	Yes	Yes	Yes
• C-Tick	Yes	Yes	Yes
• CCC	No	No	No
• Railroad application according to EN 50155	Yes	Yes	Yes
• e1 approval	Yes	Yes	Yes
• E1 approval	Yes	Yes	Yes
• Power-over-Ethernet according to IEEE802.3at for Type 1 and IEEE802.3af	Yes	Yes	Yes
Standard for wireless communication			
• IEEE 802.11a	Yes	Yes	Yes
• IEEE 802.11b	Yes	Yes	Yes
• IEEE 802.11e	Yes	Yes	Yes
• IEEE 802.11g	Yes	Yes	Yes
• IEEE 802.11h	Yes	Yes	Yes
• IEEE 802.11i	Yes	Yes	Yes
• IEEE 802.11n	No	No	No
Wireless approval	You can find the latest list of countries at: www.siemens.com/simatic-net/ik-info	You can find the latest list of countries at: www.siemens.com/simatic-net/ik-info	You can find the latest list of countries at: www.siemens.com/simatic-net/ik-info
Marine classification association			
• American Bureau of Shipping Europe Ltd. (ABS)	Yes	No	No
• Bureau Veritas (BV)	Yes	No	No
• Det Norske Veritas (DNV)	No	No	No
• Germanischer Lloyd (GL)	Yes	No	No
• Lloyds Register of Shipping (LRS)	Yes	No	No
• Nippon Kaiji Kyokai (NK)	Yes	No	No
• Polski Rejestr Statkow (PRS)	Yes	No	No
Accessories			
Accessories	24 V DC screw terminal included in scope of delivery	24 V DC screw terminal included in scope of delivery	24 V DC screw terminal included in scope of delivery

[1] Wireless approval in the USA

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SCALANCE W740 for use in the control cabinet

Ordering data	Order No.
SCALANCE W740 Client Modules	
IWLAN Ethernet Client Modules with built-in radio interface; radio networks IEEE 802.11a/b/g/h at 2.4/5 GHz to 54 Mbit/s; WPA/AES; Power over Ethernet (PoE) mounting hardware; 4-pin screw terminal for 24 V DC; manual on CD-ROM, German/English	
SCALANCE W744-1	
For administration of the radio link of one device with Industrial Ethernet connection; IP30 degree of protection	
• National approvals for operation outside the USA	**6GK5 744-1AA30-2AA0**
• National approvals for operation within the USA[1)]	**6GK5 744-1AA30-2AB0**
SCALANCE W746-1	
For administration of the radio link of up to eight devices with Industrial Ethernet connection; IP30 degree of protection	
• National approvals for operation outside the USA	**6GK5 746-1AA30-4AA0**
• National approvals for operation within the USA[1)]	**6GK5 746-1AA30-4AB0**
SCALANCE W747-1	
For administration of the radio link with iPCF of up to eight devices with Industrial Ethernet connection; IP30 degree of protection	
• National approvals for operation outside the USA	**6GK5 747-1AA30-6AA0**
• National approvals for operation within the USA[1)]	**6GK5 747-1AA30-6AB0**

[1)] Please note national approvals at www.siemens.com/wireless-approvals

Accessories	Order No.
C-PLUG	
Swap medium for simple replacement of devices in the event of a fault; for storing configuration data; can be used in SIMATIC NET products with PLUG slot	**6GK1 900-0AB00**
PRESET-PLUG	**6GK5 798-8AB00**
Swap medium for simple initial startup of SCALANCE W access points and client modules, as well as IWLAN/PB Link PN IO	
SIMATIC Mobile Panel 277F IWLAN	
• Communication via WLAN (PROFINET) with acknowledgement button and emergency stop button	**6AV6 645-0DB01-0AX0**
• Communication via WLAN (PROFINET) with acknowledgment button and emergency stop button with integrated handwheel, key-operated switch, and two illuminated pushbuttons	**6AV6 645-0DC01-0AX0**
Note: Please also order the desktop power supply or battery charger!	
• Table-top power supply incl. power cable for EU, US, UK, JP (only suitable for operation under laboratory/office conditions)	**6AV6 671-5CN00-0AX1**
• Charger for safe storage and charging the device incl. lock for securing the device in the charger. Charging capabilities for up to two additional batteries	**6AV6 671-5CE00-0AX0**
• Additional battery with LED indicator for indicating the charge status	**6AV6 671-5CL00-0AX0**
• Transponder incl. batteries (3x AA)	**6AV6 671-5CM00-0AX0**

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Ordering data

	Order No.
Accessories (continued)	
IE FC RJ45 Plug 180 2x2 RJ45 plug connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation-displacement contacts for connecting Industrial Ethernet FC installation cables; with a 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface	
• 1 pack = 1 unit	**6GK1 901-1BB10-2AA0**
• 1 pack = 10 units	**6GK1 901-1BB10-2AB0**
• 1 pack = 50 units	**6GK1 901-1BB10-2AE0**
IE FC Standard Cable GP 2 x 2 4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/ E FC RJ45 Plug; PROFINET-compliant; with UL approval; sold by the meter; max. length 1000 m, minimum order 20 m	**6XV1 840-2AH10**
IE FC Stripping Tool Preadjusted stripping tool for fast stripping of the Industrial Ethernet FC cables	**6GK1 901-1GA00**
IE TP Cord RJ45/RJ45 TP cable 4 x 2 with 2 RJ45 connectors	
• 0.5 m	**6XV1 870-3QE50**
• 1 m	**6XV1 870-3QH10**
• 2 m	**6XV1 870-3QH20**
• 6 m	**6XV1 870-3QH60**
• 10 m	**6XV1 870-3QN10**
MS2 mounting set Mounting set for fixing the SCALANCE W784 products onto an S7-300 mounting rail or a 35 mm standard DIN rail	**6GK5 798-8MJ00-0AA0**
Antennas and miscellaneous IWLAN accessories	See Industrial Wireless LAN/ accessories

More information

Wireless approvals:

Current approvals can be found on the Internet at:
www.siemens.com/wireless-approvals

To assist in selecting the right products for Industrial Wireless Communication, the SIMATIC NET Selection Tool is available:

Online version:
www.siemens.com/snst

Offline version:
www.siemens.com/snst-download

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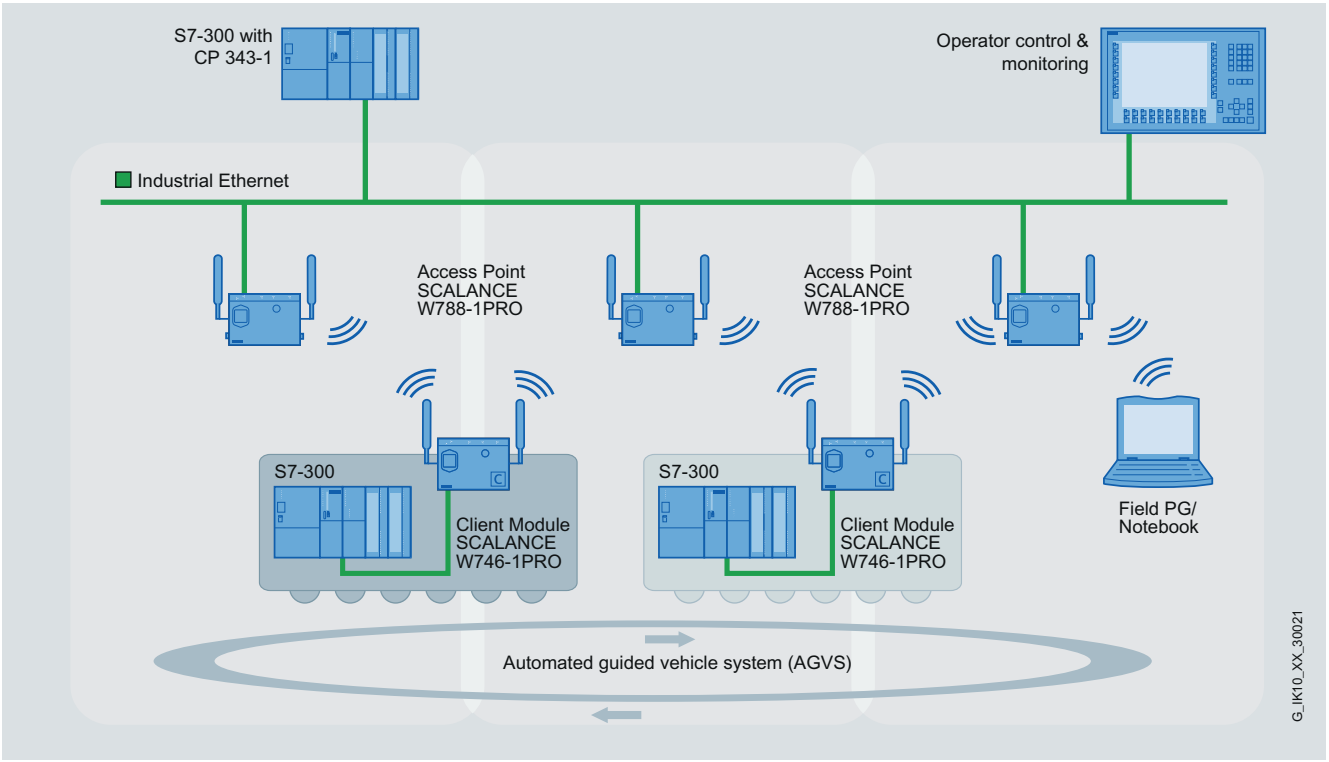
SCALANCE W740 for use in the indoor area

Overview

- Particularly suitable for industrial applications without control cabinets.

Application



Mobile controls in an automated guided vehicle system

The controllers register via the Ethernet Client Modules W746-1PRO in the radio link and can move around freely there. This makes it possible to operate an automated guided vehicle system, for example.

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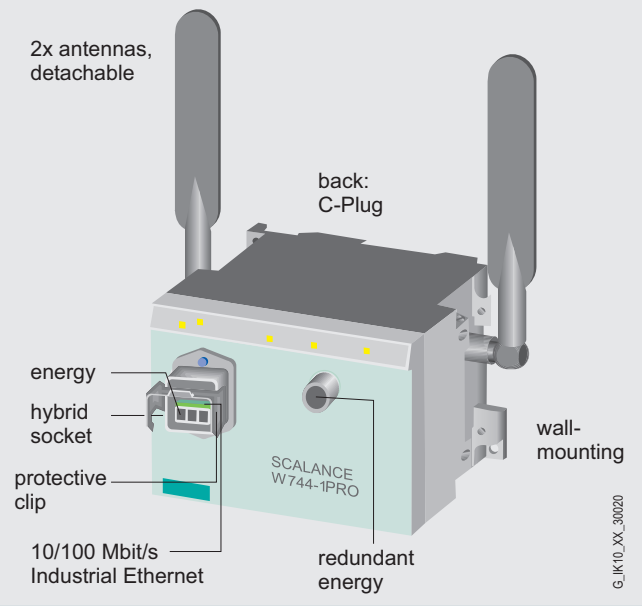
Design

- Rugged metal enclosure, shock and vibration-proof for high mechanical requirements in industrial applications designed without cabinets
- High IP65 degree of protection against dust and water jets
- For use at ambient temperatures from -20 °C to +60 °C
- Resistant to condensation
- 2 x R-SMA sockets for the connection of remote antennas (4 x R-SMA for the versions with two radio modules)
- 1 x hybrid socket for data and energy line for infeed over the IE FC Modular Outlet or for supplying with Power-over-Ethernet according to IEEE 802.3at Type 1 (corresponds to IEEE 802.3af)
- 1 x M12 socket for redundant power infeed (18 to 32 V DC, 48 V DC), e.g. in conjunction with the PS791-1PRO (90 to 265 V AC) power supply
- 1 x C-PLUG slot
- Function LEDs for optical signaling of faults and operating states
- Mounting: Wall, S7-300 mounting rail (90 mm length, vertically mounted, bolts included in scope of supply), or with optional mounting aid on 35 mm DIN rail



Configuration and interfaces for Client Modules SCALANCE W744-1PRO, W746-1PRO, W747-1RR

Product versions

SCALANCE W744-1PRO

- A wireless card permanently installed in the device; for managing the wireless connection of a connected device

SCALANCE W746-1PRO

- A wireless card permanently installed in the device; for managing the wireless connection of up to eight connected devices

SCALANCE W747-1RR

- For establishing wireless connections with iPCF; a wireless card permanently installed in the device; for managing the wireless connection of up to eight connected devices

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SCALANCE W740 for use in the indoor area

Technical specifications

Order No.	6GK5 744-1AA60-2AA0 6GK5 744-1AA60-2AB0 [1]	6GK5 746-1AA60-4AA0 6GK5 746-1AA60-4AB0 [1]	6GK5 747-1AA60-6AA0 6GK5 747-1AA60-6AB0 [1]
Product type designation	**SCALANCE W744-1PRO**	**SCALANCE W746-1PRO**	**SCALANCE W747-1RR**
Transmission rate			
Transmission rate			
• with W-LAN, maximum	54 Mbit/s	54 Mbit/s	54 Mbit/s
• with Industrial Ethernet	10 … 100 Mbit/s	10 … 100 Mbit/s	10 … 100 Mbit/s
• Note	Due to the simultaneous use of several radio channels, a transmission rate of 108 Mbit/s is possible (turbo mode)	Due to the simultaneous use of several radio channels, a transmission rate of 108 Mbit/s is possible (turbo mode)	Due to the simultaneous use of several radio channels, a transmission rate of 108 Mbit/s is possible (turbo mode)
Interfaces			
Number of electrical connections			
• for network components or terminal equipment	1	1	1
• for power supply	1	1	1
• for redundant power supply	1	1	1
Design of electrical connection			
• for network components or terminal equipment	Hybrid socket, RJ45 integrated	Hybrid socket, RJ45 integrated	Hybrid socket, RJ45 integrated
• for power supply	M12 interface (4-pin, A-coded), hybrid socket, PoE	M12 interface (4-pin, A-coded), hybrid socket, PoE	M12 interface (4-pin, A-coded), hybrid socket, PoE
Design of swap medium C-Plug	Yes	Yes	Yes
Interfaceswireless			
Number of permanently installed wireless cards	1	1	1
Number of electrical connections for external antenna(s)	2	2	2
Design of electrical connection for external antenna(s)	R-SMA female (socket)	R-SMA female (socket)	R-SMA female (socket)
Supply voltage, current consumption, power loss			
Type of power supply	DC	DC	DC
Supply voltage			
• 1 from M12 power connector (A-coded) for redundant power supply	24 V	24 V	24 V
• 2 from M12 power connector (A-coded) for redundant power supply	48 V	48 V	48 V
• 1 from IE hybrid cable 2x2 + 4x0.34	24 V	24 V	24 V
• 2 from IE hybrid cable 2x2 + 4x0.34	48 V	48 V	48 V
• From Power-over-Ethernet according to IEEE802.3at for Type 1 and IEEE802.3af	48 V	48 V	48 V
Current consumed			
• At 24 V DC, typical	0.25 A	0.25 A	0.25 A
• At 48 V DC, typical	0.13 A	0.13 A	0.13 A
• With Power-over-Ethernet according to IEEE802.3at for Type 1 and IEEE802.3af, typical	0.13 A	0.13 A	0.13 A
Effective power loss			
• At 24 V DC, typical	7 W	7 W	7 W
• At 48 V DC, typical	7 W	7 W	7 W
• With Power-over-Ethernet according to IEEE802.3at for Type 1 and IEEE802.3af, typical	7 W	7 W	7 W

[1] Wireless approval in the USA

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Technical specifications (continued)

Order No.	6GK5 744-1AA60-2AA0 6GK5 744-1AA60-2AB0 [1]	6GK5 746-1AA60-4AA0 6GK5 746-1AA60-4AB0 [1]	6GK5 747-1AA60-6AA0 6GK5 747-1AA60-6AB0 [1]
Product type designation	**SCALANCE W744-1PRO**	**SCALANCE W746-1PRO**	**SCALANCE W747-1RR**
Permissible ambient conditions			
Ambient temperature			
• During operation	-20 … +60 °C	-20 … +60 °C	-20 … +60 °C
• During storage	-40 … +70 °C	-40 … +70 °C	-40 … +70 °C
• During transport	-40 … +70 °C	-40 … +70 °C	-40 … +70 °C
Relative humidity at 25 °C without condensation during operation, maximum	100 %	100 %	100 %
IP degree of protection	IP65	IP65	IP65
Ambient conditions for operation	When used under explosion protection conditions (Zone 2), the SCALANCE W788-xPRO/RR or W74x-1PRO/RR product must be installed in an enclosure that complies at least with IP54 according to EN 60529 within the scope of EN 50021.	When used under explosion protection conditions (Zone 2), the SCALANCE W788-xPRO/RR or W74x-1PRO/RR product must be installed in an enclosure that complies at least with IP54 according to EN 60529 within the scope of EN 50021.	When used under explosion protection conditions (Zone 2), the SCALANCE W788-xPRO/RR or W74x-1PRO/RR product must be installed in an enclosure that complies at least with IP54 according to EN 60529 within the scope of EN 50021.
Design, dimensions and weights			
Width of enclosure without antenna	125 mm	125 mm	125 mm
Height of enclosure without antenna	88 mm	88 mm	88 mm
Depth of enclosure without antenna	108 mm	108 mm	108 mm
Net weight	1.05 kg	1.05 kg	1.05 kg
Type of mounting			
• S7-300 rail mounting	Yes	Yes	Yes
• Wall mounting	Yes	Yes	Yes
Wireless frequencies			
Wireless frequency			
• With WLAN in the 2.4 GHz frequency band	2.41 … 2.48 GHz	2.41 … 2.48 GHz	2.41 … 2.48 GHz
• With WLAN in the 5 GHz frequency band	4.9 … 5.8 GHz	4.9 … 5.8 GHz	4.9 … 5.8 GHz
Product properties, functions, components General			
Number of SSIDs	1	1	1
Product function			
• Dual client	No	No	Yes
• iHOP	No	No	Yes
• iPCF	No	No	Yes
• iPCF-MC	No	No	Yes
Number of iPCF-capable radio modules	0	0	1

[1] Wireless approval in the USA

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SCALANCE W740 for use in the indoor area

Technical specifications (continued)

Order No.	6GK5 744-1AA60-2AA0 6GK5 744-1AA60-2AB0 [1]	6GK5 746-1AA60-4AA0 6GK5 746-1AA60-4AB0 [1]	6GK5 747-1AA60-6AA0 6GK5 747-1AA60-6AB0 [1]
Product type designation	**SCALANCE W744-1PRO**	**SCALANCE W746-1PRO**	**SCALANCE W747-1RR**
Product functions Management, configuration, programming			
Number of manageable IP addresses in the client	1	8	8
Product function			
• CLI	Yes	Yes	Yes
• Web-based management	Yes	Yes	Yes
• MIB support	Yes	Yes	Yes
• TRAPs via e-mail	Yes	Yes	Yes
• Configuration with STEP 7	No	Yes	Yes
• Configuration with STEP 7 in the TIA Portal	No	Yes	Yes
• SMTP server	Yes	Yes	Yes
• Operation with IWLAN controller	No	No	No
• Operation with Enterasys WLAN controller	No	No	No
• iQoS	No	No	No
• Forced roaming with IWLAN	No	No	No
• WDS	No	No	No
Protocol is supported			
• Address Resolution Protocol (ARP)	Yes	Yes	Yes
• ICMP	Yes	Yes	Yes
• Telnet	Yes	Yes	Yes
• HTTP	Yes	Yes	Yes
• HTTPS	Yes	Yes	Yes
• TFTP	Yes	Yes	Yes
• SNMP v1	Yes	Yes	Yes
• SNMP v2	Yes	Yes	Yes
• SNMP v3	Yes	Yes	Yes
• DCP	Yes	Yes	Yes
• LLDP	No	Yes	Yes
Identification & maintenance			
• I&M0 - device-specific information	Yes	Yes	Yes
• I&M1 - higher-level designation/ location designation	Yes	Yes	Yes
Product functions Diagnostics			
Product function			
• PROFINET IO diagnostics	No	Yes	Yes
• Link check	No	No	No
• Connection monitoring IP-Alive	No	No	No
• Localization by means of Aeroscout	No	No	No
• SysLog	Yes	Yes	Yes
Product functions VLAN			
Product function VLAN with IWLAN	No	No	No
Product functions DHCP			
Product function DHCP client	Yes	Yes	Yes
Product functions Redundancy			
STP/RSTP protocol is supported	-	-	-

[1] Wireless approval in the USA

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Technical specifications (continued)

Order No.	6GK5 744-1AA60-2AA0 6GK5 744-1AA60-2AB0 [1]	6GK5 746-1AA60-4AA0 6GK5 746-1AA60-4AB0 [1]	6GK5 747-1AA60-6AA0 6GK5 747-1AA60-6AB0 [1]
Product type designation	**SCALANCE W744-1PRO**	**SCALANCE W746-1PRO**	**SCALANCE W747-1RR**
Product functions Security			
Product function			
• ACL – MAC based	No	No	No
• IEEE 802.1x (radius)	Yes	Yes	Yes
• NAT/NAPT	No	Yes	Yes
• Access protection according to IEEE802.11i	Yes	Yes	Yes
• WPA/WPA2	Yes	Yes	Yes
• TKIP/AES	Yes	Yes	Yes
Protocol is supported SSH	Yes	Yes	Yes
Product functions Time			
SNTP protocol is supported	Yes	Yes	Yes
Standards, specifications, approvals			
Standard			
• for EMC of FM	FM 3611: Class I, Division 2, Groups A,B,C,D, T4 / Class 1, Zone 2, Group IIC, T4	FM 3611: Class I, Division 2, Groups A,B,C,D, T4 / Class 1, Zone 2, Group IIC, T4	FM 3611: Class I, Division 2, Groups A,B,C,D, T4 / Class 1, Zone 2, Group IIC, T4
• for hazardous zone	EN 60079-15:2005, EN 60079-0:2006, II 3 G Ex nA II T4 KEMA 07 ATEX 0145X	EN 60079-15:2005, EN 60079-0:2006, II 3 G Ex nA II T4 KEMA 07 ATEX 0145X	EN 60079-15:2005, EN 60079-0:2006, II 3 G Ex nA II T4 KEMA 07 ATEX 0145X
• for CSA and UL safety	UL 60950-1 CSA C22.2 No. 60950-1	UL 60950-1 CSA C22.2 No. 60950-1	UL 60950-1 CSA C22.2 No. 60950-1
• for hazardous zone of CSA and UL	ISA 12.12.01-2000, CSA C22.2 No. 213-M1987, CL. 1, Div. 2, GP. A,B,C,D, T4 / CL. 1, Zone 2, GP IIC, T4 / CL. 1, Zone 2, AEx nC IIC, T4	ISA 12.12.01-2000, CSA C22.2 No. 213-M1987, CL. 1, Div. 2, GP. A,B,C,D, T4 / CL. 1, Zone 2, GP IIC, T4 / CL. 1, Zone 2, AEx nC IIC, T4	ISA 12.12.01-2000, CSA C22.2 No. 213-M1987, CL. 1, Div. 2, GP. A,B,C,D, T4 / CL. 1, Zone 2, GP IIC, T4 / CL. 1, Zone 2, AEx nC IIC, T4
Certificate of suitability			
• CE marking	Yes	Yes	Yes
• EC Declaration of Conformity	Yes	Yes	Yes
• C-Tick	Yes	Yes	Yes
• CCC	No	No	No
• Railroad application according to EN 50155	Yes	Yes	Yes
• e1 approval	Yes	Yes	Yes
• E1 approval	Yes	Yes	Yes
• Power-over-Ethernet according to IEEE802.3at for Type 1 and IEEE802.3af	Yes	Yes	Yes
Standard for wireless communication			
• IEEE 802.11a	Yes	Yes	Yes
• IEEE 802.11b	Yes	Yes	Yes
• IEEE 802.11e	Yes	Yes	Yes
• IEEE 802.11g	Yes	Yes	Yes
• IEEE 802.11h	Yes	Yes	Yes
• IEEE 802.11i	Yes	Yes	Yes
• IEEE 802.11n	No	No	No
Wireless approval	You can find the latest list of countries at: www.siemens.com/simatic-net/ik-info	You can find the latest list of countries at: www.siemens.com/simatic-net/ik-info	You can find the latest list of countries at: www.siemens.com/simatic-net/ik-info
Marine classification association			
• American Bureau of Shipping Europe Ltd. (ABS)	Yes	No	No
• Bureau Veritas (BV)	Yes	No	No
• Det Norske Veritas (DNV)	No	No	No
• Germanischer Lloyd (GL)	Yes	No	No
• Lloyds Register of Shipping (LRS)	Yes	No	No
• Nippon Kaiji Kyokai (NK)	Yes	No	No
• Polski Rejestr Statkow (PRS)	Yes	No	No
Accessories			
Accessories	2 antennas, hybrid connector included in scope of delivery	2 antennas, hybrid connector included in scope of delivery	2 antennas, hybrid connector included in scope of delivery

[1] Wireless approval in the USA

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SCALANCE W740 for use in the indoor area

Ordering data	Order No.
SCALANCE W740 Client Modules	
IWLAN Ethernet Client Modules with built-in radio interface; radio networks IEEE 802.11a/b/g/h at 2.4/5 GHz to 54 Mbit/s; WPA/AES; Power over Ethernet (PoE), mounting hardware; 4-pin screw terminal for 24 V DC; manual on CD-ROM, German/English	
SCALANCE W744-1PRO	
For administration of the radio link of one device with Industrial Ethernet connection; IP65 degree of protection; scope of delivery: 2 antennas ANT795-4MR, IP 67 hybrid plug connector	
• National approvals for operation outside the USA	**6GK5 744-1AA60-2AA0**
• National approvals for operation within the USA [1]	**6GK5 744-1AA60-2AB0**
SCALANCE W746-1PRO	
For administration of the radio link of up to eight devices with Industrial Ethernet connection; IP65 degree of protection; scope of delivery: 2 antennas ANT795-4MR, IP 67 hybrid plug connector	
• National approvals for operation outside the USA	**6GK5 746-1AA60-4AA0**
• National approvals for operation within the USA [1]	**6GK5 746-1AA60-4AB0**
SCALANCE W747-1RR	
For administration of the radio link with iPCF of up to eight devices with Industrial Ethernet connection; IP65 degree of protection; scope of delivery: 2 antennas ANT795-4MR, IP 67 hybrid plug connector	
• National approvals for operation outside the USA	**6GK5 747-1AA60-6AA0**
• National approvals for operation within the USA [1]	**6GK5 747-1AA60-6AB0**

	Order No.
Accessories	
C-PLUG Swap medium for simple replacement of devices in the event of a fault; for storing configuration data; can be used in SIMATIC NET products with PLUG slot	**6GK1 900-0AB00**
PRESET-PLUG Swap medium for simple initial startup of SCALANCE W access points and client modules, as well as IWLAN/PB Link PN IO	**6GK5 798-8AB00**
SIMATIC Mobile Panel 277F IWLAN	
• Communication via WLAN (PROFINET) with acknowledgement button and emergency stop button	**6AV6 645-0DB01-0AX0**
• Communication via WLAN (PROFINET) with acknowledgment button and emergency stop button with integrated handwheel, key-operated switch, and two illuminated pushbuttons	**6AV6 645-0DC01-0AX0**
Note: Please also order the desktop power supply or battery charger!	
• Table-top power supply incl. power cable for EU, US, UK, JP (only suitable for operation under laboratory/office conditions)	**6AV6 671-5CN00-0AX1**
• Charger for safe storage and charging the device incl. lock for securing the device in the charger. Charging capabilities for up to two additional batteries	**6AV6 671-5CE00-0AX0**
• Additional battery with LED indicator for indicating the charge status	**6AV6 671-5CL00-0AX0**
• Transponder incl. batteries (3x AA)	**6AV6 671-5CM00-0AX0**
IE FC RJ45 modular outlet with power insert FastConnect RJ45 modular outlet for Industrial Ethernet with a replaceable insert for 1 x 24 V and 1 x 100 Mbit/s interface	**6GK1 901-1BE00-0AA3**
IE Hybrid Cable 2x2 + 4x0.34 4-wire, shielded installation cable; sold by the meter, up to 1000 m, minimum order 20 m	**6XV1 870-2J**
IE FC RJ45 Plug 180 2x2 RJ45 plug connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation-displacement contacts for connecting Industrial Ethernet FC installation cables; with a 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface	
• 1 pack = 1 unit	**6GK1 901-1BB10-2AA0**
• 1 pack = 10 units	**6GK1 901-1BB10-2AB0**
• 1 pack = 50 units	**6GK1 901-1BB10-2AE0**

[1] Please note national approvals at www.siemens.com/wireless-approvals

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Ordering data	Order No.
Accessories (continued)	
IE FC Standard Cable GP 2 x 2 4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/ IE FC RJ45 Plug; PROFINET-compliant; with UL approval; sold by the meter; max. length 1000 m, minimum order 20 m	**6XV1 840-2AH10**
IE TP Cord RJ45/RJ45 TP cable 4 x 2 with 2 RJ45 connectors	
• 0.5 m	**6XV1 870-3QE50**
• 1 m	**6XV1 870-3QH10**
• 2 m	**6XV1 870-3QH20**
• 6 m	**6XV1 870-3QH60**
• 10 m	**6XV1 870-3QN10**
IE FC Stripping Tool Preadjusted stripping tool for fast stripping of the Industrial Ethernet FC cables	**6GK1 901-1GA00**
IP 67 hybrid connector Connector for connecting SCALANCE W700 to Industrial Ethernet and Power over Ethernet (PoE), with assembly instructions, 1 unit	**09 45 125 1300.00** Order directly from: HARTING Deutschland GmbH & Co. KG Postfach 24-51 32381 Minden, Germany Phone: +49 (0)571-8896-0 Fax: +49 (0)571-8896-354 E-mail: de.sales@HARTING.com Internet: www.HARTING.com
Power M12 Cable Connector PRO Terminal socket for connection of SCALANCE W700 for 24 V DC supply voltage; 4-pole, A-coded, with assembly instructions, 3 units	**6GK1 907-0DC10-6AA3**
PS791-1PRO Power Supply AC/DC power supply, 10 W, IP65 (-20 to +60 °C), input: 90 V - 265 V AC, output: 24 V DC, metal housing; scope of supply: AC power 3+PE cable connector, DC power cord M12, mounting hardware; operating instructions German/English	**6GK5 791-1PS00-0AA6**
IE Hybrid RJ45 Socket Dust Cover Dust cap for RJ45 connection socket (Industrial Ethernet/PoE) of SCALANCE W700	**6ES7 194-1JB10-0XA0**
Antennas and miscellaneous IWLAN accessories	See Industrial Wireless LAN/ accessories

More information

Wireless approvals:

Current approvals can be found on the Internet at:
www.siemens.com/wireless-approvals

To assist in selecting the right products for Industrial Wireless Communication, the SIMATIC NET Selection Tool is available:

Online version:
www.siemens.com/snst

Offline version:
www.siemens.com/snst-download

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IWLAN antennas

Overview

Remote antennas increase the reliability of wireless links by optimizing the receiving and emission of signals.

- Use in Industrial Wireless LAN (IWLAN) and WLAN in accordance with IEEE 802.11 at 2.4 GHz and 5 GHz with transmission rates of up to 450 Mbit/s
- Coordinated range of antennas for the most diverse applications both indoors and outdoors
- Antennas with two (dual-slant) or three (MIMO) connections for increased data throughput and increased reliability of the wireless connection thanks to selective use of multiple path propagation
- Suitable for use in hazardous areas (Zone 2); no special approvals necessary

Benefits

get Designed for Industry

- Investment protection thanks to compliance with the globally recognized standard IEEE 802.11 and – depending on the version – suitability for 2.4 GHz and/or 5 GHz
- Cost-effective connection to devices in remote, difficult-to-access, or hostile environments
- Establishment of a reliable IWLAN wireless infrastructure through the use of remote antennas, even if the access points and client modules are installed in the cabinet, for example

Application

Separate antennas optimize the transmission and receiving conditions and support the use of IWLAN products in a number of industrial applications. With directional antennas, conveyor lines or corridors can be covered by wireless or point-to-point links can be implemented at distances of up to several 1000 meters.

Alternatively, an omnidirectional antenna concentrates the wireless field around the antenna in the shape of a disc which enhances the quality of the connection.

Antennas with two or three connections enable transmission of the two to three streams usual with IEEE 802.11n, using just one antenna. They are available both with omnidirectional and directional characteristics.

Application examples:

Omnidirectional antennas

- Coverage of an area which has at its center a pole for mounting the antenna
- Installation of the antenna on the roof in the case of automated guided vehicle systems for reliable data exchange with the vehicles
- Wide-area coverage of a production cell or robot station

Directional antennas

- Communication between buildings over long distances with the help of an antenna with narrow opening angle and high gain
- Selective coverage of warehouse/high-bay warehouse aisles with the help of a wide-angle antenna prevents interference with neighboring wireless fields

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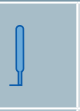
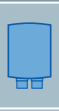
Design

Antennas exclusively for SCALANCE W-700 according to IEEE 802.11n						Antennas for SCALANCE W-700 according to IEEE 802.11n and 802.11a/b/g		Antennas exclusively for SCALANCE W-700 according to IEEE 802.11a/b/g	
with 1 connection		with 2 connections (dual)		with 3 connections (MIMO)		with 1 connection		with 1 connection	
	ANT795-4MA		ANT793-6DG		ANT795-6MT		ANT792-4DN		ANT795-4MR
	ANT795-4MC		ANT793-8DJ		ANT793-6DT		ANT793-4MN		ANT795-4MS
	ANT795-4MD		ANT793-8DK				ANT792-6MN		ANT795-6DN
	ANT795-6DC						ANT793-6MN		ANT793-8DN
							ANT792-8DN		
							ANT795-6MN		
							RCoax radiating cables		

G_IK10_XX_30286

Overview of IWLAN antennas

Function

Separate antennas are used to optimize the wireless field for the application. In industrial applications, this supports a reliable wireless field.

Antennas with several connections (dual or MIMO antennas)

Antennas with two connections combine two individual antennas, at 90° to each other, in one antenna enclosure. With these antennas, two data streams can be transferred simultaneously thanks to the two different polarization levels. Depending on the alignment of the polarization levels, these antennas are referred to as dual-slant (rotated through +/-45°) or vertical-horizontal.

Antennas with three connections contain three individual emitters that can be combined in one enclosure, either on different polarization levels (0°, +/-45°) or at a suitable distance from each other. The MIMO antennas can transmit three data streams simultaneously using multiple path propagation.

Transmission of several data streams results in increased data throughput and simultaneously a more reliable data transfer.

Directional effect

The suitable antenna is selected first by means of the wireless field characteristic. A distinction is made between omni-directional antennas and directional antennas.

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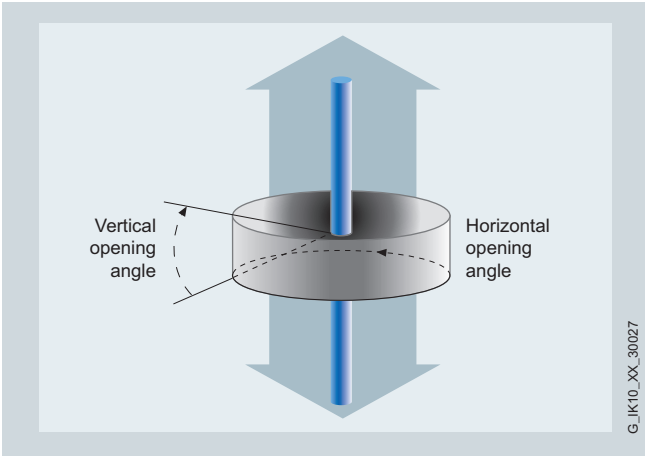
Function (continued)

Omnidirectional antennas



Omni-directional antenna

With omni-directional antennas, the wireless field is emitted in every direction surrounding the antenna (horizontal opening angle: 360°), but it weakens as the distance increases. There is a concentration in the vertical direction which creates passive amplification of the wireless field. Many omni-directional antennas have extremely weak radiation directly below the antenna due to their type of construction. This property can be seen in the associated antenna diagram.

ANT795-4Mx

With these omni-directional antennas, the wireless field is concentrated at 2.4 GHz and 5 GHz in the vertical plane of the antenna. All antennas of this type have an opening angle of 30° in the vertical direction and an antenna gain of 4 dB. They are directly mounted on the R-SMA or N connector of the SCALANCE W enclosure.

For the use of SCALANCE W-700 in accordance with IEEE 802.11n:

ANT795-4MA, ANT795-4MC and ANT795-4MD

The ANT795-4MC and ANT 795-4MD antennas can be rotated around only one axis, they have N-Connect connectors and degree of protection IP65, and they are used with the SCALANCE W788 M12 Access Points and the SCALANCE W748 M12 Client Modules.

The ANT795-4MA antenna features an additional joint, an R-SMA connector, and degree of protection IP30. It is therefore optimally suitable for the SCALANCE W788 RJ45 Access Points and the SCALANCE W748 RJ45 Client Modules.

For the use of SCALANCE W-700 in accordance with IEEE 802.11a/b/g:

ANT795-4MR, ANT795-4MS

The ANT795-4MR antenna can only be rotated about one axis and, due to its IP65 degree of protection, it is mainly used for the SCALANCE W788 Access Points and the SCALANCE W744-1PRO, W746-1PRO and W747-1RR Client Modules. Two of these antennas are supplied with these access points or client modules.

The ANT795-4MS antenna features an additional joint and is therefore ideally suited to the SCALANCE W784 Access Points and the SCALANCE W744-1, W746-1 and W747-1 Client Modules.

ANT792-6MN, ANT793-6MN

With these omni-directional antennas, the wireless field is concentrated at 2.4 GHz (ANT792-6MN) and 5 GHz (ANT793-6MN) in the vertical plane of the antenna.
The antennas have a gain of 6 dB and 5 dB respectively.

N-Connect is used as the connector and can be connected to SCALANCE W over an extension cable from the range of IWLAN cabling. Both antennas are supplied with a mounting aid (metal bracket) that supports wall or mast mounting. The antennas are therefore ideally suited, for example, to providing wireless coverage for a place that has a mast at its center on which they can be mounted.

ANT795-6MN, antenna mounting tool for ANT795-6MN

With this omni-directional antenna, the wireless field is concentrated at 2.4 GHz and 5 GHz in the vertical plane of the antenna. The antenna has a gain of 6 dB and 8 dB respectively.

N-Connect is used as the connector and can be connected to SCALANCE W over an extension cable from the range of IWLAN cabling. The antenna characteristic is such that good transmission properties also exist directly above and below the antenna. It is designed for mounting on a control cabinet or roof, but it can also be mounted under a roof, so it is suitable, for example, for the mobile units of an automated guided vehicle system. If it needs to be installed on a ceiling under a roof, the optional antenna mounting tool for ANT795-6MN is used.

ANT795-6MT

This antenna is an omnidirectional MIMO antenna with three QMA connections. The wireless field is concentrated at 2.4 GHz and 5 GHz in the vertical plane of the antenna. The antenna has a gain of 6 dB.

The antenna characteristic is such that good transmission properties also exist directly above and below the antenna. It is designed for mounting on a roof or (together with the supplied mounting bracket) under a ceiling, and it is thus suitable, for example, for the mobile units of an automated guided vehicle system.

The ANT795-6MT is connected to the SCALANCE W-700 Access Points in accordance with IEEE 802.11n via QMA/N-Connect male/female IWLAN adapter cables and the IWLAN flexible antenna connecting cables in the relevant length and connector version.

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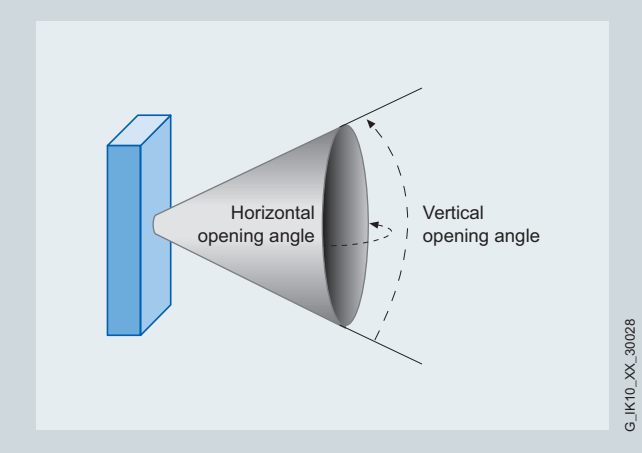
Function (continued)

Directional antennas



Directional antenna

With directional antennas, the wireless field is emitted both in the horizontal and vertical plane in the range of the opening angle. It is concentrated in these areas and generates passive amplification. They are ideally suited to wall or mast mounting. The direction can be aligned using the supplied mounting aid.

N-Connect is usually used as the connector and can be connected to SCALANCE W over an extension cable from the range of IWLAN cabling.

For the use of SCALANCE W-700 in accordance with IEEE 802.11n:

ANT795-6DC, ANT793-6DG and ANT793-6DT

The wireless field can be aligned at 2.4 GHz and 5 GHz using these wide-angle antennas. Each has an antenna gain of 9 dB.

Thanks to their characteristics, they are suitable, for example, for providing wireless coverage for an area in front of a wall.

The ANT795-6DC antenna is suitable for both frequency bands 2.4 and 5 GHz. It has an N-Connect connection. Two or three antennas of this type can also be used for covering several sectors.

ANT793-6DG is a dual-slant antenna with two N-Connect connections for the 5 GHz frequency band.

ANT793-6DT is a MIMO antenna with three QMA connections for the 5 GHz band.

The ANT795-6DT is connected to the SCALANCE W-700 Access Points in accordance with IEEE 802.11n via QMA/N-Connect male/female IWLAN adapter cables and the IWLAN flexible antenna connecting cables in the relevant length and connector version.

ANT792-8DN, ANT 793-8DJ and ANT793-8DK

These antennas enable genuine alignment of the wireless field. The wireless field is concentrated in a narrow cone due to the narrow opening angle. High passive gains and long ranges are therefore achieved.

Due to the high passive gain, the antennas are ideally suited to bridging large distances.

The ANT792-8DN antenna is suitable for the 2.4 GHz frequency band and has an antenna gain of 14 dB.

ANT793-8DJ (18 dB) and ANT793-8DK (23 dB) are strongly directional antennas with vertical-horizontal polarization. They each have two N-Connect connections.

For the use of SCALANCE W-700 in accordance with IEEE 802.11a/b/g:

ANT795-6DN

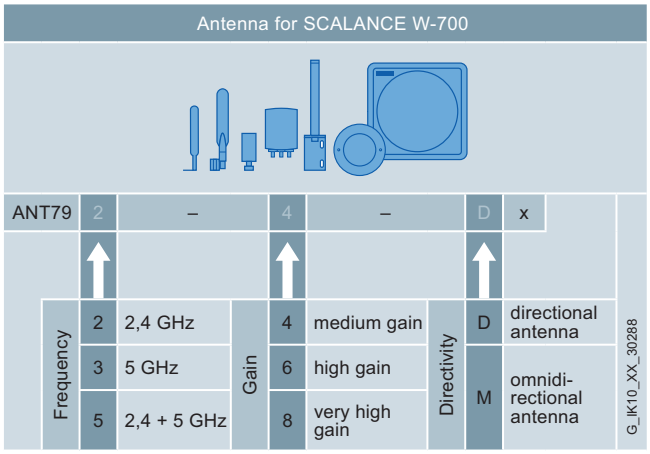
The wireless field can be aligned at 2.4 GHz and 5 GHz using this wide-angle antenna.

The antenna is suitable, for example, for providing wireless coverage for an area in front of a wall.

ANT792-8DN, ANT793-8DN

Genuine alignment of the wireless field at 2.4 GHz (ANT792-8DN) or 5 GHZ (ANT793-8DN) is achieved using these antennas. The wireless field is concentrated in a narrow cone due to the narrow opening angle. High passive gains and long ranges are therefore achieved.

Due to the high passive gain, the antennas are ideally suited to bridging large distances over IWLAN.



The antenna name indicates the properties of the IWLAN antennas

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IWLAN antennas

Integration (continued)

Antennas especially for use with RCoax radiating cables

These antennas have been specially developed for use with the RCoax radiating cable. They are preferably used in environments in which nodes move within limited areas or exclusively along predefined paths. Typical applications are suspended monorails or high-bay racking systems where the antenna is within the near field of the radiating cable.

ANT793-4MN

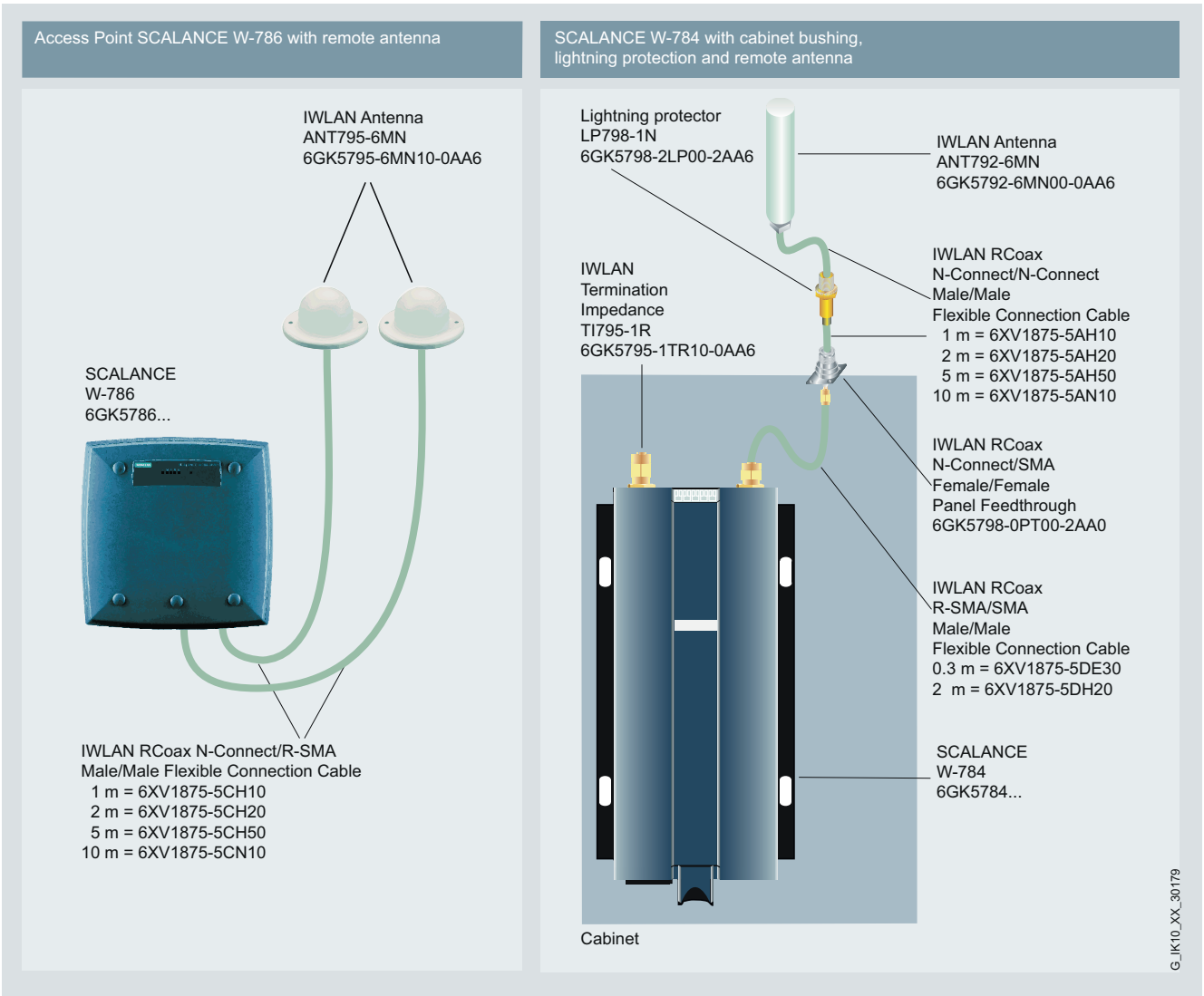
With this omni-directional antenna, the wireless field is concentrated at 5 GHz in the vertical plane of the antenna. The antenna has a gain of 6 dB at 5.2 GHz and 5 dB at 5.7 GHz. The polarization of the antenna is vertical (λ5/8 characteristic). N-Connect is used as the connector type, which can be connected to SCALANCE W or the IWLAN/PB Link PN IO over an extension cable from the IWLAN connecting cable range.

ANT792-4DN

The wireless field is aligned at 2.4 GHz for this antenna. The antenna has a gain of 4 dB. The polarization of the antenna is circular, i.e. the receive path of the signals of both polarizations is amplified equally well. Signal strength fluctuations are weaker at 2.4 GHz.

N-Connect is used as the connector type, which can be connected to SCALANCE W or the IWLAN/PB-Link PN IO over an IWLAN extension cable.

Integration



SCALANCE W using the range of accessories with direct connection of an antenna, mounting in a control cabinet and using a lightning protection element

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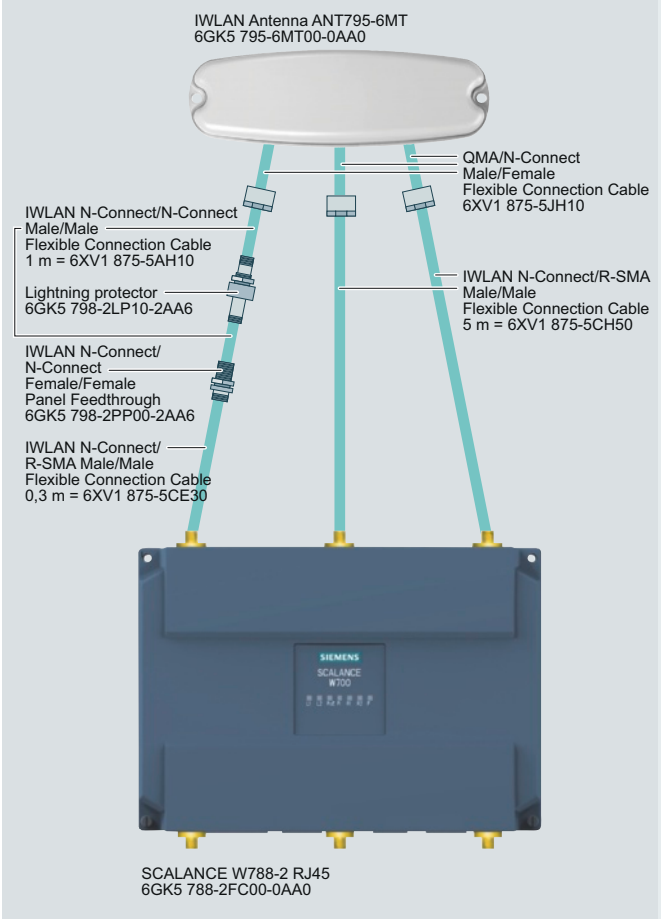
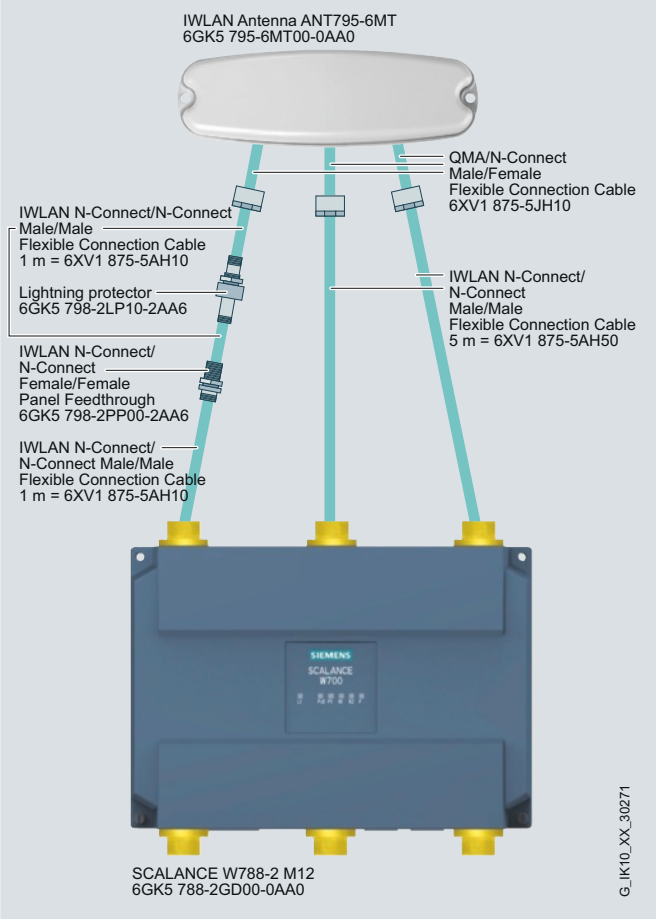
Integration (continued)

MIMO antenna ANT795-6MT connected to SCALANCE W788-2 RJ45 with R-SMA ports



MIMO antenna ANT795-6MT connected to SCALANCE W788-2 M12 with N-Connect ports



SCALANCE W788-1 RJ45 access points with MIMO antenna and SCALANCE W788-1 M12 with N-Connect connection

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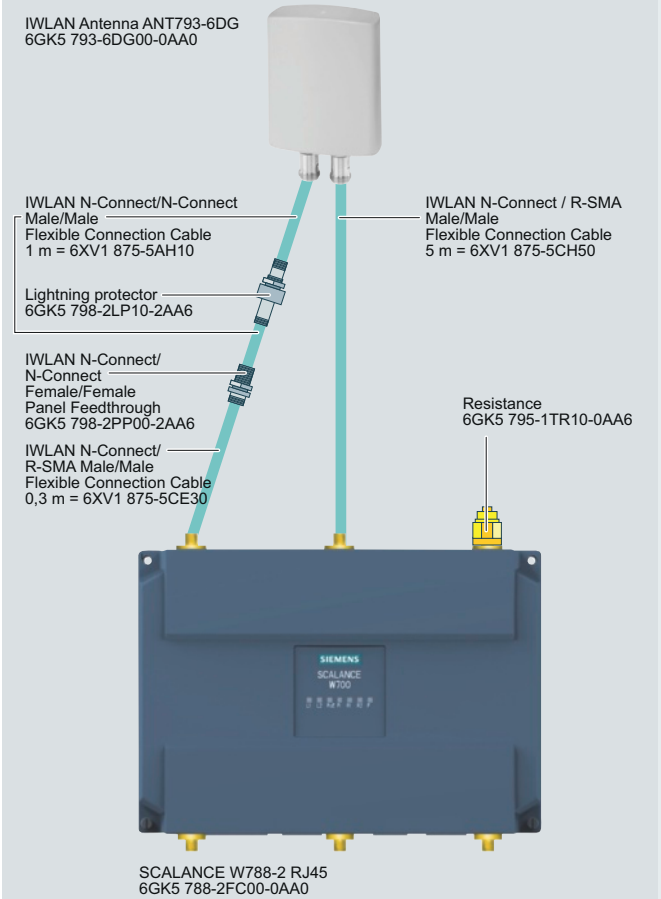
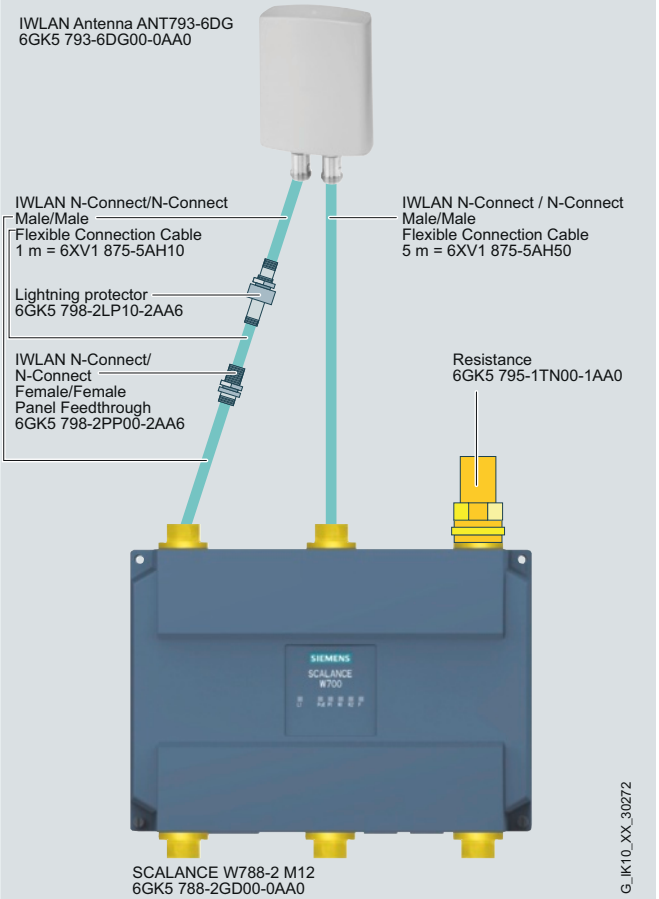
IWLAN antennas

Integration (continued)

Dual Slant antenna ANT793-6DG connected to SCALANCE W788-2 RJ45 with R-SMA ports



Dual Slant antenna ANT793-6DG connected to SCALANCE W788-2 M12 with N-Connect ports



SCALANCE W788-1 RJ45 access points with dual slant antenna and SCALANCE W788-1 M12 with N-Connect connection

All antennas can be used with an N-Connect female connecting plug.

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Technical specifications

Order No.	6GK5 795-4MC00-0AA3	6GK5 795-4MD00-0AA3	6GK5 795-4MR00-0AA6
Product type designation	**ANT795-4MC antenna**	**ANT795-4MD antenna**	**ANT795-4MR antenna**
Radio frequencies			
Radio frequency			
• With WLAN in the 2.4 GHz frequency band	2.4 … 2.4835 GHz	2.4 … 2.4835 GHz	2.4 … 2.4835 GHz
• With WLAN in the 5 GHz frequency band 1	5.15 … 5.35 GHz	5.15 … 5.35 GHz	5.15 … 5.35 GHz
• With WLAN in the 5 GHz frequency band 2	5.725 … 5.85 GHz	5.725 … 5.85 GHz	5.725 … 5.85 GHz
Electrical specifications			
Impedance	50 Ω	50 Ω	50 Ω
Polarization	Linear vertical	Linear vertical	Linear vertical
Radiation characteristic	Omnidirectional	Omnidirectional	Omnidirectional
Antenna gain compared with the isotropic radiator of the WLAN antenna			
• In the 2.4 GHz frequency band	3 dB	3 dB	4 dB
• In the 5 GHz frequency band	5 dB	5 dB	5 dB
• With transmission frequency 5.2 GHz			
• With transmission frequency 5.7 GHz			
Maximum standing wave ratio	2	2	2
Beam angle of antenna			
• In the 2.4 GHz frequency band			
- Horizontal	360°	360°	360°
- Vertical	-	-	-
• In the 5 GHz frequency band			
- Horizontal	360°	360°	360°
- Vertical	-	-	-
Note on beam angle	-	-	-
Number of electrical connections of the antenna	1	1	1
Design of electrical connection of the antenna	N connector, female, straight	N connector, female, 90° angle	R-SMA connector, male, 90° angle
Maximum angle of inclination down	0°	0°	0°
Range with free view without hindrance	-	-	100 m
Note on range	-	-	Note: The range may be much less and depends on the spatial conditions, the wireless standard being used, the data rate, and the antenna at the opposite end
Permissible ambient conditions			
Ambient temperature			
• During operation	-20 … +65 °C	-20 … +65 °C	-20 … +65 °C
• During storage	-20 … +65 °C	-20 … +65 °C	-20 … +65 °C
• During transport	-20 … +65 °C	-20 … +65 °C	-20 … +65 °C
• During mounting	- -	- -	- -
IP degree of protection	IP65	IP65	IP65
Design, dimensions and weights			
Width	35 mm	35 mm	35 mm
Height	160 mm	160 mm	148 mm
Depth	13 mm	13 mm	13 mm
Diameter	-	-	-
Net weight	26 g	26 g	26 g
Type of mounting	-	-	-
• Mast mounting	No	No	No
• Wall mounting	No	No	No
• Ceiling mounting	No	No	No
• Directly on the device	Yes	Yes	Yes

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Technical specifications (continued)

Order No.	6GK5 795-4MC00-0AA3	6GK5 795-4MD00-0AA3	6GK5 795-4MR00-0AA6
Product type designation	**ANT795-4MC antenna**	**ANT795-4MD antenna**	**ANT795-4MR antenna**
Product properties, functions, components General			
Product property silicon-free	Yes	Yes	Yes
Material of the outer sleeve	Polycarbonate	Polycarbonate	Polycarbonate
Standards, specifications, approvals			
Wireless approval	Current country-specific approvals can be found on the Internet at www.siemens.com/wireless-approvals	Current country-specific approvals can be found on the Internet at www.siemens.com/wireless-approvals	Current country-specific approvals can be found on the Internet at www.siemens.com/wireless-approvalsn

Order No.	6GK5 795-4MA00-0AA3	6GK5 795-4MS00-0AA6
Product type designation	**ANT795-4MA antenna**	**ANT795-4MS antenna**
Radio frequencies		
Radio frequency		
• With WLAN in the 2.4 GHz frequency band	2.4 … 2.4835 GHz	2.4 … 2.4835 GHz
• With WLAN in the 5 GHz frequency band 1	5.15 … 5.35 GHz	5.15 … 5.35 GHz
• With WLAN in the 5 GHz frequency band 2	5.725 … 5.85 GHz	5.725 … 5.85 GHz
Electrical specifications		
Impedance	50 Ω	50 Ω
Polarization	Linear vertical	Linear vertical
Radiation characteristic	Omnidirectional	Omnidirectional
Antenna gain compared with the isotropic radiator of the WLAN antenna		
• In the 2.4 GHz frequency band	3 dB	3 dB
• In the 5 GHz frequency band	5 dB	5 dB
Maximum standing wave ratio	2	2
Beam angle of antenna		
• In the 2.4 GHz frequency band		
- Horizontal	360°	360°
- Vertical	-	-
• In the 5 GHz frequency band		
- Horizontal	360°	360°
- Vertical	-	-
Note on beam angle	-	-
Number of electrical connections of the antenna	1	1
Design of electrical connection of the antenna	R-SMA connector, male, variable 0-90°	R-SMA connector, male variable 0-90°
Maximum angle of inclination down	0°	0°
Range with free view without hindrance	-	100 m
Note on range	-	Note: The range may be much less and depends on the spatial conditions, the wireless standard being used, the data rate, and the antenna at the opposite end
Permissible ambient conditions		
Ambient temperature		
• During operation	-20 … +65 °C	-20 … +65 °C
• During storage	-20 … +65 °C	-20 … +65 °C
• During transport	-20 … +65 °C	-20 … +65 °C
IP degree of protection	IP30	IP30

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Technical specifications (continued)

Order No.	6GK5 795-4MA00-0AA3	6GK5 795-4MS00-0AA6
Product type designation	**ANT795-4MA antenna**	**ANT795-4MS antenna**
Design, dimensions and weights		
Width	35 mm	35 mm
Height	160 mm	160 mm
Depth	13 mm	13 mm
Diameter	-	-
Net weight	26 g	26 g
Type of mounting	-	-
• Mast mounting	No	No
• Wall mounting	No	No
• Ceiling mounting	No	No
• Directly on the device	Yes	Yes
Product properties, functions, components General		
Product property silicon-free	Yes	Yes
Material of the outer sleeve	Polycarbonate	Polycarbonate
Standards, specifications, approvals		
Wireless approval	Current country-specific approvals can be found on the Internet at www.siemens.com/wireless-approvals	Current country-specific approvals can be found on the Internet at www.siemens.com/wireless-approvals

Order No.	6GK5 792-6MN00-0AA6	6GK5 793-6MN00-0AA6	6GK5 795-6MN10-0AA6	6GK5 795-6MT00-0AA0
Product type designation	**ANT792-6MN antenna**	**ANT793-6MN antenna**	**ANT795-6MN antenna**	**ANT795-6MT antenna**
Radio frequencies				
Radio frequency				
• With WLAN in the 2.4 GHz frequency band	2.4 … 2.5 GHz	-	2.4 … 2.7 GHz	2.4 … 2.69 GHz
• With WLAN in the 5 GHz frequency band 1	-	5.15 … 5.875 GHz	3.4 … 3.7 GHz	5.15 … 5.35 GHz
• With WLAN in the 5 GHz frequency band 2	-	-	4.9 … 5.935 GHz	5.47 … 5.935 GHz
Electrical specifications				
Impedance	50 Ω	50 Ω	50 Ω	50 Ω
Polarization	Linear vertical	Linear vertical	Linear vertical	3 ports: Linear vertical
Radiation characteristic	Omnidirectional	Omnidirectional	Omnidirectional	Omnidirectional
Antenna gain compared with the isotropic radiator of the WLAN antenna				
• In the 2.4 GHz frequency band	6 dB	-	6 dB	4 dB
• In the 5 GHz frequency band	-	5 dB	8 dB	6 dB
Maximum standing wave ratio	1,8	1,5	1,8	1,5
Beam angle of antenna				
• In the 2.4 GHz frequency band				
- Horizontal	360°	-	360°	360°
- Vertical	30°	-	-	-
• In the 5 GHz frequency band				
- Horizontal	-	360°	150°	360°
- Vertical	-	25°	-	-
Note on beam angle	-	-	Take note of antenna diagram	-
Number of electrical connections of the antenna	1	1	1	3
Design of electrical connection of the antenna	N connector, female	N connector, female	N connector, female	QMA, female
Maximum angle of inclination down	0°	0°	0°	0°
Crosstalk attenuation between the antenna connections	-	-	-	20 dB
Front to back ratio	-	-	-	-

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Technical specifications (continued)

Order No.	6GK5 792-6MN00-0AA6	6GK5 793-6MN00-0AA6	6GK5 795-6MN10-0AA6	6GK5 795-6MT00-0AA0
Product type designation	**ANT792-6MN antenna**	**ANT793-6MN antenna**	**ANT795-6MN antenna**	**ANT795-6MT antenna**
Maximum transmit power	25 W	6 W	75 W	10 W
Note on transmit power	-	At 25° ambient temperature	At 25° ambient temperature	At 25° ambient temperature
Range with free view without hindrance	200 m	200 m	200 m	-
Note on range	Note: The range may be much less and depends on the spatial conditions, the wireless standard being used, the data rate, and the antenna at the opposite end	Note: The range may be much less and depends on the spatial conditions, the wireless standard being used, the data rate, and the antenna at the opposite end	Note: The range may be much less and depends on the spatial conditions, the wireless standard being used, the data rate, and the antenna at the opposite end	-
Permissible ambient conditions				
Ambient temperature				
• During operation	-40 … +80 °C	-45 … +70 °C	-40 … +80 °C	-40 … +85 °C
• During storage	-40 … +80 °C	-45 … +70 °C	-40 … +80 °C	-40 … +85 °C
• During transport	-40 … +80 °C	-45 … +70 °C	-40 … +80 °C	-40 … +85 °C
IP degree of protection	IP65	IP65	IP65	IP65
Maximum wind load	3 N	3.9 N	10 N	-
Note on wind load	at 160 km/h	at 160 km/h	at 160 km/h	-
Design, dimensions and weights				
Width	50 mm	16 mm	86 mm	282 mm
Height	40 mm	160 mm	43 mm	32 mm
Depth	370 mm	16 mm	86 mm	92 mm
Diameter	-	-	-	-
Net weight	300 g	300 g	300 g	320 g
Type of mounting	-	-	-	-
• Mast mounting	Yes	Yes	No	No
• Wall mounting	Yes	Yes	Yes	Yes
• Ceiling mounting	No	No	Yes	Yes
• Directly on the device	No	No	No	No
Product properties, functions, components General				
Product property silicon-free	Yes	Yes	Yes	Yes
Material of the outer sleeve	Glass fiber	Polypropylene	Polycarbonate	Polycarbonate
Standards, specifications, approvals				
Certificate of suitability	-	-	Railway application in accordance with NF-F-16-101, NF-F-16-102	-
• RoHS compliance	Yes	Yes	Yes	Yes
• Railroad application according to EN 50124-1	-	-	Yes	-
• Railroad application according to EN 50155	-	-	Yes	-
Wireless approval	Current country-specific approvals can be found on the Internet at www.siemens.com/wireless-approvals	Current country-specific approvals can be found on the Internet at www.siemens.com/wireless-approvals	Current country-specific approvals can be found on the Internet at www.siemens.com/wireless-approvals	Current country-specific approvals can be found on the Internet at www.siemens.com/wireless-approvals

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Technical specifications (continued)

Order No.	6GK5 795-6DC00-0AA0	6GK5 795-6DN00-0AA6	6GK5 793-6DG00-0AA0	6GK5 793-6DT00-0AA0
Product type designation	**ANT795-6DC antenna**	**ANT795-6DN antenna**	**ANT793-6DG antenna**	**ANT793-6DT antenna**
Radio frequencies				
Radio frequency				
• With WLAN in the 2.4 GHz frequency band	2.4 … 2.5 GHz	2.4 … 2.5 GHz	-	-
• With WLAN in the 5 GHz frequency band 1	5.15 … 5.875 GHz	5.15 … 5.875 GHz	5.15 … 5.875 GHz	5.15 … 5.875 GHz
• With WLAN in the 5 GHz frequency band 2	-	-	-	-
Electrical specifications				
Impedance	50 Ω	50 Ω	50 Ω	50 Ω
Polarization	Linear vertical	Linear vertical	Dual linear +/- 45° slant	3 ports: Vertical, +/- 45° slant
Radiation characteristic	Directional	Directional	Directional	Directional
Antenna gain compared with the isotropic radiator of the WLAN antenna				
• In the 2.4 GHz frequency band	9 dB	9 dB	-	-
• In the 5 GHz frequency band	9 dB	9 dB	9 dB	8 dB
• With transmission frequency 5.2 GHz				
• With transmission frequency 5.7 GHz				
Maximum standing wave ratio	2	1,5	2	1,7
Beam angle of antenna				
• In the 2.4 GHz frequency band				
- Horizontal	75°	75°	-	-
- Vertical	55°	55°	-	-
• In the 5 GHz frequency band				
- Horizontal	55°	55°	70°	65°
- Vertical	55°	55°	60°	65°
Note on beam angle	-	-	-	-
Number of electrical connections of the antenna	1	1	2	3
Design of electrical connection of the antenna	N connector, female	N connector, female	N connector, female	QMA, female
Maximum angle of inclination down	0°	0°	0°	0°
Crosstalk attenuation between the antenna connections	25 dB	-	20 dB	17 dB
Front to back ratio	15 dB	15 dB	20 dB	-
Maximum transmit power	10 W	10 W	10 W	2 W
Note on transmit power	At 25° ambient temperature	At 25° ambient temperature	At 25° ambient temperature	At 25° ambient temperature
Range with free view without hindrance	-	200 m	-	-
Note on range	-	Note: The range may be much less and depends on the spatial conditions, the wireless standard being used, the data rate, and the antenna at the opposite end	-	-

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Technical specifications (continued)

Order No.	6GK5 795-6DC00-0AA0	6GK5 795-6DN00-0AA6	6GK5 793-6DG00-0AA0	6GK5 793-6DT00-0AA0
Product type designation	**ANT795-6DC antenna**	**ANT795-6DN antenna**	**ANT793-6DG antenna**	**ANT793-6DT antenna**
Permissible ambient conditions				
Ambient temperature				
• During operation	-40 … +80 °C	-40 … +80 °C	-40 … +80 °C	-40 … +85 °C
• During storage	-40 … +80 °C	-40 … +80 °C	-40 … +80 °C	-40 … +85 °C
• During transport	-40 … +80 °C	-40 … +80 °C	-40 … +80 °C	-40 … +85 °C
IP degree of protection	IP67	IP55	IP67	IP67
Maximum wind load	15 N	15 N	15 N	15 N
Note on wind load	at 160 km/h	at 160 km/h	from front at 160 km/h	from front at 160 km/h
Design, dimensions and weights				
Width	80 mm	101 mm	80 mm	80 mm
Height	101 mm	95 mm	101 mm	101 mm
Depth	35 mm	32 mm	35 mm	35 mm
Diameter	-	-	-	-
Net weight	110 g	110 g	110 g	270 g
Type of mounting				
• Mast mounting	Yes	Yes	Yes	Yes
• Wall mounting	Yes	Yes	Yes	Yes
• Ceiling mounting	No	No	No	No
• Directly on the device	No	No	No	No
Product properties, functions, components General				
Product property silicon-free	Yes	Yes	-	-
Material of the outer sleeve	Lexan EXL 9330	ASA	Lexan EXL 9330	Lexan EXL 9330
Standards, specifications, approvals				
Standard for hazardous zone	-	-	-	-
Certificate of suitability	-	-	-	-
• RoHS compliance	Yes	Yes	Yes	Yes
• UL approval	-	-	-	Yes
- Note	-	-	-	UL94-V0, UL746C F1
Wireless approval	Current country-specific approvals can be found on the Internet at www.siemens.com/wireless-approvals	Current country-specific approvals can be found on the Internet at www.siemens.com/wireless-approvals	Current country-specific approvals can be found on the Internet at www.siemens.com/wireless-approvals	Current country-specific approvals can be found on the Internet at www.siemens.com/wireless-approvals

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Technical specifications (continued)

Order No.	6GK5 792-8DN00-0AA6	6GK5 793-8DN00-0AA6	6GK5 793-8DJ00-0AA0	6GK5 793-8DK00-0AA0
Product type designation	**ANT792-8DN antenna**	**ANT793-8DN antenna**	**ANT793-6DJ antenna**	**ANT793-6DK antenna**
Radio frequencies				
Radio frequency				
• With WLAN in the 2.4 GHz frequency band	2.4 … 2.7 GHz	-	-	-
• With WLAN in the 5 GHz frequency band 1	-	5.15 … 5.875 GHz	5.25 … 5.875 GHz	5.15 … 5.875 GHz
• With WLAN in the 5 GHz frequency band 2	-	-	-	-
Electrical specifications				
Impedance	50 Ω	50 Ω	50 Ω	50 Ω
Polarization	Linear vertical	Linear, horizontal or vertical	Dual linear vertical-horizontal	Dual linear vertical-horizontal
Radiation characteristic	Directional	Directional	Directional	Directional
Antenna gain compared with the isotropic radiator of the WLAN antenna				
• In the 2.4 GHz frequency band	14 dB	-	-	-
• In the 5 GHz frequency band	-	18 dB	18 dB	23 dB
Maximum standing wave ratio	1,5	1,9	1,7	1,7
Beam angle of antenna				
• In the 2.4 GHz frequency band				
- Horizontal	35°	-	-	-
- Vertical	30°	-	-	-
• In the 5 GHz frequency band				
- Horizontal	-	18°	17°	9°
- Vertical	-	18°	17°	9°
Note on beam angle	-	-	-	-
Number of electrical connections of the antenna	1	1	2	2
Design of electrical connection of the antenna	N connector, female	N connector, female	N connector, female	N connector, female
Maximum angle of inclination down	0°	0°	0°	0°
Crosstalk attenuation between the antenna connections	-	-	30 dB	40 dB
Front to back ratio	20 dB	30 dB	30 dB	35 dB
Maximum transmit power	75 W	6 W	6 W	6 W
Note on transmit power	At 25° ambient temperature	At 25° ambient temperature	At 25° ambient temperature	At 25° ambient temperature
Range with free view without hindrance	1 000 m	1 000 m	-	-
Note on range	Note: The range may be much less and depends on the spatial conditions, the wireless standard being used, the data rate, and the antenna at the opposite end	Note: The range may be much less and depends on the spatial conditions, the wireless standard being used, the data rate, and the antenna at the opposite end	-	-

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Technical specifications (continued)

Order No.	6GK5 792-8DN00-0AA6	6GK5 793-8DN00-0AA6	6GK5 793-8DJ00-0AA0	6GK5 793-8DK00-0AA0
Product type designation	**ANT792-8DN antenna**	**ANT793-8DN antenna**	**ANT793-6DJ antenna**	**ANT793-6DK antenna**
Permissible ambient conditions				
Ambient temperature				
• During operation	-40 … +80 °C	-45 … +70 °C	-45 … +70 °C	-45 … +70 °C
• During storage	-40 … +80 °C	-45 … +70 °C	-45 … +70 °C	-45 … +70 °C
• During transport	-40 … +80 °C	-45 … +70 °C	-45 … +70 °C	-45 … +70 °C
• During mounting	-	-	-	-
IP degree of protection	IP23	IP65	IP67	IP67
Maximum wind load	57 N	104 N	104 N	389 N
Note on wind load	at 160 km/h	at 220 km/h	from front at 220 km/h	from front at 220 km/h
Design, dimensions and weights				
Width	200 mm	190 mm	190 mm	371 mm
Height	200 mm	190 mm	190 mm	371 mm
Depth	43 mm	30.5 mm	30.5 mm	40 mm
Diameter	-	-	-	-
Net weight	500 g	700 g	700 g	2 500 g
Type of mounting	-	-	-	-
• Mast mounting	Yes	Yes	Yes	Yes
• Wall mounting	Yes	Yes	Yes	Yes
• Ceiling mounting	No	No	No	No
• Directly on the device	No	No	No	No
Product properties, functions, components General				
Product property silicon-free	Yes	Yes	-	-
Material of the outer sleeve	ASA	Polypropylene	Polycarbonate/aluminum	Polycarbonate
Standards, specifications, approvals				
• RoHS compliance	Yes	Yes	Yes	Yes
Wireless approval	Current country-specific approvals can be found on the Internet at www.siemens.com/wireless-approvals	Current country-specific approvals can be found on the Internet at www.siemens.com/wireless-approvals	Current country-specific approvals can be found on the Internet at www.siemens.com/wireless-approvals	Current country-specific approvals can be found on the Internet at www.siemens.com/wireless-approvals

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Technical specifications (continued)

Order No.	6GK5 792-4DN00-0AA6	6GK5 793-4MN00-0AA6
Product type designation	**ANT792-4DN RCoax antenna**	**ANT793-4MN RCoax antenna**
Radio frequencies		
Radio frequency		
• With WLAN in the 2.4 GHz frequency band	2.4 … 2.4835 GHz	-
• With WLAN in the 5 GHz frequency band 1	-	5.15 … 5.85 GHz
• With WLAN in the 5 GHz frequency band 2	-	-
Electrical specifications		
Impedance	50 Ω	50 Ω
Polarization	Circular clockwise	Vertical (lambda 5/8 characteristic)
Radiation characteristic	Directional	Omnidirectional
Antenna gain compared with the isotropic radiator of the WLAN antenna		
• In the 2.4 GHz frequency band	4 dB	-
• In the 5 GHz frequency band	-	6 dB
• With transmission frequency 5.2 GHz		
• With transmission frequency 5.7 GHz		
Maximum standing wave ratio	1,8	2
Beam angle of antenna		
• In the 2.4 GHz frequency band		
- Horizontal	90°	-
- Vertical	-	-
• In the 5 GHz frequency band		
- Horizontal	-	360°
- Vertical	-	40°
Note on beam angle	-	-
Number of electrical connections of the antenna	1	1
Design of electrical connection of the antenna	N connector, female	N connector, female
Maximum angle of inclination down	0°	0°
Crosstalk attenuation between the antenna connections	-	-
Front to back ratio	2.5 dB	-
Maximum transmit power	1 W	1 W
Permissible ambient conditions		
Ambient temperature		
• During operation	-40 … +70 °C	-40 … +70 °C
• During storage	-40 … +70 °C	-40 … +70 °C
• During transport	-40 … +70 °C	-40 … +70 °C
IP degree of protection	IP65	IP65
Design, dimensions and weights		
Width	-	-
Height	78.7 mm	78.7 mm
Depth	-	-
Diameter	30 mm	30 mm
Net weight	114 g	65 g
Product properties, functions, components General		
Product property silicon-free	Yes	Yes
Material of the outer sleeve	Polycarbonate	Polycarbonate
Standards, specifications, approvals		
• UL approval	-	Yes
- Note	-	UL94-V1
Wireless approval	Current country-specific approvals can be found on the Internet at www.siemens.com/wireless-approvals	Current country-specific approvals can be found on the Internet at www.siemens.com/wireless-approvals

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IWLAN antennas

Ordering data	Order No.
Antennas with omnidirectional characteristic;	
National approvals, compact instructions on paper, German/English	
For mounting directly onto SCALANCE W	
Antenna gain incl. connector 4 dB, 2.4/5 GHz;	
• **ANT795-4MC antenna;** IP65 (-20 to +65 °C), straight connection, N-Connect male, scope of delivery: 3 antennas	**6GK5 795-4MC00-0AA3**
• **ANT795-4MD antenna;** IP65 (-20 to +65 °C), connection with fixed 90° angle, N-Connect male, scope of delivery: 3 antennas	**6GK5 795-4MD00-0AA3**
• **ANT795-4MR antenna;** IP65 (-20 to +65 °C), scope of delivery: 1 antenna	**6GK5 795-4MR00-0AA6**
• **ANT795-4MA / ANT795-4MS antenna;** IP30; radial rotation possible with additional joint; R-SMA male	
- **ANT795-4MA;** scope of delivery: 3 antennas	**6GK5 795-4MA00-0AA3**
- **ANT795-4MS;** scope of delivery: 2 antennas	**6GK5 795-4MS00-0AA6**
Wall or mast mounting	
• **ANT792-6MN antenna** Antenna gain incl. N-Connect connector 6 dB, 2.4 GHz; IP65 (-40 to +80 °C), with terminating resistor 1 x TI795-1R; incl. mounting hardware	**6GK5 792-6MN00-0AA6**
• **ANT793-6MN antenna** Antenna gain incl. N-Connect connector 5 dB, 5 GHz; IP65 (-45 to +70 °C), with terminating resistor 1 x TI795-1R; incl. mounting hardware	**6GK5 793-6MN00-0AA6**
For mounting on a roof	
• **ANT795-6MN antenna** Antenna gain incl. N-Connect connector 6/8 dB, 2.4/5 GHz; IP65 (-40 to +80 °C), with terminating resistor 1 x TI795-1R	**6GK5 795-6MN10-0AA6**
• **ANT795-6MT antenna** MIMO antenna with 3 QMA sockets, antenna gain 6 dB, 2.4/5 GHz; (-40 to +85°C), incl. fixing bracket	**6GK5 795-6MT00-0AA0**
• **Antenna mounting tool (ANT795-6MN)** Mounting aid for installing ANT795-6MN below a roof	**6GK5 795-6MN01-0AA6**

Ordering data	Order No.
Directional antennas;	
incl. mounting hardware; compact instructions on paper, German/English	
Wall or mast mounting	
• **ANT795-6DC antenna** Wide-angle antenna, slightly directional; antenna gain incl. N-Connect connector 9/9 dB, 2.4/5 GHz, -40 to +80 °C	**6GK5 795-6DC00-0AA0**
• **ANT793-6DG antenna** Dual-slant wide-angle antenna, slightly directional; antenna gain incl. two N-Connect connectors 9 dB, 5 GHz, -40 bis +80 °C	**6GK5 793-6DG00-0AA0**
• **ANT793-6DT antenna** MIMO antenna with 3 QMA sockets, wide-angle antenna, slightly directional; antenna gain 9 dB, 5 GHz, -40 to +85 °C	**6GK5 793-6DT00-0AA0**
• **ANT795-6DN antenna** Wide-angle antenna, slightly directional; antenna gain incl. N-Connect connector 9/9 dB, 2.4/5 GHz, -40 to +80 °C; with terminating resistor 1 x TI795-1R	**6GK5 795-6DN00-0AA6**
• **ANT792-8DN antenna** Antenna, strongly directional; antenna gain incl. N-Connect connector 14 dB, 2.4 GHz; -40 to +80 °C; with terminating resistor 1 x TI795-1R	**6GK5 792-8DN00-0AA6**
• **ANT793-8DN antenna** Antenna, strongly directional; antenna gain incl. N-Connect connector 19 dB, 5 GHz, -45 to +70 °C; with terminating resistor 1 x TI795-1R	**6GK5 793-8DN00-0AA6**
• **ANT793-8DJ antenna** Vertically-horizontally polarized antenna, strongly directional; antenna gain incl. two N-Connect connectors 18 dB, 5 GHz; -45 to +70 °C	**6GK5 793-8DJ00-0AA0**
• **ANT793-8DK antenna** Vertically-horizontally polarized antenna, strongly directional; antenna gain incl. two N-Connect connectors 23 dB, 5 GHz; -45 to +70 °C	**6GK5 793-8DK00-0AA0**
Antennas for RCoax systems	
• **ANT792-4DN antenna** Circularly polarized RCoax helix antenna for RCoax systems; N-Connect female connection; antenna gain at 2.4 GHz 1 dB	**6GK5 792-4DN00-0AA6**
• **ANT793-4MN antenna** Vertically polarized RCoax 5/8 antenna for RCoax systems; N-Connect female connection; antenna gain at 5.2 GHz/ 5.7 GHZ 6/5 dB	**6GK5 793-4MN00-0AA6**

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More information

To assist in selecting the right products for Industrial Wireless Communication, the SIMATIC NET Selection Tool is available at:

Online version:
www.siemens.com/snst

Offline version:
www.siemens.com/snst-download

You can order components supplementary to the SIMATIC NET cabling system from your local contact. Technical advice on this subject is available from:

J. Hertlein
I IA SC IC PRM 4
Phone +49 (0)911/750 44 65
E-mail: juergen.hertlein@siemens.com

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IWLAN RCoax cables

Overview

The RCoax cables are radiating cables that function as special antennas for the SCALANCE W Access Points in environments with complex radio coverage. Its design means that a defined, cone-shaped radio field is generated along the RCoax cable. The radiating cables are therefore perfectly suitable for use in all types of applications with track-bound vehicles.

- Rugged coaxial cable which can be easily installed
- Two cables for use in the frequency bands 2.4 GHz and 5 GHz
- Connection as external antenna to SCALANCE W780 Access Points
- Connection of mobile nodes via SCALANCE W740 Client Modules and IWLAN/PB Link PN IO using an antenna aligned to the RCoax
- Suitable for use in hazardous areas (Zone 2); no special approvals necessary

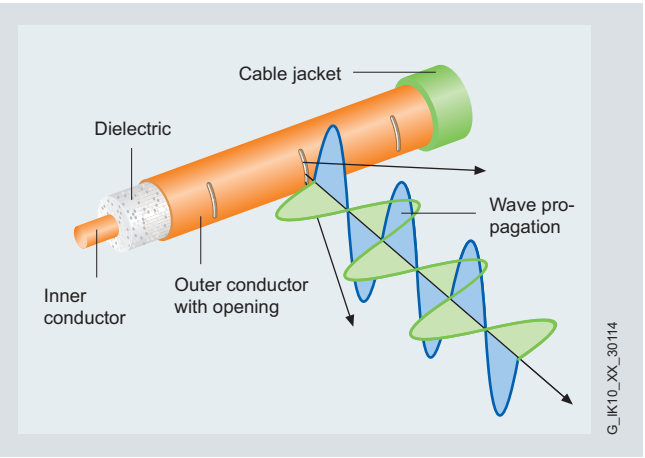
Benefits

get Designed for Industry

- Reliable coverage in areas problematic for radio
- Avoidance of greater than desired WLAN expansion by means of defined emission of the radio waves
- Cost savings thanks to direct substitution of sliding contacts, trailing cables, and data light barriers
- Highly flexible laying

Design

The RCoax cables were specially designed for the frequency band around 2.4 GHz or 5 GHz respectively.



Openings are present in the outer conductor of the coaxial cable which permit the penetration and emission of radio waves. A defined radio field is then developed around the RCoax cables. Longitudinal damping and extraction loss are in a balanced relationship, which permits a long segment length of cable per SCALANCE W780 Access Point and an appropriate distance from the mobile station (SCALANCE W740, IWLAN/ PB Link PN IO) to the RCoax cable.

Coordinated accessories are available for assembly:

- IWLAN RCoax cable clip 1/2"
- IWLAN RCoax spacer 85 mm
- IWLAN RCoax threaded washer M6

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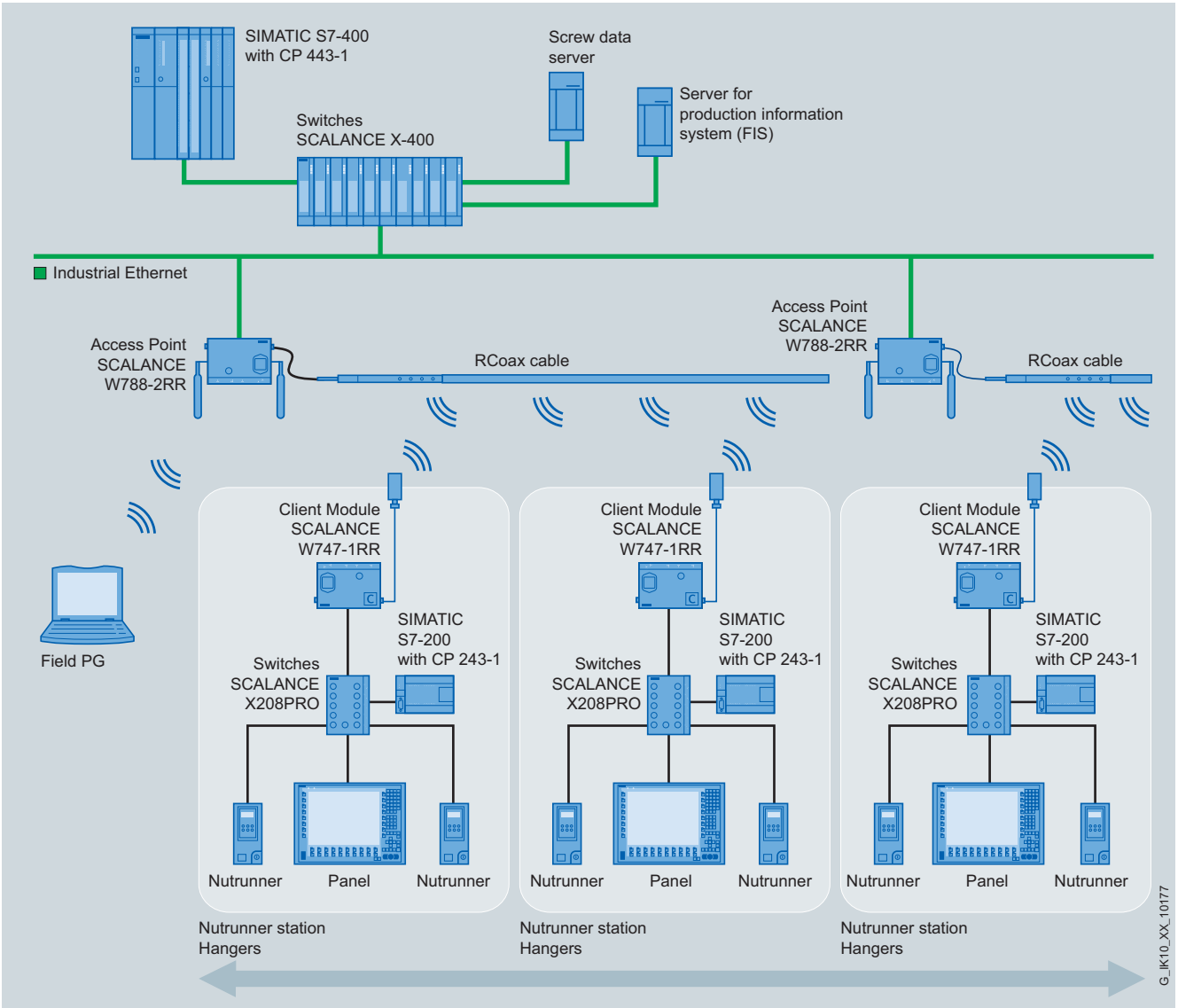
Application

- In areas with demanding conditions for wireless coverage (e.g. in tunnels, channels and elevator shafts) where "unlimited" mobility is not of decisive importance, but where rather a mechanically wear-free and thus maintenance-free solution is required to ensure reliable data transmission: This is made possible by the defined radio field along the RCoax cable.
- The RCoax cables offer, especially for conveyor systems and every type of rail-mounted vehicle (suspended monorails, AGV systems) a wear-free and reliable wireless link.

Application examples

- Suspended monorail
- Automated guided vehicle systems (AGVS)
- Cranes
- Stacker cranes
- Transfer lines
- Tool-changing trolleys
- Tunnels
- Lifts



Configuration example with RCoax cable using example of a nutrunner control in automobile production

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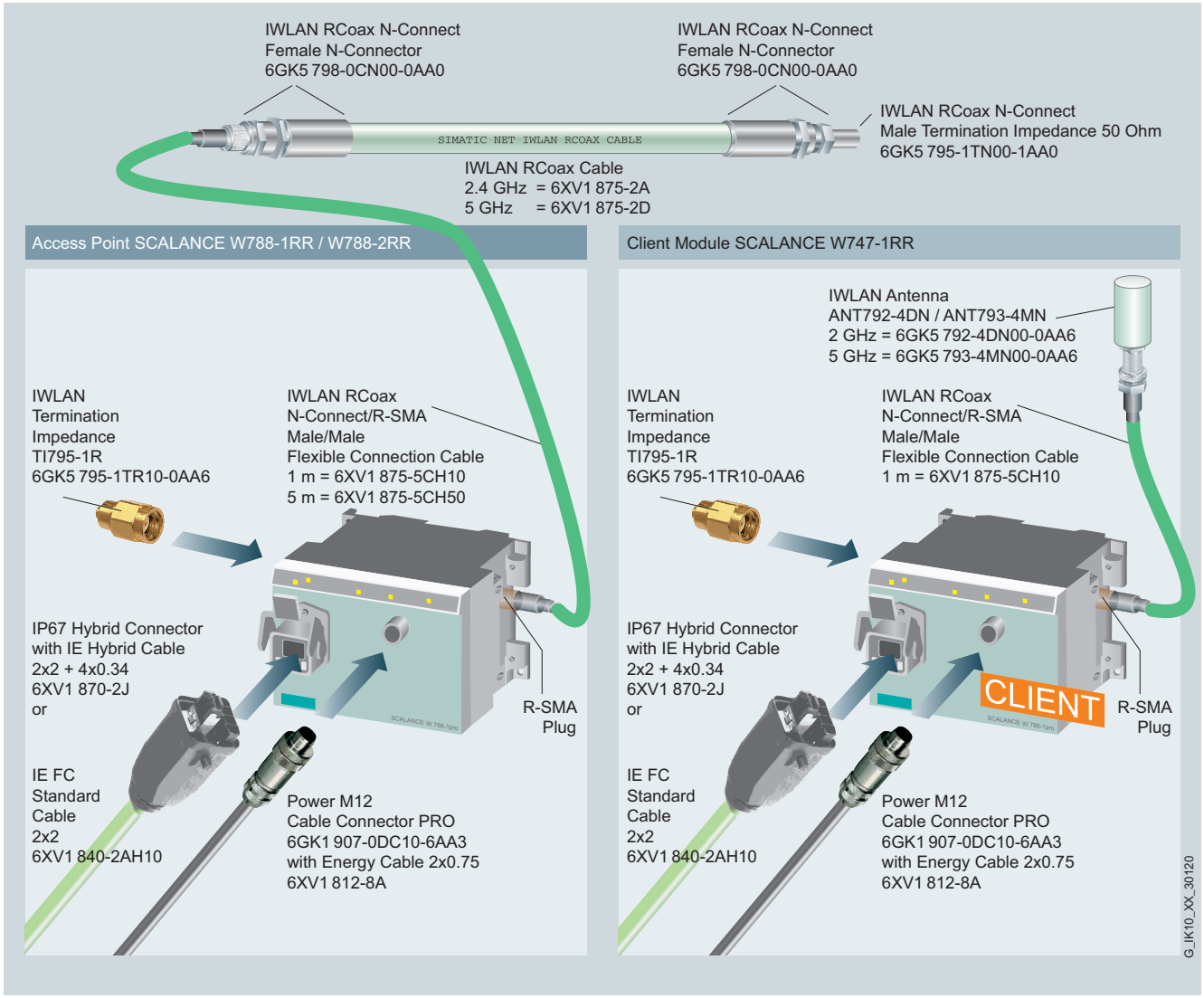
IWLAN RCoax cables

Integration



Connection example for an IWLAN RCoax system with connection to Industrial Ethernet

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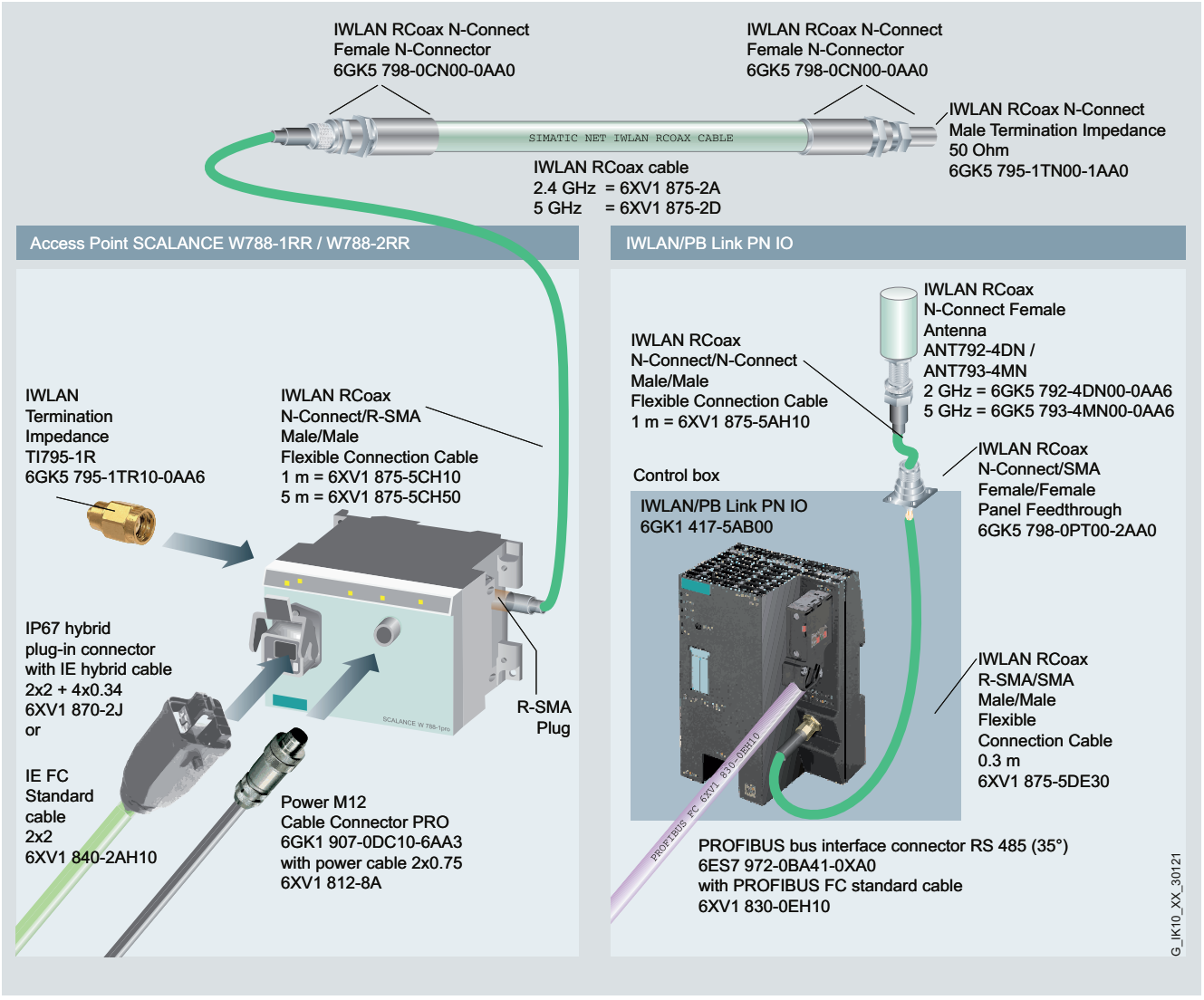
Integration (continued)



Connection example for an IWLAN RCoax system with interface to PROFIBUS

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IWLAN RCoax cables

Technical specifications

Order No.	6XV1 875-2A	6XV1 875-2D
Product type designation	**IWLAN RCoax Cable 2 GHz**	**IWLAN RCoax Cable 5 GHz**
Suitability for use	Suspended monorails, cranes, stacker cranes, or similar	Suspended monorails, cranes, stacker cranes, or similar
Wireless frequencies		
Wireless frequency		
• With WLAN in the 2.4 GHz frequency band	2.4 … 2.485 GHz	-
• With WLAN in the 5 GHz frequency band 1	-	5.15 … 5.85 GHz
• With WLAN in the 5 GHz frequency band 2	-	-
Electrical specifications		
Impedance	50 Ω	50 Ω
Attenuation factor per length		
• At 2.4 GHz		
- For cable mounting 10 mm over concrete at 20 °C	0.15 dB/m	-
- For cable mounting 15 mm over aluminum rail at 20 °C	0.17 dB/m	-
• At 5.15 GHz		
- For cable mounting 10 mm over concrete at 20 °C	-	22.5 dB/m
- For cable mounting 15 mm over aluminum rail at 20 °C	-	24.2 dB/m
• At 5.85 GHz		
- For cable mounting 10 mm over concrete at 20 °C	-	24 dB/m
- For cable mounting 15 mm over aluminum rail at 20 °C	-	27 dB/m
Attenuation factor per length Note	-	-
Tap loss		
• At 2.4 GHz at 20 °C	35 dB	-
• At 5.15 GHz at 20 °C	-	42 dB
• At 5.85 GHz at 20 °C	-	40 dB
• Note	c(50) applies to a distance of 10 cm between antenna and cable	c(50) applies to a distance of 10 cm between antenna and cable
Capacitance per length	76 pF/m	76 pF/m
DC resistance per length		
• of the inner conductor at 20 °C	1.48 Ω/km	1.48 Ω/km
• of the coaxial outer conductor at 20 °C	2.8 Ω/km	2.8 Ω/km
Relative velocity	88%	88%

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Technical specifications (continued)

Order No.	6XV1 875-2A	6XV1 875-2D
Product type designation	**IWLAN RCoax Cable 2 GHz**	**IWLAN RCoax Cable 5 GHz**
Mechanical data		
Outer diameter		
• of inner conductor	4.8 mm	4.8 mm
• of the dielectric	12.4 mm	12.4 mm
• of the cable sheath	15.5 mm	15.5 mm
Thickness of cable sheath	1.3 mm	1.3 mm
Material		
• of the cable sheath	Halogen-free polyolefin AM3	Halogen-free polyolefin AM3
• of inner conductor	Copper-clad aluminum	Copper-clad aluminum
• of the dielectric	Polyethylene foam	Polyethylene foam
• of the coaxial outer conductor	Overlapping copper foil with slot groups bonded to cable jacket	Overlapping copper foil with slot groups bonded to cable jacket
Color of cable sheath	Pastel turquoise	Pastel turquoise
Bending radius		
• Minimum permitted single bending radius	20 cm	20 cm
• Minimum permitted repeated bending radius	-	-
Number of bending cycles	1	1
• Note	-	-
Maximum tensile load	1 100 N	1 100 N
Weight per length	0.232 kg/m	0.232 kg/m
Recommended spacing	0.5 m	0.5 m
Design of plug-in connection	-	-
Permissible ambient conditions		
Ambient temperature		
• During operation	-40 … +85 °C	-40 … +85 °C
• During storage	-70 … +85 °C	-70 … +85 °C
• During transport	- -	- -
• During mounting	-25 … +60 °C	-25 … +60 °C
IP degree of protection	-	-
Product properties, functions, components General		
Product property silicon-free	-	-
Standards, specifications, approvals		
Certificate of suitability		
• RoHS compliance	-	-
• UL approval	Yes	Yes
- Note	-	-
Wireless approval	Current country-specific approvals can be found on the Internet at www.siemens.com/wireless-approvals	Current country-specific approvals can be found on the Internet at www.siemens.com/wireless-approvals
Standard		
• For behavior in fire: Corrosive gas emission	IEC 60754-2	IEC 60754-2
• For behavior in fire: Smoke emission	IEC 60332-1 and IEC 60332-3 Cat. C	IEC 60332-1 and IEC 60332-3 Cat. C
• For behavior in fire: Flame resistance	IEC 61034	IEC 61034

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IWLAN RCoax cables

Ordering data

	Order No.
IWLAN RCoax cables	
Radiating cable for complex radio environments as special antenna for SCALANCE W Access Points; for extended temperature range (-40 °C to + 85 °C); sold by the meter minimum order quantity 20 m	
• 2.4 GHz	**6XV1 875-2A**
• 5 GHz	**6XV1 875-2D**
Accessories	
IWLAN RCoax N-Connect stripping tool	**6GK1 901-1PH00**
Stripping tool for fast stripping of RCoax cable on site	
RCoax N-Connect female N-connector	**6GK5 798-0CN00-0AA0**
Plug connector for assembly on site; connection unit of RCoax cable for connection of further components, N-female connection.	
RCoax N-Connect male/male Coupler	**6GK5 798-0CP00-1AA0**
RF coupling for connecting an RCoax antenna to an RCoax cable; two N-Connect male connectors	
IWLAN RCoax cable clip 1/2"	
Cable holder for RCoax cable	
• 10 items	**6GK5 798-8MB00-0AC1**
• 100 items	**6GK5 798-8MB00-0AM1**
IWLAN RCoax threaded washer M6	
Threaded washer M6 for RCoax cable clip 1/2", for assembly with M6 threaded bolts	
• 10 items	**6GK5 798-8MC00-0AC1**
• 100 items	**6GK5 798-8MC00-0AM1**
IWLAN RCoax spacer 85 mm	
Spacer 85 mm for RCoax cable clip 1/2"	
• 10 items	**6GK5 798-8MD00-0AC1**
• 100 items	**6GK5 798-8MD00-0AM1**

More information

Wireless approvals:

Current approvals can be found on the Internet at:
www.siemens.com/wireless-approvals

To assist in selecting the right products for Industrial Wireless Communication, the SIMATIC NET Selection Tool is available:

Online version:
www.siemens.com/snst

Offline version:
www.siemens.com/snst-download

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Overview

A comprehensive, coordinated range of coaxial accessories is offered for flexible combination and installation of the individual IWLAN components indoors and outdoors.

This range encompasses connecting cables as well as diverse connectors, lightning protection elements, a power splitter and an attenuator.

Benefits

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- Flexible use thanks to extensive, coordinated range
- Operation also outdoors with extended temperature range and protection against water and dust thanks to degree of protection IP65
- Components are suitable for use with SCALANCE W-700 including national approvals

Application

RCoax/antenna connecting cables

- The flexible IWLAN RCoax/antenna connecting cables are required for connecting RCoax segments or antennas with active devices.
- The cables offer low attenuation so that the quality of the radio signal is only reduced to a minimal extent.
- All antenna cables are flame-resistant, chemical-resistant and silicone-free.

Terminating resistors

- Terminating resistors are required for wireless termination of unused antenna connections at the access points and clients.
- RCoax segments must be terminated at the end with a terminating resistor.

Lightning protection elements

- When separate antennas are used outdoors, there is a risk of lightning strikes.
- A lightning protector can be used to prevent damage.

Cabinet feedthroughs

Together with the antenna connecting cables, the cabinet feedthroughs enable simple connection of remote antennas to the active components located in the control cabinet/box.

Attenuator

The 10 dB attenuator is always used when the transmitted power has to be reduced both in the send and receive directions. Typical application areas include short RCoax segments or directional wireless links, which are to be limited in extent.

Power splitter

- With the help of the power splitter, the transmission power of an access point is divided between two RCoax or antenna segments.
- This enables wireless coverage in two areas using just one access point.

Product versions

RCoax/antenna connecting cables

- Pre-assembled cable lengths (0.3 m to 10 m)
- Different connector types and combinations (N-Connect, R-SMA, SMA, QMA)

Terminating resistors

- TI795-1R: Terminating resistor 50 ohms for R-SMA antenna sockets
- TI795-1N: Terminating resistor 50 ohms for N-Connect antenna sockets or RCoax segments

Lightning protection elements

- LP798-2N: Maintenance-free lightning protection element for N-Connect connections
  - Quarter-wave system (lambda-quarter) for the frequency range 2 to 6 GHz
  - Represents a short-circuit for DC voltages so that all types of overvoltage can be reliably diverted
  - Not suitable for DC infeed via the antenna cable
- LP798-1N: Lightning protection element for N-Connect connections
  - With gas discharge arrester for the frequency range 0 to 6 GHz for N-Connect connections
  - Suitable for DC infeed via the antenna cable

Cabinet feedthroughs

- N-Connect female/SMA female with fastening flange for panel thicknesses up to 5.5 mm
- N-Connect female/N-Connect female without flange for panel thicknesses up to 4.5 mm
  - Can also be used to connect two antenna connecting cables

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Technical specifications

Order No.	6XV1875-5Axxx	6XV1875-5Cxxx	6XV1875-5Dxxx	6XV1875-5Jxxx
Product type designation	**IWLAN RCoax antenna N-Connect male/male flexible antenna connecting cable**	**IWLAN RCoax antenna N-Connect/R-SMA male/male flexible antenna connecting cable**	**IWLAN RCoax antenna N-Connect/SMA male/male flexible antenna connecting cable**	**IWLAN RCoax antenna QMA/N-Connect male/male flexible antenna connecting cable**
Number of plug-in connections	2	2	2	2
Design of plug-in connection 1	N-Connect male	N-Connect male	N-Connect male	QMA male
Design of plug-in connection 2	N-Connect male	R-SMA male	SMA male	N-Connect female
Frequency range	≤ 6 GHz	≤ 6 GHz	≤ 6 GHz	≤ 6 GHz
Impedance	50 Ω	50 Ω	50 Ω	50 Ω
Capacity	82 pF/m	82 pF/m	82 pF/m	82 pF/m
Return loss	≥ -23 dB	≥ -23 dB	≥ -23 dB	-
Attenuation				
• at 2.4 GHz	0.53 dB/m	0.53 dB/m	0.53 dB/m	0.55 dB/m
• at 5.7 GHz	0.88 dB/m	0.88 dB/m	0.88 dB/m	0.93 dB/m
Ambient temperature				
• During operating phase	-40 °C to +80 °C	-40 °C to +80 °C	-40 °C to +80 °C	-40 °C to +80 °C
• during storage	-40 °C to +80 °C	-40 °C to +80 °C	-40 °C to +80 °C	-40 °C to +80 °C
• during transport	-40 °C to +80 °C	-40 °C to +80 °C	-40 °C to +80 °C	-40 °C to +80 °C
Smallest bending radius				
• for one-off bending	3.2 cm	3.2 cm	3.2 cm	3.2 cm
• for repeated bending	4.5 cm	4.5 cm	4.5 cm	5.8 cm
Tensile strength	30 … 80 N	30 … 80 N	30 … 80 N	-
Net weight/m	75 g/m	75 g/m	75 g/m	-
Outer diameter	6.3 mm	6.3 mm	6.3 mm	-

Order No.	6GK5 795-1TR10-0AA6	6GK5 795-1TN00-0AA6	6GK5798-0SN0-0EA0	6GK5798-0AP00-4CA0
Product type designation	**Termination Impedance TI795-1R**	**Termination impedance TI795-1N**	**Power splitter**	**Attenuator**
Number of plug-in connections	1	1	3	2
Connection version	R-SMA male	N-Connect male	N-Connect female	N-Connect male / female
Frequency range	≤ 6 GHz	≤ 6 GHz	2.4 … 6 GHz	≤ 6 GHz
Impedance	50 Ω	50 Ω	50 Ω	50 Ω
Return loss	> 25 dB/6 GHz	> 25 dB/6 GHz	≥ 24 dB	–
Insertion loss			≤ 3.05 dB	10 dB
Performance range	< 1 W	< 1 W	250 W	1 W
Ambient temperature				
• During operating phase	-40 °C to +70 °C	-40 °C to +70 °C	-25 °C to +110 °C	-40 °C to +70 °C
• during storage	-40 °C to +70 °C	-40 °C to +70 °C	-25 °C to +110 °C	-40 °C to +70 °C
• during transport	-40 °C to +70 °C	-40 °C to +70 °C	-25 °C to +110 °C	-40 °C to +70 °C
Degree of protection	IP65	IP65	IP67	–
Diameter	9 mm	21 mm	–	21 mm
Length	15 mm	34.5 mm	131.4 mm	45.7 mm
Width	–	–	71.4 mm	–
Depth	–	–	34 mm	–
Net weight	5 g	45 g	937 g	–

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Technical specifications (continued)

Order No.	6GK5 798-2LP00-2AA6	6GK5 798-2LP10-2AA6
Product type designation	**LP798-1N lightning protector**	**LP798-2N lightning protector**
Transmission frequency	0 … 6 GHz	2 … 6 GHz
Electrical data		
Impedance	50 Ω	50 Ω
Mechanical data		
Design of plug-in connection	N-Connector female/female	N-Connector female/female
Permissible ambient conditions		
Ambient temperature		
• During operation	-40 … +85 °C	-40 … +85 °C
• During storage	-40 … +85 °C	-40 … +85 °C
• During transport	-40 … +85 °C	-40 … +85 °C
IP degree of protection	IP67	IP68
Design, dimensions and weights		
Width	54.8 mm	89.6 mm
Height	-	-
Depth	-	-
Diameter	22.8 mm	29 mm
Net weight	50 g	80 g
Type of mounting	-	-

Ordering data

	Order No.
IWLAN RCoax antenna N-Connect/R-SMA Male/male flexible connection cable	
Flexible connecting cable for connecting an RCoax cable or antenna to a SCALANCE W-700 access point with R-SMA connections; pre-assembled with two connections, N-Connect male and R-SMA male	
• 0.3 m	**6XV1 875-5CE30**
• 1 m	**6XV1 875-5CH10**
• 2 m	**6XV1 875-5CH20**
• 5 m	**6XV1 875-5CH50**
• 10 m	**6XV1 875-5CN10**
IWLAN RCoax antenna N-Connect male/male Flexible connection cable	
Flexible connecting cable for connecting an RCoax cable or antenna to a SCALANCE W-700 access point with N-Connect connections; pre-assembled with two N-Connect male connections	
• 1 m	**6XV1 875-5AH10**
• 2 m	**6XV1 875-5AH20**
• 5 m	**6XV1 875-5AH50**
• 10 m	**6XV1 875-5AN10**

	Order No.
IWLAN RCoax antenna QMA/N-Connect male/male Flexible connection cable	
Adapter cable for connecting a MIMO antenna with QMA connections to the flexible connecting cables; assembled with two connections QMA male and N-Connect female; 3 units	
• 1 m	**6XV1 875-5JH10**
IWLAN RCoax antenna R-SMA/SMA male/male Flexible connection cable	
Flexible cable for connecting an active device to components with RSMA and SMA connections, e.g. cabinet feedthrough; pre-assembled with two R-SMA male to SMA male connectors	
• 0.3 m	**6XV1 875-5DE30**
• 2 m	**6XV1 875-5DH20**
IWLAN RCoax antenna N-Connect male termination impedance TI795-1N	**6GK5 795-1TN00-1AA0**
Terminating resistance for RCoax cable and open wireless interfaces on SCALANCE W-700 devices with N-Connect connections, impedance 50 ohms, N-Connect male connection; IP65 (-40 to +70 °C)	

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IWLAN cabling technology

Ordering data

	Order No.
IWLAN RCoax antenna RSMA male termination impedance TI795-1R Terminating resistance for open wireless interfaces on SCALANCE W-700 devices with RSMA connections, impedance 50 ohms, RSMA male connection; IP65 (-40 to +70 °C); 3 units	**6GK5 795-1TR10-0AA6**
Lightning protector LP798-1N Lightning protector with N/N female/female connection, IP67 (-40 to +85 °C), frequency range: 0 to 6 GHz	**6GK5 798-2LP00-2AA6**
LP798-2N lightning protector Lightning protector with N/N female/female connection, IP68 (-40 to +85 °C), quarter wave, frequency range: 2 to 6 GHz	**6GK5 798-2LP10-2AA6**
IWLAN RCoax antenna N-Connect female power splitter 2-way cable splitter, Y-element for dividing the RCoax cable or for using two antennas on one wireless interface	**6GK5 798-0SN00-0EA0**
IWLAN RCoax antenna N-Connect male/male coupler HF link for connecting two RCoax cables; two N-Connect male connectors	**6GK5 798-0CP00-1AA0**
IWLAN RCoax antenna N-Connect male/male attenuator Attenuator with N-Connect male/ N-Connect female connectors	
• 10 dB	**6GK5 798-0AP00-4CA0**
IWLAN RCoax antenna N-Connect/SMA female/female panel feedthrough Cabinet feedthrough with fastening flange for wall thicknesses up to 5.5 mm, SMA female and N-Connect female connections	**6GK5 798-0PT00-2AA6**
IWLAN RCoax antenna N-Connect/N-Connect female/female panel feedthrough Cabinet feedthrough for wall thicknesses up to 4.5 mm, two N-Connect female connections	**6GK5 798-2PP00-2AA0**

More information

To assist in selecting the right products for Industrial Wireless Communication, the SIMATIC NET Selection Tool is available:

Online version:
www.siemens.com/snst

Offline version:
www.siemens.com/snst-download

You can order components supplementary to the SIMATIC NET cabling range from your local contact. Technical advice on this subject is available from:

J. Hertlein
I IA SC IC PRM 4
Phone +49 (0)911/750 44 65
E-mail: juergen.hertlein@siemens.com

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Power supply PS791-1PRO

Overview

- The PS791-1 PRO power supply is an AC/DC power supply for input voltages of 90 to 265 V AC for numerous SCALANCE products with IP65 degree of protection.
- Mounting:
  - Wall mounting or on S7-300 rail, immediately under/next to the SCALANCE W788-xPRO and SCALANCE W788-xRR Access Points, SCALANCE W74x-1PRO and SCALANCE W74x-1RR Client Modules, or SCALANCE X-200PRO switches
- Robust metal housing with IP65 protection against water and dust
- Operating temperature -20 °C to +60 °C

Benefits

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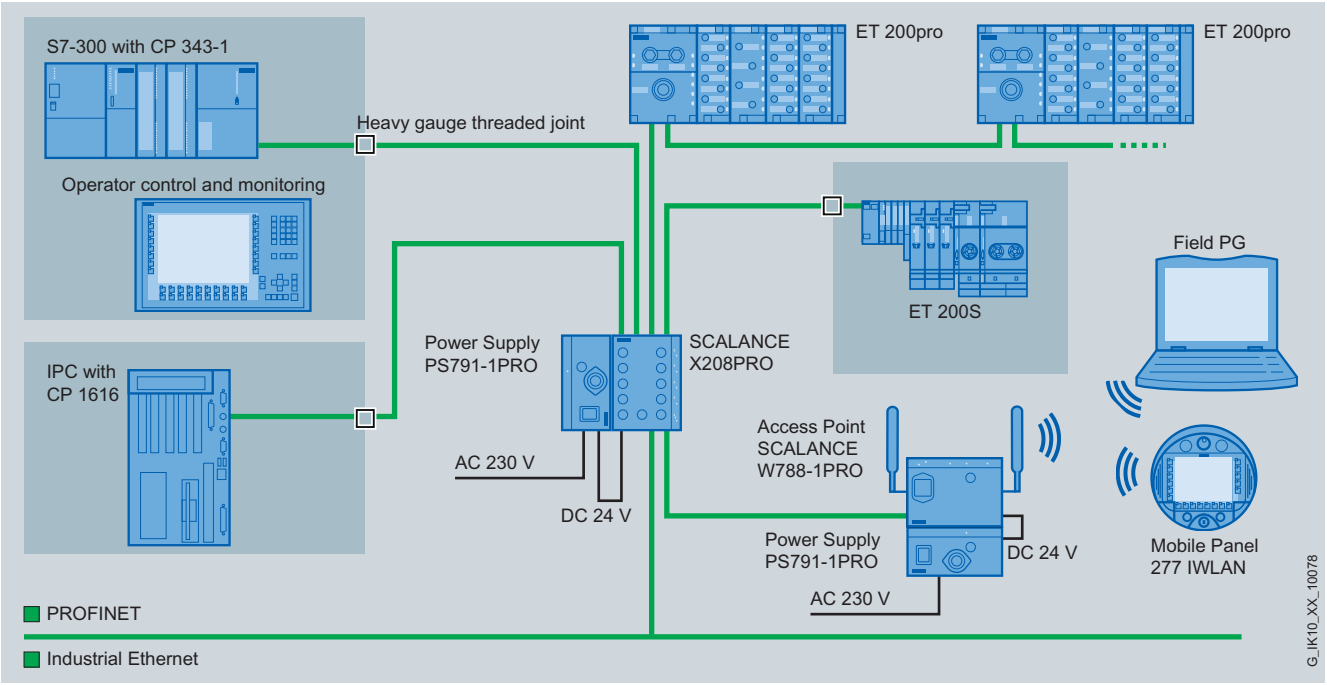
- Reduced storage of replacement parts, as only one power supply unit is required for several SCALANCE products with IP65 degree of protection
- Global application due to wide input voltage range
- High reliability as power supply is short-circuit proof, secure against no-load operation and is able to bridge short breaks in the mains power
- Variety of possible applications thanks to:
  - wide range of input voltages
  - high degree of efficiency
  - low heat dissipation

Design

- Fanless design and rugged metal casing;
  High protection against dust and splashwater with IP65 degree of protection
- Operating temperatures from -20 °C to +60 °C
- Resistant to condensation
- Connection to AC network via AC Power 3+PE cable connector (included)
- Connection to SCALANCE products in degree of protection IP65
- In other applications, the Power M12 Plug PRO is used for the DC-output (to be ordered separately)
- Direct mounting is possible on the SCALANCE products with IP65 degree of protection using supplied installation material; also suitable for wall-mounting or mounting on standard mounting rail (S7-300)



Example for the use of power supply PS791-1PRO with SCALANCE X and SCALANCE W

Note:
When SCALANCE W is connected to SCALANCE X208PRO, the power supply in the hybrid connector is not available; power must be supplied via the M12 plug connector.

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Power supply PS791-1PRO

Technical specifications

Order No.	6GK5 791-1PS00-0AA6
Product type designation	**Power supply PS791-1PRO**
Interfaces	• AC Power 3+PE cable connector for 100 … 240 V AC feed • M12 Plug PRO or Power Cord M12 for 24 V DC output voltage • On/Off switch
Input voltage	90 … 265 V AC at 47 … 63 Hz
Output voltage	24 V DC, +-7 %, 0.42 A
Output power	10 W
System disturbances	Stored energy time at least 20 ms at 230 V AC
Permissible ambient conditions	
• Operating temperature	-20°C … 60°C
• Transport/storage temperature	-40°C … +85°C
• Relative humidity	100 %
Approvals	EMC: EN 55022 Class B, EN 61000-4; UL 1950, EN 60950;
Device failure	MTBF 600,000 h at full load, 25°C
Switching frequency	typ. 100 kHz
Degree of protection	IP65
Dimensions (W x H x D) in mm	125 x 60 x 130
Assembly	Wall/DIN rail mounting (S7-300) directly on SCALANCE devices
Weight	700 g

Ordering data

	Order No.
PS791-1PRO power supply AC/DC power supply, 10 W, IP65 (-20 … +60°C), input: 90 … 265 V AC , output: 24 V DC, metal housing; scope of supply: AC power 3+PE cable connector, DC power cord M12, installation materials, instruction manual German/English	**6GK5 791-1PS00-0AA6**
Power M12 Plug PRO Plug for connection to PS791-1PRO power supply for 24 V DC supply voltage; 4-pole, A-coded, with assembly instructions, 3 items	**6GK1 907-0DB10-6AA3**
AC Power 3+PE cable connector Connection socket for connection of Power Supply PS791-1PRO to AC voltage supply, with assembly instructions, 5 items	**6GK1 907-0FC10-0AA5**
Power cable 2 x 0.75 Connecting cable for power supply PS791-1PRO, sold by the meter	**6XV1 812-8A**

More information

You can order components supplementary to the SIMATIC NET cabling range from your local contact. Technical advice on this subject is available from:

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E-mail: juergen.hertlein@siemens.com

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Power Supply PS791-2DC and PS791-2AC

Overview

PS791-2DC power supply adapter

- DC/DC power supply unit for input voltages from 12 to 24 V DC and an output voltage of 18 V DC for all SCALANCE W786 devices

PS791-2AC power supply adapter

- AC/DC power supply unit for input voltages from 100 to 240 V AC and an output voltage of 18 V DC for all SCALANCE W786 devices

Benefits

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- The PS791-2DC and PS791-2AC power supply adapters are designed specially for the SCALANCE W786 access points and are integrated direct into these
- Global application due to wide input voltage range
- High reliability as power supply is short-circuit proof, secure against no-load operation and is able to bridge short breaks in the mains power
- When the power supply adapter and Power-over-Ethernet (PoE) are used, redundant power supply of the access points can be achieved

Design

- Integral power supply adapter for SCALANCE W786
- Fan-free design
- Operating temperatures from -40 °C to +70 °C
- Resistant to condensation

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Power Supply PS791-2DC and PS791-2AC

Technical specifications

Order No.	6GK5 791-2DC00-0AA0	6GK5 791-2AC00-0AA0
Product type designation	**Power supply PS791-2DC**	**Power supply PS791-2AC**
Interfaces	• Infeed: 4-pin screw terminal for DC Power • Output voltage: 4-pin connector	• Infeed: 3-pin screw terminal for AC Power • Output voltage: 4-pin connector
Input voltage	12 ... 24 V DC (min. 9 V DC, max. 32 V DC) safety extra-low voltage (SELV)	100 ... 240 V AC, 45 ... 65 Hz
Output voltage	18 V DC	18 V DC
Output power	14.4 W	14.4 W
Mains buffering	–	> 20 ms
Permissible ambient conditions • Operating temperature	-40 °C ... +70 °C	-40 °C ... +60 °C
Approvals	EMC: EN 61000-6-2:2005, EN 61000-6-3:2007	EMC: EN 61000-6-2:2005, EN 61000-6-3:2007
Safety regulations	EN 60950, UL 60950-1	EN 60950, UL 60950-1
Protection class	VDE 0805, VDE 0100	VDE 0805, VDE 0100
Degree of protection	IP65	IP65
Dimensions (W x H x D) in mm	133 x 45 x 30 mm	133 x 45 x 30 mm
Assembly	Installation in SCALANCE W786 and HiPath Wireless Outdoor Access Points	Installation in SCALANCE W786 and HiPath Wireless Outdoor Access Points
Weight	223 g	209 g

Ordering data

	Order No.
Power supply PS791-2DC 24 V DC power supply for installation in SCALANCE W-786 products; operating instructions in German/English	**6GK5 791-2DC00-0AA0**
Power supply PS791-2AC 110 V AC to 230 V AC power supply for installation in the SCALANCE W-786 products; operating instructions German/English	**6GK5 791-2AC00-0AA0**

More information

You can order components supplementary to the SIMATIC NET cabling range from your local contact. Technical advice on this subject is available from:

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Phone +49 (0)911/750 44 65
E-mail: juergen.hertlein@siemens.com

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Function

- Input/output fields
  for displaying and changing of process values.
- Function keys
  are used for directly triggering functions and actions.
  Up to 16 functions can be configured simultaneously on function keys. The function keys can also be used directly as PROFINET IO.
  The function keys can also be reconfigured as system keys. A frequently used function such as "Acknowledge alarm" can thus be assigned to a function key.
- Auxiliary operator controls
  such as handwheels, key switches and illuminated pushbuttons can be assigned with a variable or as a direct actuation via PROFINET IO (direct keys).
- Buttons
  are used for direct triggering of functions and actions. Up to 16 functions can be configured simultaneously on buttons.
- Graphics
  can be used as symbols instead of text for "labeling" function keys or buttons. They can also be used as full-screen background images.
  In the configuration software, a comprehensive library is available containing graphics and a wide variety of objects. All editors with an OLE interface can be used as graphics editors (such as PaintShop, Designer or CorelDraw).
- Vector graphics
  simple geometric basic forms (e.g. lines, circles and rectangles) can be created directly in the configuration software.
- Text fields
  for labeling function keys, process displays, and process values in any font size.
- Trend views and bars
  are used for the graphic display of dynamic values.
- Display selection from the controller
  permits operator prompting from the controller.
- Presentation of HTML documents with MS Pocket Internet Explorer.
- Visual Basic Script, flexibility thanks to the implementation of new functions including linking to variables (comparison operations, loops, etc.).
- Language switching
  16 online languages, 32 configuration languages incl. Asiatic and Cyrillic character sets
  - Language-dependent texts and graphics
- User administration (security)
  - User-oriented access protection according to requirements of specific sectors
  - Authentication with user name and password
  - User-group-specific rights
- Signaling system
  - Discrete and analog alarms (edge alarms) as well as the ALARM_S message frame procedure for SIMATIC S7
  - Freely definable message classes (e.g. status/fault messages) for definition of acknowledgment response and display of alarm events
- Message buffer
  - Non-volatile, maintenance-free and battery-free message buffer. The messages remain stored when the mobile panel has the battery removed as well
- Recipe management
  - With additional data storage (on optional MultiMedia Card/SD Card)
  - Online/offline processing on the panel
  - Storage of recipe data in standard Windows format (CSV)
  - External processing using standard tools such as Excel and Access is possible
- Help texts
  for process images, messages and variables.
- Arithmetic functions
- Limit value monitoring
  for reliable process control of inputs and outputs.
- Indicator lights
  for machine and plant status indication.
- Scheduler
  for cyclic function processing.
- Dynamic positioning of objects and dynamic showing/hiding of objects
- Permanent window and template concept
  - Creation of screen templates:
- Simple maintenance and configuration thanks to:
  - Backup/restore of the project, operating system, recipe data records and firmware on the optional standard multi-media card/SD card
  - Backup and restoration of configuration, operating system, recipe data sets and firmware on a PC using ProSave
  - Project transfer/return transfer via PROFINET/WLAN
  - Automatic transfer detection
  - Individual brightness setting
  - Project simulation directly on the configuration computer
- WinCC flexible options
  - Sm@rtService for remote operator control and monitoring of SIMATIC HMI systems based on TCP/IP networks
  - Sm@rtAccess for communication between HMI systems based on TCP/IP networks. Remote access to recipe data records, passwords and HMI system-specific information, and much more. (Mobile Panel 277F IWLAN as server: View only)
  - OPC server: Communication with applications (e.g. MES, ERP, or applications in the office sector) from various manufacturers (see HMI software/runtime software SIMATIC WinCC flexible/WinCC flexible RT options)
  - Audit

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Function (continued)

Configuration

Configuration is carried out with the SIMATIC WinCC flexible Standard or Advanced configuration software (see SIMATIC WinCC flexible HMI software/engineering software). SIMATIC WinCC flexible is the logical further development of the field-proven ProTool family. Projects generated using ProTool can be easily migrated to WinCC. If WinCC flexible is started directly from SIMATIC Manager, data in STEP 7 can be accessed directly when the panel is configured. Duplicated data input and data management is, therefore, avoided.

IWLAN infrastructure

The required IWLAN infrastructure is set up with the IWLAN Access Points SCALANCE W-780, preferably with the version SCALANCE W786-2RR, which fully supports all possible applications of the Mobile Panel 277(F) IWLAN. For operating a plant without fail-safe communication, the version SCALANCE W786-1PRO can also be used. The iPCF functionality (rapid roaming = fast, uninterrupted switchover between several access points) is only available with V2 panels upwards.

The Access Point provides an Industrial Ethernet interface for connection to the wired network.

In addition to a reliable radio link, the SCALANCE W-780 Access Points stand out due to their optimum support of standardized IT mechanisms:

- IEEE 802.11b/ g/ a/ h for different frequency ranges
- IEEE 802.11e for multimedia, wireless multimedia (WMM) [1)]
- IEEE 802.11i for security [1)]
- Construction of redundant networks with the Rapid Spanning Tree Protocol (RSTP)
- Virtual networks (VLAN) to logically separate, for example, different user groups
- Sending the log entries of the SCALANCE W devices to a Syslog server

Wireless approvals

Only those wireless approvals printed on the mobile panel apply. Planned wireless approvals for all SIMATIC products can be found on the Internet at:
www.siemens.com/wireless-approvals

[1)] Not supported by Mobile Panel Wireless

Integration

The SIMATIC Mobile Panel 277(F) IWLAN communicates via the WLAN Standard IEEE 802.11 a(b/g) via PROFINET. The Mobile Panel 277F IWLAN devices also support PROFIsafe communication.

There are five device versions with V2:

For mobile operation and monitoring via WLAN:

- Mobile Panel 277 IWLAN V2
- Mobile Panel 277 IWLAN V2 with handwheel, key switch and illuminated pushbuttons

As fail-safe device for safety-oriented operation as well:

- Mobile Panel 277F IWLAN V2 with acknowledgement button and emergency stop button
- Mobile Panel 277F IWLAN V2 with acknowledgement button, emergency stop button, handwheel, key switch and illuminated pushbuttons
- Mobile Panel 277F IWLAN RFID Tag (for V2 only)

For the versions Mobile Panel 277F IWLAN (PROFIsafe), the following system prerequisites apply:

- The Mobile Panel must be connected as a safe device (PROFIsafe, Distributed Safety)
- Use of a SIMATIC F-CPU

SIMATIC Mobile Panel		5 GHz frequency band (IEEE 802.11a)	SIMATIC F-CPU (Distributed Safety)
277 IWLAN	Only WLAN utilization (HMI)	●	–
	When using transponders	!	–
	When using Profinet IO	●	–
277F IWLAN (fail-safe)		!	!
277F IWLAN (RFID Tag) (fail-safe)		●	!

● = Recommended

! = Requirement

– = Not required

The Mobile Panel 277(F) IWLAN can be connected to:

- SIMATIC S7-200/-300/-400 (one F-CPU required for integrating the Mobile Panel 277F IWLAN and SIMOTION (Mobile Panel 277 IWLAN V2 or higher, or Mobile Panel 277FIWLAN V2 or higher (WinCC flexible 2008 SP3 or higher))

Note:
Further information can be found under "System interfaces". The Function Manuals "Fail-Safe Operation of the Mobile Panel 277F IWLAN" are available for downloading in English, German, and Japanese.

http://support.automation.siemens.com/WW/view/en/31255853

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Technical specifications

	6AV6 645-0DD01-0AX1	6AV6 645-0DE01-0AX1	6AV6 645-0EB01-0AX1	6AV6 645-0EC01-0AX1	6AV6 645-0EF01-0AX1
Display					
Size	7.5"	7.5"	7.5"	7.5"	7.5"
Display type	TFT, 65536 colors	TFT, 65536 colors	TFT, 65536 colors	TFT, 65536 colors	TFT, 65536 colors
Resolution (pixels)					
• Resolution (WxH in pixel)	640 x 480	640 x 480	640 x 480	640 x 480	640 x 480
Backlighting					
• MTBF backlighting (at 25 °C)	about 50,000 hours	about 50,000 hours	about 50,000 hours	about 50,000 hours	about 50,000 hours
Control elements					
Operating options	Keys and Touch	Keys and Touch	Keys and Touch	Keys and Touch	Keys and Touch
Function keys, programmable	18 function keys, 18 with LEDs	18 function keys, 18 with LEDs	18 function keys, 18 with LEDs	18 function keys, 18 with LEDs	18 function keys, 18 with LEDs
Connection for mouse/keyboard/ barcode reader	USB / USB / USB	USB / USB / USB	USB / USB / USB	USB / USB / USB	USB / USB / USB
Keyboard fonts					
• Numeric/alphabetical input	Yes / Yes	Yes / Yes	Yes / Yes	Yes / Yes	Yes / Yes
Touch operation					
• Touch screen	Analog, resistive	Analog, resistive	Analog, resistive	Analog, resistive	Analog, resistive
Special operator controls					
• Emergency stop button			2-channel, positive latching	2-channel, positive latching	2-channel, positive latching
• Acknowledgement button			2-channel, number of positions: 3	2-channel, number of positions: 3	2-channel, number of positions: 3
• Key-operated switch		Yes, 3 switch settings		Yes, 3 switch settings	Yes, 3 switch settings
• Illuminated pushbutton		Yes		Yes	Yes
• Handwheel		Yes		Yes	Yes
Expansions for operator control of the process					
• DP direct LEDs (LEDs as S7 output I/O)	F1...F18	F1...F18	F1...F18	F1...F18	F1...F18
• DP direct keys (screen buttons and keys as S7 input I/O)	F1...F18, number of bytes for configurable keys: 10	F1...F18, number of bytes for configurable keys: 10	F1...F18, number of bytes for configurable keys: 10	F1...F18, number of bytes for configurable keys: 10	F1...F18, number of bytes for configurable keys: 10
Supply voltage					
Supply voltage	DC	DC	DC	DC	DC
Via charging station	Yes	Yes	Yes	Yes	Yes
Via table power supply	Yes	Yes	Yes	Yes	Yes
Main battery					
Rated voltage	7.2 V	7.2 V	7.2 V	7.2 V	7.2 V
Capacity	5 100 mA·h	5 100 mA·h	5 100 mA·h	5 100 mA·h	5 100 mA·h
Number of loading cycles, min	500	500	500	500	500
Charging time, typ.	4 h	4 h	4 h	4 h	4 h
Operating time, typ.	4 h	4 h	4 h	4 h	4 h
Display for battery capacity	Yes	Yes	Yes	Yes	Yes
Energy-saving mode	Yes	Yes	Yes	Yes	Yes
Battery replacement during operation	Yes	Yes	Yes	Yes	Yes
Processor					
Processor	ARM, 520 MHz	ARM, 520 MHz	ARM, 520 MHz	ARM, 520 MHz	ARM, 520 MHz
Memory					
Type	Flash / RAM	Flash / RAM	Flash / RAM	Flash / RAM	Flash / RAM
Usable memory for user data	6 MB usable memory for user data	6 MB usable memory for user data	6 MB usable memory for user data	6 MB usable memory for user data	6 MB usable memory for user data

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Technical specifications (continued)

	6AV6 645-0DD01-0AX1	6AV6 645-0DE01-0AX1	6AV6 645-0EB01-0AX1	6AV6 645-0EC01-0AX1	6AV6 645-0EF01-0AX1
Type of output					
Status LEDs	Yes	Yes	Yes	Yes	Yes
LED for safe			Yes	Yes	Yes
LED for communication	Yes	Yes	Yes	Yes	Yes
LED for battery	Yes	Yes	Yes	Yes	Yes
Vibrations	Yes	Yes	Yes	Yes	Yes
Time of day					
Clock					
• Type	Hardware clock, battery backup, synchronizable	Hardware clock, battery backup, synchronizable	Hardware clock, battery backup, synchronizable	Hardware clock, battery backup, synchronizable	Hardware clock, battery backup, synchronizable
Interfaces					
Interfaces	1 x Ethernet (RJ45)	1 x Ethernet (RJ45)	1 x Ethernet (RJ45)	1 x Ethernet (RJ45)	1 x Ethernet (RJ45)
USB port	1 x USB	1 x USB	1 x USB	1 x USB	1 x USB
Multi Media Card slot	1 MMC/SD card slot	1 MMC/SD card slot	1 MMC/SD card slot	1 MMC/SD card slot	1 MMC/SD card slot
Industrial Ethernet					
• Industrial Ethernet interface	1 x Ethernet (RJ45)	1 x Ethernet (RJ45)	1 x Ethernet (RJ45)	1 x Ethernet (RJ45)	1 x Ethernet (RJ45)
• Wireless LAN	Yes	Yes	Yes	Yes	Yes
• Supports standards	according to IEEE 802.11a	according to IEEE 802.11a	according to IEEE 802.11a	according to IEEE 802.11a	according to IEEE 802.11a
• Supported channels (according to IEEE 802.11a)	Channel 34, channel 36, channel 38, channel 40, channel 42, channel 44, channel 46, channel 48, channel 52, channel 56, channel 60, channel 64, channel 149, channel 153, channel 157, channel 161	Channel 34, channel 36, channel 38, channel 40, channel 42, channel 44, channel 46, channel 48, channel 52, channel 56, channel 60, channel 64, channel 149, channel 153, channel 157, channel 161	Channel 34, channel 36, channel 38, channel 40, channel 42, channel 44, channel 46, channel 48, channel 52, channel 56, channel 60, channel 64, channel 149, channel 153, channel 157, channel 161	Channel 34, channel 36, channel 38, channel 40, channel 42, channel 44, channel 46, channel 48, channel 52, channel 56, channel 60, channel 64, channel 149, channel 153, channel 157, channel 161	Channel 34, channel 36, channel 38, channel 40, channel 42, channel 44, channel 46, channel 48, channel 52, channel 56, channel 60, channel 64, channel 149, channel 153, channel 157, channel 161
• Supported channels (according to IEEE 802.11b and IEEE 802.1g)	Channels 1 to 11, channel 12, channel 13, channel 14	Channels 1 to 11, channel 12, channel 13, channel 14	Channels 1 to 11, channel 12, channel 13, channel 14	Channels 1 to 11, channel 12, channel 13, channel 14	Channels 1 to 11, channel 12, channel 13, channel 14
• Country approval (radio)	Australia, Austria, Belgium, Bulgaria, Canada, China, Cyprus, Denmark, Estonia, Finland, France, Germany, UK, Greece, Hungary, Ireland, Iceland, Italy, Japan, Latvia, Liechtenstein, Lithuania, Luxemburg, Malta, the Netherlands, Norway, Poland, Portugal, Rumania, Sweden, Switzerland, Slovakia, Slovenia, Spain, South Korea, South Africa, Taiwan, Czech Republic, Turkey	Australia, Austria, Belgium, Bulgaria, Canada, China, Cyprus, Denmark, Estonia, Finland, France, Germany, UK, Greece, Hungary, Ireland, Iceland, Italy, Japan, Latvia, Liechtenstein, Lithuania, Luxemburg, Malta, the Netherlands, Norway, Poland, Portugal, Rumania, Sweden, Switzerland, Slovakia, Slovenia, Spain, South Korea, South Africa, Taiwan, Czech Republic, Turkey	Australia, Austria, Belgium, Bulgaria, Canada, China, Cyprus, Denmark, Estonia, Finland, France, Germany, UK, Greece, Hungary, Ireland, Iceland, Italy, Japan, Latvia, Liechtenstein, Lithuania, Luxemburg, Malta, the Netherlands, Norway, Poland, Portugal, Rumania, Sweden, Switzerland, Slovakia, Slovenia, Spain, South Korea, South Africa, Taiwan, Czech Republic, Turkey	Australia, Austria, Belgium, Bulgaria, Canada, China, Cyprus, Denmark, Estonia, Finland, France, Germany, UK, Greece, Hungary, Ireland, Iceland, Italy, Japan, Latvia, Liechtenstein, Lithuania, Luxemburg, Malta, the Netherlands, Norway, Poland, Portugal, Rumania, Sweden, Switzerland, Slovakia, Slovenia, Spain, South Korea, South Africa, Taiwan, Czech Republic, Turkey	Australia, Austria, Belgium, Bulgaria, Canada, China, Cyprus, Denmark, Estonia, Finland, France, Germany, UK, Greece, Hungary, Ireland, Iceland, Italy, Japan, Latvia, Liechtenstein, Lithuania, Luxemburg, Malta, the Netherlands, Norway, Poland, Portugal, Rumania, Sweden, Switzerland, Slovakia, Slovenia, Spain, South Korea, South Africa, Taiwan, Czech Republic, Turkey
• Encryption	WEP, WPA	WEP, WPA	WEP, WPA	WEP, WPA	WEP, WPA
• Supports rapid roaming	Yes	Yes	Yes	Yes	Yes

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Technical specifications (continued)

	6AV6 645-0DD01-0AX1	6AV6 645-0DE01-0AX1	6AV6 645-0EB01-0AX1	6AV6 645-0EC01-0AX1	6AV6 645-0EF01-0AX1
Protocols					
PROFINET	Yes	Yes	Yes	Yes	Yes
Supports protocol for PROFINET IO	Yes	Yes	Yes	Yes	Yes
Supports protocol for PROFIsafe			Yes	Yes	Yes
EMC					
Emission of radio interference acc. to EN 55 011					
• Emission of radio interferences acc. to EN 55 011 (limit class A)	Yes; The product is designed for use in industrial environments. When used in residential areas, the emission of radio interference according to limit class B of EN 55011 must be ensured. For further information refer to the user documentation	Yes; The product is designed for use in industrial environments. When used in residential areas, the emission of radio interference according to limit class B of EN 55011 must be ensured. For further information refer to the user documentation	Yes; The product is designed for use in industrial environments. When used in residential areas, the emission of radio interference according to limit class B of EN 55011 must be ensured. For further information refer to the user documentation	Yes; The product is designed for use in industrial environments. When used in residential areas, the emission of radio interference according to limit class B of EN 55011 must be ensured. For further information refer to the user documentation	Yes; The product is designed for use in industrial environments. When used in residential areas, the emission of radio interference according to limit class B of EN 55011 must be ensured. For further information refer to the user documentation
Ambient conditions					
Operating temperature					
• Operation	0 °C to +40 °C	0 °C to +40 °C	0 °C to +40 °C	0 °C to +40 °C	0 °C to +40 °C
Storage/transport temperature					
• Transport, storage	-20 °C to +60 °C	-20 °C to +60 °C	-20 °C to +60 °C	-20 °C to +60 °C	-20 °C to +60 °C
Relative humidity					
• max. relative humidity	80 %	80 %	80 %	80 %	80 %
Drop height	1.2 m	1.2 m	1.2 m	1.2 m	1.2 m
Degree and class of protection					
IP65 enclosure	Yes	Yes	Yes	Yes	Yes
Standards, approvals, certificates					
Certifications	CE, cULus, C-TICK	CE, cULus, C-TICK	CE, cULus, C-TICK	CE, cULus, C-TICK	CE, cULus, C-TICK
TÜV safety certification			Yes	Yes	Yes
Safety Integrity Level to IEC 61508			3	3	3
Performance level acc. to EN ISO 13849-1			e	e	e
Safety category according to EN 954-1			Safety category according to EN 954-1 (enabling button, STOP button if present) 4	Safety category according to EN 954-1 (enabling button, STOP button if present) 4	Safety category according to EN 954-1 (enabling button, STOP button if present) 4
Operating systems					
Operating system	Windows CE	Windows CE	Windows CE	Windows CE	Windows CE
Configuration					
Configuration software					
• Configuration tool	WinCC flexible Standard Version 2008 SP2 and higher (to be ordered separately)	WinCC flexible Standard Version 2008 SP2 and higher (to be ordered separately)	WinCC flexible Standard Version 2008 SP2 and higher (to be ordered separately)	WinCC flexible Standard Version 2008 SP2 and higher (to be ordered separately)	WinCC flexible Standard Version 2008 SP2 and higher (to be ordered separately)

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Technical specifications (continued)

	6AV6 645-0DD01-0AX1	6AV6 645-0DE01-0AX1	6AV6 645-0EB01-0AX1	6AV6 645-0EC01-0AX1	6AV6 645-0EF01-0AX1
Functionality under WinCC flexible					
Applications/options	Internet Explorer, Sm@rtService, Sm@rtAccess	Internet Explorer, Sm@rtService, Sm@rtAccess	Internet Explorer, Sm@rtService, Sm@rtAccess	Internet Explorer, Sm@rtService, Sm@rtAccess	Internet Explorer, Sm@rtService, Sm@rtAccess
Number of Visual Basic Scripts	50	50	50	50	50
Task planner	Yes	Yes	Yes	Yes	Yes
Help system	Yes	Yes	Yes	Yes	Yes
Status/control	With SIMATIC S7	With SIMATIC S7	With SIMATIC S7	With SIMATIC S7	With SIMATIC S7
With alarm logging system (incl. buffer and acknowledgment)					
• Number of messages	4 000	4 000	4 000	4 000	4 000
• Bit messages	Yes	Yes	Yes	Yes	Yes
• Analog messages	Yes	Yes	Yes	Yes	Yes
• Message buffer	Ring buffer (n x 512 entries), retentive, maintenance-free	Ring buffer (n x 512 entries), retentive, maintenance-free	Ring buffer (n x 512 entries), retentive, maintenance-free	Ring buffer (n x 512 entries), retentive, maintenance-free	Ring buffer (n x 512 entries), retentive, maintenance-free
Recipes					
• Recipes	300	300	300	300	300
• Data records per recipe	500	500	500	500	500
• Entries per data record	1000	1000	1000	1000	1000
• Recipe memory	64 KB integrated Flash, expandable	64 KB integrated Flash, expandable	64 KB integrated Flash, expandable	64 KB integrated Flash, expandable	64 KB integrated Flash, expandable
Number of process images					
• Process images	500	500	500	500	500
• Variables	2 048	2 048	2 048	2 048	2 048
• Limit values	Yes	Yes	Yes	Yes	Yes
• Multiplexing	Yes	Yes	Yes	Yes	Yes
Image elements					
• Text objects	10,000 text elements	10,000 text elements	10,000 text elements	10,000 text elements	10,000 text elements
• Graphics object	Bit maps, icons, vector graphics	Bit maps, icons, vector graphics	Bit maps, icons, vector graphics	Bit maps, icons, vector graphics	Bit maps, icons, vector graphics
• dynamic objects	Diagrams, bar graphs, sliders, analog display, invisible buttons	Diagrams, bar graphs, sliders, analog display, invisible buttons	Diagrams, bar graphs, sliders, analog display, invisible buttons	Diagrams, bar graphs, sliders, analog display, invisible buttons	Diagrams, bar graphs, sliders, analog display, invisible buttons
Lists					
• Text lists	500	500	500	500	500
• Graphics list	400	400	400	400	400
• Libraries	Yes	Yes	Yes	Yes	Yes
Archiving					
• Number of archives per project	20	20	20	20	20
• Number of measuring points per project	20	20	20	20	20
• Number of entries per archive	10 000	10 000	10 000	10 000	10 000
• Memory location	Multi Media Card	Multi Media Card	Multi Media Card	Multi Media Card	Multi Media Card
Security					
• Number of user groups	50	50	50	50	50
• Passwords exportable	Yes	Yes	Yes	Yes	Yes
• Number of user rights	32	32	32	32	32
Data carrier support					
• Multi Media Card	Yes	Yes	Yes	Yes	Yes
Logging					
• Recording/Printing	Alarms, report (shift report), PROFINET	Alarms, report (shift report), PROFINET	Alarms, report (shift report), PROFINET	Alarms, report (shift report), PROFINET	Alarms, report (shift report), PROFINET

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Technical specifications (continued)

	6AV6 645-0DD01-0AX1	6AV6 645-0DE01-0AX1	6AV6 645-0EB01-0AX1	6AV6 645-0EC01-0AX1	6AV6 645-0EF01-0AX1
Languages					
• Languages	D, GB, F, I, E, CHN "traditional", CHN "simplified", DK, FIN, GR, J, KP / ROK, NL, N, PL, P, RUS, S, CZ / SK, TR, H	D, GB, F, I, E, CHN "traditional", CHN "simplified", DK, FIN, GR, J, KP / ROK, NL, N, PL, P, RUS, S, CZ / SK, TR, H	D, GB, F, I, E, CHN "traditional", CHN "simplified", DK, FIN, GR, J, KP / ROK, NL, N, PL, P, RUS, S, CZ / SK, TR, H	D, GB, F, I, E, CHN "traditional", CHN "simplified", DK, FIN, GR, J, KP / ROK, NL, N, PL, P, RUS, S, CZ / SK, TR, H	D, GB, F, I, E, CHN "traditional", CHN "simplified", DK, FIN, GR, J, KP / ROK, NL, N, PL, P, RUS, S, CZ / SK, TR, H
• Character sets	Tahoma, Arial, Courier New, WinCC flexible Standard, ideographic languages, all freely scalable	Tahoma, Arial, Courier New, WinCC flexible Standard, ideographic languages, all freely scalable	Tahoma, Arial, Courier New, WinCC flexible Standard, ideographic languages, all freely scalable	Tahoma, Arial, Courier New, WinCC flexible Standard, ideographic languages, all freely scalable	Tahoma, Arial, Courier New, WinCC flexible Standard, ideographic languages, all freely scalable
Transfer (upload/download)					
• Transfer of configuration	USB, Ethernet, automatic transfer recognition	USB, Ethernet, automatic transfer recognition	USB, Ethernet, automatic transfer recognition	USB, Ethernet, automatic transfer recognition	USB, Ethernet, automatic transfer recognition
• Wireless LAN	Yes	Yes	Yes	Yes	Yes
Process coupling					
• Connection to controller	S7-200, S7- 300/400 see section on "System interfaces"	S7-200, S7- 300/400 see section on "System interfaces"	S7-200, S7- 300/400 see section on "System interfaces"	S7-200, S7- 300/400 see section on "System interfaces"	S7-200, S7- 300/400 see section on "System interfaces"
• Zones	Yes	Yes	Yes	Yes	
- Number of zones per project, max.	254	254	254	254	
- Number of transponders for zones per project, max.	255	255	255	255	
• Effective range			Yes	Yes	Yes
- Number of effective ranges per project, max.			127	127	127
- Number of transponders for effective ranges per project, max.			127	127	
• Transponder	Yes	Yes	Yes	Yes	
- Number of transponders per project, max.	256	256	256	256	
- Adjustable distance range	Yes	Yes	Yes	Yes	
- Adjustable distance, min.	2 m	2 m	2 m	2 m	
- Adjustable distance, max.	8 m	8 m	8 m	8 m	
I/O					
I/O devices	Barcode reader	Barcode reader	Barcode reader	Barcode reader	Barcode reader
Mechanics/material					
Type of housing (front)	Plastic	Plastic	Plastic	Plastic	Plastic
Dimensions and weight					
Dimensions					
• Housing diameter/depth (mm)	Dia 290 mm / D 103 mm	Dia 290 mm / D 103 mm	Dia 290 mm / D 103 mm	Dia 290 mm / D 103 mm	Dia 290 mm / D 103 mm
Weight					
• Weight	2.2 kg	2.2 kg	2.2 kg	2.2 kg	2.2 kg

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Technical specifications (continued)

	6AV6 645-0FD01-0AX1	6AV6 645-0FE01-0AX1	6AV6 645-0GB01-0AX1	6AV6 645-0GC01-0AX1	6AV6 645-0GF01-0AX1
Display					
Size	7.5"	7.5"	7.5"	7.5"	7.5"
Display type	TFT, 65536 colors	TFT, 65536 colors	TFT, 65536 colors	TFT, 65536 colors	TFT, 65536 colors
Resolution (pixels)					
• Resolution (WxH in pixel)	640 x 480	640 x 480	640 x 480	640 x 480	640 x 480
Backlighting					
• MTBF backlighting (at 25 °C)	about 50,000 hours	about 50,000 hours	about 50,000 hours	about 50,000 hours	about 50,000 hours
Control elements					
Operating options	Keys and Touch	Keys and Touch	Keys and Touch	Keys and Touch	Keys and Touch
Function keys, programmable	18 function keys, 18 with LEDs	18 function keys, 18 with LEDs	18 function keys, 18 with LEDs	18 function keys, 18 with LEDs	18 function keys, 18 with LEDs
Connection for mouse/keyboard/ barcode reader	USB / USB / USB	USB / USB / USB	USB / USB / USB	USB / USB / USB	USB / USB / USB
Keyboard fonts					
• Numeric/alphabetical input	Yes / Yes	Yes / Yes	Yes / Yes	Yes / Yes	Yes / Yes
Touch operation					
• Touch screen	Analog, resistive	Analog, resistive	Analog, resistive	Analog, resistive	Analog, resistive
Special operator controls					
• Emergency stop button			2-channel, positive latching	2-channel, positive latching	2-channel, positive latching
• Acknowledgement button			2-channel, number of positions: 3	2-channel, number of positions: 3	2-channel, number of positions: 3
• Key-operated switch		Yes, 3 switch settings		Yes, 3 switch settings	Yes, 3 switch settings
• Illuminated pushbutton		Yes		Yes	Yes
• Handwheel		Yes		Yes	Yes
Expansions for operator control of the process					
• DP direct LEDs (LEDs as S7 output I/O)	F1...F18	F1...F18	F1...F18	F1...F18	F1...F18
• DP direct keys (screen buttons and keys as S7 input I/O)	F1...F18, number of bytes for configurable keys: 10	F1...F18, number of bytes for configurable keys: 10	F1...F18, number of bytes for configurable keys: 10	F1...F18, number of bytes for configurable keys: 10	F1...F18, number of bytes for configurable keys: 10
Supply voltage					
Supply voltage	DC	DC	DC	DC	DC
Via charging station	Yes	Yes	Yes	Yes	Yes
Via table power supply	Yes	Yes	Yes	Yes	Yes
Main battery					
Rated voltage	7.2 V	7.2 V	7.2 V	7.2 V	7.2 V
Capacity	5 100 mA·h	5 100 mA·h	5 100 mA·h	5 100 mA·h	5 100 mA·h
Number of loading cycles, min	500	500	500	500	500
Charging time, typ.	4 h	4 h	4 h	4 h	4 h
Operating time, typ.	4 h	4 h	4 h	4 h	4 h
Display for battery capacity	Yes	Yes	Yes	Yes	Yes
Energy-saving mode	Yes	Yes	Yes	Yes	Yes
Battery replacement during operation	Yes	Yes	Yes	Yes	Yes
Processor					
Processor	ARM, 520 MHz	ARM, 520 MHz	ARM, 520 MHz	ARM, 520 MHz	ARM, 520 MHz

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Technical specifications (continued)

	6AV6 645-0FD01-0AX1	6AV6 645-0FE01-0AX1	6AV6 645-0GB01-0AX1	6AV6 645-0GC01-0AX1	6AV6 645-0GF01-0AX1
Memory					
Type	Flash / RAM	Flash / RAM	Flash / RAM	Flash / RAM	Flash / RAM
Usable memory for user data	6 MB usable memory for user data	6 MB usable memory for user data	6 MB usable memory for user data	6 MB usable memory for user data	6 MB usable memory for user data
Type of output					
Status LEDs	Yes	Yes	Yes	Yes	Yes
LED for safe			Yes	Yes	Yes
LED for communication	Yes	Yes	Yes	Yes	Yes
LED for battery	Yes	Yes	Yes	Yes	Yes
Vibrations	Yes	Yes	Yes	Yes	Yes
Time of day					
Clock					
• Type	Hardware clock, battery backup, synchronizable	Hardware clock, battery backup, synchronizable	Hardware clock, battery backup, synchronizable	Hardware clock, battery backup, synchronizable	Hardware clock, battery backup, synchronizable
Interfaces					
Interfaces	1 x Ethernet (RJ45)	1 x Ethernet (RJ45)	1 x Ethernet (RJ45)	1 x Ethernet (RJ45)	1 x Ethernet (RJ45)
USB port	1 x USB	1 x USB	1 x USB	1 x USB	1 x USB
Multi Media Card slot	1 MMC/SD card slot	1 MMC/SD card slot	1 MMC/SD card slot	1 MMC/SD card slot	1 MMC/SD card slot
Industrial Ethernet					
• Industrial Ethernet interface	1 x Ethernet (RJ45)	1 x Ethernet (RJ45)	1 x Ethernet (RJ45)	1 x Ethernet (RJ45)	1 x Ethernet (RJ45)
• Wireless LAN	Yes	Yes	Yes	Yes	Yes
• Supports standards	according to IEEE 802.11a	according to IEEE 802.11a	according to IEEE 802.11a	according to IEEE 802.11a	according to IEEE 802.11a
• Supported channels (according to IEEE 802.11a)	Channel 34, channel 36, channel 38, channel 40, channel 42, channel 44, channel 46, channel 48, channel 52, channel 56, channel 60, channel 64, channel 149, channel 153, channel 157, channel 161	Channel 34, channel 36, channel 38, channel 40, channel 42, channel 44, channel 46, channel 48, channel 52, channel 56, channel 60, channel 64, channel 149, channel 153, channel 157, channel 161	Channel 34, channel 36, channel 38, channel 40, channel 42, channel 44, channel 46, channel 48, channel 52, channel 56, channel 60, channel 64, channel 149, channel 153, channel 157, channel 161	Channel 34, channel 36, channel 38, channel 40, channel 42, channel 44, channel 46, channel 48, channel 52, channel 56, channel 60, channel 64, channel 149, channel 153, channel 157, channel 161	Channel 34, channel 36, channel 38, channel 40, channel 42, channel 44, channel 46, channel 48, channel 52, channel 56, channel 60, channel 64, channel 149, channel 153, channel 157, channel 161
• Supported channels (according to IEEE 802.11b and IEEE 802.1g)	Channels 1 to 11, channel 12, channel 13, channel 14	Channels 1 to 11, channel 12, channel 13, channel 14	Channels 1 to 11, channel 12, channel 13, channel 14	Channels 1 to 11, channel 12, channel 13, channel 14	Channels 1 to 11, channel 12, channel 13, channel 14
• Country approval (radio)	USA, Canada	USA, Canada	USA, Canada	USA, Canada	USA, Canada
• Encryption	WEP, WPA	WEP, WPA	WEP, WPA	WEP, WPA	WEP, WPA
• Supports rapid roaming	Yes	Yes	Yes	Yes	Yes
Protocols					
PROFINET	Yes	Yes	Yes	Yes	Yes
Supports protocol for PROFINET IO	Yes	Yes	Yes	Yes	Yes
Supports protocol for PROFIsafe			Yes	Yes	Yes

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Technical specifications (continued)

	6AV6 645-0FD01-0AX1	6AV6 645-0FE01-0AX1	6AV6 645-0GB01-0AX1	6AV6 645-0GC01-0AX1	6AV6 645-0GF01-0AX1
EMC					
Emission of radio interference acc. to EN 55 011					
• Emission of radio interferences acc. to EN 55 011 (limit class A)	Yes; The product is designed for use in industrial environments. When used in residential areas, the emission of radio interference according to limit class B of EN 55011 must be ensured. For further information refer to the user documentation	Yes; The product is designed for use in industrial environments. When used in residential areas, the emission of radio interference according to limit class B of EN 55011 must be ensured. For further information refer to the user documentation	Yes; The product is designed for use in industrial environments. When used in residential areas, the emission of radio interference according to limit class B of EN 55011 must be ensured. For further information refer to the user documentation	Yes; The product is designed for use in industrial environments. When used in residential areas, the emission of radio interference according to limit class B of EN 55011 must be ensured. For further information refer to the user documentation	Yes; The product is designed for use in industrial environments. When used in residential areas, the emission of radio interference according to limit class B of EN 55011 must be ensured. For further information refer to the user documentation
Ambient conditions					
Operating temperature					
• Operation	0 °C to +40 °C	0 °C to +40 °C	0 °C to +40 °C	0 °C to +40 °C	0 °C to +40 °C
Storage/transport temperature					
• Transport, storage	-20 °C to +60 °C	-20 °C to +60 °C	-20 °C to +60 °C	-20 °C to +60 °C	-20 °C to +60 °C
Relative humidity					
• max. relative humidity	80 %	80 %	80 %	80 %	80 %
Drop height	1.2 m	1.2 m	1.2 m	1.2 m	1.2 m
Degree and class of protection					
IP65 enclosure	Yes	Yes	Yes	Yes	Yes
Standards, approvals, certificates					
Certifications	CE, cULus, C-TICK	CE, cULus, C-TICK	CE, cULus, C-TICK	CE, cULus, C-TICK	CE, cULus, C-TICK
TÜV safety certification			Yes	Yes	Yes
Safety Integrity Level to IEC 61508			3	3	3
Performance level acc. to EN ISO 13849-1			e	e	e
Safety category according to EN 954-1			Safety category according to EN 954-1 (enabling button, STOP button if present) 4	Safety category according to EN 954-1 (enabling button, STOP button if present) 4	Safety category according to EN 954-1 (enabling button, STOP button if present) 4
Operating systems					
Operating system	Windows CE	Windows CE	Windows CE	Windows CE	Windows CE
Configuration					
Configuration software					
• Configuration tool	WinCC flexible Standard Version 2008 SP2 and higher (to be ordered separately)	WinCC flexible Standard Version 2008 SP2 and higher (to be ordered separately)	WinCC flexible Standard Version 2008 SP2 and higher (to be ordered separately)	WinCC flexible Standard Version 2008 SP2 and higher (to be ordered separately)	WinCC flexible Standard Version 2008 SP2 and higher (to be ordered separately)
Functionality under WinCC flexible					
Applications/options	Internet Explorer, Sm@rtService, Sm@rtAccess	Internet Explorer, Sm@rtService, Sm@rtAccess	Internet Explorer, Sm@rtService, Sm@rtAccess	Internet Explorer, Sm@rtService, Sm@rtAccess	Internet Explorer, Sm@rtService, Sm@rtAccess
Number of Visual Basic Scripts	50	50	50	50	50
Task planner	Yes	Yes	Yes	Yes	Yes
Help system	Yes	Yes	Yes	Yes	Yes
Status/control	With SIMATIC S7	With SIMATIC S7	With SIMATIC S7	With SIMATIC S7	With SIMATIC S7
With alarm logging system (incl. buffer and acknowledgment)					
• Number of messages	4 000	4 000	4 000	4 000	4 000
• Bit messages	Yes	Yes	Yes	Yes	Yes
• Analog messages	Yes	Yes	Yes	Yes	Yes
• Message buffer	Ring buffer (n x 512 entries), retentive, maintenance-free	Ring buffer (n x 512 entries), retentive, maintenance-free	Ring buffer (n x 512 entries), retentive, maintenance-free	Ring buffer (n x 512 entries), retentive, maintenance-free	Ring buffer (n x 512 entries), retentive, maintenance-free

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Technical specifications (continued)

	6AV6 645-0FD01-0AX1	6AV6 645-0FE01-0AX1	6AV6 645-0GB01-0AX1	6AV6 645-0GC01-0AX1	6AV6 645-0GF01-0AX1
Recipes					
• Recipes	300	300	300	300	300
• Data records per recipe	500	500	500	500	500
• Entries per data record	1000	1000	1000	1000	1000
• Recipe memory	64 KB integrated Flash, expandable	64 KB integrated Flash, expandable	64 KB integrated Flash, expandable	64 KB integrated Flash, expandable	64 KB integrated Flash, expandable
Number of process images					
• Process images	500	500	500	500	500
• Variables	2 048	2 048	2 048	2 048	2 048
• Limit values	Yes	Yes	Yes	Yes	Yes
• Multiplexing	Yes	Yes	Yes	Yes	Yes
Image elements					
• Text objects	10,000 text elements	10,000 text elements	10,000 text elements	10,000 text elements	10,000 text elements
• Graphics object	Bit maps, icons, vector graphics	Bit maps, icons, vector graphics	Bit maps, icons, vector graphics	Bit maps, icons, vector graphics	Bit maps, icons, vector graphics
• dynamic objects	Diagrams, bar graphs, sliders, analog display, invisible buttons	Diagrams, bar graphs, sliders, analog display, invisible buttons	Diagrams, bar graphs, sliders, analog display, invisible buttons	Diagrams, bar graphs, sliders, analog display, invisible buttons	Diagrams, bar graphs, sliders, analog display, invisible buttons
Lists					
• Text lists	500	500	500	500	500
• Graphics list	400	400	400	400	400
• Libraries	Yes	Yes	Yes	Yes	Yes
Archiving					
• Number of archives per project	20	20	20	20	20
• Number of measuring points per project	20	20	20	20	20
• Number of entries per archive	10 000	10 000	10 000	10 000	10 000
• Memory location	Multi Media Card	Multi Media Card	Multi Media Card	Multi Media Card	Multi Media Card
Security					
• Number of user groups	50	50	50	50	50
• Passwords exportable	Yes	Yes	Yes	Yes	Yes
• Number of user rights	32	32	32	32	32
Data carrier support					
• Multi Media Card	Yes	Yes	Yes	Yes	Yes
Logging					
• Recording/Printing	Alarms, report (shift report), PROFINET	Alarms, report (shift report), PROFINET	Alarms, report (shift report), PROFINET	Alarms, report (shift report), PROFINET	Alarms, report (shift report), PROFINET
Languages					
• Languages	D, GB, F, I, E, CHN "traditional", CHN "simplified", DK, FIN, GR, J, KP / ROK, NL, N, PL, P, RUS, S, CZ / SK, TR, H	D, GB, F, I, E, CHN "traditional", CHN "simplified", DK, FIN, GR, J, KP / ROK, NL, N, PL, P, RUS, S, CZ / SK, TR, H	D, GB, F, I, E, CHN "traditional", CHN "simplified", DK, FIN, GR, J, KP / ROK, NL, N, PL, P, RUS, S, CZ / SK, TR, H	D, GB, F, I, E, CHN "traditional", CHN "simplified", DK, FIN, GR, J, KP / ROK, NL, N, PL, P, RUS, S, CZ / SK, TR, H	D, GB, F, I, E, CHN "traditional", CHN "simplified", DK, FIN, GR, J, KP / ROK, NL, N, PL, P, RUS, S, CZ / SK, TR, H
Character sets					
• Character sets	Tahoma, Arial, Courier New, WinCC flexible Standard, ideographic languages, all freely scalable	Tahoma, Arial, Courier New, WinCC flexible Standard, ideographic languages, all freely scalable	Tahoma, Arial, Courier New, WinCC flexible Standard, ideographic languages, all freely scalable	Tahoma, Arial, Courier New, WinCC flexible Standard, ideographic languages, all freely scalable	Tahoma, Arial, Courier New, WinCC flexible Standard, ideographic languages, all freely scalable
Transfer (upload/download)					
• Transfer of configuration	USB, Ethernet, automatic transfer recognition	USB, Ethernet, automatic transfer recognition	USB, Ethernet, automatic transfer recognition	USB, Ethernet, automatic transfer recognition	USB, Ethernet, automatic transfer recognition
• Wireless LAN	Yes	Yes	Yes	Yes	Yes

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Technical specifications (continued)

	6AV6 645-0FD01-0AX1	6AV6 645-0FE01-0AX1	6AV6 645-0GB01-0AX1	6AV6 645-0GC01-0AX1	6AV6 645-0GF01-0AX1
Process coupling					
• Connection to controller	S7-200, S7- 300/400 see section on "System interfaces"	S7-200, S7- 300/400 see section on "System interfaces"	S7-200, S7- 300/400 see section on "System interfaces"	S7-200, S7- 300/400 see section on "System interfaces"	S7-200, S7- 300/400 see section on "System interfaces"
• Zones	Yes	Yes	Yes	Yes	
- Number of zones per project, max.	254	254	254	254	
- Number of transponders for zones per project, max.	255	255	255	255	
• Effective range			Yes	Yes	Yes
- Number of effective ranges per project, max.			127	127	127
- Number of transponders for effective ranges per project, max.			127	127	
• Transponder	Yes	Yes	Yes	Yes	
- Number of transponders per project, max.	256	256	256	256	
- Adjustable distance range	Yes	Yes	Yes	Yes	
- Adjustable distance, min.	2 m	2 m	2 m	2 m	
- Adjustable distance, max.	8 m	8 m	8 m	8 m	
I/O					
I/O devices	Barcode reader	Barcode reader	Barcode reader	Barcode reader	Barcode reader
Mechanics/material					
Type of housing (front)	Plastic	Plastic	Plastic	Plastic	Plastic
Dimensions and weight					
Dimensions					
• Housing diameter/depth (mm)	Dia 290 mm / D 103 mm	Dia 290 mm / D 103 mm	Dia 290 mm / D 103 mm	Dia 290 mm / D 103 mm	Dia 290 mm / D 103 mm
Weight					
• Weight	2.2 kg	2.2 kg	2.2 kg	2.2 kg	2.2 kg

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Ordering data	Order No.
SIMATIC Mobile Panel 277 IWLAN V2 (RoW version)	
• Communication via WLAN (PROFINET)	**6AV6 645-0DD01-0AX1**
• Communication via WLAN (PROFINET) with integrated handwheel, key-operated switch and two illuminated pushbuttons	**6AV6 645-0DE01-0AX1**
SIMATIC Mobile Panel 277F IWLAN V2 PROFIsafe (RoW version)	
• Communication via WLAN (PROFINET) with acknowledgement button and emergency stop button	**6AV6 645-0EB01-0AX1**
• Communication via WLAN (PROFINET) with acknowledgement button and emergency stop button with integrated handwheel, key-operated switch, and two illuminated pushbuttons	**6AV6 645-0EC01-0AX1**
• RFID tag version: Communication via WLAN (PROFINET) with acknowledgement button and emergency stop button with integrated handwheel, key-operated switch, and two illuminated pushbuttons	**6AV6 645-0EF01-0AX1**
SIMATIC Mobile Panel 277 IWLAN V2 (USA version)	
• Communication via WLAN (PROFINET)	**6AV6 645-0FD01-0AX1**
• Communication via WLAN (PROFINET) with integrated handwheel, key-operated switch and two illuminated pushbuttons	**6AV6 645-0FE01-0AX1**
SIMATIC Mobile Panel 277F IWLAN V2 PROFIsafe (USA version)	
• with acknowledgement button and emergency stop button	**6AV6 645-0GB01-0AX1**
• with acknowledgement button and emergency stop button with integrated handwheel, key-operated switch, and two illuminated pushbuttons	**6AV6 645-0GC01-0AX1**
• with acknowledgement button and emergency stop button with integrated handwheel, key-operated switch, and two illuminated pushbuttons (tag version)	**6AV6 645-0GF01-0AX1**
Starter kit SIMATIC Mobile Panel 277(F) IWLAN (RoW version)	
for	
• Mobile Panel 277 IWLAN V2	**6AV6 651-5GA01-0AA1**
• Mobile Panel 277F IWLAN V2	**6AV6 651-5HA01-0AA1**

	Order No.
Accessories	
Note: Please order the table-top power supply or charging station as well. Required for charging the battery	
• Table-top power supply incl. power cable for EU, US, UK, JP (only suitable for operation under laboratory/office conditions)	**6AV6 671-5CN00-0AX2**
• Charger V2 for safe storage and charging of device incl. lock for securing the device in the charger. Charging capabilities for up to two additional batteries	**6AV6 671-5CE00-0AX1**
• Additional battery with LED indicator for indicating the charge status	**6AV6 671-5CL00-0AX0**
• Transponder V2 incl. batteries (3x AA)	**6AV6 671-5CM00-0AX1**
• Transponder V1 incl. batteries (3x AA) (mandatory for operation in plants with Mobile Panels 277(F) IWLAN V1)	**6AV6 671-5CM00-0AX0**
• Service pack V2 for Mobile Panel 277(F) IWLAN V2 contains accessories pack for Mobile Panel 277 (labeling strip cover), battery compartment cover (device), cover left/right (charger), power supply connector counterpart (charger), replacement key (charger)	**6AV6 671-5CA00-0AX2**

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SIMATIC Mobile Panel 277(F) IWLAN

Ordering data

	Order No.
SCALANCE W-786 Access Points for SIMATIC Mobile Panel 277(F) IWLAN	
• IWLAN Access Points with integrated radio interfaces; radio networks; IEEE 802.11b/g/a/h at 2.4/5 GHz up to 54 Mbit/s. National approvals; WPA2/AES; Power over Ethernet (PoE), degree of protection IP65 (-40 °C to +70 °C); scope of delivery: Mounting hardware, 48 V DC terminal block; manual on CD-ROM; German/English;	
SCALANCE W-786-2RR	
IWLAN Dual Access Point with two integrated radio interface for setting up radio links with iPCF; RJ45 connection	
Four internal antennas	
• National approvals for operation outside the U.S.	**6GK5 786-2BA60-6AA0**
• National approvals for operation within the U.S. [1]	**6GK5 786-2BA60-6AB0**
SCALANCE W-786-1PRO	
IWLAN Access Points with built-in wireless interface RJ45 connection	
Two internal antennas	
• National approvals for operation outside the U.S.	**6GK5 786-1BA60-2AA0**
• National approvals for operation within the U.S. [1]	**6GK5 786-1BA60-2AB0**
Further IWLAN Access Point versions:	
SCALANCE W-784 Access Points	**6GK5 784-1AA30-...**
SCALANCE W-786 Access Points	**6GK5 786-...**
SCALANCE W-788 Access Points	**6GK5 788-...**
PS791-2DC power supply	**6GK5 791-2DC00-0AA0**
• 24 V DC power supply for installation in SCALANCE W-786 products; operating instructions in German/English	
PS791-2AC power supply	**6GK5 791-2AC00-0AA0**
• 110 V AC to 230 V AC power supply for installation in SCALANCE W-786 products; operating instructions in German/English	
Other compatible accessories	See catalog ST 80 / ST PC

[1] Please note national approvals at www.siemens.com/wireless-approvals

	Order No.
Configuration	
with SIMATIC WinCC flexible	See catalog ST 80 / ST PC
Documentation (to be ordered separately)	
Mobile Panel 277F IWLAN V2 Operating Instructions	
• German	**6AV6 691-1DQ01-2AA1**
• English	**6AV6 691-1DQ01-2AB1**
• French	**6AV6 691-1DQ01-2AC1**
• Italian	**6AV6 691-1DQ01-2AD1**
• Spanish	**6AV6 691-1DQ01-2AE1**
Mobile Panel 277 IWLAN V2 Operating Instructions	
• German	**6AV6 691-1DM01-2AA1**
• English	**6AV6 691-1DM01-2AB1**
• French	**6AV6 691-1DM01-2AC1**
• Italian	**6AV6 691-1DM01-2AD1**
• Spanish	**6AV6 691-1DM01-2AE1**
User Manual WinCC flexible Compact/Standard/Advanced	
• German	**6AV6 691-1AB01-3AA0**
• English	**6AV6 691-1AB01-3AB0**
• French	**6AV6 691-1AB01-3AC0**
• Italian	**6AV6 691-1AB01-3AD0**
• Spanish	**6AV6 691-1AB01-3AE0**
WinCC flexible Communication User Manual	
• German	**6AV6 691-1CA01-3AA0**
• English	**6AV6 691-1CA01-3AB0**
• French	**6AV6 691-1CA01-3AC0**
• Italian	**6AV6 691-1CA01-3AD0**
• Spanish	**6AV6 691-1CA01-3AE0**
Accessories for Mobile Panels	See HMI accessories

The Function Manuals "Fail-Safe Operation of the Mobile Panel 277F IWLAN V1" are available for downloading in English, German, and Japanese.
http://support.automation.siemens.com/WW/view/en/31255853

More information

Additional information is available in the Internet at:
www.siemens.com/simatic-mobile-panels

Note:
Do you need a specific modification or addition to the products described here? Then take a look under "Customer-specific products". There, you will find information on ordering additional and standard industry products as well as possibilities for customer-specific modifications and adjustments.

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Overview

Interface module for handling communication between ET 200pro and host PROFINET IO controllers over Industrial Wireless LAN (IWLAN) radio networks for 2.4 GHz or 5 GHz with data transfer rates up to 54 Mbit/s.

- Protection against illegal access, espionage, tapping and falsification through use of effective encryption mechanisms
- Fast exchange of devices through use of interchangeable medium MICRO MEMORY CARD

Ordering data

	Order No.
IM 154-6 PN HF IWLAN interface module	
For communication between ET 200pro and host controllers over Industrial Wireless LAN (IWLAN) radio networks; support of PROFIsafe	
With various national approvals; refer to the current list of approvals	**6ES7 154-6AB00-0AB0**
With approval for USA	**6ES7 154-6AB50-0AB0**
Antennas with omnidirectional characteristic	
Mounting directly on IM154-6 PN HF IWLAN	
• ANT IM 154-6 IWLAN; 2 units	**6ES7 194-4MA00-0AA0**
For wall or pipe mounting	
• ANT 792-6MN; rod antenna N-Connect female 2.4 GHz; 1 unit	**6GK5 792-6MN00-0AA6**
• ANT793-6MN; rod antenna N-Connect female 5 GHz; 1 unit	**6GK5 793-6MN00-0AA6**
For use with the RCoax antenna system	
• ANT 792-4DN; RCoax N-Connect female 2.4 GHz; 1 unit	**6GK5 792-4DN00-0AA6**
• ANT793-4MN; RCoax N-Connect female 5 GHz; 1 unit	**6GK5 793-4MN00-0AA6**
Antenna cables IWLAN RCoax; N-Connect / R-SMA	
1 m long	**6XV1 875-5CH10**
2 m long	**6XV1 875-5CH20**
5 m long	**6XV1 875-5CH50**
10 m long	**6XV1 875-5CN10**
IWLAN terminating resistor 50 Ohm for second R-SMA antenna socket, 3 units	**6GK5 795-1TR10-0AA6**

	Order No.
Accessories	
7/8" connecting cable to power supply	
5-core, 5 x 1.5 mm^2, trailing type, pre-assembled with two 7/8" connectors	
1.5 m long	**6XV1 822-5BH15**
2.0 m long	**6XV1 822-5BH20**
3.0 m long	**6XV1 822-5BH30**
5.0 m long	**6XV1 822-5BH50**
10 m long	**6XV1 822-5BN10**
15 m long	**6XV1 822-5BN15**
• Other special lengths with 90° or 180° cable outlet	See http://support.automation.siemens.com/WW/view/en/26999294
Power line	**6XV1 830-8AH10**
5-core, 5 x 1.5 mm^2, trailing type, sold by the meter, minimum order quantity 20 m, maximum order quantity 1,000 m	
7/8" cable connector	**6GK1 905-0FB00**
For ET 200eco, with axial cable outlet; with socket insert, pack of 5	
Twisted Pair cables 4x2 with RJ45 connectors	
0.5 m long	**6XV1 870-3QE50**
1 m long	**6XV1 870-3QH10**
2 m long	**6XV1 870-3QH20**
6 m long	**6XV1 870-3QH60**
10 m long	**6XV1 870-3QN10**
Crossed Twisted Pair cables 4x2 with RJ45 connectors	
0.5 m long	**6XV1 870-3RE50**
1 m long	**6XV1 870-3RH10**
2 m long	**6XV1 870-3RH20**
6 m long	**6XV1 870-3RH60**
10 m long	**6XV1 870-3RN10**

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IM 154-6 PN IWLAN

Ordering data

	Order No.
General accessories	
ET 200pro rack	
• Narrow, for interface, electronics and power modules	
- 500 mm	**6ES7 194-4GA00-0AA0**
- 1000 mm	**6ES7 194-4GA60-0AA0**
- 2000 mm, can be cut to length	**6ES7 194-4GA20-0AA0**
• Compact, for interface, electronics and power modules	
- 500 mm	**6ES7 194-4GC70-0AA0**
- 1000 mm	**6ES7 194-4GC60-0AA0**
- 2000 mm, can be cut to length	**6ES7 194-4GC20-0AA0**
• Wide, for interface, electronics, power modules and motor starters	
- 500 mm	**6ES7 194-4GB00-0AA0**
- 1000 mm	**6ES7 194-4GB60-0AA0**
- 2000 mm, can be cut to length	**6ES7 194-4GB20-0AA0**
• Wide, for I/O modules and motor starters	
- 500 mm	**6ES7 194-4GD00-0AA0**
- 1000 mm	**6ES7 194-4GD10-0AA0**
- 2000 mm	**6ES7 194-4GD20-0AA0**

	Order No.
Spare fuse 12.5 A quick-response, for interface and power modules, 10 items per package unit	**6ES7 194-4HB00-0AA0**
Labels 20 x 7 mm, pale turquoise, 340 units per pack	**3RT1 900-1SB20**
SIMATIC Micro Memory Card	
• 64 KB	**6ES7 953-8LF20-0AA0**
• 128 KB	**6ES7 953-8LG20-0AA0**
• 512 KB	**6ES7 953-8LJ30-0AA0**
SIMATIC Manual Collection Electronic manuals on DVD, multi-language: S7-200, TD 200, S7-300, M7-300, C7, S7-400, M7-400, STEP 7, Engineering Tools, Runtime Software, SIMATIC DP (Distributed I/O), SIMATIC HMI (Human Machine Interface), SIMATIC NET (Industrial Communication)	**6ES7 998-8XC01-8YE0**
SIMATIC Manual Collection – Update service for 1 year Scope of delivery: Current DVD "S7 Manual Collection" and the three subsequent updates	**6ES7 998-8XC01-8YE2**

Note:
You can find more information in Catalog ST 70 and in the Industry Mall at www.siemens.com/industrymall

More information

Wireless approvals

Current approvals can be found on the Internet.

In Germany:

Further information can be found on the Internet at:

www.siemens.com/wireless-approvals

Outside Germany:

Further information can be found on the Internet at:

www.siemens.com/wireless-approvals

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IWLAN/PB Link PN IO

Overview

PN	DP-M	DP-S	ASi-M		
●	●				

- Compact router between Industrial Wireless LAN (IWLAN) and PROFIBUS
- Wireless connection to IWLAN (e.g. SCALANCE W Access Points) according to IEEE 802.11a/b/g/h with up to 54 Mbit/s at 2.4 GHz and 5 GHz
- PROFINET IO proxy;
  connection of PROFIBUS DP slaves to PROFINET IO controller according to PROFINET standard:
  - From the viewpoint of the IO controller, all DP slaves are handled like I/O devices with Ethernet interface, i.e. the IWLAN/PB Link PN IO is their proxy.
  - From the viewpoint of the DP slaves, the IWLAN/PB Link PN IO is the DP master
- High, deterministic data throughput and very fast roaming through support of iPCF; the iPCF mechanism represents an extension of the IEEE 802.11 standard and must be available both on the station and on the access point,
  e.g. SCALANCE W788-1RR
- Full support of the security options defined in the IEEE 802.11i standard for authentication via WPA2 with TLS, TTLS, PEAP
- High degree of protection against unauthorized access thanks to 128-bit encoding (AES)
- Direct substitution of solutions with Power Rail Booster for PROFIBUS with non-contact data transmission technology; Advantages: no wear of sliding contacts
- Cross-network PG/OP communication by means of S7 routing, i.e. all S7 stations can be remotely programmed using the programming device on the Industrial Ethernet or PROFIBUS.
- Cross-network access to data of S7 stations for visualization by means of S7 OPC server and S7 routing;
  via the IE/PB Link PN IO access can be made from the PC on the Industrial Ethernet (e.g. for HMI applications with OPC client interface) to all data of the S7 stations on the PROFIBUS by means of the S7 OPC server.
- Module replacement without the need for a programming device, using the C-PLUG swap media for backing up the configuration data
- Configuring in STEP 7

Benefits

get Designed for Industry

- High mobility;
  increased plant availability through wireless data transmission to mobile communication partners, e.g. to control an automated guided vehicle system (AGVS)
- Wear-free;
  contact-free technology with RCoax as a substitute for contact wires, e.g. for suspended monorails
- Investment protection;
  integration of PROFIBUS field devices into an IWLAN radio network
- Also enables use in plants with PROFIsafe applications
- Flexible use ensured by connecting the antenna best suited to the respective application (e.g. for operation on RCoax radiating cable)

Application

The IWLAN/PB Link PN IO supports the use of an IWLAN, for example with RCoax radiating cables, for wireless data transmission in the case of suspended monorails, storage and retrieval systems, or other applications with mobile stations. Support of PROFINET means that the wide variety of PROFIBUS system services, such as diagnostics over the bus, can still be utilized.

- Suspended monorails;
  vehicle controllers for suspended monorails can be implemented economically on the basis of SIMATIC components. High availability, short response times and easy expansion are achieved by using distributed controllers, such as SIMATIC ET 200S IM 151/CPU. With the aid of the IWLAN/PB Link PN IO, the vehicle controllers can continue to be used without change. The user can also program them remotely with STEP 7 over IWLAN.
- Storage and retrieval systems;
  with these systems, data light barriers requiring intensive maintenance and offering no flexibility can be replaced by an IWLAN solution. This enhances plant availability.

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IWLAN/PB Link PN IO

Design

The IWLAN/PB Link PN IO is snapped onto a standard mounting rail. The external dimensions are the same as those of the Power Rail Booster enclosure. The IP20 degree of protection ensures that the IWLAN/PB Link PN IO is suitable for installation in the control cabinet.

- Compact construction;
  the rugged plastic enclosure features the following on the front panel:
  - an R-SMA interface for connecting an antenna, e.g. for operation on the RCoax radiating cable
  - a 9-pin sub-D socket for connection to PROFIBUS
  - a 4-pin terminal strip for connecting the external supply voltage of 24 V DC.
  - Diagnostic LEDs
- Can be operated without a fan
- Fast device replacement in the event of a fault by using the optional C-PLUG swap medium (not included in scope of supply)

Function

PROFINET

- PROFINET IO proxy;
  wireless connection of PROFIBUS DP slaves to PROFINET IO Controller according to PROFINET standard. Using the IWLAN/PB Link PN IO as a proxy, you can continue to use existing PROFIBUS devices (also with PROFIsafe functionality, V2.0 or higher) and integrate them into a PROFINET application.

Vertical integration

- S7 routing;
  permits cross-network PG communication, in other words, all S7 stations on the IWLAN/Industrial Ethernet or PROFIBUS can be programmed remotely using the programming device. Access can be made to visualization data of S7 stations on the PROFIBUS from HMI stations on the IWLAN/Industrial Ethernet.
- Data set routing (PROFIBUS DP);
  using this option, the IWLAN/PB Link PN IO can be used as a router for data sets that are forwarded to field devices (DP slaves). SIMATIC PDM (**P**rocess **D**evice **M**anager) is a tool that creates data sets of this type for parameterizing and diagnosing field devices.
  It is possible, for example, to use SIMATIC PDM (on the PC) to set parameters and perform diagnostics for a PROFIBUS PA field device on the IWLAN/Industrial Ethernet over the IWLAN/PB Link PN IO and DP/PA Coupler/Link.
  The additional functions for vertical integration can also be used in an existing PROFIBUS application without PROFINET for connection to a higher-level IWLAN/Industrial Ethernet. In this case, the IWLAN/PB Link PN IO is used as an additional DP-Master Class 2 on a PROFIBUS segment for linking to the IWLAN/Industrial Ethernet and offers the above functions.

Diagnosis

Extensive diagnostic options are available via STEP 7 or SNMP, including:

- Diagnosis of the assigned PROFIBUS field devices;
  using the IWLAN/PB Link PN IO as a proxy, the connected DP slaves can be diagnosed in the same manner as PROFINET IO devices (even in the user program of the PROFINET IO controller)
- General diagnostics and statistics functions
- Connection diagnostics
- Diagnostic buffer
- Integration into network management systems through the support of SNMP V1 MIB-II

Configuration

STEP 7 V5.4 or higher or the TIA Portal is required for configuring the full functional scope of the IWLAN/PB Link PN IO.

For the IWLAN/PB Link PN IO, STEP 7 automatically generates the necessary parameters, e.g. the ones that assign addresses, and all necessary routing information.

The configuration data for PROFINET IO created with STEP 7 is saved on the IO controller. Attention must however be paid to the memory capacity. The initialization data for the Ethernet interface is backed up on the C-PLUG (Configuration Plug) swap media. The IWLAN/PB Link PN IO can be swapped in the event of failure without a programming device, because the relevant user and configuration data is saved on the IO controller or on the C-PLUG.

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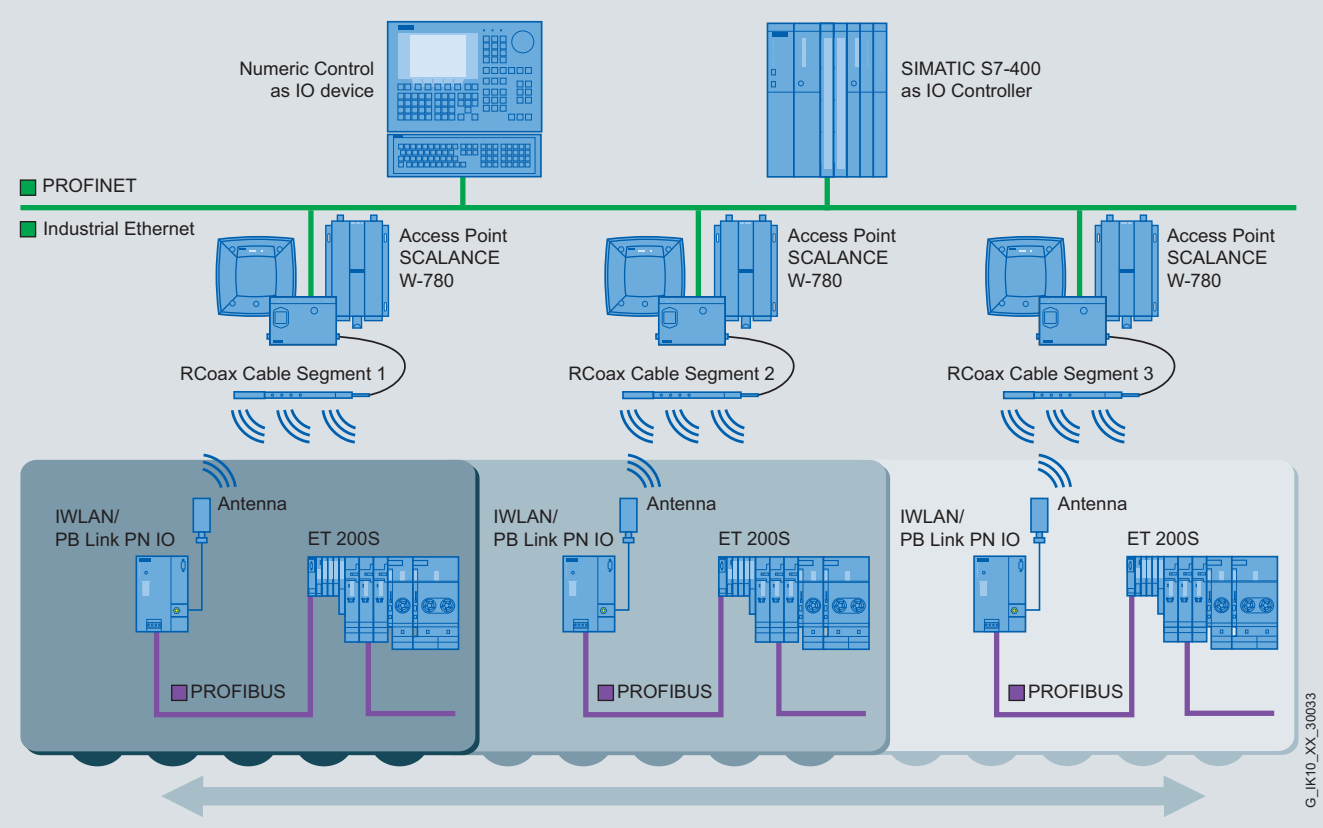
Integration



System solution with IWLAN/PB Link PN IO using example of suspended monorail

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IWLAN/PB Link PN IO

Technical specifications

Product type designation	IWLAN/PB Link PN IO
Transfer rates	
• Radio	1 … 54 Mbit/s
- standards supported	IEEE 802.11a, 802.11b, 802.11g, 802.11h, 802.11i
• PROFIBUS	9.6 kbit/s to 12 Mbit/s incl. 45.45 kbit/s (PROFIBUS PA)
Interfaces	
• Connection to Industrial Wireless LAN	R-SMA antenna socket
• Connection to PROFIBUS	9-pin Sub-D socket
- maximum segment length for PROFIBUS [1]	20 m
- maximum current consumption at the PROFIBUS interface with connection of network components (for example, optical network components)	100 mA at 5 V
• Connection for power supply	4-pin terminal block
Power supply [2]	2 supplies for 20.4 … 28.8 V DC
Current consumption (at rated voltage)	
• external from 24 V DC, max.	300 mA
Power loss	approx. 6.5 W
Perm. ambient conditions	
• Operating temperature	0 … + 60 °C
• Transport/storage temperature	- 40 … + 70 °C
• Relative humidity, max.	95 % at +25 °C
Design	
• Module format	Power Rail Booster enclosure
• Dimensions (W x H x D) in mm	90 x 132 x 75
• Weight	approx. 300 g
Degree of protection	IP20
Configuration	
Configuration software	STEP 7/NCM S7 with V5.3 SP2 or later plus Hardware Support Package for IWLAN/PB Link PN IO

Product type designation	IWLAN/PB Link PN IO
Performance data	
PROFINET communication	
• Number of DP slaves on the IWLAN/PB Link PN IO (PROFINET IO-Devices for PROFINET IO)	max. 8
• Number of DP inputs	max. 256 byte
• Number of DP outputs	max. 256 byte
Additional functionality	
• Number of S7 connections	max. 8
• Number of DSGW connections	max. 8

[1] A repeater is required if the specified length is exceeded

[2] The power supply is electrically isolated; a high-impedance connection (>700 kΩ) exists to the contact spring for mounting of the enclosure on the DIN rail).

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Ordering data	Order No.
IWLAN/PB Link PN IO	
Network transition between Industrial Wireless LAN and PROFIBUS with PROFINET IO functionality, TCP/IP, S7 routing, IEEE 802.11a/b/g/h at 2.4/5 GHz up to 54 Mbit/s, 9.6 Kbit/s to 12 Mbit/s PROFIBUS; including electronic manual on CD-ROM; German, English, French, Spanish, Italian	
• National approvals for operation outside the USA	**6GK1 417-5AB00**
• National approvals for operation within the USA[1)]	**6GK1 417-5AB01**

	Order No.
Accessoires	
C-PLUG Swap medium for simple replacement of devices in the event of a fault; for storing configuration or engineering and application data; can be used for SIMATIC NET products with C-PLUG slot	**6GK1 900-0AB00**
PRESET-PLUG Swap medium for simple initial startup of IWLAN clients, e.g. IWLAN/PB Link PN IO	**6GK5 798-8AB00**
PROFIBUS FC Standard Cable GP Standard type with special design for fast mounting, 2-core, shielded,	**6XV1 830-0EH10**
PROFIBUS FastConnect bus connector RS485 Plug 180 with insulation displacement terminals, with 180° cable outlet, for industrial PC, SIMATIC HMI OP, OLM; max. transmission rate 12 Mbit/s	**6GK1 500-0FC10**
PROFIBUS FastConnect Stripping Tool Preadjusted stripping tool for fast stripping of PROFIBUS FastConnect bus cables	**6GK1 905-6AA00**
S7-300 PS 307 load power supply 24 V DC	**6ES7 307-1BA00-0AA0**
Antennas and miscellaneous IWLAN accessories	See Industrial Wireless LAN/ accessories

1) Please note national approvals at www.siemens.com/wireless-approvals

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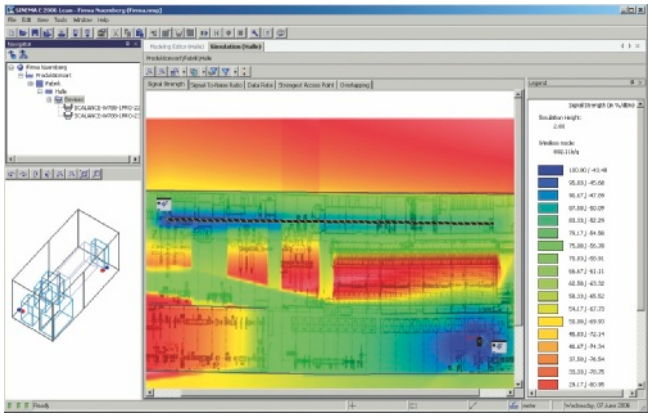
SINEMA E

Overview



- Engineering tool for support with planning, configuration, simulation and measurement of an IWLAN radio field on site (Site Survey) according to the IEEE 802.11 a/b/g/h standard
- Automatic determination of the WLAN infrastructure for new and existing networks
- Optimization functions for minimization of channel interference
- Visualization and analysis of WLAN networks according to signal strength, data rate, signal-to-noise ratio, overlapping and applications (PROFINET, TCP/IP, Voice over WLAN)
- Configuration of single and multiple devices as well as uploading/downloading of IWLAN device parameters
- Site survey functions (measurements) for the acquisition, conditioning, evaluation and visualization of measured WLAN signals
- Integrated and expandable catalog entries for WLAN devices, antennas and radio hindrances as well as standard graphics formats for importing layout plans
- Report function for documenting the configured and measured WLAN infrastructure

Benefits

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- Quick and easy creation of WLAN applications for industrial and office environments indoors and outdoors thanks to functions for
  - automatic detection of the optimal WLAN infrastructure
  - minimization of channel interference
  - simulation of changes to device properties, to predict the operating principle of real networks
  - wizard-supported project and tender preparation
- Minimization of the configuration and start-up outlay thanks to grouped offline and online functions
- Reduction of configuration errors through inherent consistency check
- Analysis of the the performance of existing WLAN networks through measurement and evaluation functions
  - at the beginning or for verification of start-up
  - for troubleshooting and optimization during maintenance and servicing
- Report function including the planning and measurement results for offer generation, device installation instructions and plant documentation
- Extendable catalogs for integration of further
  - WLAN devices (to the IEEE 802.11 a/b/g/h standard)
  - obstacles to radio waves, through the measurement and/or input of attenuation values

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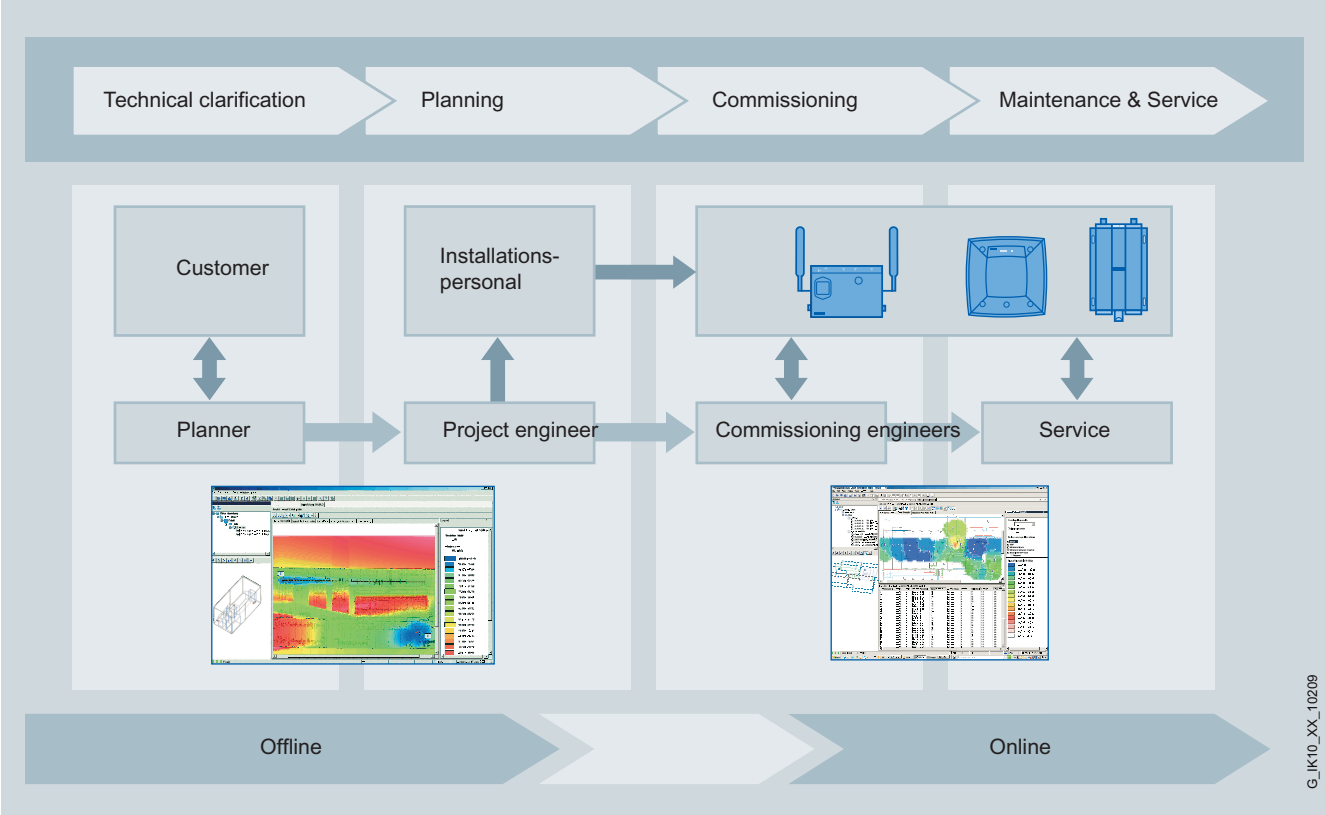
Application

SINEMA E (**SI**MATIC **Ne**twork **Ma**nager Engineering) is the generic term for the engineering of network products such as SCALANCE W.



Application diagram of the SINEMA E software for planning and measuring WLAN networks

SINEMA E 2006 contains the following functions for the engineering of IWLAN networks:

Technical clarification

- Wizard-supported tender preparation

Planning

- Measurement (site survey) of an existing WLAN network
- Planning, simulation, and optimization of a WLAN infrastructure
  - Simultaneous configuring of device groups
  - Generation of a report with installation guidelines

Start-up

- Identification, upload/download from devices
- Measurement (site survey) for verification and optimization of planning
- Report for final documentation

Maintenance and service

- Optimization and fault rectification with the help of measurements (site survey)

The functional scope of the software is subdivided into "lean" and "standard" licenses. With the standard license, additional functions are possible for the acquisition, evaluation and visualization of measured WLAN signals (site survey) as well as extended simulation and planning (automatic placement, contour presentation, storage/comparison of simulations, extended filter options).

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SINEMA E

Function

The SINEMA E software (**SI**MATIC **NE**twork **MA**nager **E**ngineering) provides the user with various different tools for planning, configuration, simulation and measurement (site survey) of WLAN networks.

Modeling, simulation, visualization, and optimization

Special algorithms in **SINEMA E** allow the operating principle of WLAN networks to be predicted taking into account environmental sources of interference. Catalogs provided in the software that contain known sources of interference (e.g. walls, machines, and tools) make it easy to model even the most difficult environments at the office desk quickly and accurately. If required, obstacles specific to the environment can be accurately determined with local measurements and added to the catalog.

Using the software, the properties of Access Points and Client Modules, such as channel settings/transmitted power, and their antennas can be changed to ensure that the optimal configuration is achieved for the real network.

Following simulation, all signal parameters such as range, data rate, attenuation, etc. can be evaluated using several different views. At any time, therefore, the quality of the WLAN can be predicted inside and outside buildings and gaps in security can be closed.

The "standard" license also offers integrated expert functions such as automatic placement and channel optimization, which determine the necessary access points and optimize the device parameters. The "standard" license also supports visualization with contours, further filter options, the comparison of saved simulations and the creation of application profiles for PROFINET, TCP/IP, and Voice over WLAN.

Multi-device setting of access points and clients

The parameters of all SCALANCE W access points and clients are part of the SINEMA E project and can be set accordingly. Common parameters of these devices can be combined in a group and therefore set more rapidly.

Configuring with SINEMA E can also be carried out without the hardware being present. SINEMA E checks the consistency of the configuration, thus preventing faulty settings.

Initial startup and configuration

Simply by pressing a key, SINEMA E identifies all IWLAN nodes which can be accessed online, and transmits all basic parameters of these devices, such as IP addresses etc., during initial commissioning.

Further devices which are not yet included in the project are also detected, and their configuration data can be added to the project.

The initial startup can be carried out from any point in the same subnetwork. Further settings and configurations can then also be transmitted from other subnetworks in the Ethernet network to all devices in the project by pressing a key.

WLAN site survey (measurement), evaluation and visualization

SINEMA E is a complete tool for measurement (site survey) of existing WLAN networks according to the IEEE 802.11 a/b/g/h standard. WLAN signals can be measured using this at the start of planning or for verification during commissioning as well as for troubleshooting during maintenance and servicing.

The software saves received measured values of the WLAN adapter used with the coordinates in the floor plan and links them together. Different methods are available for measurement and evaluation to suit the application.

Standard measuring technique

The WLAN adapter used for measurement is always connected to a previously defined WLAN network (SSID). Properties such as speed, signal strength and roaming behavior of the existing client access point connection are determined.

For continuous measurements along a route, it is sufficient to set a start and end point to enable all additional measuring coordinates to be automatically determined by the software. The WLAN connection properties of a client can then be measured quickly even in the case of large areas.

Advanced measuring technique

All WLAN signals in the environment are scanned so that signals from known and unknown devices can be acquired.

Using the filter functions of SINEMA, such as minimum, maximum, average value, measurements from a wide range of different points in time can be combined and analyzed.

Sales wizard

For creating an offer for IWLAN applications of an industrial plant (Level 1)

SINEMA E report function

The report function supplies an up-to-date project overview at every phase of the engineering process.

A report always comprises a project device list with order numbers and antennas as well as installation coordinates inside and outside the modeling environment. The format and scope of the HTML report can be changed using the software. All the planning and measurement graphics can be inserted as well as later plant photos, logos, etc. without the need for any special software.

The report permits quotations to be generated at an early point in time, and devices can be installed for commissioning using the coordinates data. The report is an important document following commissioning and during service and maintenance.

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Ordering data

	Order No.
SINEMA E	
Engineering software for planning, configuring, simulating and measuring (Site Survey) industrial WLAN applications in office and industrial environments on PG/PC in accordance with the 802.11 a/b/g/h standard; software and electronic manual on CD-ROM, license key on diskette, Class A, for 32-bit Windows XP Professional +SP2; German/English	
• **SINEMA E 2006 Lean** Planning, configuring and simulating WLAN applications	**6GK1 781-0AA00-6AA0**
• **SINEMA E 2006 standard** Extended planning, configuring, simulating and measuring (site survey) of WLAN applications (automatic placement, application profile, contour presentation, storage/comparison of simulations, extended filter options)	**6GK1 782-0AA00-6AA0**
• **SINEMA E 2006 Powerpack** Software upgrade from SINEMA E Lean to SINEMA E Standard	**6GK1 782-4AA00-6AC0**

More information

You can find further information on the Internet at:
www.siemens.com/sinema

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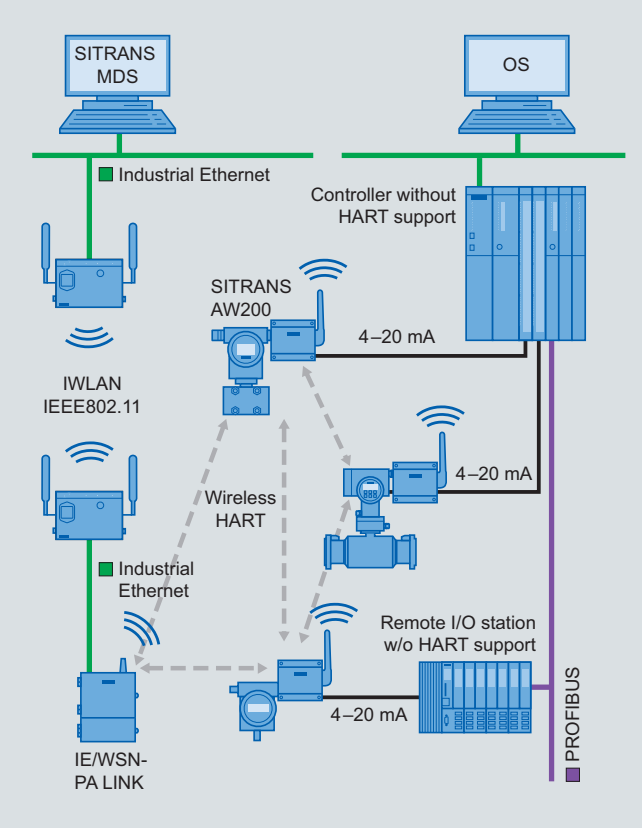
Introduction

Overview



HART (**H**ighway **A**ddressable **R**emote **T**ransducer) is the protocol for bus-addressed field devices. It is not a fieldbus, but a version of the digital field communication that contains many of the functionalities of fieldbuses.

WirelessHART is the wireless HART communication to fieldbuses in the process industry. The HART Communication Foundation (HCF) specified WirelessHART and published it as part of the HART standard V7.1. The radio transmission is based on the wireless communications standard IEEE 802.15.4. High availability is achieved by means of the meshed network architecture (each field device is simultaneously a repeater) with redundant communication paths and constantly changing frequency channels (channel hopping). 128-bit encryption in conjunction with authentication and validation of each data packet ensures secure data transfer and prevents unauthorized access to the field devices.

As a basic principle, a WirelessHART network consists of WirelessHART field devices and a WirelessHART gateway that receives the data from the field devices and forwards it to the automation system.

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Overview

SITRANS P280 for flexible and cost-effective applications in pressure monitoring

- Supports the WirelessHART standard (HART V 7.1)
- Very high security level for wireless data transmission
- Built-in local user interface (LUI) with 3-button operation
- Optimum representation and readability using graphical display (104 x 80 pixels) with integrated backlight
- Stand-by (deep sleep phase) can be activated and deactivated device with push of a button
- Battery power supply
- Battery life time up to 5 years
- Extend battery life time with switch off the HART modem interface
- Optimized power consumption through new design, and increase in battery life time
- Simple configuration thanks to SIMATIC PDM
- Device meets IP65 degree of protection
- Can be used for absolute and gauge pressure measurements

Note:
You can find more information in Catalog FI 01 and in the Industry Mall at www.siemens.com/industrymall

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SITRANS P280

Ordering data

	Order No.
Configuration	
SITRANS P280 WirelessHART pressure transmitter (Required battery not included with delivery, see accessories)	**7MP1120 - ■ ■ ■ ■ ■ - ■ ■ ■ 0**
Measuring cell filling	
Dry measuring cell	**0**
Measuring span	
Gauge pressure	
• 0 ... 2 bar g (0 ... 29 psi g)	**D**
• 0 ... 10 bar g (0 ... 145 psi g)	**E**
• 0 ... 50 bar g (0 ... 725 psi g)	**F**
• 0 ... 200 bar g (0 ... 2900 psi g)	**G**
• 0 ... 400 bar g (0 ... 5800 psi g)	**H**
Absolute pressure	
• 0 ... 2 bar a (0 ... 29 psi a)	**M**
• 0 ... 10 bar a (0 ... 145 psi a)	**N**
• 0 ... 50 bar a (0 ... 725 psi a)	**P**
• 0 ... 200 bar a (0 ... 2900 psi a)	**Q**
• 0 ... 400 bar a (0 ... 5800 psi a)	**R**
Wetted parts	
Ceramic	**K**
Display	
Digital display, visible	**1**
Enclosure	
Die-cast aluminum	**1**
Process connection	
G½ as per EN 837-1	**0**
½-14 NPT	**1**
Explosion protection	
Without	**A**
Antenna	
Variable, attached to device	**A**

	Order No.
Further designs	
Please add "-Z" to Order No. and specify Order code(s) and plain text.	Order code
Stainless steel TAG plate	
• Measuring point number (TAG Nr.) max. 16 digits entered in plain text Y15:	**Y15**
• Measuring point message max. 27 characters entered in plain text: Y16:	**Y16**
Accessoires	
Lithium battery for SITRANS TF280/P280	**7MP1990-0AA00**
Mounting bracket, steel	**7MF4997-1AC**
Mounting bracket, stainless steel	**7MF4997-1AJ**
Cover, die-cast aluminum, without window	**7MF4997-1BB**
Cover, die-cast aluminum, with window	**7MF4997-1BE**
IE/WSN-PA LINK	see Chap. 8
HART modem with RS232 interface	**7MF4997-1DA**
HART modem with USB interface	**7MF4997-1DB**
SIMATIC PDM	see Chap. 9

More information

The PIA Life Cycle Portal is designed to support you in selecting the correct ordering numbers:

www.pia-portal.automation.siemens.com

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Overview

SITRANS TF280 for flexible and cost-effective temperature measurements

- Supports the WirelessHART standard (HART V 7.1)
- Very high security level for wireless data transmission
- Built-in local user interface (LUI) with 3-button operation
- Optimum display and readability using graphics display (104 x 80 pixels) with integrated background lighting
- Stand-by (deep sleep phase) on device can be turned on and off with a push of a button
- Battery power supply
- Battery service live up to 5 years
- Extend battery service life with HART modem interface which can be shut off
- Optimized power consumption through new design, and increase in battery service life
- Simple configuration thanks to SIMATIC PDM
- Housing meets IP65 degree of protection
- Supports all Pt100 sensors as per IEC 751/ EN 60751

Note:
You can find more information in Catalog FI 01 and in the Industry Mall at www.siemens.com/industrymall

Ordering data

Ordering data	Order No.
Configuration	
SITRANS TF280 WirelessHART Temperature transmitter (Required battery not included with delivery, see accessories)	**7MP1110 - 0 A ■ ■ ■ - 0 ■ ■ 0**
Connections/cable entry	
Cable gland M20x1.5	**C**
Sensor pipe with Pt100, G½" male thread, pre-mounted and connected	**D**
Display	
Digital display, visible	**1**
Enclosure	
Die-cast aluminum	**1**
Explosion protection	
Not included	**A**
Antenna	
Variable, attached to device	**A**
Further designs	
Please add "-Z" to Order No. and specify Order code(s) and plain text.	Order code
Stainless steel TAG plate	
Measuring point number (TAG Nr.) max. 16 digits entered in plain text Y15:	**Y15**
Measuring point message max. 27 characters entered in plain text: Y16:	**Y16**
Accessories	
Lithium battery for SITRANS TF280/P280	**7MP1990-0AA00**
Mounting bracket, steel	**7MF4997-1AC**
Mounting bracket, stainless steel	**7MF4997-1AJ**
Cover, die-cast aluminum, without window	**7MF4997-1BB**
Cover, die-cast aluminum, with window	**7MF4997-1BE**
Thread adapter M20x1.5 (male thread) on ½-14 NP (female thread)	**7MP1990-0BA00**
Thread adapter M20x1.5 (male thread) on G½B (female thread)	**7MP1990-0BB00**
IE/WSN-PA LINK	see Chap.. 9
HART modem with RS232 interface	**7MF4997-1DA**
HART modem with USB interface	**7MF4997-1DB**

[1] Please order sensor separately.

More information

The PIA Life Cycle Portal is designed to support you in selecting the correct ordering numbers:

www.pia-portal.automation.siemens.com

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SITRANS AW200

Overview

SITRANS AW200 WirelessHART Adapter

The SITRANS AW200 WirelessHART adapter is a battery-powered communication component, which integrates HART and 4 ... 20 mA field devices into a WirelessHART network. On the wireless communication side, the adapter supports the WirelessHART standard. HART and 4 ... 20 mA field devices are connected on the field device side.

The SITRANS AW200 WirelessHART adapter

- supports the WirelessHART standard (HART V 7.1)
- features a very high degree of security for wireless data transmission
- integrates one 4 ... 20 mA field device or up to four HART field devices (in multidrop mode) into a WirelessHART network
- features intelligent energy management for the power supply of connected field devices
- can be easily parameterized using SIMATIC PDM

Note:
You can find more information in Catalog FI 01 and in the Industry Mall at www.siemens.com/industrymall

Ordering data

	Order No.
Configuration	
SITRANS AW200 adapter for WirelessHART communication	**7MP3112 - ■ ■ ■ ■ 0 - 0 A A 0**
WirelessHART adapter AW200 with 4 ... 20 mA- or HART interface	
Without battery	**1**
Power supply	
Battery powered	**A**
Certificates and approvals [1]	
Ohne	**A**
Enclosure	
Polyester	**0**
Accessories	
Lithium battery for SITRANS AW200	**7MP3990-0AA00**
Thread adapter for direct mounting of the adapter to a field device	**7MF4997-1AC**
• M20 thread adapter	**7MP3990-0BA00**
• Thread adapter G½	**7MP3990-0BB00**
• Thread adapter ½" - 14 NPT	**7MP3990-0BC00**
• Thread adapter ¾" - 14 NPT	**7MP3990-0BD00**
Mounting bracket for attachment to wall/pipe Material: Stainless steel SS304, including cable gland	**7MP3990-0CA00**

[1] Additional approvals in process.

More information

The PIA Life Cycle Portal is designed to support you in selecting the correct ordering numbers:

www.pia-portal.automation.siemens.com

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Overview

- The IE/WSN-PA LINK is a gateway for the connection of WirelessHART field devices (HART V7.1) to Industrial Ethernet, as an alternative or supplement to the wired connection.
- Connection of up to 100 WirelessHART devices
- Approved for operation in hazardous areas in Zone 2
- Open TCP/IP communication and Modbus TCP via the Ethernet interface
- Can be used with HART-OPC servers of the HART Communication Foundation

Note:
A general introduction to WirelessHART and information on the WirelessHART adapter and the WirelessHART field devices can be found in Catalog FI 01 or on the Internet at www.siemens.com/wirelesshart

Benefits

get Designed for Industry

- Extended possible solutions for connecting process industry field devices by means of alternative or supplementary WirelessHART communication
- Reliable data transmission using intermeshed network technology; the self-organizing network with alternative paths enables radio obstacles to be bypassed
- Reduction of cabling costs under difficult installation conditions, e.g. if the field devices are located on inaccessible plant components or are only required temporarily
- To improve process monitoring and for maintenance tasks, sensors can be retrofitted
- Existing transmitters can be integrated wirelessly into maintenance and diagnostics systems by means of WirelessHART adapters
- Without additional software, restricted monitoring is possible via web services and the integrated web server of the IE/WSN-PA LINK.

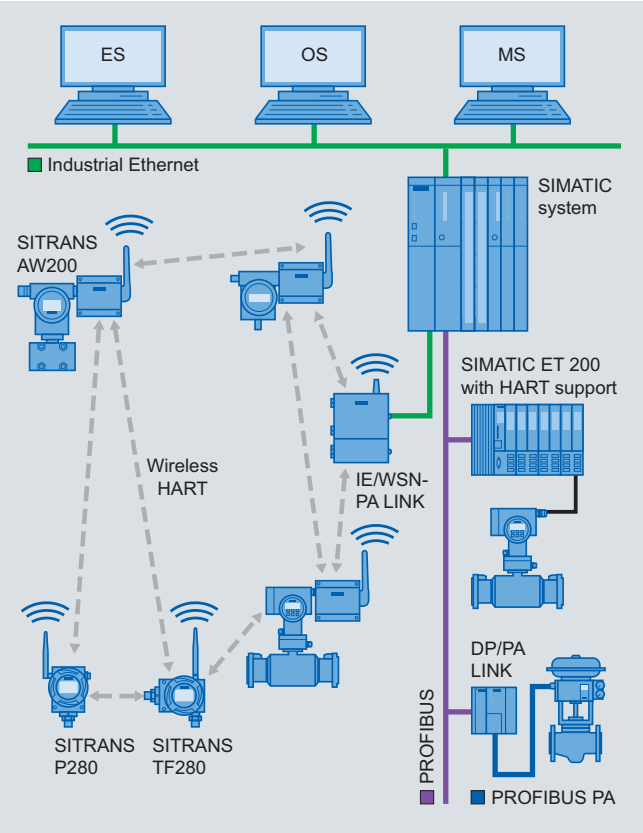
Application

The IE/WSN-PA LINK connects wireless HART field devices by radio to the Ethernet. On the radio side, the IE/WSN-PA LINK supports the WirelessHART standard and on the Ethernet side the TCP/IP and Modbus TCP communication.

The IE/WSN-PA LINK thus enables wireless diagnostics, maintenance and process monitoring.

Monitoring

WirelessHART is particularly suitable for use in plant sections that are to be included in monitoring, but which do not have any existing MSR cabling, e.g. external tank stores or other installations where high cabling costs are anticipated. Data for the visualization can be retrieved from the IE/WSN-PA LINK via Industrial Ethernet or Modbus TCP.



Monitoring of process states via WirelessHART

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IE/WSN-PA LINK

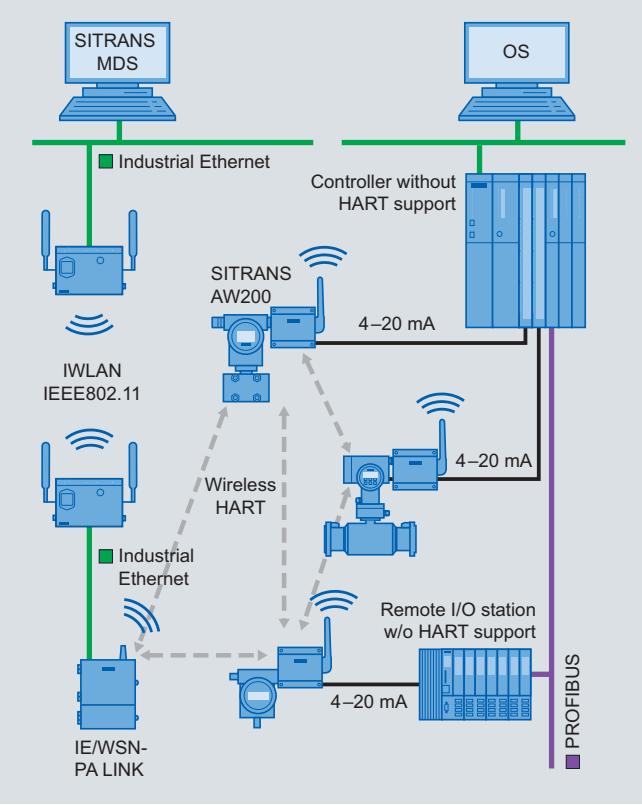
Application (continued)

Retrofitting for diagnostics and maintenance

For this application, wireless adapters are looped into the 4-20 mA interface or screwed directly onto the HART device. The acyclic HART message frames are transmitted by radio between IE/WSN-PA LINK and a wireless adapter. Without affecting the operation of the plant, the wireless adapter modulates the acyclic HART message frames to the 4-20 mA interface or extracts them from the 4-20 mA interface.

The IE/WSN-PA LINK collects the data of all wireless adapters and transfers it via Industrial Ethernet to the diagnostics and maintenance station.

If greater distances between the IE/WSN-PA LINK and the monitoring station are to be spanned without cabling, this can be implemented by means of Industrial Wireless LAN with the access points and client modules of the SCALANCE W family.



Retrofitting of plants for diagnostics and maintenance

Design

- 2 x 10/100/1000 Mbit/s RJ45 ports, electrical (no integral switch; interfaces can be used, for example, for continuous connection to the plant network as well as the temporary connection of a PC)
- 1 x screw terminal for connection to Modbus RTU via RS485
- 1 x screw terminal for the 24 V DC connection
- Rugged metal enclosure with IP65 protection for use outdoors, also in hazardous zone 2
- Mounting: wall or mast mounting (vertical); U-bolts for mast mounting are included in the scope of delivery.

Product versions

- With integral, non-detachable antenna
- With N connector for connection of external antennas

Function

WirelessHART

The IE/WSN-PA LINK establishes on the radio side an inter-meshed wireless sensor network for communication with wireless field devices (e.g. transmitters). The data from the wireless field devices is received by the IE/WSN-PA LINK and transmitted via Industrial Ethernet to the connected systems. The supported wireless network is an open wireless network specified by the HART Communication Foundation (HCF) in accordance with the WirelessHART (HART V7.1) standard.

On the field device side, the IE/WSN-PA LINK requires field devices that support WirelessHART (HART). Existing field devices can be integrated by means of wireless adapters into the WirelessHART communication. To this end, the adapters are looped into the 4-20 mA interface. In addition, as many as four standard HART field devices with external power supply can be connected to the adapter in multidrop mode. Individually connected devices can be operated with the battery of the adapter.

The adapter wirelessly transmits all data and process values of the connected devices. The advantage of this solution is that tried and tested devices can continue to be used.

Industrial Ethernet

Via the Ethernet interface the IE/WSN-PA LINK supports the use of the HART OPC server and the Modbus TCP protocol.

Configuration

The configuration is web-based, without additional software, and performed from the PC. By means of the web user interface it is also possible to display the device states and measured values of the WirelessHART devices.

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Integration

Integration into automation systems

The IE/WSN-PA LINK can be integrated into automation systems via Ethernet or Modbus TCP. Communication modules (CP 343-1 or CP 443-1) are required to connect the IE/WSN-PA LINK to SIMATIC S7-300/400. Function blocks and technical support can be found at:

www.siemens.com/simatic-net/ik-info

Integration in PCS 7

For integration of the IE/WSN-PA LINK into PCS 7 you can obtain function blocks and technical support at:

www.siemens.com/simatic-net/ik-info

Technical specifications

Ordering data	**6GK1 411-6CA40-0AA0**	**6GK1 411-6CA40-0BA0**
Product type designation	**IE/WSN-PA LINK**	**IE/WSN-PA LINK**
Data transmission rate		
• at interface 1	10 … 100 Mbit/s	10 … 100 Mbit/s
• at interface 2	10 … 100 Mbit/s	10 … 100 Mbit/s
• at interface 3	9.6 to 57.6 kbit/s	9.6 to 57.6 kbit/s
Interfaces		
Number of electrical connections		
• at interface 1 in accordance with Industrial Ethernet	1	1
• at interface 2 in accordance with Industrial Ethernet	1	1
• at interface 3 in accordance with RS 485	1	1
• For power supply	1	1
Design of electrical connection		
• at interface 1 in accordance with Industrial Ethernet	RJ45 port	RJ45 port
• at interface 2 in accordance with Industrial Ethernet	RJ45 port	RJ45 port
• at interface 3 in accordance with RS 485	2-pin terminal strip	2-pin terminal strip
• For power supply	3-pin terminal strip	3-pin terminal strip
Interfaces Wireless		
Number of radio cards permanently installed	1	1
Number of internal antennas	1	0
Number of electrical connections for external antenna(s)	0	1
Design of electrical connection for external antenna(s)	-	N-Connector
Supply voltage, current consumption, power loss		
Type of power supply	DC	DC
Supply voltage, external	24 V	24 V
• Minimum	20 V	20 V
• Maximum	28 V	28 V
Current consumed from external power supply at 24 V DC, maximum	0.5 A	0.5 A
Effective power loss, maximum	12 W	12 W

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Technical specifications (continued)

Ordering data	6GK1 411-6CA40-0AA0	6GK1 411-6CA40-0BA0
Product type designation	**IE/WSN-PA LINK**	**IE/WSN-PA LINK**
Permitted ambient conditions		
Ambient temperature		
• During operating phase	-40 … +60 °C	-40 … +60 °C
• During storage	-40 … +85 °C	-40 … +85 °C
• During transport	-40 … +85 °C	-40 … +85 °C
Relative humidity at 25 °C without condensation during operating phase, maximum	90 %	90 %
IP degree of protection	IP 65	IP 65
Design, dimensions and weights		
Housing width	229 mm	229 mm
Housing height		
• Without antenna	306 mm	306 mm
• With antenna	354 mm	354 mm
Housing depth	89 mm	89 mm
Net weight	4.54 kg	4.54 kg
Type of mounting		
• Wall mounting	Yes	Yes
• Mast mounting	Yes	Yes
Type of mounting	Material for mast mounting included in scope of delivery	Material for mast mounting included in scope of delivery
Radio frequencies		
Radio frequency with WirelessHART in the 2.4 GHz frequency band		
• Start value	2.4 GHz	2.4 GHz
• Full-scale value	2.5 GHz	2.5 GHz
Performance data WirelessHART		
Number of WirelessHART devices which can be operated	100	100
Network latency		
• Maximum with 100 field devices and WirelessHART network	10 s	10 s
• Maximum with 50 field devices and WirelessHART network	5 s	5 s
Transition link between two devices with WirelessHART network		
• Maximum	100 m	100 m
• Note	The values may deviate if obstacles affecting radio transmission are present	The values may deviate if obstacles affecting radio transmission are present
HART protocol is supported	Yes	Yes
Product properties, functions, components General		
Protocol is supported		
• Address Resolution Protocol (ARP)	Yes	Yes
• HTTP	Yes	Yes
• HTTPS	Yes	Yes
• Modbus TCP	Yes	Yes
• Modbus TCP secure	Yes	Yes
• Modbus RTU	Yes	Yes

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Technical specifications (continued)

Ordering data	6GK1 411-6CA40-0AA0	6GK1 411-6CA40-0BA0
Product type designation	**IE/WSN-PA LINK**	**IE/WSN-PA LINK**
Product functions Management, configuration, programming		
Product function		
• Web-based management	Yes	Yes
• DHCP client	Yes	Yes
Product functions Diagnostics		
Product function		
• Web-based diagnostics	Yes	Yes
• WirelessHART diagnostics via Modbus	Yes	Yes
Product functions Security		
Product function		
• Password protection - multilevel	Yes	Yes
• WirelessHART join key	Yes	Yes
• ACL - MAC-based	Yes	Yes
• WirelessHART network ID	Yes	Yes
SSL protocol is supported	Yes	Yes
Encryption principle	AES 128 bit	AES 128 bit
Product functions Time		
NTP protocol is supported	Yes	Yes
Standards, specifications, approvals		
Standard for WirelessHART	HART V 7.1	HART V 7.1
Standard for wireless communication IEEE 802.15.4	Yes	Yes
Certificate of suitability		
• CE mark	Yes	Yes
• Referred to CSA	CSA Division 2 & Dust Ignition-proof for Class I, Division 2, Groups A, B, C, and D. Dust Ignition-proof for Class II, Groups E, F, and G / Suitable for Class III Hazardous Locations. / Install per Siemens drawing A5E02467236A. Temperature Code: T4 (-40°C < Ta < 60°C) CSA Enclosure Type 4X	CSA Division 2 & Dust Ignition-proof for Class I, Division 2, Groups A, B, C, and D. Dust Ignition-proof for Class II, Groups E, F, and G / Suitable for Class III Hazardous Locations. / Install per Siemens drawing A5E02467236A. Temperature Code: T4 (-40°C < Ta < 60°C) CSA Enclosure Type 4X
• Referred to FM	FM Division 2, Non-Incendive for Class I, Division 2, Groups A, B, C, and D. Dust Ignition-proof for Class II, III, Division 1, Groups E, F, and G / Indoor and outdoor locations / NEMA Type 4X Temperature Code: T4 (-40°C < Ta < 60°C)	FM Division 2, Non-Incendive for Class I, Division 2, Groups A, B, C, and D. Dust Ignition-proof for Class II, III, Division 1, Groups E, F, and G / Indoor and outdoor locations / NEMA Type 4X Temperature Code: T4 (-40°C < Ta < 60°C)
• Referred to ATEX	ATEX type n, see note: Certificate number: Baseefa10ATEX0044X, ATEX marking: Ex II 3 G, Ex nA nL IIC T4 (-40 °C <= Ta <= 60 °C), rated voltage: 28 V, ATEX Dust Ignition-proof: Certificate number: Baseefa10ATEX0045X, ATEX marking: II 3 D, Ex tD A22 IP66 T135 (-40 °C <= Ta <= 60 °C), rated voltage: 28 V. Note on type n: Conditions for safe handling during installation: The device does not pass the 500 V insulation test in accordance with paragraph 6.8.1 of EN 60079-15:2005. This must be taken into account when installing the device.	ATEX type n, see note: Certificate number: Baseefa10ATEX0044X, ATEX marking: Ex II 3 G, Ex nA nL IIC T4 (-40 °C <= Ta <= 60 °C), rated voltage: 28 V, ATEX Dust Ignition-proof: Certificate number: Baseefa10ATEX0045X, ATEX marking: II 3 D, Ex tD A22 IP66 T135 (-40 °C <= Ta <= 60 °C), rated voltage: 28 V. Note on type n: Conditions for safe handling during installation: The device does not pass the 500 V insulation test in accordance with paragraph 6.8.1 of EN 60079-15:2005. This must be taken into account when installing the device.
• Referred to IECEx	IECEx type n, see note: Certificate number: IECEx BAS 10.0014X, Ex nA nL IIC T4 (-40 °C <= Ta <= 60 °C), rated voltage: 28 V, IECEx Dust Ignition-proof, see note: Certificate number: IECEx BAS 10.0015X, Ex tD A22 IP66 T135 (-40 °C <= Ta <= 60 °C), rated voltage: 28 V. Note on type n: Conditions for safe handling during installation: The device does not pass the 500 V insulation test in accordance with paragraph 6.8.1 of EN 60079-15:2005. This must be taken into account when installing the device.	IECEx type n, see note: Certificate number: IECEx BAS 10.0014X, Ex nA nL IIC T4 (-40 °C <= Ta <= 60 °C), rated voltage: 28 V, IECEx Dust Ignition-proof, see note: Certificate number: IECEx BAS 10.0015X, Ex tD A22 IP66 T135 (-40 °C <= Ta <= 60 °C), rated voltage: 28 V. Note on type n: Conditions for safe handling during installation: The device does not pass the 500 V insulation test in accordance with paragraph 6.8.1 of EN 60079-15:2005. This must be taken into account when installing the device.
• Referred to NEMA	-	-
Wireless approval	FCC and IC approval	IC approval

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IE/WSN-PA LINK

Ordering data

	Order No.
IE/WSN-PA LINK	
Gateway between WirelessHART and Industrial Ethernet; transmission frequency: 2.4 GHz	
• With integral, non-detachable antenna	**6GK1 411-6CA40-0AA0**
• N connector for connection of external antennas	**6GK1 411-6CA40-0BA0**
Antennas	
Antennas with omni-directional characteristics; country permits, compact instructions (hard copy), German/English	
Wall or mast-mounting	
• **Antenna ANT792-6MN** Antenna gain including N-Connect connector 6 dBi, 2.4 GHz	**6GK5 792-6MN00-0AA6**
Roof mounting	
• **ANT795-6MN antenna** Antenna gain incl. N-Connect connector 6/8 dBi, 2.4/5 GHz	**6GK5 795-6MN00-0AA6**
• **Antenna mounting tool (ANT795-6MN)** Mounting tool for installation of ANT795-6MN under a roof	**6GK5 795-6MN01-0AA6**
LP798-1N Lightning Protector	**6GK5 798-2LP00-2AA6**
Lightning protector with N/N female/female connector, IP65 (-40 to +100 °C)	
Antenna cables	
IWLAN N-Connect male/male flexible connection cable	
Flexible connecting cable for connecting an external antenna; assembled with two N-Connect male connectors	
• 1 m	**6XV1 875-5AH10**
• 2 m	**6XV1 875-5AH20**
• 5 m	**6XV1 875-5AH50**
• 10 m	**6XV1 875-5AN10**
HF coupling	**6GK5 798-0CP00-1AA0**
N-Connect male/male connector for connecting the LP798-1N lightning protector	

	Order No.
Accessories	
IE FC M12 Plug PRO	
M12 plug-in connector suitable for on-site assembly (D-coded, IP65/IP67), metal housing, FastConnect connection system, for connecting HARTING adapter cables to the Industrial Ethernet	
• 1 unit	**6GK1 901-0DB20-6AA0**
IE FC TP Standard Cable GP 2 x 2 (Type A)	**6XV1 840-2AH10**
4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/IE FC RJ45 Plug; PROFINET-compatible; with UL approval; sold by the meter; max. length 1000 m, minimum order quantity 20 m	
IE FC Stripping Tool	**6GK1 901-1GA00**
Preadjusted stripping tool for fast stripping of the Industrial Ethernet FC cables	
HARTING adapter cable [1]	**21 03 683 6420**
M12 female NPT 1/2 thread to RJ45 11 cm, (minimum order quantity: 10); The adapter is provided for easy connection of the link to the Industrial Ethernet;	Not included in the scope of delivery of the IE/WSN-PA link; You can find ordering information on the Internet at: www.harting.com/en/kontakt/adressen//
SITOP compact 24 V/ 0.6 A	**6EP1 331-5BA00**
1-phase power supply with wide-range input 85 – 264 V AC/110 – 300 V DC, stabilized output voltage 24 V, rated output current value 0.6 A, slim design	

[1] When using the Harting adapter cable for the Ethernet connection, the requirements for intrinsic safety approval are not applicable. When used in an application relevant to intrinsic safety guidelines, it requires acceptance by the appropriate approval agency.

More information

Current approvals can be found on the Internet at:
http://support.automation.siemens.com/WW/view/en/46374734