



SIMATIC NET

**Industrial Wireless LAN
SCALANCE W788-xPRO/RR /
W74x-1PRO/RR**

Operating Instructions

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Introduction

2.1 Information on the Operating Instructions

Validity of the Operating Instructions

These operating instructions cover the following products:

- SCALANCE W788-1PRO
- SCALANCE W788-2PRO
- SCALANCE W788-1RR
- SCALANCE W788-2RR
- SCALANCE W744-1PRO
- SCALANCE W746-1PRO
- SCALANCE W747-1RR

These operating instructions apply to the following software version:

- SCALANCE W788-xPRO/RR or W74x-1PRO/RR with firmware as of version 4.4

Purpose of the Operating Instructions

Based on the Operating Instructions, you will be able to install and connect up the SCALANCE W788-xPRO/RR or W74x-1PRO/RR correctly. The configuration and the integration of the device in a WLAN are not described in these instructions.

Documentation on the accompanying CD

You will find detailed information on configuration in the configuration manual SCALANCE W-700 on the accompanying CD in the file:

PH_SCALANCE-W-700_76.pdf

Note

Make sure that you read the explanations and instructions in the README.txt file

2.2 Type designations

Abbreviations used

The information in the manuals for the SCALANCE W-700 product family often applies to more than one product variant. In such situations, the designations of the products are shortened to avoid having to list all the type designations. The following table shows how the abbreviations relate to the product variants.

Product group	The designation . . . stands for . . .	Product name
Ethernet client modules (IP30, cabinet installation)	W74x-1	W744-1 W746-1 W747-1
Ethernet client modules (IP65, installed outside a cabinet)	W74x-1PRO/RR	W744-1PRO W746-1PRO W747-1RR
All Ethernet client modules SCALANCE W	W74x	W744-1 W746-1 W747-1 W744-1PRO W746-1PRO W747-1RR
Access points (IP30, cabinet installation)	W784-1xx	W784-1 W784-1RR
Access points (IP65, installed outside a cabinet, extreme climatic requirements)	W786-xPRO/RR	W786-1PRO W786-2PRO W786-3PRO W786-2RR
Access points (IP65, installed outside a cabinet)	W788-xPRO/RR	W788-1PRO W788-2PRO W788-1RR W788-2RR
Access points with the "RR" range of functions	W78x-xRR	W784-1RR W786-2RR W788-1RR W788-2RR

Description

3.1 Components of the product

The following parts belong to the consignment of the SCALANCE W788-xPRO/RR or W74x-1PRO/RR:

- SCALANCE W788-xPRO/RR or W74x-1PRO/RR
- 2 OMNI antennas ANT795-4MR
- 1 IE IP 67 hybrid plug-in connector
- 1 protective cap for the M12 socket
- 2 (or 4 with SCALANCE W788-2PRO or SCALANCE W788-2RR) sealing plugs for the R-SMA sockets
- 1 SIMATIC NET Industrial Wireless LAN CD

Please check that the consignment you have received is complete. If it is not complete, please contact your supplier or your local Siemens office.

3.2 LED displays

Information on the operating status and data transfer of the SCALANCE W-788-xPRO/RR or W74x-1PRO/RR

There are several LEDs on the front of the SCALANCE W788-xPRO/RR or W74x-1PRO/RR that provide information its operating status:

Note

If the LED for the WLAN interface is not green when the device starts up, although it is activated, the interface is not ready for operation (interface not initialized).

The main reason for this is usually that during commissioning of a SCALANCE W788-xPRO/RR or W74x-1PRO/RR products, a waiting time of up to 15 minutes can occur when the ambient temperature is below zero. The device is ready for operation at the specified ambient temperature as soon as the LED for the WLAN interface is lit green.

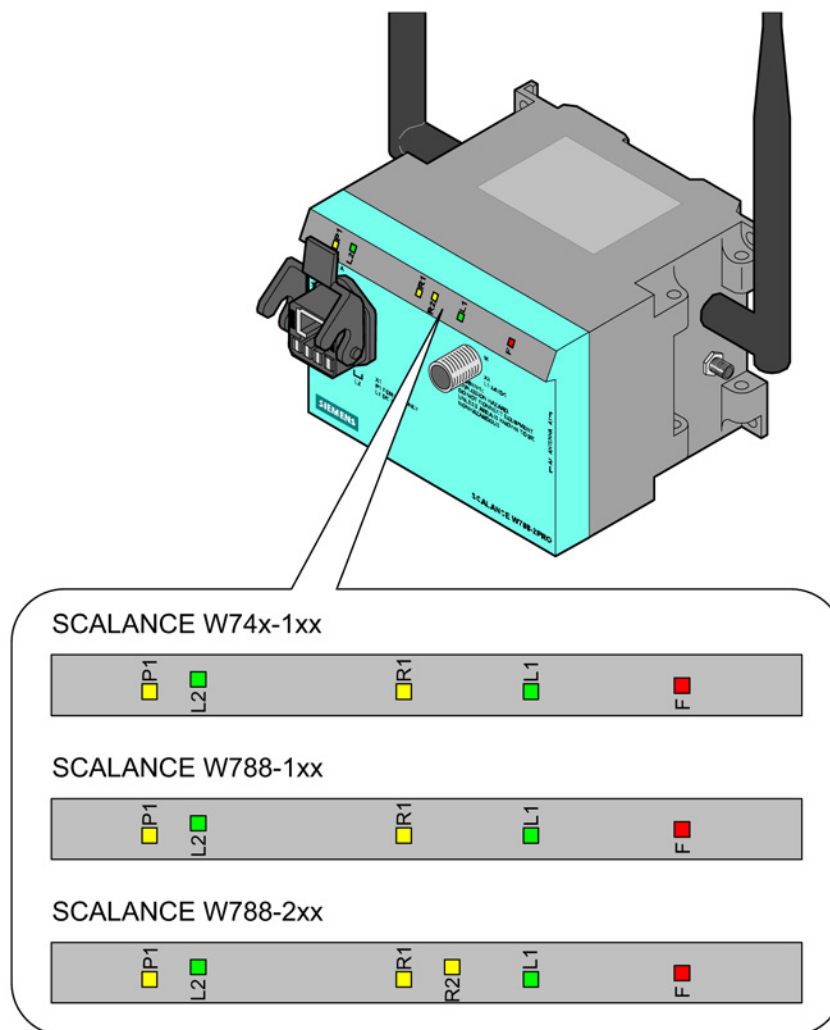


Figure 3-1 LEDs of the SCALANCE W788-xPRO/RR or W74x-1PRO/RR

LED	Color	Meaning
P1	Yellow	Data transfer over the Ethernet interface (traffic).
	Green	There is a connection over the Ethernet port. (Link)
	Flashing yellow	PRESET-PLUG detected.
	Yellow/green	PRESET function completed successfully.
	Flashing green	"Flashing" enabled over PST.
L2	Green	Power supply over the hybrid connector X1 (PoE or energy contacts).
R1	Yellow	Data transfer over the first WLAN interface.
	Green	<i>W788-xPRO/RR in access point mode:</i> The WLAN interface is initialized and ready for operation. <i>W788-xPRO/RR in client mode or W74x-1PRO/RR:</i> There is a connection over the first WLAN interface.
	Flashing green	<i>W788-xPRO/RR in access point mode:</i> The channels are being scanned. <i>W788-xPRO/RR in client mode or W74x-1PRO/RR:</i> The client is searching for a connection to an access point or ad hoc network.
	Green flashing quickly	<i>W788-xPRO/RR in access point mode:</i> With 802.11h, the channel is scanned for one minute for primary users before the channel can be used for data traffic. <i>W788-xPRO/RR in client mode or W74x-1PRO/RR:</i> The client waits for the adopt MAC address due to the setting <Auto find 'Adopt MAC'> and is connected to no access point.
	Green 3 x fast , 1 x long flashing	<i>W788-xPRO/RR in client mode or W74x-1PRO/RR:</i> The client waits for the adopt MAC address due to the setting <Auto find 'Adopt MAC'> and is connected to an access point.
	Flashing yellow	PRESET-PLUG detected.
	Yellow/green	PRESET function completed successfully.

3.2 LED displays

LED	Color	Meaning
R2	Yellow	<i>W788-xPRO/RR in access point mode:</i> Data transfer over the second WLAN port. <i>W788-xPRO/RR in client mode or W74x-1PRO/RR:</i> The LED is always off because the 2nd interface is not available in client mode.
	Green	<i>W788-xPRO/RR in access point mode:</i> The WLAN interface is initialized and ready for operation. <i>W788-xPRO/RR in client mode or W74x-1PRO/RR:</i> The LED is always off because the 2nd interface is not available in client mode.
	Flashing green	<i>W788-xPRO/RR in access point mode:</i> The channels are being scanned. <i>W788-xPRO/RR in client mode or W74x-1PRO/RR:</i> The LED is always off because the 2nd interface is not available in client mode.
	Green flashing quickly	<i>W788-xPRO/RR in access point mode:</i> With 802.11h, the channel is scanned for one minute for primary users before the channel can be used for data traffic. <i>W788-xPRO/RR in client mode or W74x-1PRO/RR:</i> The LED is always off because the 2nd interface is not available in client mode.
	Flashing yellow	PRESET-PLUG detected.
	Yellow/green	PRESET function completed successfully.
L1	Green	Power supply over the M12 connector (X2).
F	Red	An error has occurred during operation of the SCALANCE W788-xPRO/RR or W74x-1PRO/RR.
	Flashing red, R1 or R2 flashing green at the same time	A primary user was found on all enabled channels.

Note**Primary user (radar) on all enabled channels**

If the device detects a primary user on all enabled channels (for example radio waves of a radar station), the LEDs **F** and **R1** flash. No data traffic is then possible for the next 30 minutes. After this time, the device runs the scan again and checks whether a primary user still exists. If no primary user is detected, data traffic is possible again.

The wait time of 30 minutes is necessary due to legal requirements and cannot be shortened even by resetting the device.

3.3 Reset button

Functions of the reset button

The reset button is on the rear of the device below the sealing screw directly beside the C-PLUG and has several functions:

- Restart of the device

To restart the device, press the Reset button.

- Loading new firmware

If the normal procedure with the Load & Save menu of Web Based Management does not work, the reset button can be used to load new firmware. This situation can occur if there was a power outage during the normal firmware update.

- Restoring the default parameters (factory defaults)
- Adopting the configuration data from the PRESET PLUG.

Technical specifications

6.1 Technical specifications for the SCALANCE W788-xPRO/RR and W74x-1PRO/RR

Device variants

The technical specifications of the

- SIMATIC NET SCALANCE W744-1PRO
- SIMATIC NET SCALANCE W746-1PRO
- SIMATIC NET SCALANCE W747-1RR
- SIMATIC NET SCALANCE W788-1PRO
- SIMATIC NET SCALANCE W788-2PRO
- SIMATIC NET SCALANCE W788-1RR
- SIMATIC NET SCALANCE W788-2RR

are largely identical. Unless indicated otherwise in the table, the following tables apply to all the devices listed above:

Data transfer

Ethernet transfer rate	10/100 Mbps
Wireless transmission rate	1 ... 54 Mbps (108 Mbps)
Wireless standards supported	802.11a 802.11b 802.11g 802.11h
Power supply standards supported	802.3af (Power over Ethernet)

Interfaces

Note

Bridging a power outage is possible only with an input voltage of 24 VDC (-15% . . . +20%).

6.1 Technical specifications for the SCALANCE W788-xPRO/RR and W74x-1PRO/RR

Power	• M12 connector 24 VDC, 48 VDC (minimum permitted voltage 18 VDC, maximum permitted voltage 57 VDC) • Power contacts in hybrid connector 24 VDC, 48 VDC (minimum permitted voltage 18 VDC, maximum permitted voltage 57 VDC) • RJ-45 jack Power over Ethernet (48 VDC) The following applies to all named power contacts: Power supply cables isolated according to IEEE 802.3af, isolation resistance > 2 Mohms.
Data	IE IP67 hybrid connector R-SMA antenna sockets (2 x or 4 x with the 788-2PRO)

Electrical data

Maximum power consumption	< 9 W
Typical power consumption (a wireless card)	6 W
Typical power consumption (two wireless cards)	7 W

Construction

Dimensions without antennas (W x H x L)	125 mm x 88 mm x 108 mm
Weight	approx. 1050 g

Permitted ambient conditions

Operating temperature	-20°C to 60°C
Transportation/storage temperature	-40°C to 70°C
Degree of protection	Tested to IP65

MTBF information (mean time between failure)

MTBF	67 years
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6.1 Technical specifications for the SCALANCE W788-xPRO/RR and W74x-1PRO/RR

Transmit power

Table 6- 1 Transmit power in IEEE 802.11b mode (2.4 GHz)

Data rate [Mbps]	P ₀ [dBm]
1	20
2	20
5.5	20
11	20

Table 6- 2 Transmit power in IEEE 802.11g mode (2.4 GHz)

Data rate [Mbps]	P ₀ [dBm]
6	17
9	17
12	17
18	17
24	17
36	17
48	17
54	16

Table 6- 3 Transmit power in IEEE 802.11a/h mode (5 GHz)

Data rate [Mbps]	P ₀ [dBm]
6	17
9	17
12	17
18	17
24	17
36	16
48	15
54	13.5

Receiver sensitivity

Table 6- 4 Receiver sensitivity in IEEE 802.11b mode (2.4 GHz)

Data rate [Mbps]	P _e [dBm]
1	-98
2	-94
5.5	-92
11	-90

Table 6- 5 Receiver sensitivity in IEEE 802.11g mode (2.4 GHz)

Data rate [Mbps]	P _e [dBm]
6	-93
9	-92
12	-91
18	-88
24	-85
36	-82
48	-77
54	-76

Table 6- 6 Receiver sensitivity in IEEE 802.11a/h mode (5 GHz)

Data rate [Mbps]	P _e [dBm]
6	-90
9	-89
12	-88
18	-86
24	-83
36	-80
48	-75
54	-74

PNIO - performance data

Even in the planning phase of a plant, it is important to know the reaction time of IO communication and the delay time for data communication in a PROFIBUS, PROFINET IO or Industrial Ethernet network. To provide you with reliable information on typical plants with different topologies, a large number of different configurations have been set up and measured. Based on these measured values, you can do the following:

- Design plants ideally in terms of their communication response and
- Compare different plant configurations with each other

You will find the measured values with the following link:

<http://www.siemens.de/automation/pd>

Certification ID

The following table shows the product names and the corresponding certification ID:

Type	Number of supported IP nodes	Number of supported MAC nodes	IPCF mode	Certification ID Order no. Order no. US variant
W788-1PRO	Multiple	Multiple	No	RAP-W1-RJ-E1 6GK5788-1AA60-2AA0 6GK5788-1AA60-2AB0
W788-2PRO	Multiple	Multiple	No	RAP-W2-RJ-E2 6GK5788-2AA60-2AA0 6GK5788-2AA60-2AB0
W788-1RR	Multiple	Multiple	Yes	RAP-W1-RJ-E1 6GK5788-1AA60-6AA0 6GK5788-1AA60-6AB0
W788-2RR	Multiple	Multiple	Yes	RAP-W2-RJ-E2 6GK5788-2AA60-6AA0 6GK5788-2AA60-6AB0
W744-1PRO	1	1	No	RAP-W1-RJ-E1 6GK5744-1AA60-2AA0 6GK5744-1AA60-2AB0
W746-1PRO	Multiple	Multiple	No	RAP-W1-RJ-E1 6GK5746-1AA60-4AA0 6GK5746-1AA60-4AB0
W747-1RR	Multiple	Multiple	Yes	RAP-W1-RJ-E1 6GK5747-1AA60-6AA0 6GK5747-1AA60-6AB0