

SIMATIC NET

Industrial Remote Communication Remote Networks SCALANCE M874, M876

Operating Instructions

Preface

Safety notices

1

Security recommendations

2

Description of the device

3

Installing and removing

4

Connecting up

5

Maintenance and cleaning

6

Troubleshooting

7

Technical specifications

8

Dimension drawings

9

Approvals

10

Preface

Purpose of the operating instructions

Based on the operating instructions, you will be able to install and connect the SCALANCE device correctly. The instructions are aimed primarily at planning, commissioning, maintenance and service personnel.

The configuration and the integration of the device in a network are not described in these instructions.

Scope of validity

These operating instructions cover the following products:

Product	Description	Article numbers
SCALANCE M874-2	Mobile wireless router for 2G (GPRS/EDGE)	6GK5874-2AA00-2AA2
SCALANCE M874-3	Mobile wireless router for 3G (HSPA+)	6GK5874-3AA00-2AA2
SCALANCE M876-3	Mobile wireless router for 3G (HSPA+) with antenna diversity	6GK5876-3AA02-2BA2 6GK5876-3AA02-2EA2 (ROK)
SCALANCE M876-4	Mobile wireless router for 4G (LTE) with antenna diversity	6GK5876-4AA00-2BA2 (EU) 6GK5876-4AA00-2DA2 (NAM)
	Mobile wireless router for 4G (LTE) optimized for worldwide use	6GK5876-4AA10-2BA2

These operating instructions apply to the following firmware version:

- SCALANCE M-800/S615 as of version V8.3

Designations used

Classification	Description	Terms used
Product line	For all devices and variants of all product groups within the SCALANCE M-800 product line, the term M-800 is used.	M-800
Product group	For all devices and variants of a product group, only the product group is used.	M874 stands for M874-2 and M874-3 M876 stands for M876-3 and M876-4 M87x stands for M874-2, M874-3, M876-3 and M876-4
Device	For a device, only the device name is used.	M874-2 M874-3 M876-3 M876-4

Description of the device

3.1 Product characteristics

Interfaces

Functionality	SCALANCE M874-2 SCALANCE M874-3	SCALANCE M876-3 SCALANCE M876-4
Connectors for external antennas	1 SMA antenna connector	2 SMA antenna connectors
Ethernet interface	2 x RJ45 10 / 100 Mbps	4 x RJ45 10 / 100 Mbps
Digital input/output	1/1	1/1

Using the device in a PROFINET environment

Note

When using the device in a PROFINET environment, follow the configuration instructions in the configuration manuals:

- Web Based Management: Description > Requirements for operation > Use in a PROFINET environment
 - Command Line Interface: General > Use in a PROFINET environment
-

Installing and removing

4.1 Safety when mounting

Safety notices

When installing the device, keep to the safety notices listed below.

NOTICE

Improper mounting

Improper mounting may damage the device or impair its operation.

- Before mounting the device, always ensure that there is no visible damage to the device.
- Mount the device using suitable tools. Observe the information in the respective section about mounting.

WARNING

If a device is operated in an ambient temperature of more than 50 °C, the temperature of the device housing may be higher than 70 °C. The device must therefore be installed so that it is only accessible to service personnel or users that are aware of the reason for restricted access and the required safety measures at an ambient temperature higher than 50 °C.

WARNING

If the device is installed in a cabinet, the inner temperature of the cabinet corresponds to the ambient temperature of the device.

WARNING

Warming and premature aging of the device due to direct sunlight/UV light

Direct sunlight and UV light can heat up the device and can lead to premature aging of the device and its cabling.

Provide suitable shade to protect the device against direct sunlight and UV light.

 WARNING

Open equipment

The devices are "open equipment" according to the standard IEC 61010-2-201 or UL 61010-2-201 / CSA C22.2 No. 61010-2-201. To fulfill requirements for safe operation with regard to mechanical stability, flame retardation, stability, and protection against contact, the following alternative types of installation are specified:

- Installation in a suitable cabinet.
- Installation in a suitable enclosure.
- Installation in a suitably equipped, enclosed control room.

 WARNING

If the temperature at the cable or housing socket or at the branching points of the cables exceeds 60 °C, special precautions must be taken. If the equipment is operated at ambient temperatures in excess of 40 °C, only use cables with permitted operating temperature of at least 80 °C.

 WARNING

Improper disassembly

Improper disassembly may result in a risk of explosion in hazardous areas.

For proper disassembly, observe the following:

- Before starting work, ensure that the electricity is switched off.
- Secure remaining connections so that no damage can occur as a result of disassembly if the system is accidentally started up.

4.2 Securing the housing

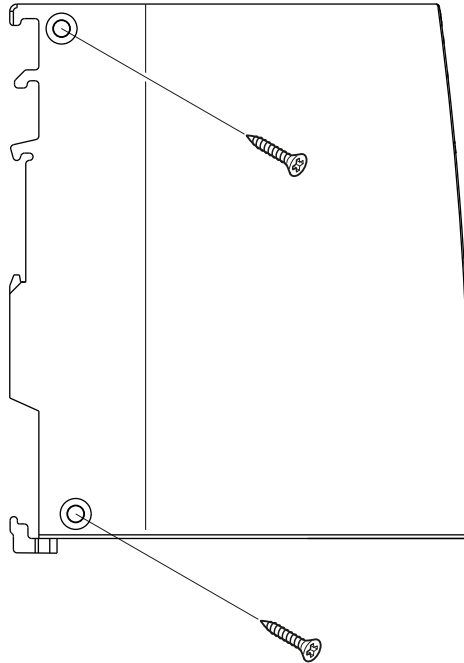
Types of installation

For the device, you have the following options:

- Wall mounting (no ceiling mounting)
- Installation on a DIN rail
- Installation on the S7-300 mounting rail
- Installation on the S7-1500 mounting rail
- Installation in a 19" mounting frame
- Installation on a desktop pedestal

Installation

1. Insert the SIM card, refer to the section "SIM card (Page 71)".
2. Prepare the drill holes for wall mounting. For the precise dimensions, refer to the section "Dimension drawings (Page 105)".
3. Secure the device to the wall with two screws. When mounting on a wall, use mounting fittings suitable for the type of wall.



1. Connect the power supply, refer to the section "Power supply (Page 63)".
2. Fit the connectors for the digital input and digital output, refer to the section "Digital input/output (Page 65)".
3. Connect the antenna, refer to the section "Antennas (Page 67)".
4. Connect the device to the local network, refer to the section "Ethernet port (Page 70)".
5. Connect the terminal with as short a cable as possible ≤ 150 mm and a large cross-sectional area ≥ 1.5 mm² to the functional ground of the system, refer to the section "Grounding (Page 64)" and section "Terminals (Page 32)".

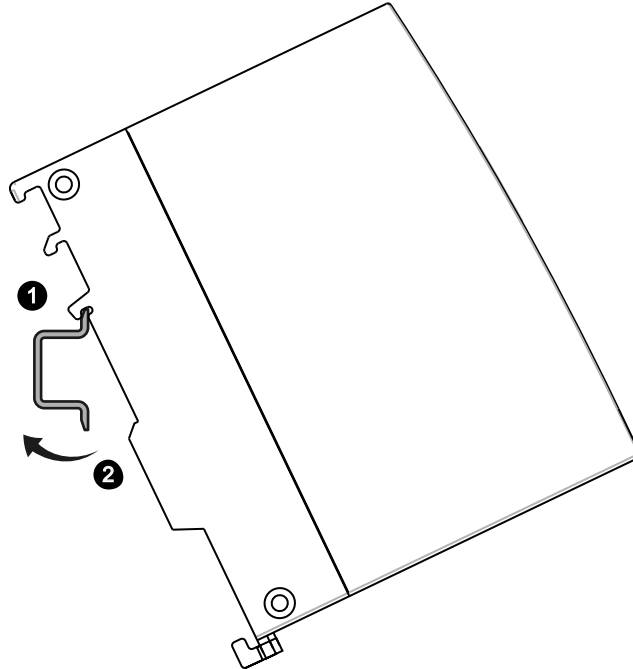
4.4 Installation on the DIN rail

Requirement

There is a mini SIM card for the device.

Installation

1. Insert the SIM card, refer to the section "SIM card (Page 71)".
2. Place the third housing guide of the device on the top edge of the DIN rail ①.



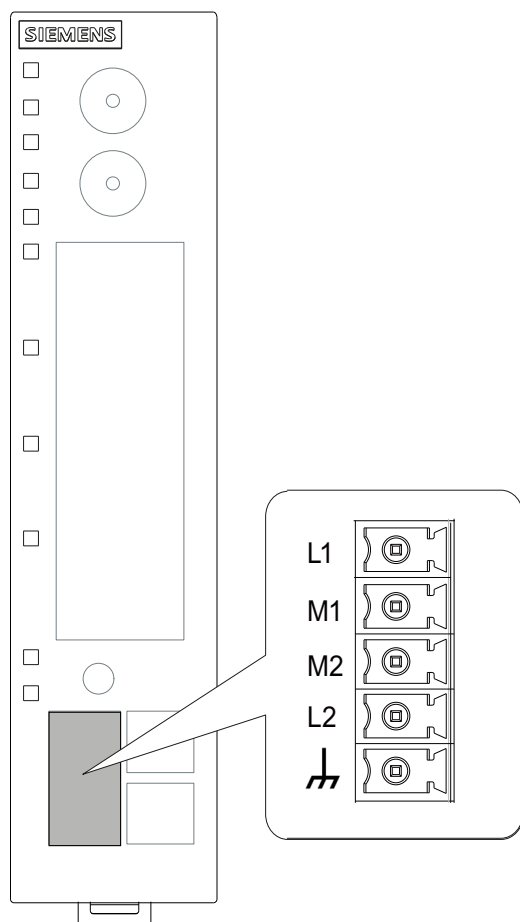
3. Press the device down against the DIN rail until the spring catch locks into place ②.
4. Connect the power supply, refer to the section "Power supply (Page 63)".
5. Fit the connectors for the digital input and digital output, refer to the section "Digital input/output (Page 65)".
6. Connect the antenna, refer to the section "Antennas (Page 67)".
7. Connect the device to the local network, refer to the section "Ethernet port (Page 70)".
8. Connect the terminal with as short a cable as possible ≤ 150 mm and a large cross-sectional area ≥ 1.5 mm² to the functional ground of the system, refer to the section "Grounding (Page 64)" and section "Terminals (Page 32)".

Uninstalling

1. Disconnect all connected cables.
2. Using a screwdriver, pull down the catch on the rear of the device.
3. Pull lower part of the device away from the DIN rail.

5.3 Power supply

The power supply is connected using a 5-pin terminal block. The power supply is non-floating.



PIN	Signal	Description
1	L1+	24 VDC
2	M1	Ground
3	M2	Ground
4	L2+	24 VDC
5		Functional ground, refer to the section "Grounding (Page 64)"

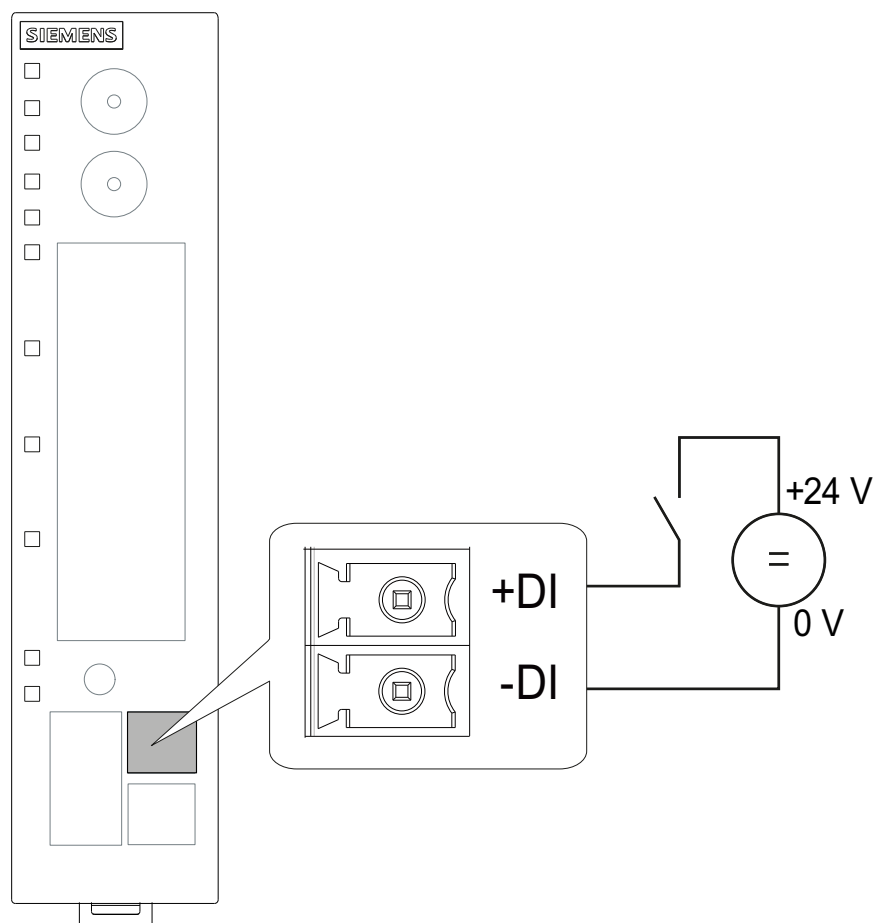
You can find information on wiring in the section "Terminals (Page 32)".

External power supply

Refer to the section Connecting up (Page 57) and the installation instructions and instructions for use of the manufacturer of the power supply, the battery or the accumulator.

Digital input

The 2-pin terminal block has the following assignment:



Contact	Assignment
+DI	Input
-DI	Ground

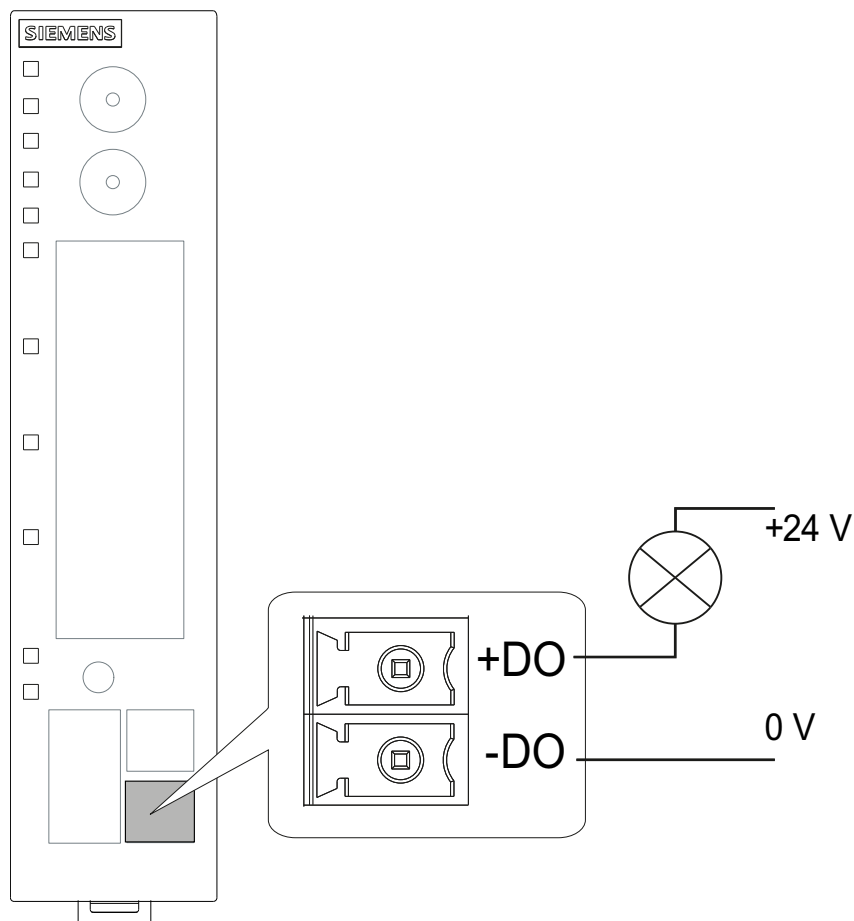
If there is an adequate switching voltage at the digital input, the digital input is active and the "DI" LED is lit.

The voltage applied to the "DI" contact is converted to a digital status by the device as follows:

Voltage	Status
-30 to +3 V DC	0
+13 to +30 V DC	1

Digital output

The 2-pin terminal block has the following assignment:



Contact	Assignment
+DO	Switching signal
-DO	Ground

The output is a switch that switches the signal at +DO to -DO.

5.6 Antennas

Note

Use the antennas from the accessories program for the M87x device. You will find more detailed information in "Accessories (Page 31)". If you use a different antenna, there is no guarantee that the device will function according to the specification.

You can either connect an external antenna directly to the device or connect it with a flexible connecting cable.

The antenna socket for connecting the antenna is of the type SMA. The antenna used should have an impedance of about 50 ohms.

! CAUTION

Minimum clearance to the device

The device may only be operated when the distance between the device (or antenna) and user is at least 26 cm.

Notes on lightning protection



! WARNING

Danger due to lightning strikes

Antennas installed outdoors must be within the area covered by a lightning protection system. Make sure that all conducting systems entering from outdoors are protected by lightning protection electrical bonding.

When implementing your lightning protection concept, make sure you adhere to the requirements of the VDE 0182 or IEC 62305 standards.

Suitable lightning protectors are available in the range of accessories of SIMATIC NET Industrial WLAN:

- Lightning protector LP798-1N (order no. 6GK5798-2LP00-2AA6)
- Lightning protector LP798-2N (order no. 6GK5798-2LP10-2AA6)

Note

We recommend that you use the maintenance-free lightning protector LP798-2N. Exception: When there is also DC power supplied via the antenna cable. In this case, only the lightning protector LP798-1N can be used.

- Depending on the connector, an adapter cable is required to connect to SMA.



! WARNING

Danger due to lightning strikes

Installing this lightning protector between an antenna and a SCALANCE M87x is not adequate protection against a lightning strike. The LP798-1N lightning protector only works within the framework of a comprehensive lightning protection concept. If you have questions, ask a qualified specialist company.

Procedure

1. Insert the connector on the antenna cable into the SMA socket and tighten the sleeve nut of the plug on the socket (key size SW8, tightening torque 0.6 Nm).

NOTICE

The SMA socket may be damaged

When securing an antenna to the device, only the screw cap of the antenna can be rotated. Rotating the entire antenna could damage the SMA connector on the device.

Frequency bands

Depending on the frequency bands used by your mobile wireless provider, antennas must be tuned to the following frequencies:

SCALANCE M876-4 6GK5 876-4AA10-2BA2	LTE bands	B1, B2, B3, B4, B5, B7, B8, B12, B13, B18, B19, B20, B26, B28, B66
	LTE TDD:	B38, B40, B41
	UMTS with HSPA+	B1, B2, B3, B4, B5, B6, B8, B19
	GSM	850 MHz, 900 MHz, 1800 MHz, 1900 MHz
SCALANCE M876-4 (NAM) 6GK5876-4AA00-2DA2	LTE	700 MHz, 850 MHz, AWS-1 (1700/2100) MHz, 1900 MHz
	UMTS with HSPA+	850 MHz, AWS-1 (1700/2100) MHz, 1900 MHz
	GSM	850 MHz, 900 MHz, 1800 MHz, 1900 MHz
SCALANCE M876-4 (EU) 6GK5 876-4AA00-2BA2	LTE	800 MHz, 900 MHz, 1800 MHz, 2100 MHz, 2600 MHz
	UMTS with HSPA+	900 MHz, 1800 MHz, 2100 MHz
	GSM	850 MHz, 1900 MHz
SCALANCE M876-3 6GK5 876-3AA02-2EA2	GSM	850 MHz, 900 MHz, 1800 MHz, 1900 MHz
	UMTS with HSPA+	800 MHz, 850 MHz, 900 MHz, 1800 MHz, 1900 MHz, 2100 MHz
	CDMA	800, 1900 MHz
SCALANCE M876-3 6GK5 876-3AA02-2EA2	GSM	850 MHz, 900 MHz, 1800 MHz, 1900 MHz
	UMTS with HSPA+	800 MHz, 850 MHz, 900 MHz, 1800 MHz, 1900 MHz, 2100 MHz
SCALANCE M874-3 6GK5 874-3AA00-2AA2	GSM	850 MHz, 900 MHz, 1800 MHz, 1900 MHz
	UMTS	800 MHz, 850 MHz, 900 MHz, 1800 MHz, 1900 MHz, 2100 MHz
SCALANCE M874-2 6GK5 874-2AA00-2AA2	GSM	850 MHz, 900 MHz, 1800 MHz, 1900 MHz

Check with your mobile wireless provider for the suitable frequencies.

Signal quality

During installation make sure that there is a good signal strength of > -73 dBm.

M874-3		
Antenna connector	Quantity	1
	Design	SMA socket (straight)
	Impedance	50 Ω nominal
Frequency bands	UMTS	800 MHz, 850 MHz, 900 MHz, 1800 MHz, 1900 MHz, 2100 MHz
	GSM	850 MHz, 900 MHz, 1800 MHz, 1900 MHz
UMTS with HSPA+	Transmission speed	- HSDPA (downlink): up to 14.4 Mbps - HSUPA (uplink): up to 5.76 Mbps
EGPRS	Properties	Multislot class 12, end device class B - Coding scheme downlink: CS 1 ... 4, MCS 1 ... 9 - Coding scheme uplink: CS 1 ... 4, MCS 1 ... 9
	Transmission speed	- Downlink: up to 237 kbps: - Uplink: up to 237 kbps:
GPRS	Properties	Multislot class 12, end device class B, coding scheme 1 ... 4
	Transmission speed	- Downlink: up to 85.6 kbps. - Uplink: up to 85.6 kbps.
GSM (CSD dial-in)	Properties	Radio Link Protocol (RLP) V.110, non-transparent
	Transmission speed	up to 14.4 kbps
SMS (TX)	Properties	Text mode, SMSoverIP
Electrical data		
Power supply	Quantity	1
	Design	Terminal block, 5-pin
	Properties	Input voltage: 12 to 24 VDC - min. 10.8 VDC, max. 28.8 VDC Maximum power consumption 8 W Maximum cable length < 3 m
Digital input	Quantity	1
	Design	Terminal block, 2-pin
	Properties	Rated voltage 24 VDC Safety Extra Low Voltage (SELV) For state "1": 10 to 30 VDC For state "0": -30 to 3 VDC Maximum input current 8 mA Cables should be routed in pairs Maximum cable length < 30 m Inputs isolated from electronics.

M874-3		
Digital output	Quantity	1
	Design	Terminal block, 2-pin
	Properties	Rated voltage 24 VDC Safety Extra Low Voltage (SELV)
		Relay, internally not current limited Maximum current carrying capacity 1 A Cables should be routed in pairs Maximum cable length < 30 m Output isolated from electronics
Permitted ambient conditions		
Ambient temperature	During operation	Vertical mounting position: • -20 °C ... +60 °C Horizontal mounting position: • -20 °C ... +50 °C
	During storage	-40 °C to +70 °C
	During transportation	-40 °C to +70 °C
Relative humidity	During operation	≤ 95% at 25 °C, no condensation
Design, dimensions and weight		
Module format		Compact module S7-1500
Degree of protection		IP20
Weight		290 g
Dimensions (W x H x D)		34.8 x 150.9 x 134.7 mm
Installation options		• Wall mounting • Mounting on a DIN rail • Installation on S7-300 mounting rail • Installation on S7-1500 mounting rail • Mounting on a pedestal
Mounting position		• Vertical (ventilation openings at the top and bottom) • Horizontal (ventilation openings to the right and left) See Permitted ambient conditions
Product functions		
Configuration / management		• Web Based Management (WBM) via HTTP and HTTPS. • Command Line Interface (CLI) via Telnet and SSH

M874-3	
Security	• Router with NAT function – IP masquerading – NAPT – SourceNAT – NETMAP • Password protection • Firewall function – Port forwarding – IP firewall with stateful packet inspection (layer 3 and 4) – Global and user-defined firewall rules - VPN functions – To establish a VPN (Virtual Private Network), the following functions are available – Up to 20 connections – IPsec VPN, OpenVPN (as client) • SINEMA RC client • Proxy server • Siemens Remote Service (SRS)