


## RFID systems SIMATIC RF300


System Manual


## Legal information

### Warning notice system

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring only to property damage have no safety alert symbol. These notices shown below are graded according to the degree of danger.

 <b>DANGER</b>
indicates that death or severe personal injury <b>will</b> result if proper precautions are not taken.

 <b>WARNING</b>
indicates that death or severe personal injury <b>may</b> result if proper precautions are not taken.

 <b>CAUTION</b>
indicates that minor personal injury can result if proper precautions are not taken.

<b>NOTICE</b>
indicates that property damage can result if proper precautions are not taken.


If more than one degree of danger is present, the warning notice representing the highest degree of danger will be used. A notice warning of injury to persons with a safety alert symbol may also include a warning relating to property damage.

### Qualified Personnel

The product/system described in this documentation may be operated only by **personnel qualified** for the specific task in accordance with the relevant documentation, in particular its warning notices and safety instructions. Qualified personnel are those who, based on their training and experience, are capable of identifying risks and avoiding potential hazards when working with these products/systems.

### Proper use of Siemens products

Note the following:

 <b>WARNING</b>
Siemens products may only be used for the applications described in the catalog and in the relevant technical documentation. If products and components from other manufacturers are used, these must be recommended or approved by Siemens. Proper transport, storage, installation, assembly, commissioning, operation and maintenance are required to ensure that the products operate safely and without any problems. The permissible ambient conditions must be complied with. The information in the relevant documentation must be observed.

### Trademarks

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### Disclaimer of Liability

We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

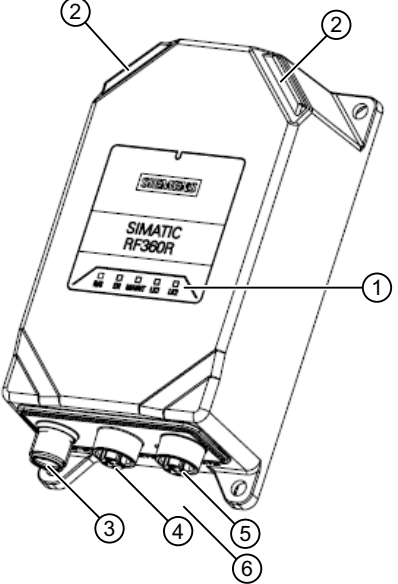
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## 1.1 SIMATIC RF360R

### 1.1.1 Features

SIMATIC RF360R	Characteristics	
	Design	<ul style="list-style-type: none"> <li>① Status LEDs (status display of the reader and PROFINET connection)</li> <li>② Operation LEDs (operating states of the reader)</li> <li>③ Interface for the power supply X80 (M12, 4-pin, L-coded)</li> <li>④ Interface for PROFINET IO X1 P1R (M12, 4-pin, D-coded)</li> <li>⑤ Interface for PROFINET IO X1 P2R (M12, 4-pin, D-coded)<sup>1)</sup></li> <li>⑥ Bore hole for functional ground</li> </ul>
	Area of application	Identification tasks on assembly lines or AGV in industrial environments

<sup>1)</sup> You can loop the PROFINET IO via the M12 round socket ⑤.

#### Note

#### Configuration Manual SIMATIC RF360R

You can find a detailed description of commissioning and configuration of the reader in the "SIMATIC RF360R (<https://support.industry.siemens.com/cs/ww/en/ps/26319/man>)" configuration manual.

### 1.1.2 Ordering data

Table 1-1 RF360R ordering data

	Article number
RF360R with RS-422 interface (3964R)	6GT2801-5BA30

### 1.1.3 Connecting the reader to functional ground

You need to connect the reader to functional ground. A ground bore hole is provided for this on the connection side of the reader for attaching a grounding conductor.

#### Required tools

You need the following tools to connect to the functional ground:

- Screwdriver
- Stripping tool
- Crimp tool

#### Accessories required

You need the following accessories to connect to the functional ground:

- Fastening screw (M3) and washer
- Cable lug suitable for M3 screws
- Ground conductor cable (copper braid) with a minimum cross-section of 4 mm<sup>2</sup>

#### Mounting

Proceed as follows to connect the reader to functional ground via a grounding conductor:

1. Fasten the reader in the holes provided for this purpose.
2. Insulate the ground conductor.
3. Attach the cable lug to the ground conductor.
4. Screw the cable lug together with the M3 fastening screws with a torque of 1.2 Nm.

<b>NOTICE</b>
<b>Low-impedance connection</b>
Ensure a low impedance connection between the reader module and the functional ground. When attaching the grounding cable, ensure it is not on a coated surface.

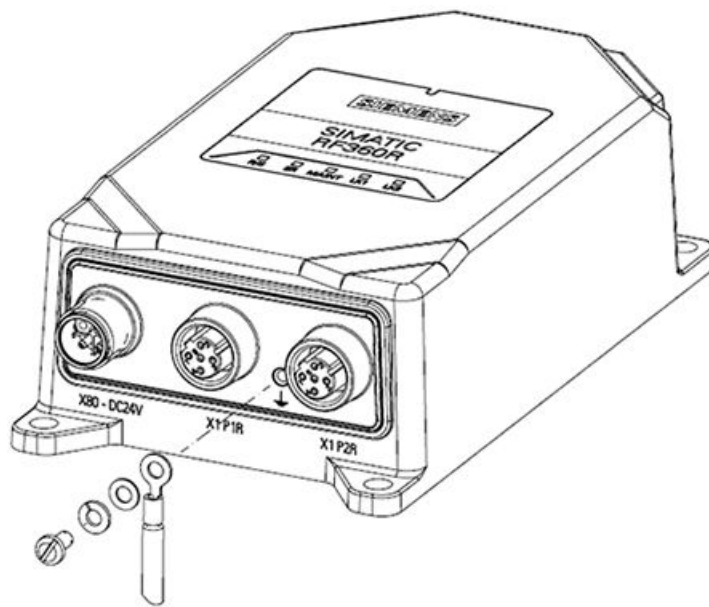


Figure 1-1 Connecting the grounding conductor

## 1.1.4 Connecting readers

### Requirement

Only wire the communication module when the supply voltage is switched off.

### Required tools

When using preassembled cables, you need the following tool:

- Torque wrench set (e.g. from Peres; M12/M8, can be set; PER091) for wiring the reader connections

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### Note

#### Using preassembled cables

When connecting the supply voltage, we recommend the cables specified in the section "AUTOHOTSPOT" (4 x 1.5 mm<sup>2</sup> preassembled).

If you want to make the cable yourself, ensure that the conductor cross-section matches the system setup or the corresponding protection (1.5 mm<sup>2</sup>).

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When using cables that are not preassembled, you need the tool for the specific cable/connector, for example, an insulation stripper, screwdriver or Allen wrench.

### Accessories required

You need the following accessories:

- For connecting the power supply  
M12 plug (4-pin, L-coded) and 4-wire cable (4 x 1.5 mm<sup>2</sup>)
- for PROFINET IO connection  
M12 plug (4-pin, D-coded) and 4-wire Ethernet cable (Twisted Pair, shielded)

You can find the associated article numbers in the section "AUTOHOTSPOT".

### Connect the plug

Proceed as follows to connect the device:

1. Push the respective plug into the corresponding round socket on the reader.  
Make sure the connectors and sockets are properly interlocked (tongue and groove).
2. Fasten the connector by tightening the knurled locking ring.  
To guarantee the degree of protection, you must fasten all connectors with  $\approx 1.0$  Nm.

<b>NOTICE</b>
<b>Ensuring the degree of protection</b>
You need to close all unused sockets with M12 sealing caps to ensure IP65 or IP67 degree of protection. You can find the order data of the sealing caps in the section "AUTOHOTSPOT".

### 1.1.5 Pin assignment of the interfaces

The following tables show the pin assignment for the interfaces/connectors.

Table 1-2 Pin assignment power supply; M12 socket (4-pin, L-coded)

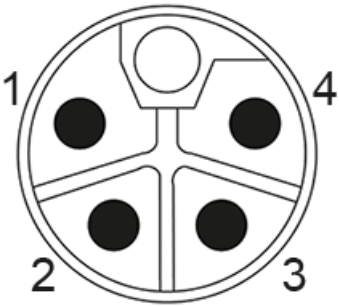
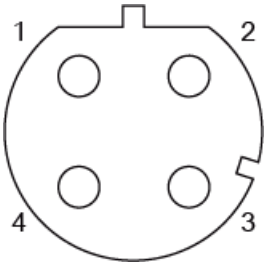
Pin	Assignment	View of M12 socket, 4-pin
1	+24 V (brown)	
2	Unassigned (white)	
3	Ground/shield (blue)	
4	Reset to Factory (black)	



Table 1-3 Pin assignment PROFINET IO; M12 socket (4-pin, D-coded)

Pin	Assignment	View of M12 socket, 4-pin
1	Data line TxP	
2	Data line RxP	
3	Data line TxN	
4	Data line RxN	

## 1.1.6 LED displays

### Operation LED display












The operational states of the reader are displayed by two LEDs. The LEDs can adopt the colors white green, red, yellow or blue and the states off , on , flashing :

Table 1-4 Shows the operating states via the operation LED display

LEDs	Meaning
	The reader is turned off.
	The reader is turned on and is searching for transponders. The reader is in the "Setup" mode, in the "Search for transponders" status and has not yet received a "RESET" command and is not ready.
 	There is a transponder in the antenna field. The reader is in the "Setup" mode, in the status "Show quality", has not yet received a "RESET" command and is not ready. Depending on the signal strength, the LED flickers or is lit permanently.
	The reader has received a "RESET" command.
	The reader is turned on, the antenna is turned off.
	<ul style="list-style-type: none"> <li>Operating mode "with presence": Transponder present</li> <li>Operating mode "without presence": Transponder present and command currently being executed</li> </ul>
	There is an error. The number of flashes provides information about the current error. You can find more information on error messages in the section "AUTOHOTSPOT".

### Status LED display (including PROFINET/Ethernet LEDs)




















The operating states of the reader are displayed by the LEDs "R/S", "ER" and "MAINT". The LEDs can adopt the colors green, red or yellow and the statuses off , on , flashing :

Table 1-5 Shows the operating states via the status LED display

R/S	ER	MAINT	Meaning
			The reader is turned off.
			<ul style="list-style-type: none"> <li>LED test while the reader is starting up.</li> <li>The reader is manually reset to factory settings.</li> <li>A connected cable is defective.</li> </ul>
			<ul style="list-style-type: none"> <li>No data exchange between the reader and user application takes place. The reader has not yet received a user command.</li> <li>The connection to the user application has been closed.</li> </ul>
	--	--	Data exchange between the reader and user application takes place. The reader has received and executed a user command.
--	--		A firmware update is in progress.
--	--		The voltage at the reader is too low.
			<ul style="list-style-type: none"> <li>The flash test is performed for reader identification. At the same time, the LEDs of the reader and PROFINET/Ethernet LED display also flash.</li> <li>The firmware is defective.</li> </ul>
--		--	There is an error. You can find more information on error messages in the section "AUTOHOTSPOT".







The states of the PROFINET/Ethernet connections are indicated by the "LK1" LEDs for interface "X1 P1R" and "LK2" for interface "X1 P2R". The LEDs can adopt the colors green, red or yellow and the states off , on , flashing :

Table 1-6 Shows the PROFINET/Ethernet states via the PROFINET/Ethernet LED display

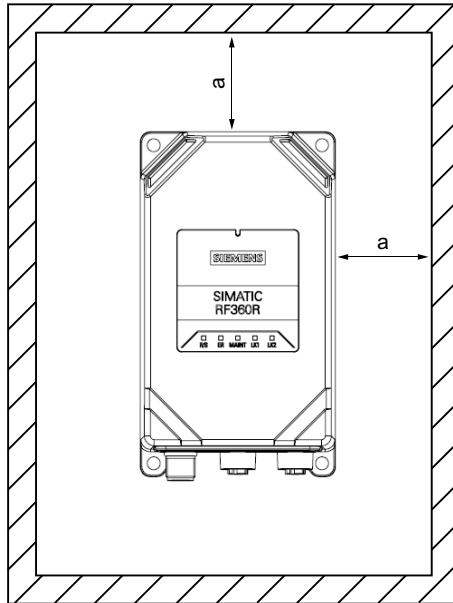
LK*	Meaning
	<ul style="list-style-type: none"> <li>No connection is available.</li> <li>No cable has been connected.</li> </ul>
	The flash test is performed for reader identification. At the same time, the LEDs of the operation and status LED display also flash.
	<ul style="list-style-type: none"> <li>LED test while the reader is starting up.</li> <li>A connection is available.</li> </ul>

### 1.1.7 Ensuring reliable data exchange

The "center point" of the transponder must be situated within the transmission window.

### 1.1.8 Metal-free area

The RF360R can be flush-mounted in metal. Allow for a possible reduction in the field data. To avoid any influence on the field data, the distance "a" should be kept to.

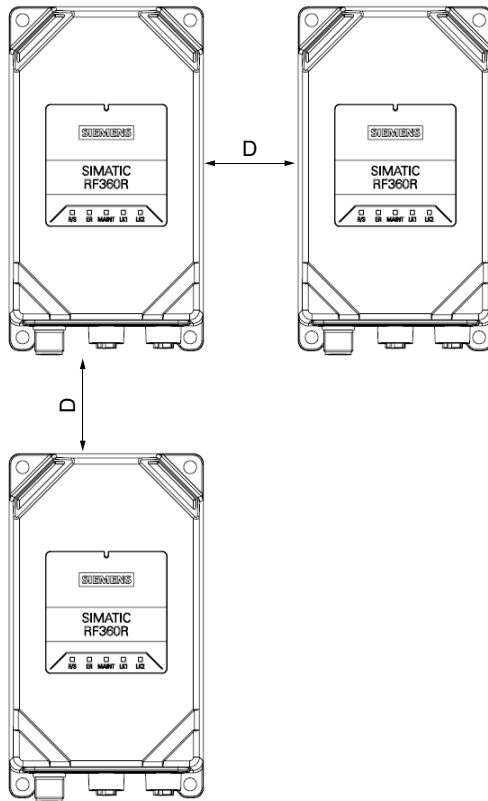


$a \geq 20 \text{ mm}$

Figure 1-2 Metal-free area for RF360R

### 1.1.9 Minimum distance between several RF360R readers

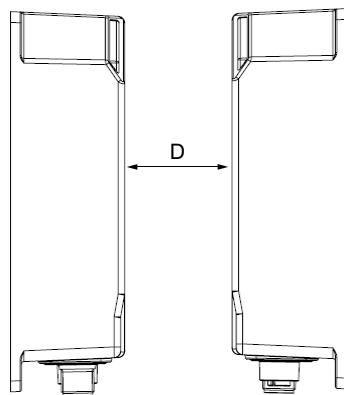
#### RF360R side-by-side



$D \geq \begin{matrix} \geq 350 \text{ mm (with 2 readers)} \\ \geq 500 \text{ mm (with more than 2 readers)} \end{matrix}$

Figure 1-3 Minimum distance between several RF360R readers

#### RF360R face-to-face



$D \geq 500 \text{ mm}$

Figure 1-4 Face-to-face distance between two RF360R

## 1.1.10 Technical specifications

Table 1-7 Technical specifications of the RF360R reader

		<b>6GT2801-5BA30</b>	
Product type designation	SIMATIC RF360R		
<b>Radio frequencies</b>			
Operating frequency, rated value	13.56 MHz		
<b>Electrical data</b>			
Maximum range	140 mm		
Maximum data transmission speed reader ↔ transponder	RF300 transponder	ISO transponder (MDS D)	
• Read	• ≤ 8000 bytes/s	• ≤ 3300 bytes/s	
• Write	• ≤ 8000 bytes/s	• ≤ 1700 bytes/s	
Read/write distances of the reader	See section "AUTOHOTSPOT"		
<b>Interfaces</b>			
Power supply	M12, 4-pin, D-coded		
Antenna	integrated		
<b>Ethernet interface</b>			
Connection type	PROFINET IO, EtherNet/IP, OPC UA, XML		
Physical medium	Ethernet over 4-wire cable		
Operating mode	100BaseX full duplex		
Transmission speed	100 Mbps		
Connector	2x M12 interface, 4-pin, D-coded		
Max. cable length	100 m		
Cable type	STP Cat 5		
Autonegotiation	Yes		
Autocrossing	Yes		
Switch function	Yes, internal		
PROFINET RT	Yes		
Vendor ID	0x002A		
Device ID	0x0C09		
<b>Mechanical specifications</b>			

<b>6GT2801-5BA30</b>	
<b>Enclosure</b>	
• Material	• Plastic PA 12
• Color	• TI-Grey
Recommended distance to metal	0 mm
<b>Supply voltage, current consumption, power loss</b>	
Supply voltage	24 VDC
Typical current consumption	150 mA
<b>Permitted ambient conditions</b>	
<b>Ambient temperature</b>	
• During operation	• 0 ... +55 °C
• During transportation and storage	• -40 ... +70 °C
Degree of protection according to EN 60529	IP67
Shock-resistant acc. to EN 60721-3-7, Class 7 M2	500 m/s <sup>2</sup>
Vibration-resistant acc. to EN 60721-3-7, Class 7 M2	200 m/s <sup>2</sup>
Torsion and bending load	Not permitted
<b>Design, dimensions and weight</b>	
Dimensions (L x W x H)	130 x 80 x 42 mm
Weight	410 g
Type of mounting	4 x M5 screws; 1.5 Nm
<b>LED display design</b>	
• Operation LED display	2 LEDs, 5 colors
• Status LED display	5 LEDs, 3 colors
<b>Standards, specifications, approvals</b>	
Proof of suitability	Radio to R&TTE directives EN 300330, EN 301489, CE, FCC, UL/CSA (IEC 61010)
MTBF	65 years

### 1.1.11 Approvals

#### FCC information

##### Siemens SIMATIC RF360R (MLFB 6GT2801-5BA30); FCC ID NXW-RF360R

This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference, and
- (2) this device must accept any interference received, including interference that may cause undesired operation.

#### **Caution**

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

#### **Note**

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules.

These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

## **IC information**

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions:

- (1) This device may not cause interference, and
- (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :

- (1) L'appareil ne doit pas produire de brouillage, et
- (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

## **UL information (IEC 61010-1 / IEC 61010-2-201)**

This standard applies to equipment designed to be safe at least under the following conditions:

- a) indoor use;
- b) altitude up to 2 000 m;
- c) temperature -0 °C to 55 °C;
- d) maximum relative humidity 80 % for temperature up to 31 °C decreasing linearly to 50 % relative humidity at 40 °C;
- e) TRANSIENT OVERVOLTAGES up to the levels of OVERVOLTAGE CATEGORY II,  
NOTE 1: These levels of transient overvoltage are typical for equipment supplied from the building wiring.
- f) using a "NEC Class 2" power supply is required
- g) the device is categorized as pollution degree 3/4

### 1.1.12 Dimension drawing

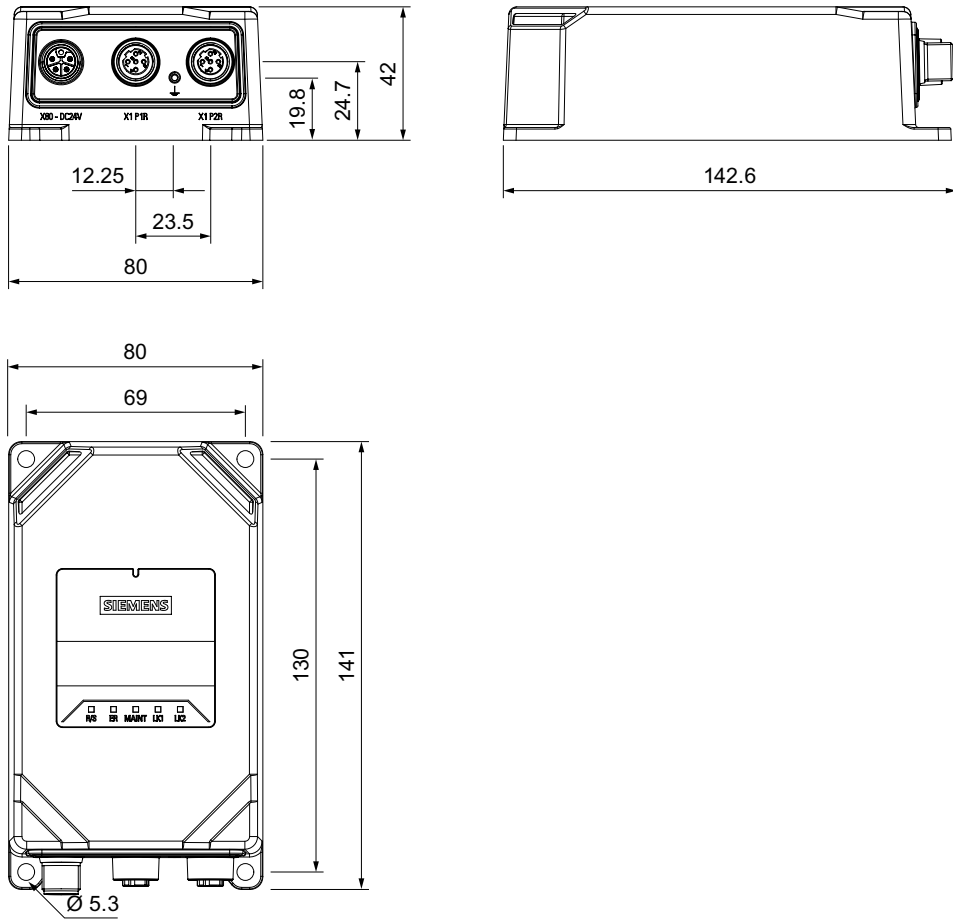


Figure 1-5 Dimensional drawing of RF360R

Dimensions in mm