

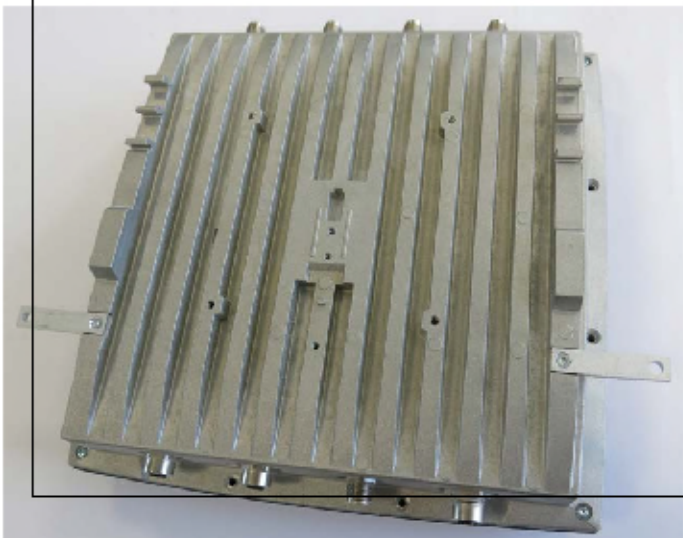
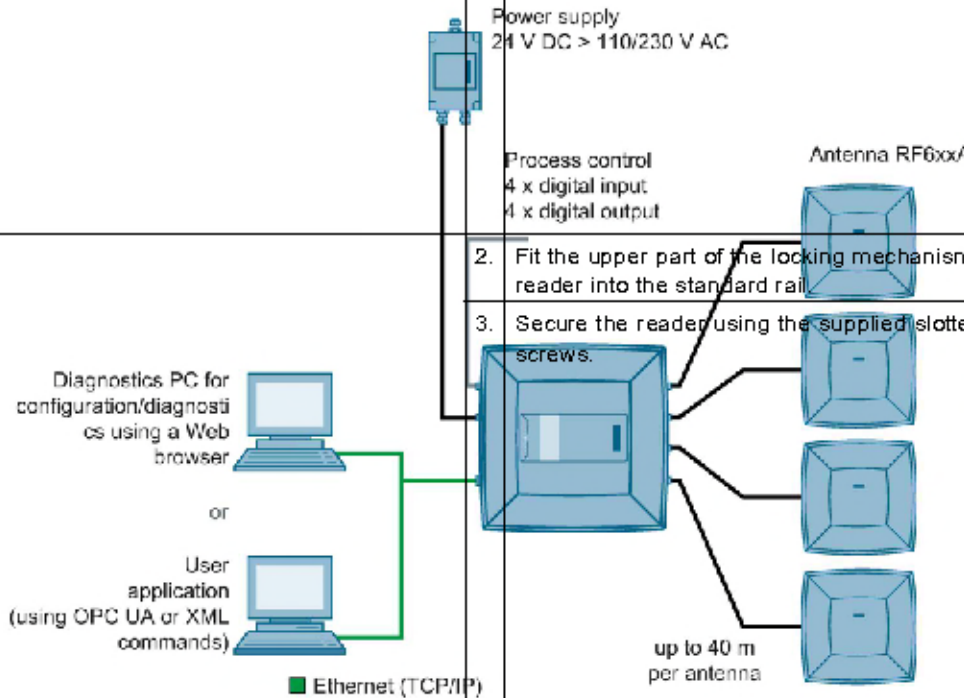
	Description
	3. Fit the lower part of the locking mechanism of the reader into the DIN rail. To be able to mount the reader on or remove it from the DIN rail, pull down the holder mounted in step 2.



Table 5- 29 Installation on a standard rail

	Description
	1. Mount the two adapter pieces using the supplied Torx screws.  Power supply 24 V DC > 110/230 V AC Process control 4 x digital input 4 x digital output Antenna RF6xxA up to 40 m per antenna ■ Ethernet (TCP/IP) Diagnostics PC for configuration/diagnostics using a Web browser or User application (using OPC UA or XML commands) 2. Fit the upper part of the locking mechanism of the reader into the standard rail. 3. Secure the reader using the supplied slotted-head screws.

5.4.4 Configuration/integration

An Ethernet interface is available for integrating the device into system environments/networks. The RF650R can be configured via the Ethernet interface and with direct connection to the PC. You can configure and program the reader using the following tools:

- using Web Based Management (WBM)
- OPC UA or XML based user applications

Note that configuration in parallel is not possible using different tools. Simple process controls (e.g. a traffic signal) can be implemented directly using the reader via four digital inputs/outputs.

Figure 5-22 Overview: Configuration of RF650R readers

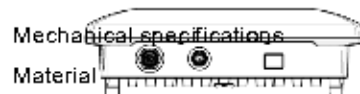
5.4.5 Technical specifications

Table 5- 30 Technical specifications of the RF650R reader

6GT2811-6AB20-xAA0	
Product type designation	SIMATIC RF 650R
Radio frequencies	
Operating frequency	
▪ ETSI	▪ 865 to 868 MHz
▪ FCC	▪ 902 to 928 MHz
▪ CMIIT	▪ 920 to 925 MHz
▪ ARIB (STD-T107)	▪ 920.4 to 923.4 MHz
Transmit power ¹⁾	
▪ ETSI	▪ 3 to 1000 mW
▪ FCC	▪ 3 to 1000 mW
▪ CMIIT	▪ 3 to 1000 mW
▪ ARIB (STD-T107)	▪ 3 to 250 mW
Maximum radiated power per antenna	
▪ ETSI	▪ 2000 mW ERP
▪ FCC	▪ 4000 mW EIRP
▪ CMIIT	▪ 2000 mW ERP
▪ ARIB (STD-T107)	▪ 500 mW EIRP
Electrical data	
Range	
▪ ETSI	▪ ≤ 8 m
▪ FCC	▪ ≤ 8 m
▪ CMIIT	▪ ≤ 8 m
▪ ARIB (STD-T107)	▪ ≤ 4 m
Protocol	ISO 18000-62/-63
Transmission speed	≤ 300 kbps
Frequency accuracy	≤ ±10 ppm

6GT2811-6AB20-xAA0	
Channel spacing	
▪ ETSI	▪ 600 kHz
▪ FCC	▪ 500 kHz
▪ CMIT	▪ 250 kHz
▪ ARIB (STD-T107)	▪ 200 kHz
Modulation methods	ASK; DSB modulation & PR-ASK modulation encoding, Manchester or Pulse Interval (PIE)
Multitag capability	Yes
Typical transmission time per byte	
▪ Write access	▪ 2 ms
▪ Read access	▪ 0.15 ms
Supply voltage	24 V DC (20 ... 30 V DC) ²⁾
Maximum permitted current consumption	2 A
Maximum permitted current consumption via DI/DQ interface	1 A
Current consumption (on standby), typical	
▪ 20 V input voltage on the reader	▪ 220 mA / 4.4 W
▪ 24 V input voltage on the reader	▪ 190 mA / 4.5 W
▪ 30 V input voltage on the reader	▪ 150 mA / 4.5 W
Current consumption (at 1000 mW transmit power), typical	
▪ 20 V input voltage on the reader	▪ 450 mA / 9.0 W
▪ 24 V input voltage on the reader	▪ 370 mA / 8.9 W
▪ 30 V input voltage on the reader	▪ 300 mA / 9.0 W
Current consumption (at 2000 mW transmit power), typical	
▪ 20 V input voltage on the reader	▪ 610 mA / 12.2 W
▪ 24 V input voltage on the reader	▪ 500 mA / 12.0 W
▪ 30 V input voltage on the reader	▪ 410 mA / 12.3 W
Interfaces	
Antenna connectors	4x RP-TNC
Power supply	1x M12 (8-pin)
DI/DQ interface	1x M12 (12-pin)
Digital inputs	4
Digital outputs	4
Ethernet interface	1x RJ45 (8-pin), 100 Mbps

6GT2811-6AB20-xAA0



Mechanical specifications

Material

- Upper part of housing
- Lower part of housing

Color

- Upper part of housing
- Lower part of housing

Permitted ambient conditions

Ambient temperature

- During operation
- During transportation and storage

Degree of protection

Shock resistant to EN 60068-2-27

Vibrations according to EN 60068-2-6

- Pvcan (silicone-free)

Aluminum

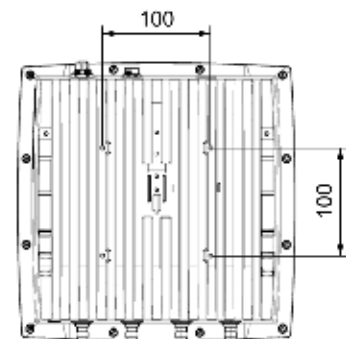
TI-Grey

Silver

-25 ... +55 °C

- -40 ... +85 °C

IP30

25.5 g ³⁾3.1 g ³⁾

Design, dimensions and weight

Dimensions (W × H × D)

258 × 258 × 80 mm

Weight

2.4 kg

Type of mounting

- Mounting rail
- VESA 100

- Hanging

- 4x M4 screws (1.5 Nm)

Operation indicator

6 LEDs

Status display

-

Standards, specifications, approvals

Proof of suitability

EN 301 489-1 V1.9.2 / EN 301 489-3 V1.6.1 /

EN 302 208-1/-3 V1.4.1

FCC CFR 47, Part 15 section 15.247

MTBF

31 years

¹⁾ Measured at the output of the antenna socket.

²⁾ All supply and signal voltages must be safety extra low voltage (SELV/PELV according to EN 60950). The voltage sources must meet the requirements of limited power sources (LPS) and NEC Class 2.

Note that, depending on the power consumption, using extension cables > 20 m (6GT2891-4FN50) may lead to a voltage drop on the reader. This voltage drop can mean that the necessary minimum voltage on the reader is below the required 20 V.

³⁾ The values for shock and vibration are maximum values and must not be applied continuously. These values only apply to mounting using screws.

5.4.6 Dimension drawing



Figure 5-23 Dimension drawing RF650R

All dimensions in mm (± 0.5 mm tolerance)

5.4.7 Certificates and approvals



Note

Marking on the readers according to specific approval

The certificates and approvals listed here apply only if the corresponding mark is found on the readers.



Table 5- 31 6GT2811-6AB20-0AA0

Labeling	Description
	Conformity with the RED directive 2014/53/EU Conformity with the RoHS directive 2011/65/EU
	South Africa radio approval: Radio Equipment Type Approval
India	India wireless approval Marking on the reader: No. NR-ETA/1587
	Radio approval for Russia, Belarus, Kazakhstan

Table 5- 32 6GT2811-6AB20-1AA0

Labeling	Description
Federal Communications Commission 	FCC CFR 47, Part 15 section 15.247 Radio Frequency Interference Statement This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. FCC ID: NXW-RF600R2
Industry Canada Radio Standards Specifications 	RSS-247 Issue 2 IC: 267X-RF600R2
	This product is UL-certified for the USA and Canada. It meets the following safety standard(s): UL 60950-1 - Information Technology Equipment Safety - Part 1: General Requirements CSA C22.2 No. 60950 -1 - Safety of Information Technology Equipment UL Report E 115352

Labeling	Description
	Brazil radio approval Marking on the reader (6GT2811-6AB20-1AA0): Statement about approval: Este equipamento opera em caráter secundário, isto é, não tem direito à proteção contra interferência prejudicial, mesmo de estações do mesmo tipo e não pode causar interferência a sistemas operando em caráter primário. Reader certificate: ANATEL 2892-15-4794
	KCC Certification Type of equipment: A급 기기 (업무용 방송통신기자재) Class A Equipment (Industrial Broadcasting & Communication Equipment) 이 기기는 업무용(A급) 전자파적합기기로서 판매자 또는 사용자는 이 점을 주의하시기 바라며, 가정외의 지역에서 사용하는 것을 목적으로 합니다. This equipment is Industrial (Class A) electromagnetic wave suitability equipment and seller or user should take notice of it, and this equipment is to be used in the places except for home. Certificate of the reader: MSIP-CMM-RF5-RF650R
C-14627	Argentina radio approval: Registro de la COMISION NACIONAL DE COMUNICACIONES
RCP SIS14-1926	Mexico radio approval: CERTIFICADO DE HOMOLOGACION, IFETEL
	Australia radio approval: This product meets the requirements of the AS/NZS 3548 Norm.

Table 5- 33 6GT2811-6AB20-2AA0

Standard	
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Standard	
CMIIT Certification	China radio approval Marking on the reader: CMIIT ID: 2014DJ3987

5.4.7.1 FCC information

Siemens SIMATIC RF650R (FCC): 6GT2811-6AB20-1AA0

FCC ID: NXW-RF600R2

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 B 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.

FCC Notice

To comply with FCC part 15 rules in the United States, the system must be professionally installed to ensure compliance with the Part 15 certification.

It is the responsibility of the operator and professional installer to ensure that only certified systems are deployed in the United States. The use of the system in any other combination (such as co-located antennas transmitting the same information) is expressly forbidden.

FCC Exposure Information

To comply with FCC RF exposure compliance requirements, the antennas used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.

5.4.7.2 IC-FCB information

Siemens SIMATIC RF650R (FCC): 6GT2811-6AB20-1AA0

IC: 267X-RF600R2

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.

Industry Canada Notice

To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that permitted for successful communication.

Transmitter power and antenna information for antennas with a gain less than 6 dBi:

This device has been designed to operate with the SIMATIC RF620A antenna 902-928, the SIMATIC RF640A antenna 902-928 as well as the SIMATIC RF660A antenna 902-928 listed below, and having a maximum gain of 5,5 dBi.

Arbitrary transmission power settings in combination with other antennas or antennas having a gain greater than 5,5 dBi are strictly prohibited for use with this device.

The required antenna impedance is 50 Ohms.

Transmitter power and antenna information for antennas with a gain greater 6 dBi:

This device requires professional installation. Antennas with a gain greater 6 dBi may be used provided the system does not exceed the radiation power of 4000 mW E.I.R.P. This device has been designed to operate with the SIMATIC RF642A antenna 902-928 exceeding the maximum gain of 5,5 dBi under the restriction that the RF power at the input of the antenna must be set to meet the following relation: RF power (dBm) $\leq$ 30 dBm – (antenna gain (dBi) – 6 dBi). Other antennas or system configurations for antennas having a gain greater than 6 dBi are strictly prohibited for use with this device. The required antenna impedance is 50 Ohms.

5.5 SIMATIC RF680R

5.5.1 Description

5.5.1.1 Overview

The SIMATIC RF680R is a stationary reader in the UHF frequency band without an integrated antenna. Up to four external UHF RFID antennas can be connected via RP-TNC connectors.

The maximum transmit power is 2000 mW at the reader output. A radiated power of up to 2000 mW ERP / 4000 mW EIRP is achieved when the appropriate antennas and antenna cables are used. The interfaces (Ethernet, power supply, DI/DQ interface) are located on the lower front edge. These interfaces can be used to connect the reader to the power supply and to a PC or a controller for parameter assignment.

The degree of protection is IP 65.

	Pos.	Description
	①	RP-TNC interfaces for connecting up to 4 external antennas
	②	LED status display
	③	LED operating display
	④	DI/DQ interface: X10 DI/DQ (M12, 12-pin)
	⑤	Interface to power supply (RS422), 24 V DC ¹ : X80 DC24V (M12, 8-pin)
	⑥	Ethernet interface, TCP/IP: X1 P1 (M12, 4-pin)
	⑦	Ethernet interface, TCP/IP: X1 P2 (M12, 4-pin)

¹) Connection of the readers to the ASM 456 communications module via the RS-422 interface.

5.5.1.2 Ordering data

Table 5- 34 Ordering data RF680R

Product	Article number
RF680R (ETSI)	6GT2811-6AA10-0AA0
RF680R (FCC)	6GT2811-6AA10-1AA0
RF680R (CMIIT)	6GT2811-6AA10-2AA0
RF680R (ARIB)	6GT2811-6AA10-4AA0

Table 5- 35 Ordering data accessories

Product	Article number
Holder set for securing the reader - DIN rail T35 (S7-1200) - S7-300 standard rail - S7-1500 standard rail	6GT2890-0AB00
SIMATIC antenna holder for RF600 devices	6GT2890-2AB10
Connecting cable and connectors	
DI/DQ cable connector open cable ends	5 m 6GT2891-0CH50
Ethernet plug on the reader FastConnect M12 (IP65)	6GK1901-0DB20-6AA0
Ethernet plug Standard IE FastConnect RJ45 180 (IP20)	6GK1901-1BB10-2AA0
Industrial Ethernet cable M12 / RJ45	5 m 6XV1871-5TH50
Industrial Ethernet cable M12 / M12	5 m 6XV1870-8AH50
Industrial Ethernet connecting cable M12-180 / RJ45	2 m 6XV1871-5TH20 3 m 6XV1871-5TH30 5 m 6XV1871-5TH50
Industrial Ethernet cable by the meter, green (minimum 20 m)	6XV1840-2AH10
Connecting cable reader ↔ CM M12-180 / M12-180	2 m 6GT2891-4FH20 5 m 6GT2891-4FH50 10 m 6GT2891-4FN10 20 m 6GT2891-4FN20 50 m 6GT2891-4FN50

Product	Article number
Connecting cable CM ↔ reader / extension cable for 24 V connecting cable RS422, M12 connector, 8-pin socket	
▪ 2 m	6GT2891-4FH20
▪ 5 m	6GT2891-4FH50
▪ 10 m	6GT2891-4FN10
▪ 20 m	6GT2891-4FN20
▪ 50 m	6GT2891-4FN50
Wide-range power supply unit for SIMATIC RF systems	
▪ With EU plug	6GT2898-0AC00
▪ With UK plug	6GT2898-0AC10
▪ With US plug	6GT2898-0AC20
24 V connecting cable reader ↔ wide-range power supply unit	
▪ with plug, 5 m	6GT2891-0PH50
▪ with open ends, 2 m	6GT2891-4EH20
▪ with open ends, 5 m	6GT2891-4EH50
Set of protective caps	6GT2898-4AA10
Contains 3 protective caps for antenna output, one protective cap for digital I/O interface and 2 protective caps for Ethernet/PROFINET (required for IP65 degree of protection when some connectors are unused)	Blue Gray pink Red blue
DVD "Ident Systems Software & Documentation"	6GT2060-2AA20

5.5.1.3 Pin assignment of the DI/DQ interface (X10 DI/DQ)

Table 5- 36 Pin assignment of the DI/DQ interface (reader end)

View of interface (M12 socket, 12-pin)	Pin	Pin assignment
	1	GND (output to supply of the digital inputs/outputs [not galvanically isolated])
	2	VCC (output to the supply of the digital inputs/outputs [not galvanically isolated])
	3	DO Common / Output Common
	4	DO 0 / Output 00
	5	DO 1 / Output 01
	6	DO 2 / Output 02
	7	DO 3 / Output 03
	8	DI 0 / Input 00
	9	DI Common / Input Common
	10	DI 1 / Input 01
	11	DI 2 / Input 02
	12	DI 3 / Input 03

Note

Requirement for external power sources

When the DI/DQ interface is supplied with power by an external power source, this source must meet the requirements for LPS (Limited Power Sources) and NEC Class 2.

Color scheme of the DI/DQ standard cable with M12 connector

The following figure shows the color scheme of the DI/DQ standard cable from Siemens (6GT2891-0CH50). You can use the color scheme to assign the wire colors to the pins.

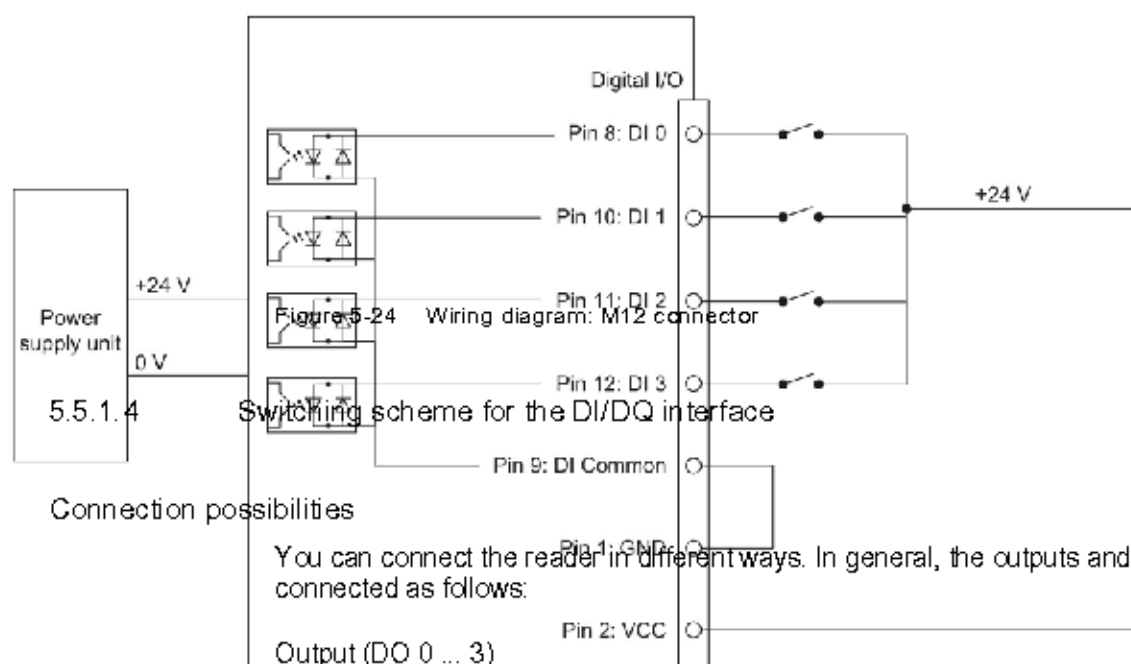


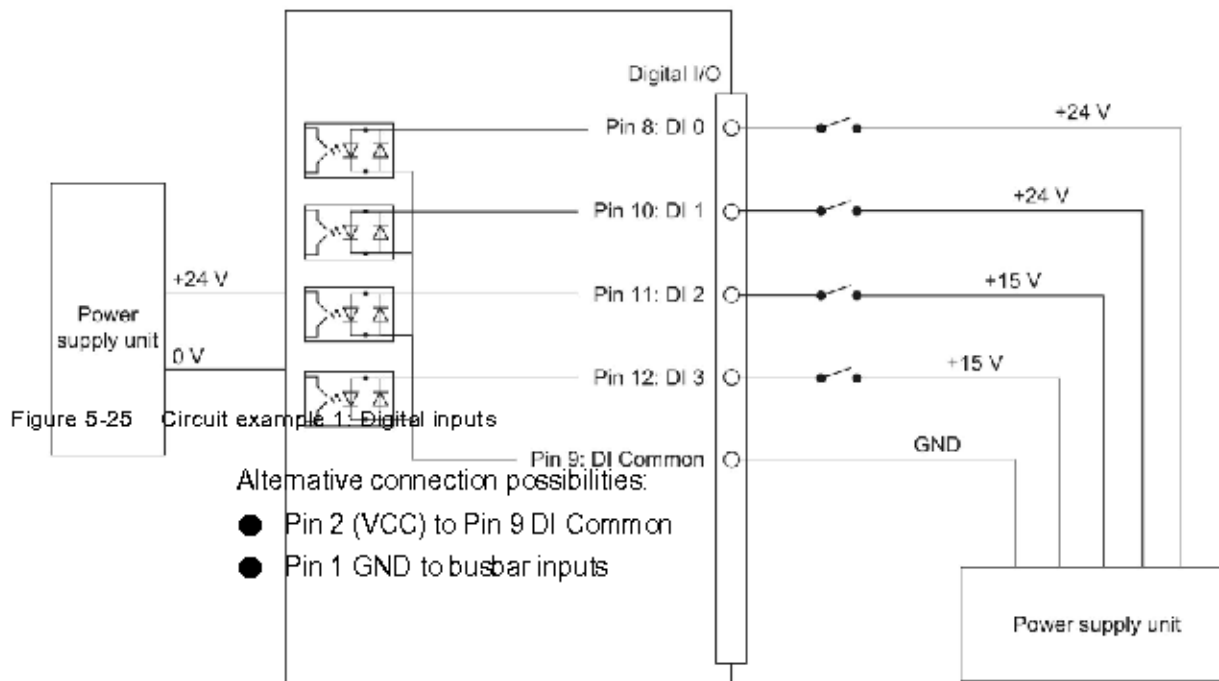
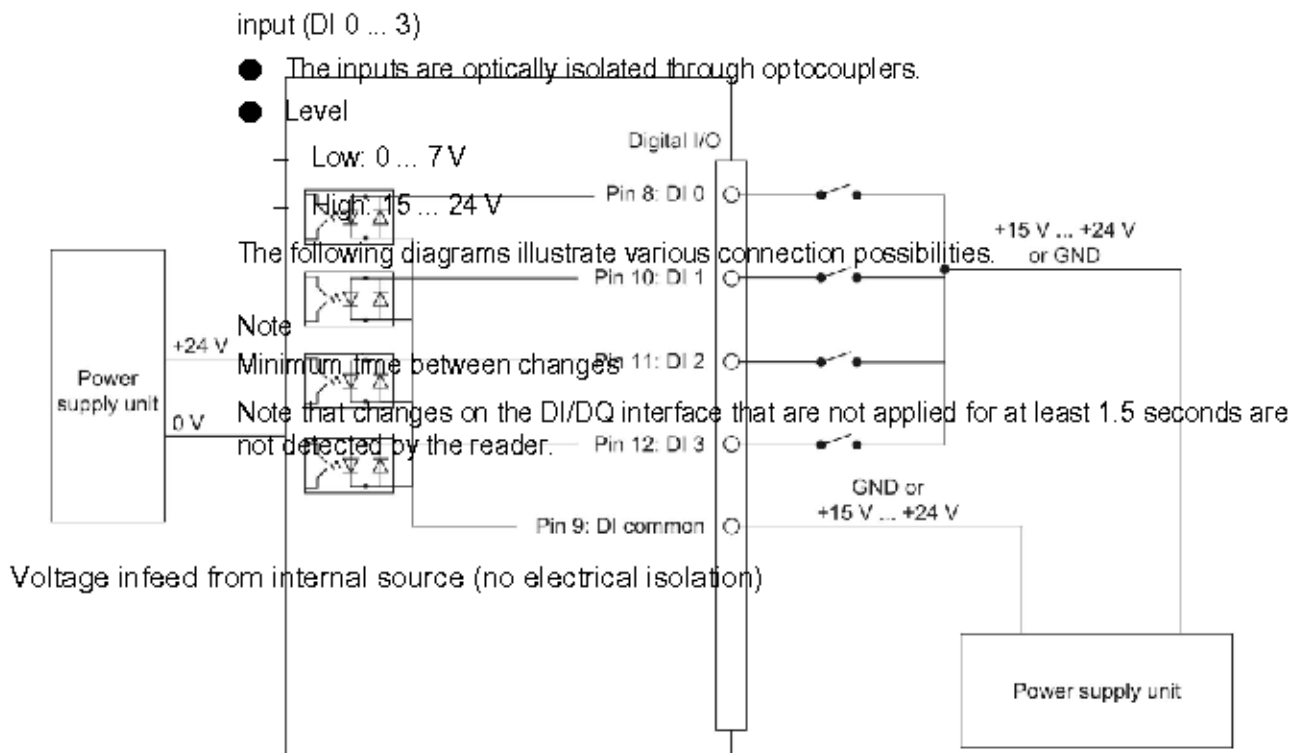
Figure 5-24 Wiring diagram: M12 connector

Switching scheme for the DI/DQ interface

You can connect the reader in different ways. In general, the outputs and inputs should be connected as follows:

Output (DO 0 ... 3)

- Each output is rated for 0.5 A current and is electronically protected.
- 4 digital outputs can be operated simultaneously each with up to 0.5 A (up to 1 A in total). With a total current > 1 A, you need to use an external power supply.
- The outputs are optically isolated through optocouplers.



Voltage infeed from external source

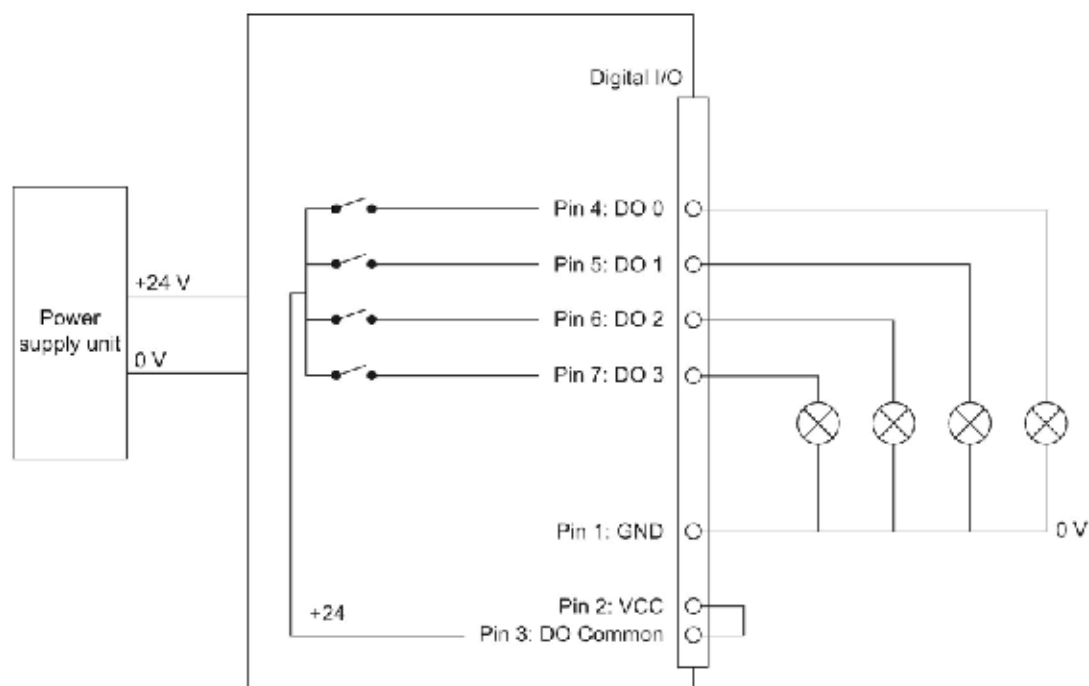


Figure 5-26 Circuit example 2: Digital inputs

Voltage infeed from external source with various voltages

Figure 5-27 Circuit example 3: Digital inputs

Voltage infeed from internal source

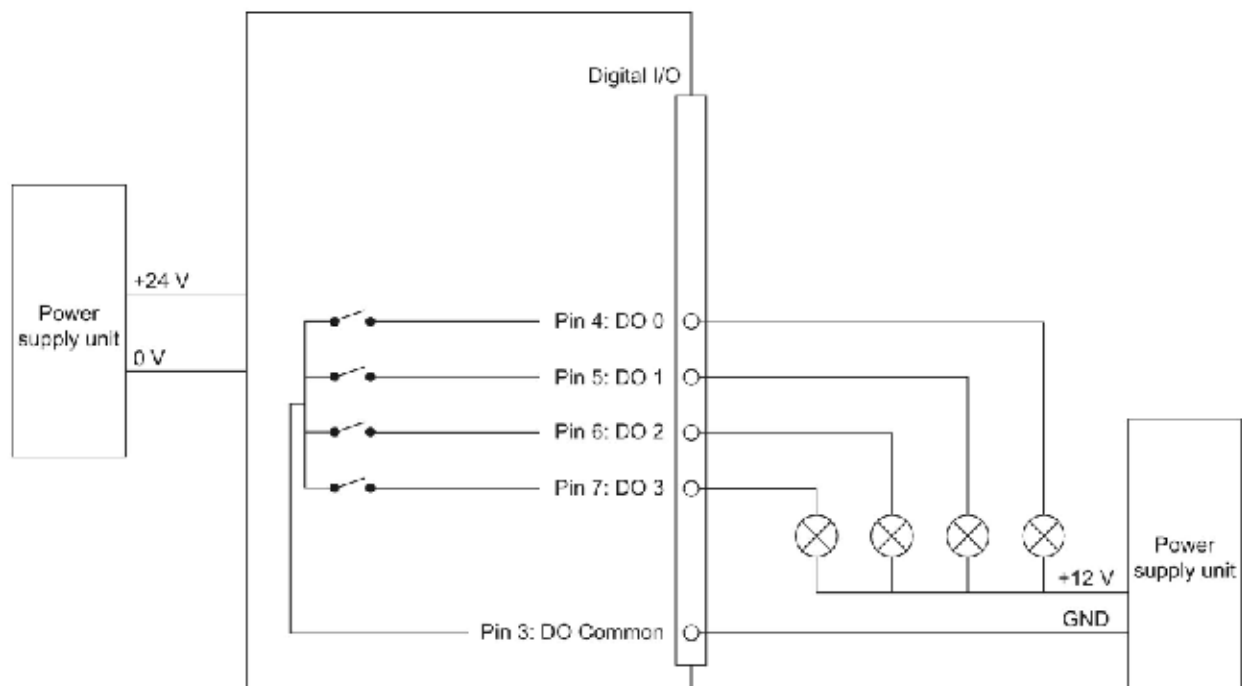


Figure 5-28 Circuit example 4: Digital outputs

Alternative connection possibilities:

- Pin 1 GND to Pin 3 DO Common
- Pin 2 (VCC) to busbar outputs

Voltage infeed from external source

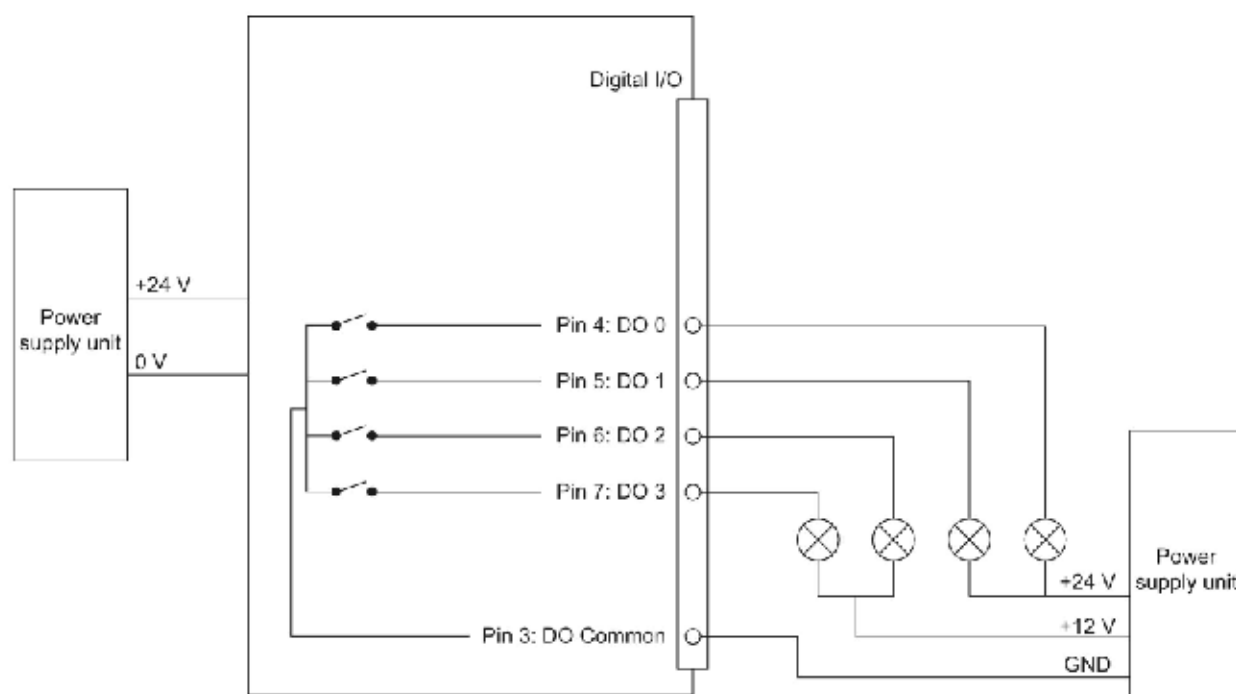


Figure 5-29 Circuit example 5: Digital outputs

Voltage infeed from an external source is shown here for 12 V as an example. Other voltages are also permissible.



Voltage infeed from external source with various voltages

Figure 5-30 Circuit example 6: Digital outputs

5.5.1.5 Pin assignment of the power supply interface (X80 24VDC)

Table 5- 37 Pin assignment of the RS422 interface (reader end)

View of interface (M12 socket 8-pin)	Pin	Wire colors	Assignment
	1	White	+ 24 V
	2 ¹⁾	Brown	- Tx
	3	Green	0 V
	4 ¹⁾	Yellow	+ Tx
	5 ¹⁾	Gray	+ Rx
	6 ¹⁾	Pink	- Rx
	7	--	Unassigned
	8	--	Earth (shield)

¹⁾ These pins are not required if the reader is operated via Ethernet.

Note

Requirement for external power sources

The reader must only be supplied with power by power supply units that meet the requirements of LPS (Limited Power Source) and NEC Class 2.

Requirement for external power sources

The reader must only be supplied with power by power supply units that meet the requirements of limited power source (LPS) and NEC Class 2.

Spécification des sources de tension externes

L'alimentation du plot de lecture/écriture doit être exclusivement assurée par des blocs d'alimentation conformes aux spécifications des sources à puissance limitée (Limited Power Sources LPS) et de NEC class 2.

Notes on connectors and cables

 The cables with open cable ends (6GT2891-4EH20, 6GT2891-4EH50) have an 8-pin M12 plug at one end, while the other end of the cable is "open". There are 8 color-coded single wires there for connecting to external devices.

The product range includes additional cables of the type 6GT2891-4Fxxx (2 to 50 m) with an M12 connector at both ends. These cables can be used as extension cables. Long cables can be shortened if necessary.

NOTICE

Insulate unused single wires

Unused single wires must be insulated individually to prevent unwanted connections of signal lines.

NOTICE

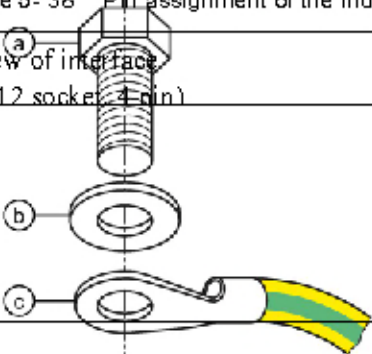
For long cables: Adapt the power supply and transmission speed

Note that even with long cables, the supply voltage of 24 VDC must always be guaranteed. Note also that the transmission speed on the serial interface must, if necessary, be reduced.

SIMATIC standard cables (e.g. 6GT2891-4FN10) have a loop resistance of 160 mOhm / meter. This results in a voltage drop of 0.8 volts on the 24 V cable for every 10 meters of connecting cable and with a power requirement of 500 mA. If the power requirement increases through the use of the digital inputs/outputs, the voltage drop increases accordingly.

5.5.1.6 Pin assignment of the Industrial Ethernet interface (X1 P1; X1 P2)

Table 5- 38 Pin assignment of the Industrial Ethernet interface (reader end)

	Pin	Pin assignment
	1	Data line +Tx
	2	Data line +Rx
	3	Data line -Tx
	4	Data line -Rx

5.5.1.7 Grounding connection

On the top of the reader there is a blind drill hole (M4 x 8) for grounding. Tighten the screw with a torque of 1.5 Nm.

WARNING
Hazardous voltage due to lightning strikes Death or serious injury may occur as a result of lightning strikes to antennas mounted outside buildings. If the reader is operated with antennas mounted outside buildings, it is imperative that the reader is electrically connected to the ground potential.
NOTICE
Installation only in protected areas The antenna can be installed in the protected part of a building. When implementing your lightning protection concept, make sure you adhere to the VDE 0182 or IEC 62305 standards.

Ground connection		
	(a)	Screw (M4 x 8)
	(b)	Flat washer
	(c)	Cable lug
	(d)	Contact washer

5.5.2 Planning operation

5.5.2.1 Antenna/read point configurations

You can connect up to four external antennas to the RF680R reader. The standard setting is that an antenna is connected when the reader is started. When connecting multiple antennas, note the information in the section "Specified minimum and maximum spacing of antennas (Page 46)".

With the WBM, you can set up various different configurations of antennas and/or reading points as required. Based on the number of data sources and subsequent assignment of the antennas, many tasks can be accomplished.

Examples of possible antenna reading point configurations

- Four data sources each with one antenna for four different reading points.
- Two data sources each with two antennas for small portals.
- One data source with 4 antennas for large portals.

You will find further information in the online help of the products.

5.5.3 Installation/mounting

Requirement

NOTICE

Close unused connectors

Note that the readers only have the specified degree of protection when all connectors are in use or when unused connectors are closed with the protective caps.

Close any connectors on the reader that you are not using with protective caps. You can order the protective cap set using the article number specified in the section "Ordering data".

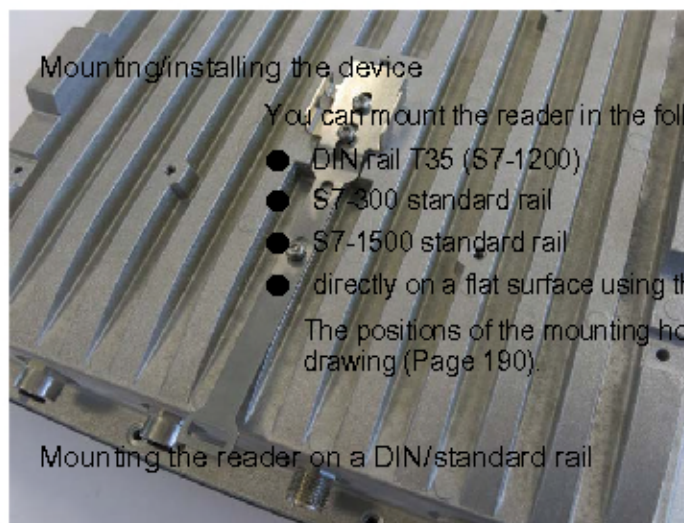
CAUTION

Emitted radiation

The transmitter complies with the requirements of Health Canada and the FCC limit values for subjecting persons to HF radiation, provided that a minimum spacing of 26 cm exists between antenna and person. When the antennas are installed, you must therefore ensure that a minimum spacing of 26 cm is maintained between personnel and antennas.



5.5.3.1 Mounting/Installation



Mounting/installing the device

You can mount the reader in the following ways:

- DIN rail T35 (S7-1200)
- S7-300 standard rail
- S7-1500 standard rail
- directly on a flat surface using the VESA 100 mounting system (torque 1.5 Nm).

The positions of the mounting holes for the device are shown in the section Dimension drawing (Page 190).

Mounting the reader on a DIN/standard rail

Table 5- 39 DIN rail mounting

	Description
	1. Place the spring in the groove.

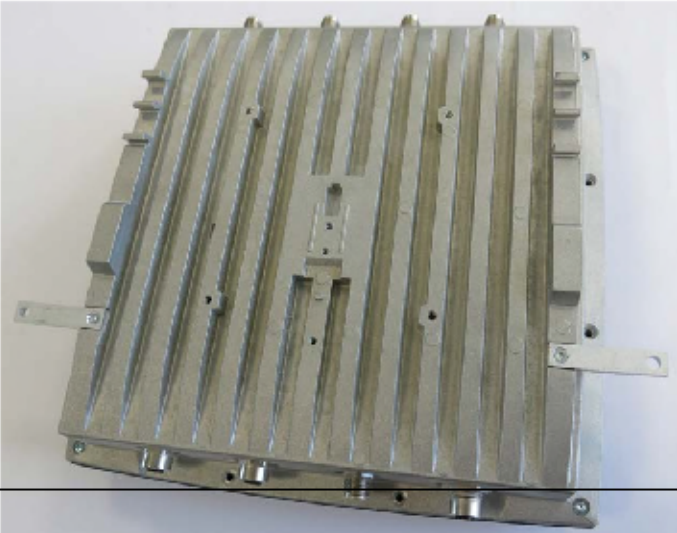
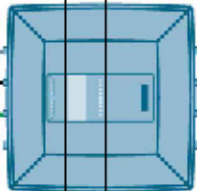
	Description
	2. Mount the holder using the supplied Torx screws. When mounting the holder, make sure that the angled tip is positioned above the spring in the groove.
	3. Fit the lower part of the locking mechanism of the reader into the DIN rail. To be able to mount the reader on or remove it from the DIN rail, pull down the holder mounted in step 2.

Table 5- 40 Installation on a standard rail

	Description
STEP 7 Basic/Professional (TIA Portal) 	1. Mount the two adapter pieces using the supplied Torx screws.
or Ethernet/IP controller  or Diagnostics PC for configuration/diagnostics using a Web browser  or User application (using OPC UA or XML commands) 	2. Fit the upper part of the locking mechanism of the reader into the standard rail. 3. Secure the reader using the supplied slotted-head screws.  up to 40 m per antenna 

■ Ethernet (TCP/IP) / PROFINET

5.5.4 Configuration/integration

An Ethernet interface is available for integrating the device into system environments/networks. The RF680R can be configured via the Ethernet interface and with direct connection to the PC. You can configure and program the reader using the following tools:

- STEP 7 Basic/Professional (TIA Portal)
- or via EtherNet/IP
- Web-Based Management (WBM)
- OPC UA or XML based user applications

Note that configuration in parallel is not possible using different tools. Simple process controls (e.g. a traffic signal) can be implemented directly using the reader via four digital inputs/outputs.

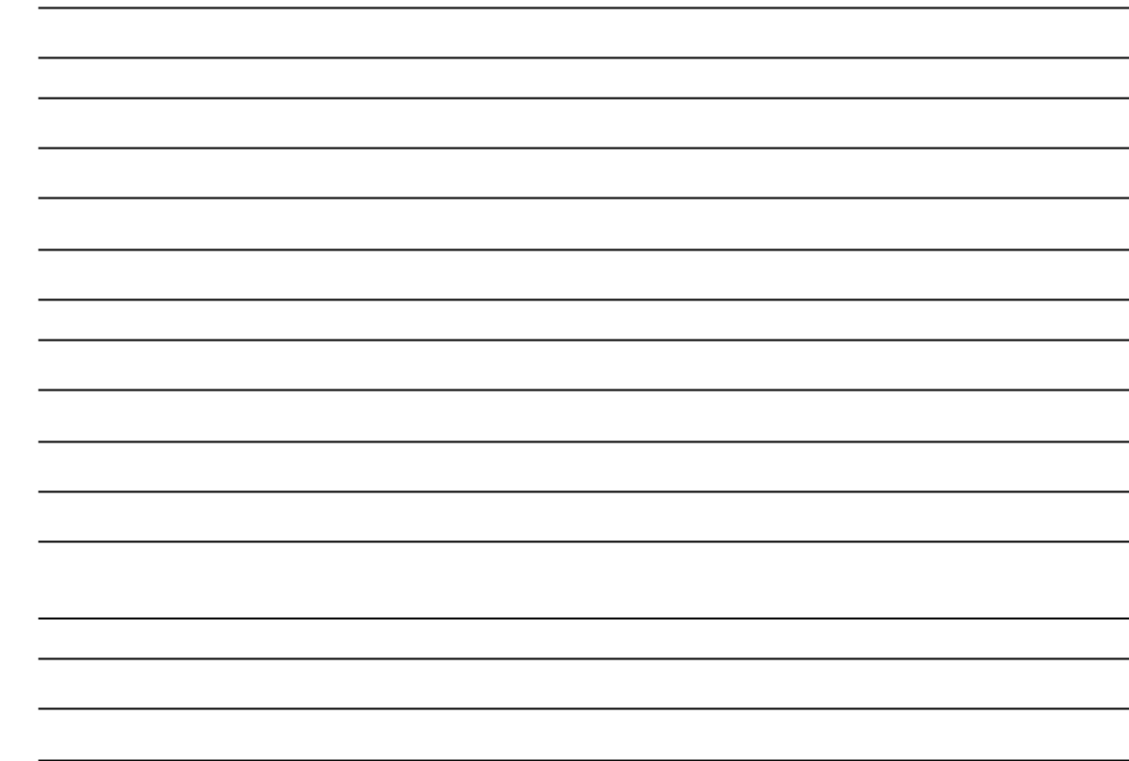
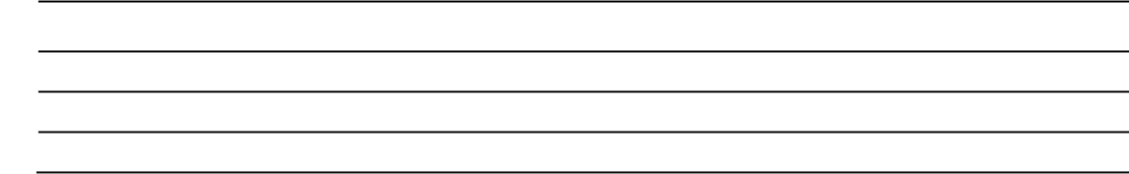


Figure 5-31 Overview: Configuration of RF680R readers



5.5.5 Technical specifications

Table 5- 41 Technical specifications of the RF680R reader

6GT2811-6AA10-xAA0	
Product type designation	SIMATIC RF680R
Radio frequencies	
Operating frequency	
▪ ETSI	▪ 865 to 868 MHz
▪ FCC	▪ 902 to 928 MHz
▪ CMIIT	▪ 920 to 925 MHz
▪ ARIB (STD-T106)	▪ 916.8 MHz to 920.4 MHz
Transmit power ¹⁾	
▪ ETSI	▪ 3 to 2000 mW
▪ FCC	▪ 3 to 2000 mW
▪ CMIIT	▪ 3 to 2000 mW
▪ ARIB (STD-T106)	▪ 3 to 1000 mW
Maximum radiated power per antenna	
▪ ETSI	▪ 2000 mW ERP
▪ FCC	▪ 4000 mW EIRP
▪ CMIIT	▪ 2000 mW ERP
▪ ARIB (STD-T106)	▪ 4000 mW EIRP
Electrical data	
Range	
▪ ETSI	▪ ≤ 8 m
▪ FCC	▪ ≤ 8 m
▪ CMIIT	▪ ≤ 8 m
▪ ARIB (STD-T106)	▪ ≤ 8 m
Protocol	ISO 18000-62/-63
Transmission speed	≤ 300 kbps
Frequency accuracy	≤ ±10 ppm

6GT2811-6AA10-xAA0	
Channel spacing	
▪ ETSI	▪ 600 kHz
▪ FCC	▪ 500 kHz
▪ GMIT	▪ 250 kHz
▪ ARIB (STD-T100)	▪ 1200 kHz
Modulation methods	ASK, DSB modulation & PR-ASK modulation encoding, Manchester or Pulse Interval (PIE)
Multitag capability	Yes
Typical transmission time per byte	
▪ Write access	▪ 2 ms
▪ Read access	▪ 0.15 ms
Supply voltage	24 V DC (20 ... 30 V DC) ²⁾
Maximum permitted current consumption	2 A
Maximum permitted current consumption via DI/DQ interface	1 A ³⁾
Current consumption (on standby), typical	
▪ 20 V input voltage on the reader	▪ 220 mA / 4.4 W
▪ 24 V input voltage on the reader	▪ 190 mA / 4.5 W
▪ 30 V input voltage on the reader	▪ 150 mA / 4.5 W
Current consumption (at 1000 mW transmit power), typical	
▪ 20 V input voltage on the reader	▪ 450 mA / 9.0 W
▪ 24 V input voltage on the reader	▪ 380 mA / 9.1 W
▪ 30 V input voltage on the reader	▪ 300 mA / 9.0 W
Current consumption (at 2000 mW transmit power), typical	
▪ 20 V input voltage on the reader	▪ 610 mA / 12.2 W
▪ 24 V input voltage on the reader	▪ 500 mA / 12.0 W
▪ 30 V input voltage on the reader	▪ 410 mA / 12.3 W
Interfaces	
Antenna connectors	4x RP-TNC
Power supply	1x M12 (8-pin)
DI/DQ interface	1x M12 (12-pin)
Digital inputs	4
Digital outputs	4
Ethernet interface	2x M12 (4-pin), 100 Mbps

6GT2811-6AA10-xAA0

Mechanical specifications

Material

- | | |
|-------------------------|-------------------------|
| ▪ Upper part of housing | ▪ Pocal (silicone-free) |
| ▪ Lower part of housing | ▪ Aluminum |

Color

- | | |
|-------------------------|-----------|
| ▪ Upper part of housing | ▪ TI-Grey |
| ▪ Lower part of housing | ▪ Silver |

Permitted ambient conditions

Ambient temperature

- | | |
|-------------------------------------|------------------|
| ▪ During operation | ▪ -25 ... +55 °C |
| ▪ During transportation and storage | ▪ -40 ... +85 °C |

Degree of protection

IP 65

Shock resistant to EN 60068-2-27

25.5 g ⁴⁾

Vibrations according to EN 60068-2-6

3.1 g ⁴⁾

Design, dimensions and weight

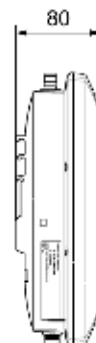
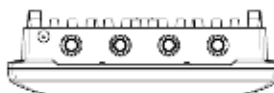
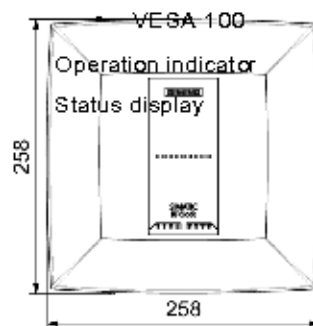
Dimensions (W × H × D)
Weight

258 × 258 × 80 mm

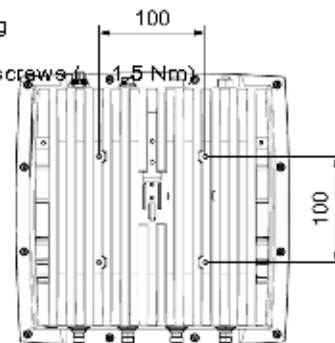
2.4 kg

Type of mounting

- Mounting rail



- Hanging
- 4x M4 screws (1.5 Nm)
- 8 LEDs
- 9 LEDs



6GT2811-6AA10-xAA0

Standards, specifications, approvals	
Proof of suitability	EN 301 489-1 V1.9.2 / EN 301 489-3 V1.6.1 / EN 302 208-1/-3 V1.4.1 FCC CFR 47, Part 15 section 15.247
MTBF	28 years

- 1) Measured at the output of the antenna socket.
- 2) All supply and signal voltages must be safety extra low voltage (SELV/PELV according to EN 60950). The voltage sources must meet the requirements of limited power sources (LPS) and NEC Class 2.

Note that, depending on the power consumption, using extension cables > 20 m (6GT2891-4FN50) may lead to a voltage drop on the reader. This voltage drop can mean that the necessary minimum voltage on the reader is below the required 20 V.

- 3) Keep to the switching schemes of the DI/DQ interface.
- 4) The values for shock and vibration are maximum values and must not be applied continuously. These values only apply to mounting using screws.

5.5.6 Dimension drawing



Figure 5-32 Dimension drawing RF680R

All dimensions in mm (± 0.5 mm tolerance)

5.5.7 Certificates and approvals



Marking on the readers according to specific approval

The certificates and approvals listed here apply only if the corresponding mark is found on the readers.



Table 5- 42 6GT2811-6AA10-0AA0

Labeling	Description
	Conformity with the RED directive 2014/53/EU Conformity with the RoHS directive 2011/65/EU
	South Africa radio approval: Radio Equipment Type Approval
India	India wireless approval Marking on the reader: No. NR-ETA/1588
	Radio approval for Russia, Belarus, Kazakhstan

Table 5- 43 6GT2811-6AA10-1AA0

Labeling	Description
Federal Communications Commission	FCC CFR 47, Part 15 section 15.247 Radio Frequency Interference Statement This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. FCC ID: NXW-RF600R2
 Industry Canada Radio Standards Specifications	RSS-210 Issue 7, June 2007, Section 2.2, A8 IC: 267X-RF600R2, Model: RF680R
	This product is UL-certified for the USA and Canada. It meets the following safety standard(s): UL 60950-1 - Information Technology Equipment Safety - Part 1: General Requirements CSA C22.2 No. 60950 -1 - Safety of Information Technology Equipment UL Report E 115352

Labeling	Description
	Brazil radio approval Marking on the reader (6GT2811-6AA10-1AA0): Statement about approval: Este equipamento opera em caráter secundário, isto é, não tem direito à proteção contra interferência prejudicial, mesmo de estações do mesmo tipo e não pode causar interferência a sistemas operando em caráter primário. Reader certificate: ANATEL 2892-15-4794
	KCC Certification Type of equipment: A급 기기 (업무용 방송통신기자재) Class A Equipment (Industrial Broadcasting & Communication Equipment) 이 기기는 업무용(A급) 전자파적합기기로서 판 매자 또는 사용자는 이 점을 주의하시기 바라 며, 가정외의 지역에서 사용하는 것을 목적으로 합니다. This equipment is Industrial (Class A) electromagnetic wave suitability equipment and seller or user should take notice of it, and this equipment is to be used in the places except for home. Certificate of the reader: MSIP-CMM-RF5-RF680R
C-141618	Argentina radio approval: Registro de la COMISION NACIONAL DE COMUNICACIONES
RCPSISI14-1926-A1	Mexico radio approval: CERTIFICADO DE HOMOLOGACION, IFETEL
	Australia radio approval: This product meets the requirements of the AS/NZS 3548 Norm.

Table 5- 44 6GT2811-6AA10-2AA0

Standard	
CMIIT Certification	China radio approval Marking on the reader: CMIIT ID: 2014DJ3988

5.5.7.1 FCC information

Siemens SIMATIC RF680R (FCC): 6GT2811-6AA10-1AA0

FCC ID: NXW-RF600R2

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 B 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.

FCC Notice

To comply with FCC part 15 rules in the United States, the system must be professionally installed to ensure compliance with the Part 15 certification.

It is the responsibility of the operator and professional installer to ensure that only certified systems are deployed in the United States. The use of the system in any other combination (such as co-located antennas transmitting the same information) is expressly forbidden.

FCC Exposure Information

To comply with FCC RF exposure compliance requirements, the antennas used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.

5.5.7.2 IC-FCB information

Siemens SIMATIC RF680R (FCC): 6GT2811-6AA10-1AA0

IC: 267X-RF600R2

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.

Industry Canada Notice

To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that permitted for successful communication.

Transmitter power and antenna information for antennas with a gain less than 6 dBi:

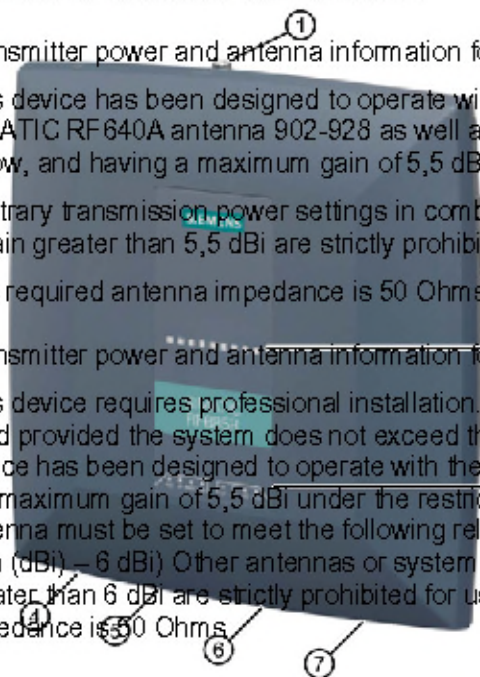
This device has been designed to operate with the SIMATIC RF620A antenna 902-928, the SIMATIC RF640A antenna 902-928 as well as the SIMATIC RF660A antenna 902-928 listed below, and having a maximum gain of 5,5 dBi.

Arbitrary transmission power settings in combination with other antennas or antennas having a gain greater than 5,5 dBi are strictly prohibited for use with this device.

The required antenna impedance is 50 Ohms.

Transmitter power and antenna information for antennas with a gain greater 6 dBi:

This device requires professional installation. Antennas with a gain greater 6 dBi may be used provided the system does not exceed the radiation power of 4000 mW E.I.R.P. This device has been designed to operate with the SIMATIC RF642A antenna 902-928 exceeding the maximum gain of 5,5 dBi under the restriction that the RF power at the input of the antenna must be set to meet the following relation: RF power (dBm) $\leq$ 30 dBm – (antenna gain (dBi) – 6 dBi) Other antennas or system configurations for antennas having a gain greater than 6 dBi are strictly prohibited for use with this device. The required antenna impedance is 50 Ohms.



5.6 SIMATIC RF685R

5.6.1 Description

5.6.1.1 Overview

The SIMATIC RF685R is a stationary reader in the UHF frequency band with an integrated antenna. An additional external UHF RFID antenna can be connected via an RP-TNC connector.

The maximum transmit power is 2000 mW at the external reader output, the radiant power of the internal antenna is also 2000 mW ERP/EIRP. A radiated power of up to 2000 mW ERP / 4000 mW EIRP is achieved when the appropriate antennas and antenna cables are used. The interfaces (Ethernet, power supply, DI/DQ interface) are located on the lower front edge. These interfaces can be used to connect the reader to the power supply and to a PC or a controller for parameter assignment.

The degree of protection is IP65.

	Pos.	Description
	①	RP-TNC interface for connection of an external antenna
	②	LED status display
	③	LED operating display
	④	DI/DQ interface: X10 DI/DQ (M12, 12-pin)
	⑤	Interface to power supply (RS422), 24 V DC ¹⁾ ; X80 DC24V (M12, 8-pin)
	⑥	Ethernet interface, TCP/IP: X1 P1 (M12, 4-pin)
	⑦	Ethernet interface, TCP/IP: X1 P2 (M12, 4-pin)

¹⁾) Connection of the readers to the ASM 456 communications module via the RS-422 interface.

5.6.1.2 Ordering data

Table 5- 45 Ordering data RF685R

Product	Article number
RF685R (ETSI)	6GT2811-6CA10-0AA0
RF685R (FCC)	6GT2811-6CA10-1AA0
RF685R (CMIIT)	6GT2811-6CA10-2AA0
RF685R (ARIB)	6GT2811-6CA10-4AA0

Table 5- 46 Ordering data accessories

Product	Article number
Holder set for securing the reader - DIN rail T35 (S7-1200) - S7-300 standard rail - S7-1500 standard rail	6GT2890-0AB00
SIMATIC antenna holder for RF600 devices	6GT2890-2AB10
Connecting cable and connectors	
DI/DQ cable connector open cable ends	5 m 6GT2891-0CH50
Ethernet plug on the reader FastConnect M12 (IP65)	6GK1901-0DB20-6AA0
Ethernet plug Standard IE FastConnect RJ45 180 (IP20)	6GK1901-1BB10-2AA0
Industrial Ethernet cable M12 / RJ45	5 m 6XV1871-5TH50
Industrial Ethernet cable M12 / M12	5 m 6XV1870-8AH50
Industrial Ethernet connecting cable M12-180 / RJ45	2 m 3 m 5 m 6XV1871-5TH20 6XV1871-5TH30 6XV1871-5TH50
Industrial Ethernet cable by the meter, green (minimum 20 m)	6XV1840-2AH10
Connecting cable reader ↔ CM M12-180 / M12-180	2 m 5 m 10 m 20 m 50 m 6GT2891-4FH20 6GT2891-4FH50 6GT2891-4FN10 6GT2891-4FN20 6GT2891-4FN50

Product	Article number
Connecting cable CM ↔ reader / extension cable for 24 V connecting cable RS 422, M12 connector, 8-pin socket	
▪ 2 m	6GT2891-4FH20
▪ 5 m	6GT2891-4FH50
▪ 10 m	6GT2891-4FN10
▪ 20 m	6GT2891-4FN20
▪ 50 m	6GT2891-4FN50
Wide-range power supply unit for SIMATIC RF systems	
▪ With EU plug	6GT2898-0AC00
▪ With UK plug	6GT2898-0AC10
▪ With US plug	6GT2898-0AC20
24 V connecting cable reader ↔ wide-range power supply unit	
▪ with plug, 5 m	6GT2891-0PH50
▪ with open ends, 2 m	6GT2891-4EH20
▪ with open ends, 5 m	6GT2891-4EH50
Set of protective caps	6GT2898-4AA10
Contains 3 protective caps for antenna output, one protective cap for digital I/O interface and 2 protective caps for Ethernet/PROFINET (required for IP 65 degree of protection when some connectors are unused)	
DVD "Ident Systems Software & Documentation"	6GT2080-2AA20

5.6.1.3 Pin assignment of the DI/DQ interface (X10 DI/DQ)

Table 5- 47 Pin assignment of the DI/DQ interface (reader end)

View of interface (M12 socket, 12-pin)	Pin	Pin assignment
	1	GND (output to supply of the digital inputs/outputs [not galvanically isolated])
	2	VCC (output to the supply of the digital inputs/outputs [not galvanically isolated])
	3	DO Common / Output Common
	4	DO 0 / Output 00
	5	DO 1 / Output 01
	6	DO 2 / Output 02
	7	DO 3 / Output 03
	8	DI 0 / Input 00
	9	DI Common / Input Common
	10	DI 1 / Input 01
	11	DI 2 / Input 02
	12	DI 3 / Input 03

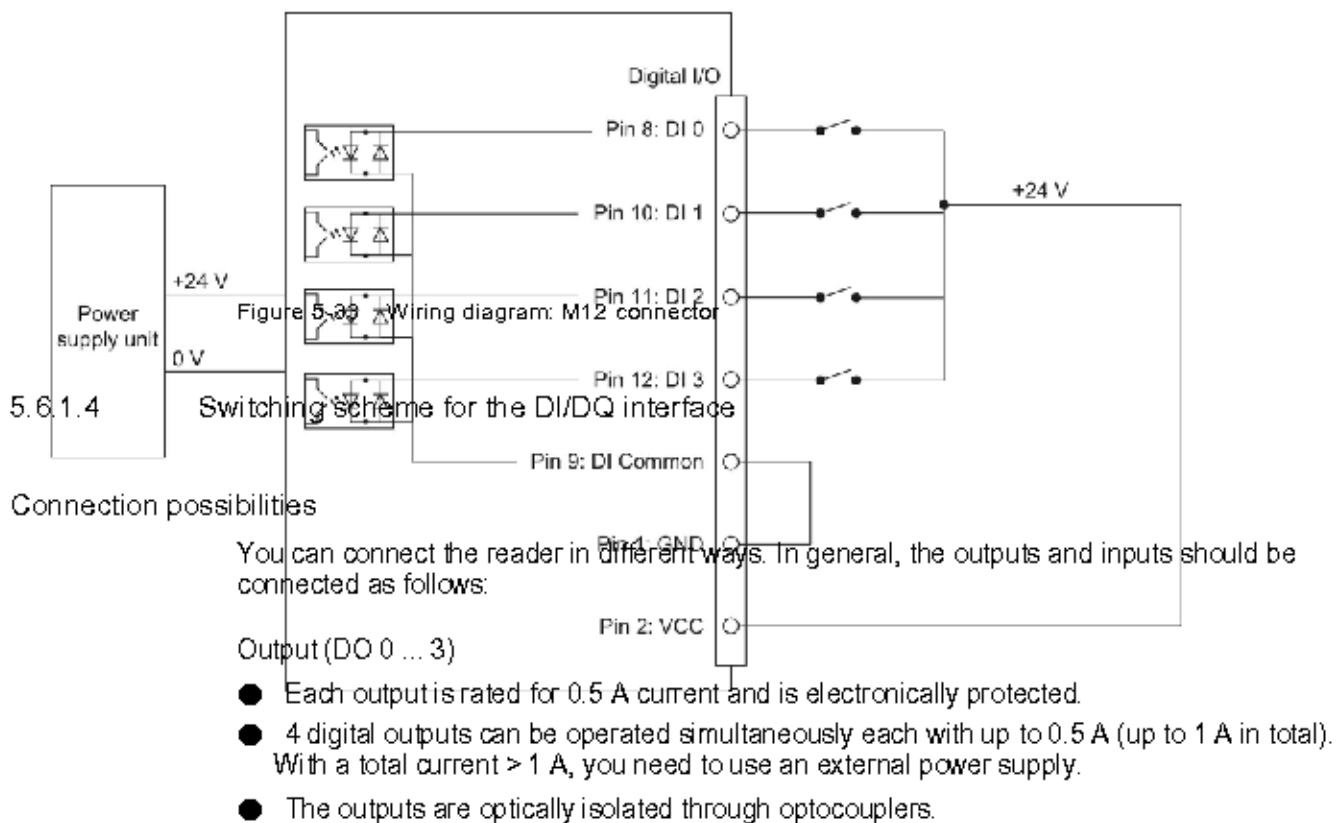
Note

Requirement for external power sources

When the DI/DQ interface is supplied with power by an external power source, this source must meet the requirements for LPS (Limited Power Sources) and NEC Class 2.

Color scheme of the DI/DQ standard cable with M12 connector

The following figure shows the color scheme of the DI/DQ standard cable from Siemens (6GT2891-0CH50). You can use the color scheme to assign the wire colors to the pins.



input (DI 0 ... 3)

- The inputs are optically isolated through optocouplers.

- Level

– Low: 0 ... 7 V

Digital I/O

Pin 8: DI 0

Pin 10: DI 1

Pin 11: DI 2

Pin 12: DI 3

Pin 9: DI common

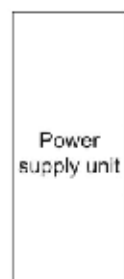
+15 V ... +24 V

GND

GND or

+15 V ... +24 V

Power supply unit



The following diagrams illustrate various connection possibilities

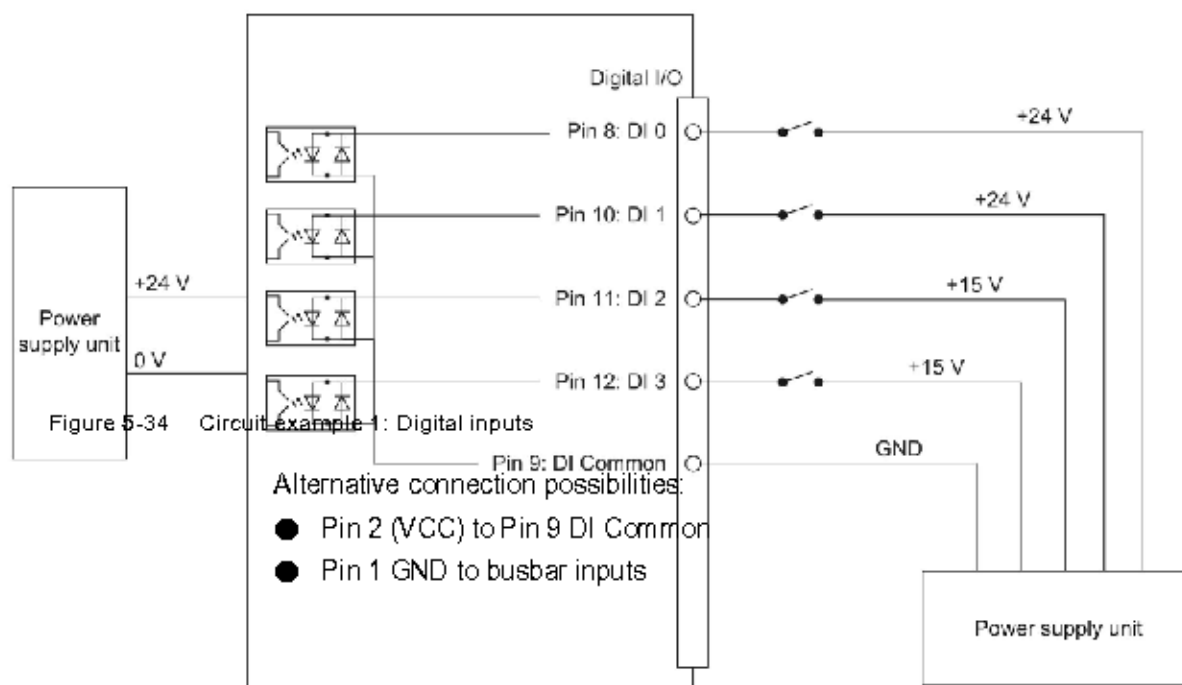
Note

Minimum time between changes

Note that changes on the DI/DQ interface that are not applied for at least 1.5 seconds are

not detected by the reader.

Voltage infeed from internal source (no electrical isolation)



Voltage infeed from external source

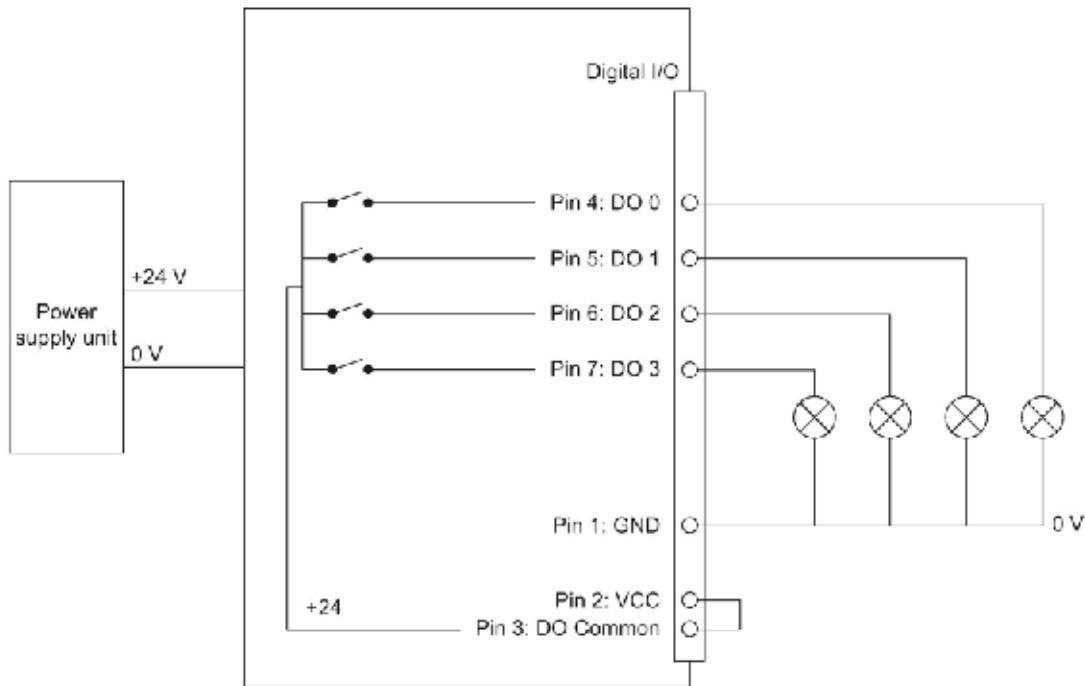


Figure 5-35 Circuit example 2: Digital inputs

Voltage infeed from external source with various voltages

Figure 5-36 Circuit example 3: Digital inputs

Voltage infeed from internal source

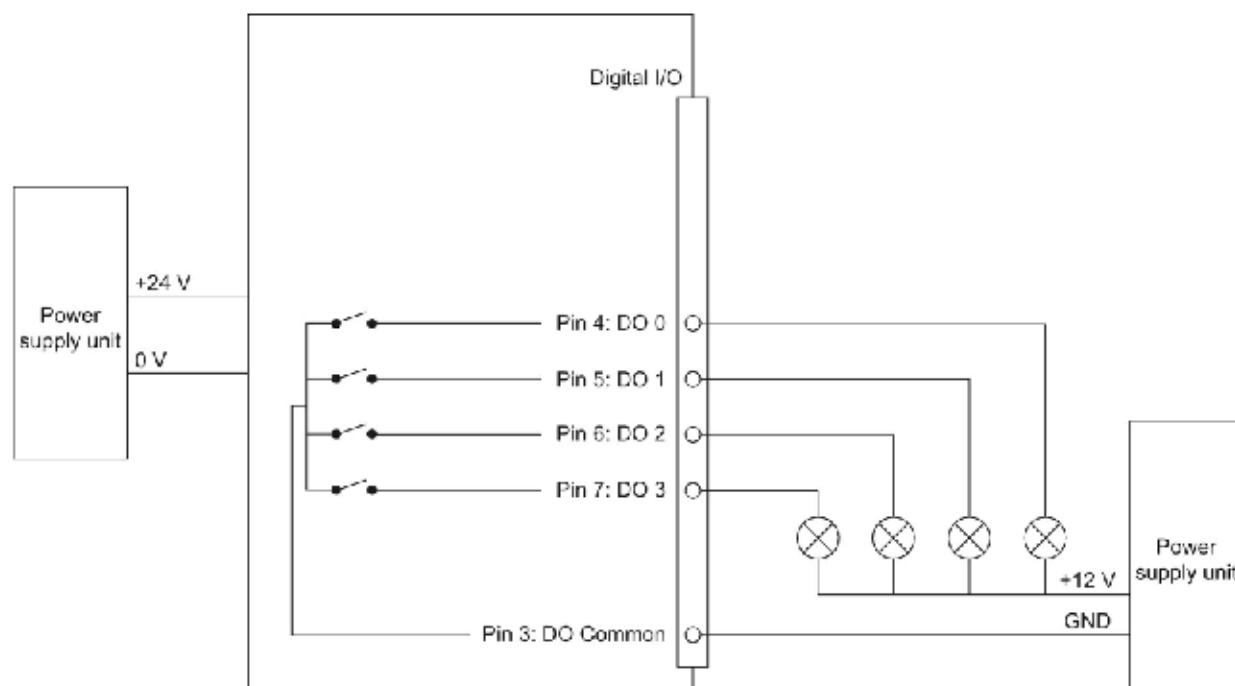


Figure 5-37 Circuit example 4: Digital outputs

Alternative connection possibilities:

- Pin 1 GND to Pin 3 DO Common
- Pin 2 (VCC) to busbar outputs

Voltage infeed from external source

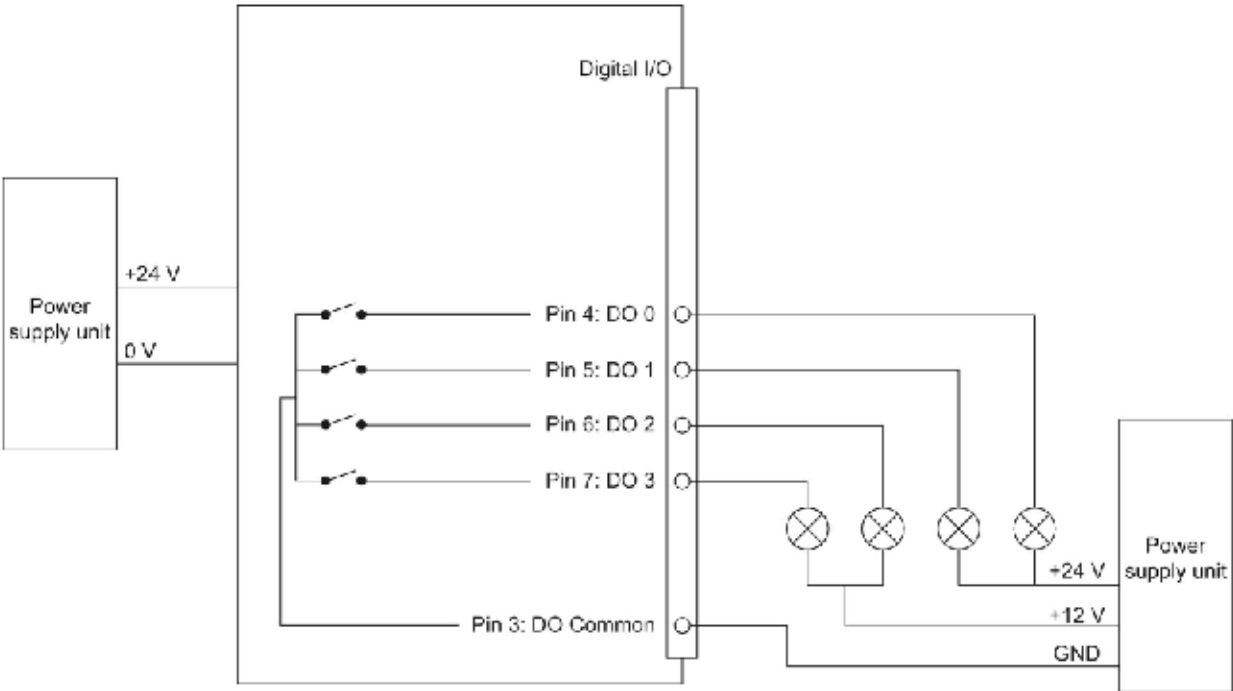


Figure 5-38 Circuit example 5: Digital outputs

Voltage infeed from an external source is shown here for 12 V as an example. Other voltages are also permissible.



Voltage infeed from external source with various voltages

Figure 5-39 Circuit example 6: Digital outputs

5.6.1.5 Pin assignment of the power supply interface (X80 24VDC)

Table 5- 48 Pin assignment of the RS422 interface (reader end)

View of interface (M12 socket 8-pin)	Pin	Wire colors	Assignment
	1	White	+ 24 V
	2 ¹⁾	Brown	- Tx
	3	Green	0 V
	4 ¹⁾	Yellow	+ Tx
	5 ¹⁾	Gray	+ Rx
	6 ¹⁾	Pink	- Rx
	7	--	Unassigned
	8	--	Earth (shield)

¹⁾ These pins are not required if the reader is operated via Ethernet.

Note

Requirement for external power sources

The reader must only be supplied with power by power supply units that meet the requirements of LPS (Limited Power Source) and NEC Class 2.

Requirement for external power sources

The reader must only be supplied with power by power supply units that meet the requirements of limited power source (LPS) and NEC Class 2.

Spécification des sources d'alimentation externes

L'alimentation du plot de lecture/écriture doit être exclusivement assurée par des blocs d'alimentation conformes aux spécifications des sources à puissance limitée (Limited Power Sources LPS) et de NEC class 2.

Notes on connectors and cables

The cables with open cable ends (6GT2891-4EH20, 6GT2891-4EH50) have an 8-pin M12 plug at one end, while the other end of the cable is "open". There are 8 color-coded single wires there for connecting to external devices.

The product range includes additional cables of the type 6GT2891-4Fxxx (2 to 50 m) with an M12 connector at both ends. These cables can be used as extension cables. Long cables can be shortened if necessary.

NOTICE

Insulate unused single wires

Unused single wires must be insulated individually to prevent unwanted connections of signal lines.

NOTICE

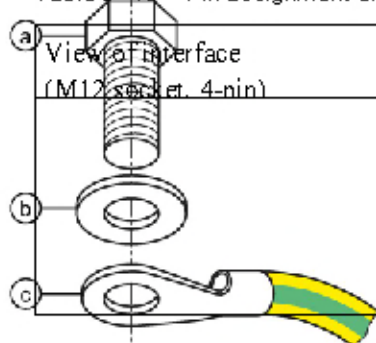
For long cables: Adapt the power supply and transmission speed

Note that even with long cables, the supply voltage of 24 VDC must always be guaranteed. Note also that the transmission speed on the serial interface must, if necessary, be reduced.

SIMATIC standard cables (e.g. 6GT2891-4FN10) have a loop resistance of 160 mOhm / meter. This results in a voltage drop of 0.8 volts on the 24 V cable for every 10 meters of connecting cable and with a power requirement of 500 mA. If the power requirement increases through the use of the digital inputs/outputs, the voltage drop increases accordingly.

5.6.1.6 Pin assignment of the Industrial Ethernet interface (X1 P1; X1 P2)

Table 5-49 Pin assignment of the Industrial Ethernet interface (reader end)

	Pin	Pin assignment
	1	Data line +Tx
	2	Data line +Rx
	3	Data line -Tx
	4	Data line -Rx

5.6.1.7 Grounding connection

On the top of the reader there is a blind drill hole (M4 x 8) for grounding. Tighten the screw with a torque of 1.5 Nm.

WARNING

Hazardous voltage due to lightning strikes

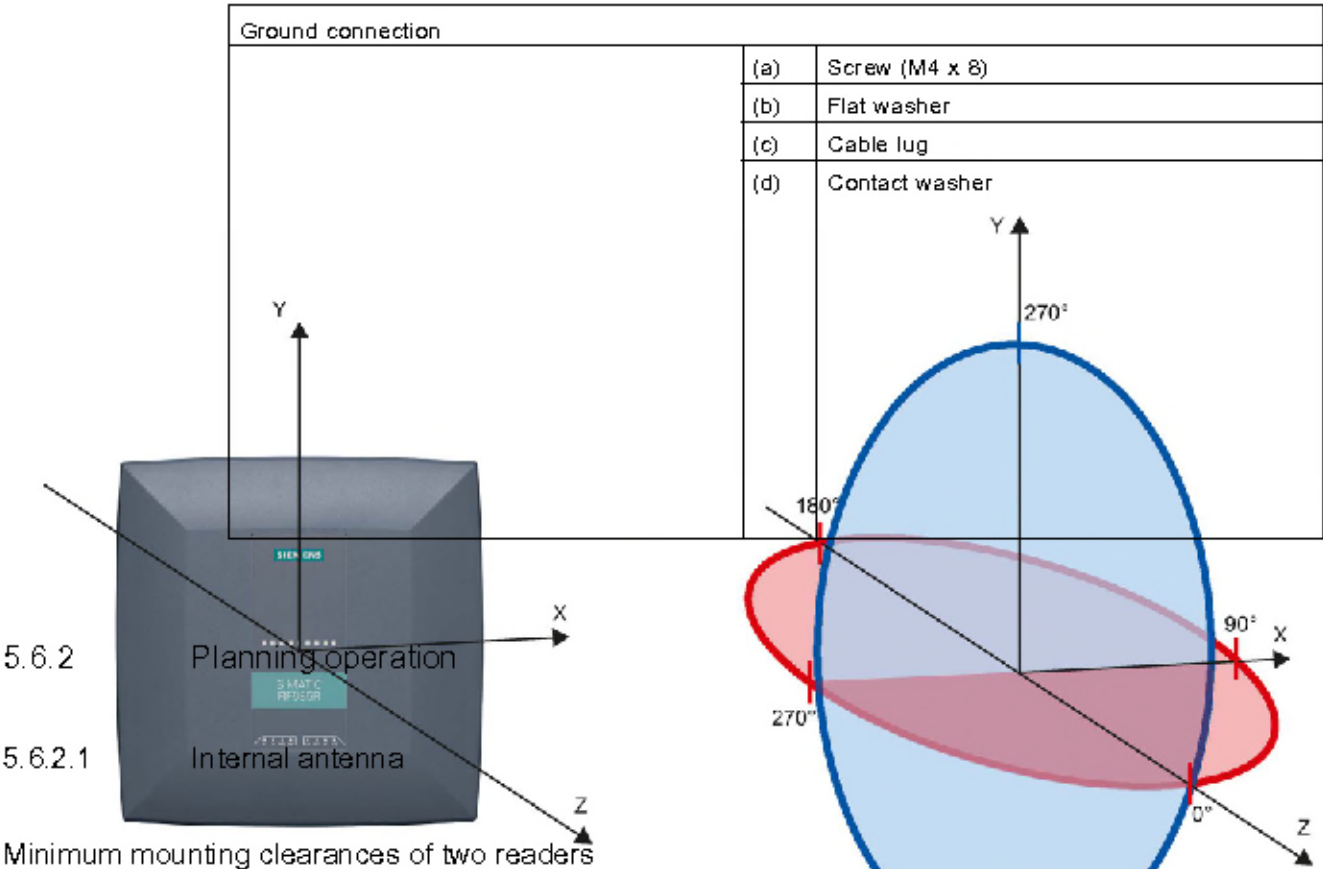
Death or serious injury may occur as a result of lightning strikes to antennas mounted outside buildings.

If the reader is operated with antennas mounted outside buildings, it is imperative that the reader is electrically connected to the ground potential.

NOTICE

Installation only in protected areas

The antenna can be installed in the protected part of a building. When implementing your lightning protection concept, make sure you adhere to the VDE 0182 or IEC 62305 standards.



RF685R has an adjustable internal antenna (linear horizontal or linear vertical). This means that you can set the antenna polarization to be either horizontal, vertical or circular. With the internal antenna active and at 2000 mW ERP radiated power, due to the aperture angle of the antennas, their fields can overlap considerably. This means it is no longer possible to be sure in which of the antenna fields the data of a transponder will be accessed.

To avoid these cases, always observe the recommended minimum distances between two readers as described in the section "Reciprocal influence of read points (Page 47)".

Dense Reader Mode (DRM)

The readers can also interfere with each other (secondary fields), if the channels (Reader TX, Transponder TX) overlap. In order to prevent a transponder channel overlapping with a reader channel, we recommend that the Dense Reader Mode (DRM) is used.

Note
Protective cap

If you only use the internal antenna of the reader, we recommend that you close the external, unused antenna connector on the reader using a protective cap.

Antenna diagram for RF685R (ETSI)

The following radiation diagrams show the directional characteristics of the internal antenna of the RF685R (ETSI) reader. For the spatial presentation of the directional characteristics, the horizontal plane (azimuth section) as well as the vertical plane (elevation section) must be considered. This results in a spatial image of the directional radiation pattern of the antenna.

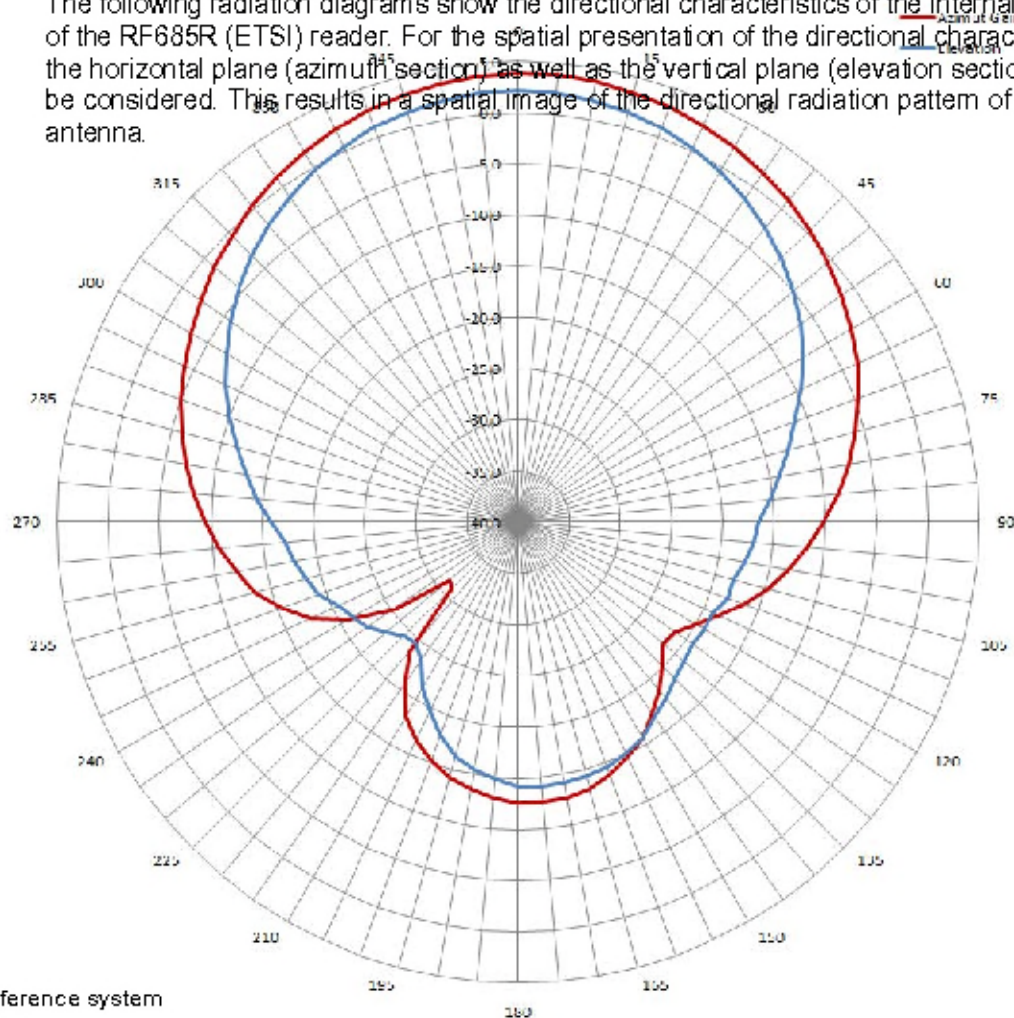


Figure 5-40 Reference system

Radiation diagram (Azimuth section)

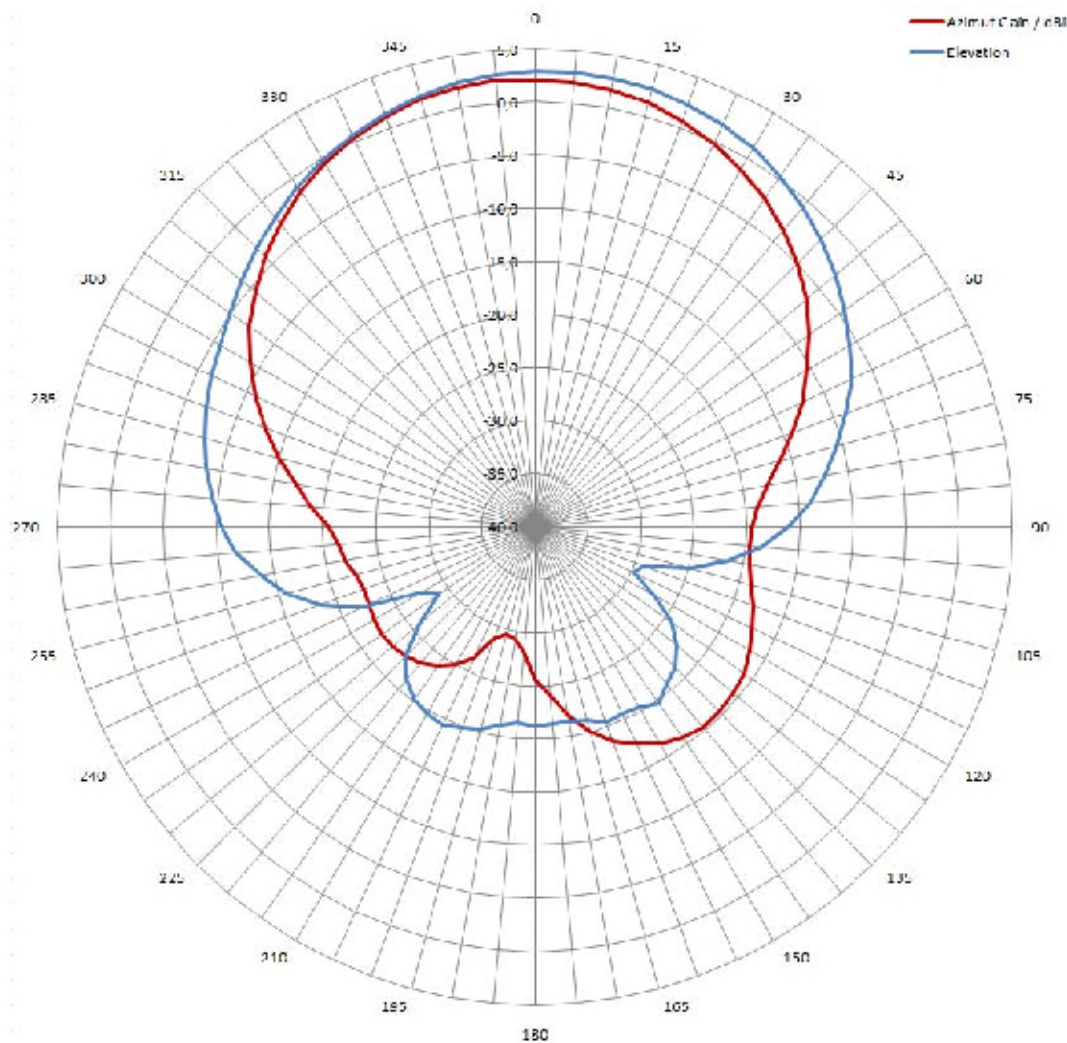


Figure 5-41 Azimuth section

Radiation diagram (elevation section)

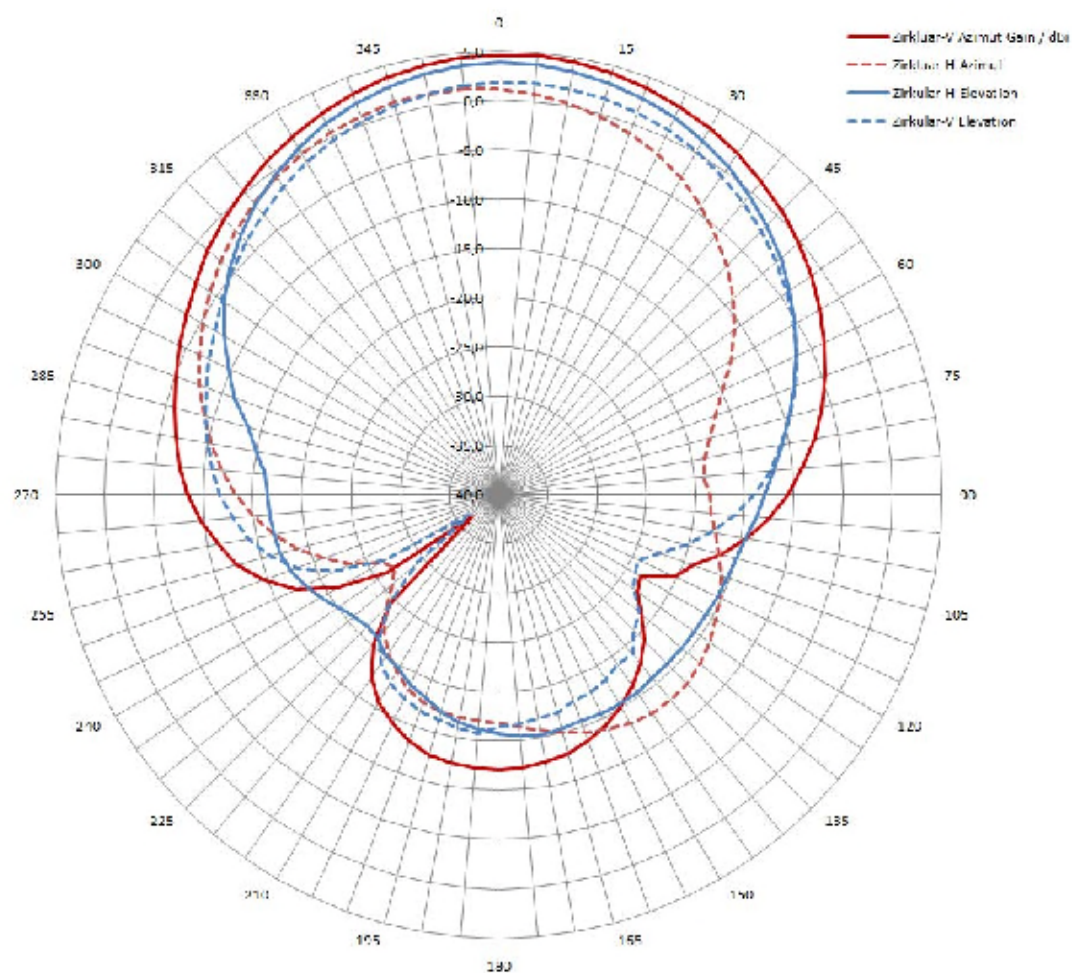


Figure 5-42 Elevation section

Radiation diagram circular

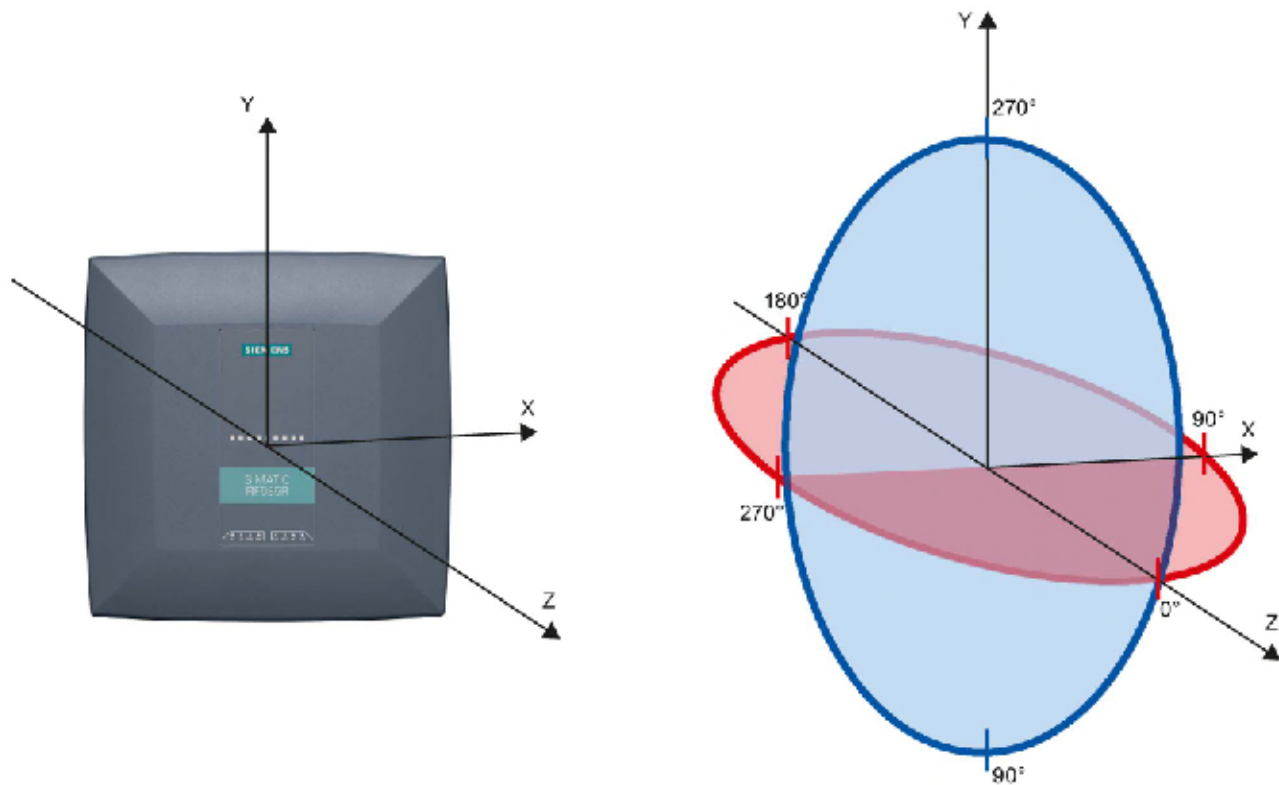


Figure 5-43 Circular section

Overview of the antenna parameters

Table 5- 50 Maximum linear electrical aperture angle at 865 MHz

	Polarization		Circular polarization
	Linear vertical	Linear horizontal	
Azimuth section	64°	61°	65°
Elevation section	64°	66°	63°
Typical antenna gain in the frequency band 865 to 868 MHz	5 dBi	3 dBi	5 dBi
Antenna axis ratio	--	--	2 dB

You will find more information on the antennas in the section "Guidelines for selecting RFID UHF antennas (Page 51)".

Antenna diagram for RF685R (FCC)

The following radiation diagrams show the directional characteristics of the internal antenna of the RF685R (FCC) reader. For the spatial presentation of the directional characteristics, the horizontal plane (azimuth section) as well as the vertical plane (elevation section) must be considered. This results in a spatial image of the directional radiation pattern of the antenna.

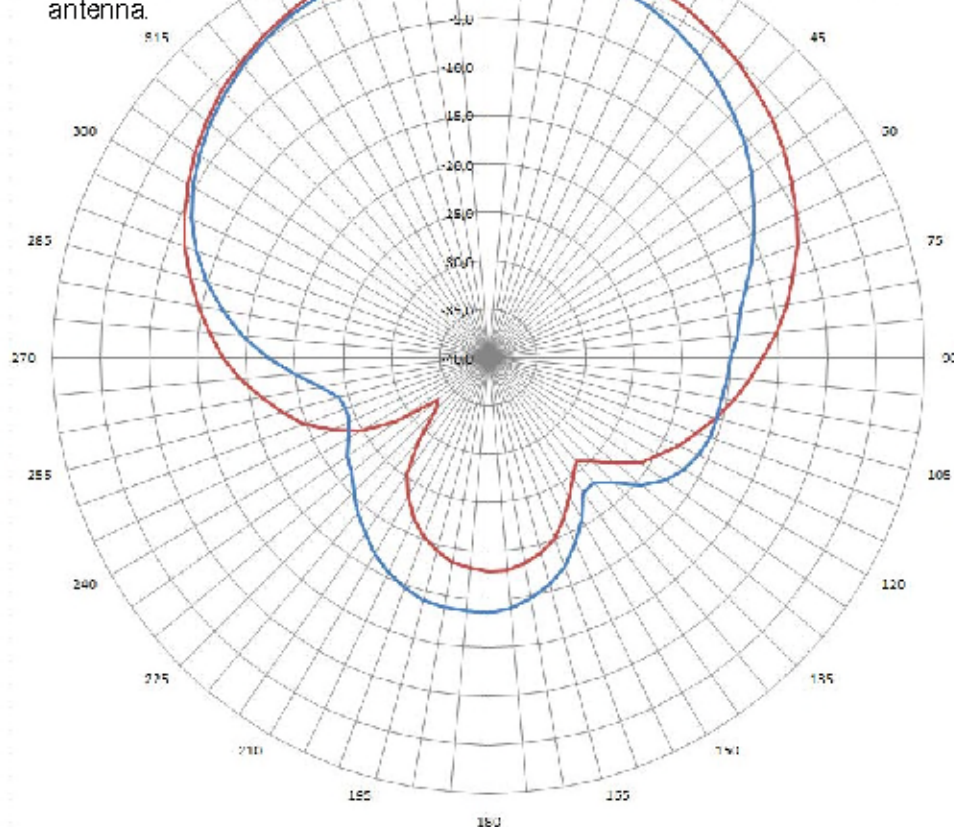


Figure 5-44 Reference system

Radiation diagram (Azimuth section)

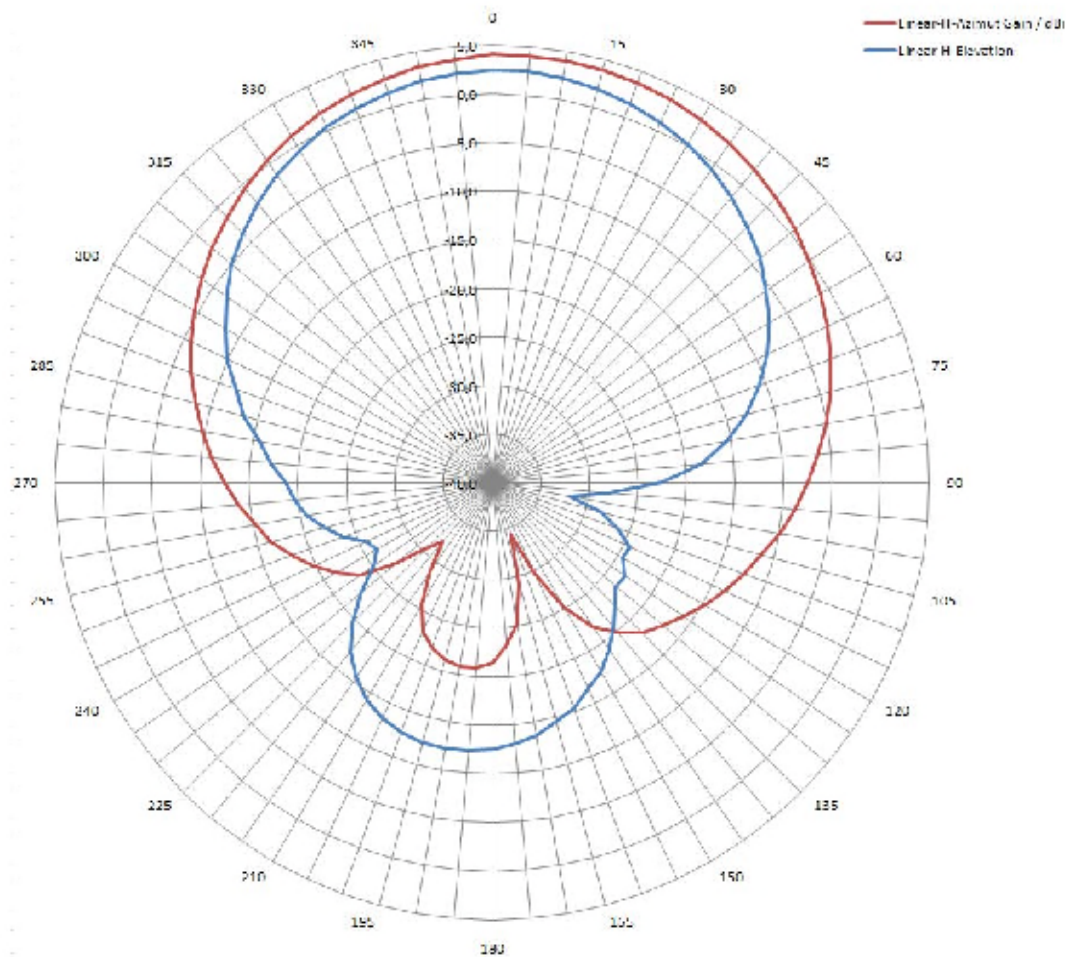


Figure 5-45 Azimuth section

Radiation diagram (elevation section)

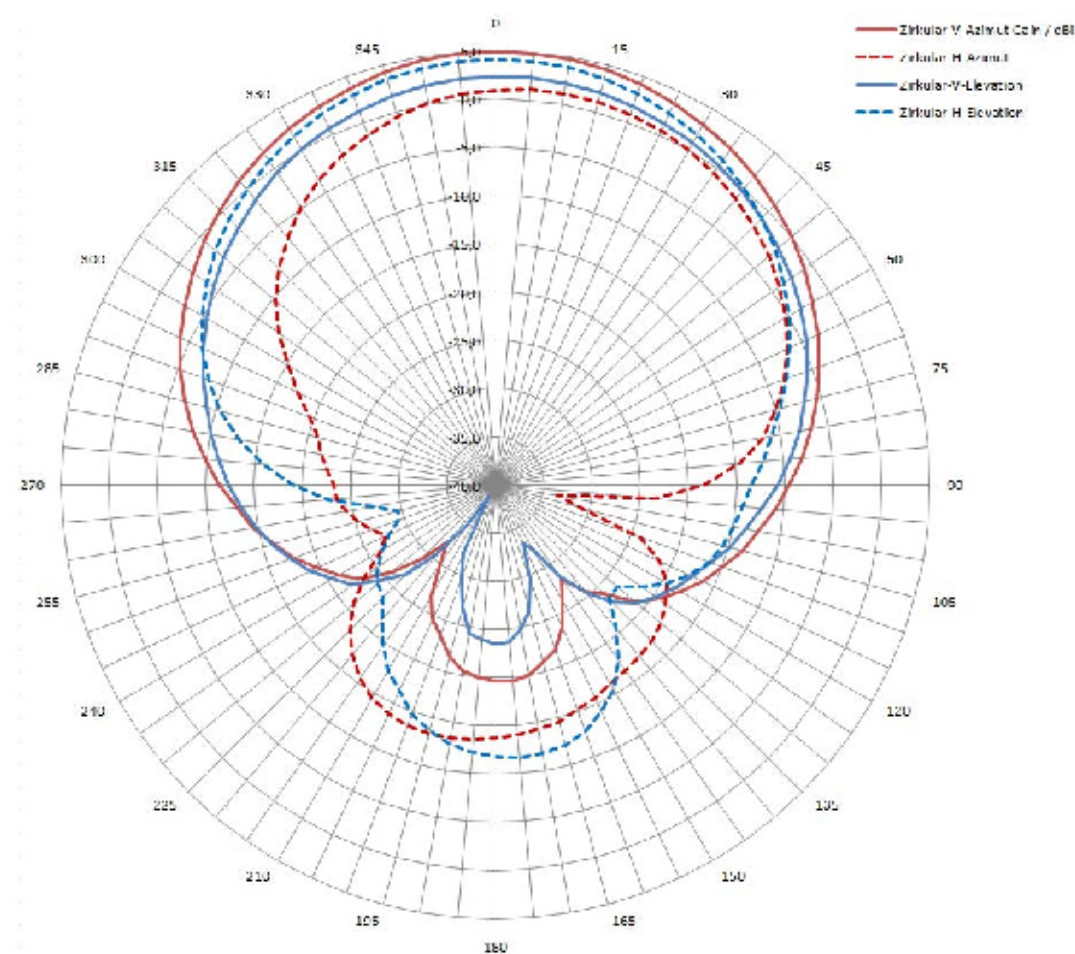


Figure 5-46 Elevation section

Radiation diagram (circular)

Figure 5-47 Circular section

Overview of the antenna parameters

Table 5- 51 Maximum linear electrical aperture angle at 915 MHz

	Polarization		Circular polariza- tion
	Linear vertical	Linear horizontal	
Azimuth section	74°	64°	73°
Elevation section	70°	78°	68°
Typical antenna gain in the frequency band 902 to 928 MHz	5 dBi	3 dBi	5 dBi
Antenna axis ratio	--	--	2 dB

You will find more information on the antennas in the section "Guidelines for selecting RFID UHF antennas (Page 51)".

Interpretation of radiation patterns

The following overview table will help you with the interpretation of radiation patterns.

The table shows which dBi values correspond to which read/write ranges (in %). You can read the radiated power depending on the reference angle from the radiation patterns, and thus obtain information on the read/write range with this reference angle with regard to a transponder.

The dBr values correspond to the difference between the maximum dBi value and a second dBi value.

Table 5- 52 Range of antenna depending on antenna gain

Deviation from maximum antenna gain [dBr]	Read/write range [%]
0	100
-3	70
-6	50
-9	35
-12	25
-15	18
-18	13



Example

As can be seen in the section Antenna diagram for RF685R (ETSI) (Page 207), the maximum antenna gain 0 dB is standardized. In the Azimuth diagram, the antenna gain falls by 3°dB at approximately $\pm 39^\circ$. This means that the dBr value is -3. The antenna range is only 70 % of the maximum range at $\pm 39^\circ$ from the Z axis within the horizontal plane.

5.6.2.2 External antenna

Preassembled standard cables in lengths of 1 m, 3 m, 5 m, 10 m, 15 m, 20 m and 40 m are available to connect the antenna.

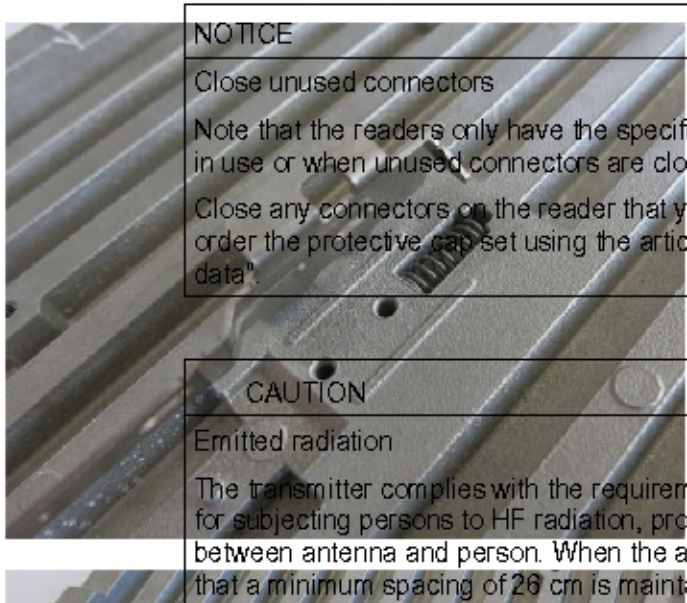
The read range is limited by the cable loss. The maximum range can be achieved with the cable 6GT2815-0BH10 (length 1 m) since this has the lowest cable loss.

Examples of possible antenna reading point configurations

- A data source with an external antenna for a reading point.
- As an alternative, a data source with an internal antenna for a reading point.

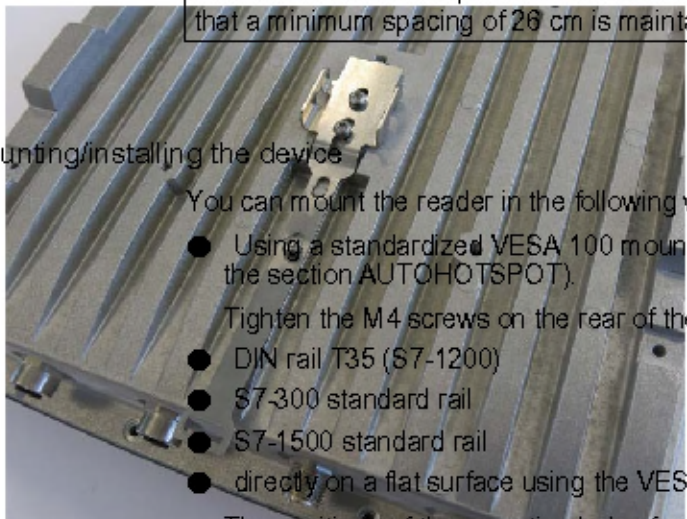
5.6.3 Installation/mounting

Requirement



NOTICE	
Close unused connectors	
Note that the readers only have the specified degree of protection when all connectors are in use or when unused connectors are closed with the protective caps.	
Close any connectors on the reader that you are not using with protective caps. You can order the protective cap set using the article number specified in the section "Ordering data".	
CAUTION	
Emitted radiation	
The transmitter complies with the requirements of Health Canada and the FCC limit values for subjecting persons to HF radiation, provided that a minimum spacing of 26 cm exists between antenna and person. When the antennas are installed, you must therefore ensure that a minimum spacing of 26 cm is maintained between personnel and antennas.	

Mounting/installing the device



You can mount the reader in the following ways:

- Using a standardized VESA 100 mounting system and the Antenna Mounting Kit (refer to the section AUTOHOTSPOT).

Tighten the M4 screws on the rear of the reader using a torque of ≤ 1.5 Nm.

- DIN rail T35 (S7-1200)
- S7-300 standard rail
- S7-1500 standard rail
- directly on a flat surface using the VESA 100 mounting system (torque ≤ 1.5 Nm).

The positions of the mounting holes for the device are shown in the section Dimension drawing (Page 224).

Mounting the reader on a DIN/standard rail

Table 5- 53 DIN rail mounting



Description	
	1. Place the spring in the groove.
	2. Mount the holder using the supplied Torx screws. When mounting the holder, make sure that the angled tip is positioned above the spring in the groove.

	Description
	3. Fit the lower part of the locking mechanism of the reader into the DIN rail. To be able to mount the reader on or remove it from the DIN rail, pull down the holder mounted in step 2.
	

Table 5- 54 Installation on a standard rail

	Description
	1. Mount the two adapter pieces using the supplied Torx screws.
STEP 7 Basic/Professional (TIA Portal) Power supply 24 V DC > 110/230 V AC Process control 4 x digital input 4 x digital output Ethernet/IP controller Diagnostics PC for configuration/diagnostics using a Web browser User application (using OPC UA or XML commands) Antenna RF6xxA up to 40 m ■ Ethernet (TCP/IP) / PROFINET	2. Fit the upper part of the locking mechanism of the reader into the standard rail. 3. Secure the reader using the supplied slotted-head screws.