

# SIEMENS

## SIMATIC Ident

## RFID systems SIMATIC RF200

### System Manual

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## Legal information

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# Introduction

## Introduction

SIMATIC RF200 is a compact RFID system in the SIMATIC RFID product family. The product range comprises cost-efficient RF readers that are ideal for use in small assembly lines or in intralogistics. SIMATIC RF200 RFID readers only support the RFID standard ISO 15693 and are therefore ideal for operation with the extensive range of ISO 15693 transponders.

The readers of the RF200 product family are available with the following interfaces:

- RS-422 for connecting to the communications modules
- RS-232 with a simple ASCII protocol for connection to PCs and third-party controllers
- IO-Link for connection to IO Link masters from Siemens and third-party controllers

Readers with an internal antenna have a particularly compact design (RF210R/RF220R/RF240R/RF260R). RF250R and RF290R are designed for operation with external antennas either to achieve longer distances or larger field sizes (RF290R with ANT D5/D6/D10) or to allow installation where there is very little space (RF250R with ANT 3/8/12/18/30).

## Scope of validity of this document

This documentation is valid for all variants of the SIMATIC RF200 system and describes the devices shipped as of July 2015.

## Registered trademarks

SIMATIC®, SIMATIC RF®, MOBY®, RF MANAGER® and SIMATIC Sensors® are registered trademarks of Siemens AG.

## Further information

For additional information, refer to the manuals:

- Function manual "Ident profile and Ident blocks" (<https://support.industry.siemens.com/cs/us/en/view/106368029>)
- Function manual "FB 45" (<https://support.industry.siemens.com/cs/ww/en/view/21738808>)
- Operating instructions "RF200 IO-Link" (<https://support.industry.siemens.com/cs/ww/en/view/60641859>)
- System manual "MOBY D" (<https://support.industry.siemens.com/cs/ww/en/view/13628689>)

- Operating instructions "RF310M"  
(<https://support.industry.siemens.com/cs/us/en/view/51812642>)
- Product information "RF200 command set"  
(<https://support.industry.siemens.com/cs/us/en/view/44864850>)

## History

The following issues of the SIMATIC RF200 system manual have been published:

Output	Note
03/2011	First edition
05/2011	Expansion of the documentation with the addition of the device variant RF260R with RS-232 interface
09/2011	Expansion of the documentation with the device variant RF240R
03/2013	Expansion of the documentation with the device variant RF290R
09/2013	Expansion of the documentation by the following: <ul style="list-style-type: none"> <li>• The device variant RF250R</li> <li>• The device variants RF240R and RF260R with ASCII interface</li> <li>• Antennas ANT 8, ANT 12, ANT 18 and ANT 30</li> <li>• Transponder</li> </ul>
07/2015	Expansion of the documentation by the following: <ul style="list-style-type: none"> <li>• ANT 3 antennas</li> <li>• MDS D5xx transponder</li> <li>• Mobile reader RF210R</li> </ul>
05/2017	Expansion of the documentation by the following: <ul style="list-style-type: none"> <li>• Device version RF280R</li> <li>• Mobile Reader RF350M</li> </ul>

## 1.1 Abbreviations and naming conventions

### Abbreviations and naming conventions

The following terms/abbreviations are used synonymously in this document:

Reader	Write/read device (SLG)
Transponder, tag	Data carrier, mobile data storage, (MDS)
Communications module (CM)	Interface module (ASM)

## Safety notes

SIMATIC RFID products comply with the salient safety specifications acc. to IEC, VDE, EN, UL and CSA. If you have questions about the permissibility of the installation in the planned environment, please contact your service representative.

### WARNING

#### Opening the device

Do not open the device when the power supply is on. Unauthorized opening of and improper repairs to the device may result in substantial damage to equipment or risk of personal injury to the user.

### NOTICE

#### Alterations not permitted

Alterations to the devices are not permitted.

Failure to observe this requirement shall constitute a revocation of the radio equipment approval, CE approval and manufacturer's warranty.

## Installation instructions

### NOTICE

#### Switch/fuse to disconnect the reader from the power supply

Make sure that the readers can be disconnected from the power supply with a switch or a fuse. The function of the switch or fuse must be clearly recognizable.

## Operating temperature

### CAUTION

#### Danger of burns

Note that some outer components of the reader are made of metal. Depending on the environmental conditions temperatures can occur on the device that are higher than the maximum permitted operating temperature.

## Repairs

 **WARNING**

**Repairs only by authorized qualified personnel**

Repairs may only be carried out by authorized qualified personnel. Unauthorized opening of and improper repairs to the device may result in substantial damage to equipment or risk of personal injury to the user.

## System expansions

Only install system expansions intended for this system. If you install other expansions, you may damage the system or violate the safety requirements and regulations for radio frequency interference suppression. Contact Technical Support or your local sales department to find out which system expansions are suitable for installation.

**NOTICE**

**Warranty conditions**

If you cause system defects by installing or exchanging system expansion devices, the warranty becomes void.

## Safety distances

 **CAUTION**

**Safety distance between reader/antenna and persons**

Note that for permanent exposure, the following safety distances must be adhered to:

- RF310R:  $\geq 80$  mm
- RF340R:  $\geq 130$  mm
- RF350R + ANT 1:  $\geq 140$  mm
- RF350R + ANT 3:  $\geq 80$  mm
- RF350R + ANT 12:  $\geq 25$  mm
- RF350R + ANT 18:  $\geq 50$  mm
- RF350R + ANT 30:  $\geq 80$  mm
- RF380R:  $\geq 250$  mm
- RF382R:  $\geq 130$  mm

---

**Note**

**Safety distance with pacemakers**

A safety distance between reader/antenna and persons with pacemakers is not necessary.

---

## Security information

Siemens provides products and solutions with industrial security functions that support the secure operation of plants, systems, machines and networks.

In order to protect plants, systems, machines and networks against cyber threats, it is necessary to implement – and continuously maintain – a holistic, state-of-the-art industrial security concept. Siemens' products and solutions only form one element of such a concept.

Customer is responsible to prevent unauthorized access to its plants, systems, machines and networks. Systems, machines and components should only be connected to the enterprise network or the internet if and to the extent necessary and with appropriate security measures (e.g. use of firewalls and network segmentation) in place.

Additionally, Siemens' guidance on appropriate security measures should be taken into account. For more information about industrial security, please visit

Link: (<http://www.siemens.com/industrialsecurity>)

Siemens' products and solutions undergo continuous development to make them more secure. Siemens strongly recommends to apply product updates as soon as available and to always use the latest product versions. Use of product versions that are no longer supported, and failure to apply latest updates may increase customer's exposure to cyber threats.

To stay informed about product updates, subscribe to the Siemens Industrial Security RSS Feed under

Link: (<http://www.siemens.com/industrialsecurity>).



## System overview

SIMATIC RF200 is an inductive identification system that is compatible with the ISO 15693 standard and was specially designed for use in industrial production for the control and optimization of material flows.

In contrast to SIMATIC RF300, SIMATIC RF200 is intended for RFID applications where performance requirements are not very high, for example with regard to data volume, transfer rate or diagnostics options. SIMATIC RF200 is characterized by particularly favorable prices.

## **3.1 RFID components and their function**

### **RF200 system components**

Figure 3-1 RF200 system overview



Table 3- 1 Reader-transponder combination options, Part 1

Transponder	RF210R/ RF210M	RF220R	RF240R	RF260R	RF280R	RF290R <sup>4)</sup>	RF350M
MDS D100	--	○	✓	✓	✓	✓	✓
MDS D117	○	--	--	--	--	--	✓ <sup>6)</sup>
MDS D124	✓	✓	✓	✓	✓	✓	✓
MDS D126	--	✓	✓	✓	✓	✓	✓
MDS D127	✓	--	--	--	--	--	✓ <sup>6)</sup>
MDS D139 <sup>1)</sup>	--	○	○	✓	✓	✓	✓
MDS D160 <sup>2)</sup>	✓	✓	✓	✓	✓	✓	✓
MDS D165	--	○	✓	✓	✓	✓	✓
MDS D200	--	○	✓	✓	✓	✓	✓
MDS D261	--	○	✓	✓	✓	✓	✓
MDS D324	✓	✓	✓	✓	✓	✓	✓
MDS D339	--	○	○	✓	✓	✓	✓
MDS D400	--	--	✓	✓	✓	✓	✓
MDS D421	✓	○	--	--	--	--	✓ <sup>6)</sup>
MDS D422	✓	✓	✓	--	--	--	✓ <sup>6)</sup>
MDS D423	✓	✓	✓	✓	✓	--	✓
MDS D424	✓	✓	✓	✓	✓	✓	✓
MDS D425	✓	✓	✓	--	✓	--	✓
MDS D426	--	✓	✓	✓	✓	✓	✓
MDS D428	✓	✓	✓	✓	✓	--	✓
MDS D460	✓	✓	✓	✓	✓	○ / ✓ <sup>5)</sup>	✓
MDS D521	✓	○	--	--	--	--	✓ <sup>6)</sup>
MDS D522 <sup>3)</sup>	✓	✓	✓	--	--	--	✓ <sup>6)</sup>
MDS D524	✓	✓	✓	✓	✓	✓	✓
MDS D525	✓	✓	✓	--	✓	--	--
MDS D526	--	✓	✓	✓	✓	✓	✓
MDS D528	✓	✓	✓	✓	✓	--	✓

1) only with the article number 6GT2600-0AA10

2) only with the article number 6GT2600-0AB10

3) The transponder MDS D522 special variant has the same compatibility as the transponder MDS D522.

4) in conjunction with ANT D5, D6 or D10

5) combination recommended only in conjunction with ANT D5.

6) Only in conjunction with RF350M for external antennas (6GT2803-1BA10)

- ✓ Combination possible
- Combination not possible
- Combination possible, but not recommended

3.1 RFID components and their function

Table 3-2 Reader-transponder combination options, Part 2

RF250R with						
Transponder	ANT 1	ANT 3	ANT 8	ANT 12	ANT 18	ANT 30
MDS D100	✓	○	--	--	--	○
MDS D117	--	--	✓	✓	--	--
MDS D124	✓	✓	--	--	✓	✓
MDS D126	✓	✓	--	--	--	✓
MDS D127	--	--	✓	✓	--	--
MDS D139	✓	○	--	--	--	○
MDS D160	✓	✓	--	✓	✓	✓
MDS D165	✓	○	--	--	--	○
MDS D200	✓	○	--	--	--	○
MDS D261	✓	○	--	--	--	○
MDS D324	✓	✓	--	○	✓	✓
MDS D339	✓	○	--	--	--	○
MDS D400	✓	○	--	--	--	○
MDS D421	--	--	✓	✓	✓	--
MDS D422	--	✓	--	✓	✓	✓
MDS D423	✓	✓	--	--	✓	✓
MDS D424	✓	✓	--	--	✓	✓
MDS D425	✓	✓	--	✓	✓	✓
MDS D426	✓	✓	--	--	--	✓
MDS D428	✓	✓	--	✓	✓	✓
MDS D460	✓	✓	--	✓	✓	✓
MDS D521	--	--	✓	✓	✓	--
MDS D522)	--	✓	--	✓	✓	✓
MDS D524	✓	✓	--	--	✓	✓
MDS D525	✓	✓	--	✓	✓	✓
MDS D526	✓	✓	--	--	--	✓
MDS D528	✓	✓	--	✓	✓	✓

- ✓ Combination possible
- Combination not possible
- Combination possible, but not recommended

## 3.2 Overview of transponders

### Overview of typical areas of application of ISO transponders for RF200

Transponder	Area of application
MDS D100	From simple identification such as electronic barcode replacement or supplementation, through warehouse and distribution logistics, right up to product identification. With this transponder, the maximum ranges are achieved in combination with the SIMATIC RF260R reader.
MDS D117	Very compact data carrier that can be cemented into objects where precise positioning is necessary. e.g. tool identification.
MDS D124	Application areas in factory automation (e.g. small paintshops to 180°C).
MDS D126	Compact and rugged ISO transponder; suitable for identification of transport units in production-related logistics; can also be deployed in harsh conditions.
MDS D127	Very compact data carrier that can be screwed into areas where precise positioning is necessary. e.g. tool identification.
MDS D139 <sup>1)</sup>	Applications in production automation with high temperature demands (up to +220 °C). Typical application areas: <ul style="list-style-type: none"> <li>• Paintshops and their preparatory treatments</li> <li>• Primer coat, electrolytic dip area, cataphoresis with the associated drying furnaces</li> <li>• Top coat area with drying furnaces</li> <li>• Washing areas at temperatures &gt; 85 °C</li> <li>• Other applications with higher temperatures</li> </ul>
MDS D160 <sup>2)</sup>	Typical applications are, for example: <ul style="list-style-type: none"> <li>• Rented work clothing</li> <li>• Hotel laundry</li> <li>• Surgical textiles</li> <li>• Hospital clothing</li> <li>• Dirt collection mats</li> <li>• Clothing for nursing homes/hostels</li> <li>• Assembly lines with very small workpiece holders</li> </ul>
MDS D165	Smart label (self-adhesive label) From simple identification such as electronic barcode replacement/supplementation, through warehouse and distribution logistics, right up to product identification
MDS D200	From simple identification such as electronic barcode replacement/supplementation, through warehouse and distribution logistics, right up to product identification.
MDS D261	Smart label (self-adhesive label) The design of the transponder (self-adhesive label) permits a variety of designs in order to ensure optimum dimensioning for the widest variety of applications. From simple identification such as electronic barcode replacement/supplementation, through warehouse and distribution logistics, right up to product identification.
MDS D324	Production and distribution logistics as well as in assembly and production lines
MDS D339	Applications in production automation with high temperature demands (up to +220 °C). For typical areas of application, see "MDS D139".

3.2 Overview of transponders

Transponder	Area of application
MDS D400	Simple identification such as electronic barcode replacement/supplements, from warehouse and distribution logistics right through to product identification.
MDS D421	The MDS D421 is designed for tool coding according to DIN 69873. It can be used wherever small data carriers and exact positioning are required, e.g. tool identification, workpiece holders
MDS D422	Identification of metallic workpiece holders, workpieces or containers
MDS D423	Identification of metallic workpiece holders, workpieces or containers, production automation
MDS D424	Production and distribution logistics as well as in assembly and production lines
MDS D425	Compact and rugged ISO transponder; suitable for screw mounting. Use in assembly and production lines in the powertrain sector; ideal for mounting on motors, gearboxes, and workpiece holders
MDS D426	Compact and rugged ISO transponder; suitable for identification of transport units in production-related logistics; can also be deployed in harsh conditions
MDS D428	Compact and rugged ISO transponder; suitable for screw mounting Use in assembly and production lines in the powertrain sector
MDS D460	Assembly lines with very small workpiece holders
MDS D521	The MDS D521 is constructed for tool coding according to DIN 69873. It can be used wherever small data carriers and exact positioning are required, e.g. tool identification, workpiece holders.
MDS D522	Identification of metallic workpiece holders, workpieces or containers
MDS D522 Special variants	If Identification of metallic workpiece holders or workpieces
MDS D524	Production and distribution logistics as well as in assembly and production lines
MDS D526	Compact and rugged ISO transponder; suitable for identification of transport units in production-related logistics; can also be deployed in harsh environmental conditions
MDS D528	Compact and rugged ISO transponder; suitable for screw mounting Use in assembly and production lines in the powertrain sector

- 1) Only with the MLFB 6GT2600-0AA10
- 2) Only with the MLFB 6GT2600-0AB10

Overview of the memory sizes of the ISO transponders for RF200

Transponder	Memory size
MDS D1xx	112 bytes of EEPROM
MDS D2xx	256 bytes of EEPROM
MDS D3xx	992 bytes of EEPROM
MDS D4xx	2000 bytes FRAM
MDS D5xx	8192 bytes FRAM





# Planning the RF200 system

## 4.1 Fundamentals of application planning

### 4.1.1 Selection criteria for SIMATIC RF200 components

Assess your application according to the following criteria, in order to choose the right SIMATIC RF200 components:

- Static or dynamic data transfer
- Data volume to be transferred
- Speed in case of dynamic transfer
- Ambient conditions such as relative humidity, temperature, chemical impacts, etc.

### 4.1.2 Transmission window and read/write distance

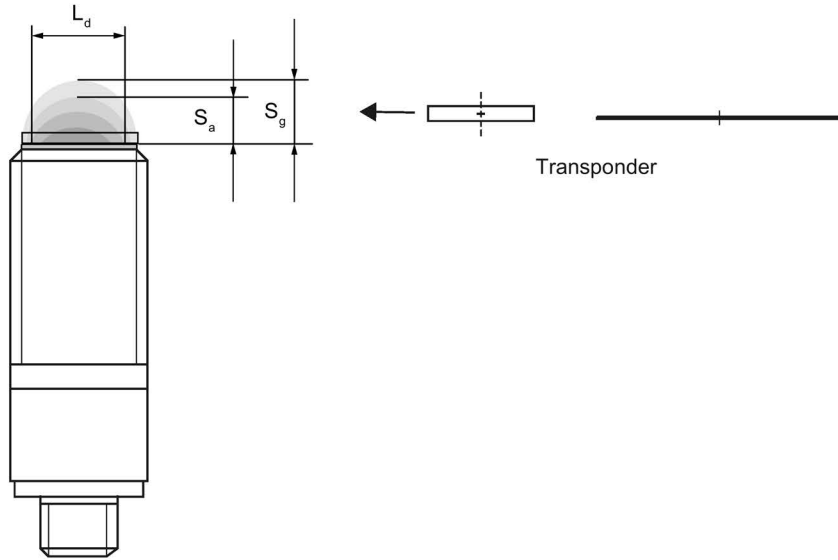
The reader generates an inductive alternating field. The field is strongest close to the reader; however, a read/write distance of "zero" between reader and transponder is not recommended.

The field strength of the alternating field decreases quickly in proportion to the distance from the reader. The distribution of the field depends on the structure and geometry of the antennas in the reader and transponder

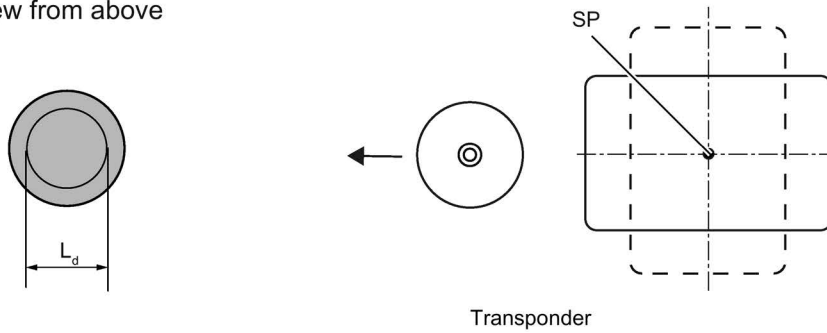
A prerequisite for the function of the transponder is a minimum field strength at the transponder, which is still barely achieved at distance  $S_g$  from the reader.

The picture below shows the transmission window of the SIMATIC RF210R and SIMATIC RF220R readers between transponder and reader:

View from the side



View from above



Transmission window

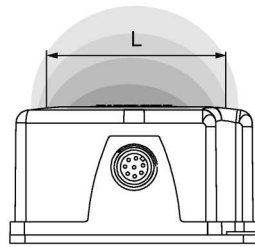
- S<sub>a</sub> Operating distance between transponder and reader
- S<sub>g</sub> Limit distance (maximum clear distance between upper surface of the reader and the transponder, at which the transmission can still function under normal conditions)
- L Diameter of a transmission window
- SP Intersection of the axes of symmetry of the transponder

Figure 4-1 RF210R/RF220R transmission window

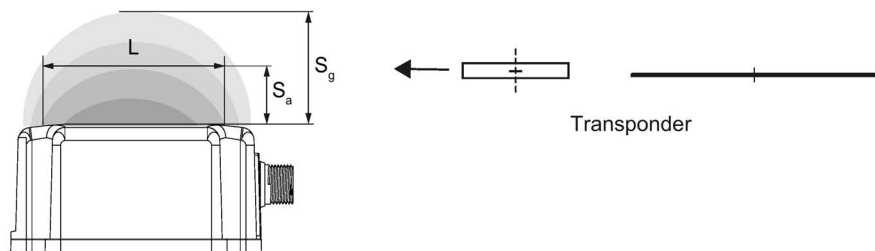
The figure below shows the transmission window of the SIMATIC RF240R and SIMATIC RF260R readers between transponder and reader:



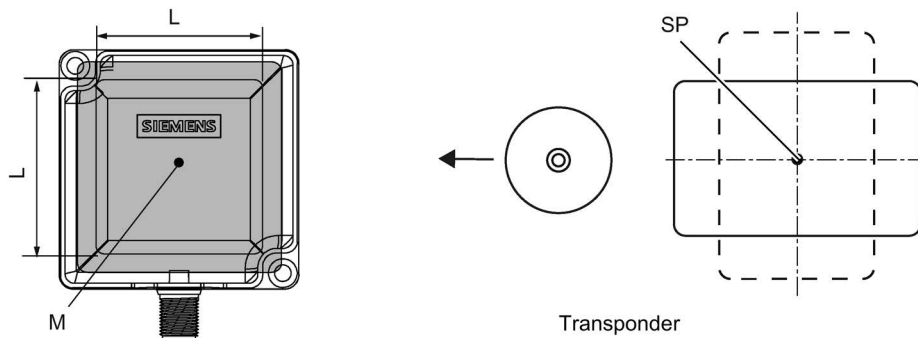
Front view



Side view



Top view



- S<sub>a</sub> Operating distance between transponder and reader
- S<sub>g</sub> Limit distance (maximum clear distance between upper surface of the reader and the transponder, at which the transmission can still function under normal conditions)
- L Length of a transmission window
- M Field centerpoint

Figure 4-2 RF240R/RF260R transmission window

The transponder can be used as soon as the intersection (SP) of the transponder enters the area of the transmission window.

From the diagrams above, it can also be seen that operation is possible within the area between S<sub>a</sub> and S<sub>g</sub>. The active operating area reduces as the distance increases, and shrinks to a single point at distance S<sub>g</sub>. Only static mode should thus be used in the area between S<sub>a</sub> and S<sub>g</sub>.

### 4.1.3 Width of the transmission window

#### Determining the width of the transmission window

The following approximation formula can be used for practical applications:

$$B = 0.4 \cdot L$$

B: Width of the transmission window

L: Length of the transmission window

#### Tracking tolerances

The width of the transmission window (B) is particularly important for the mechanical tracking tolerance. The formula for the dwell time is valid without restriction when B is observed.

#### 4.1.4 Impact of secondary fields

Secondary fields in the range from 0 mm to 30% of the limit distance ( $S_g$ ) generally always exist.

They should, however, only be used during configuration in exceptional cases, since the read/write distances are very limited. Exact details of the secondary field geometry cannot be given, since these values depend heavily on the operating distance and the application. When working in dynamic mode, remember that during the transition from the secondary field to the main field the presence of the tag is lost temporarily. It is therefore advisable to select a distance  $> 30\%$  of  $S_g$ .

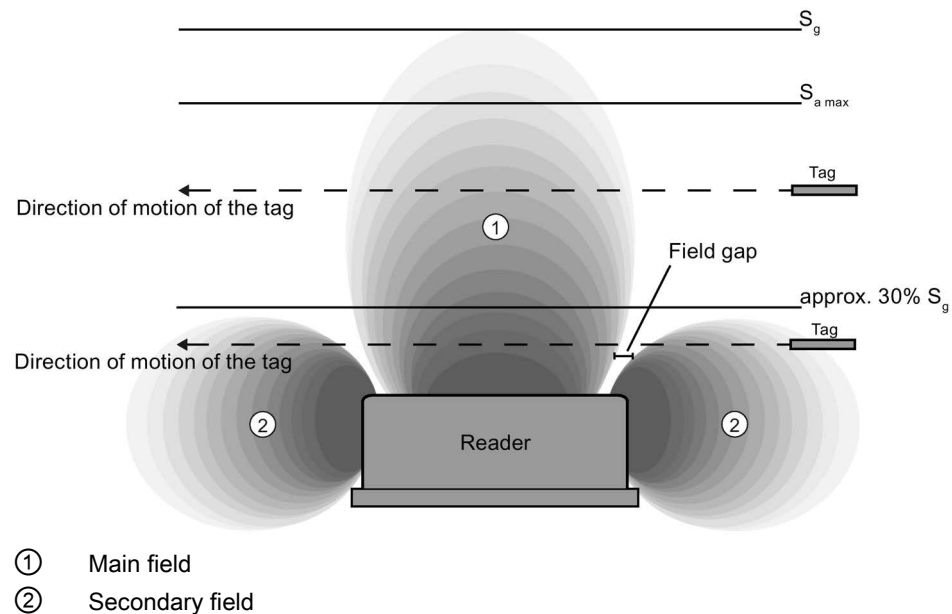
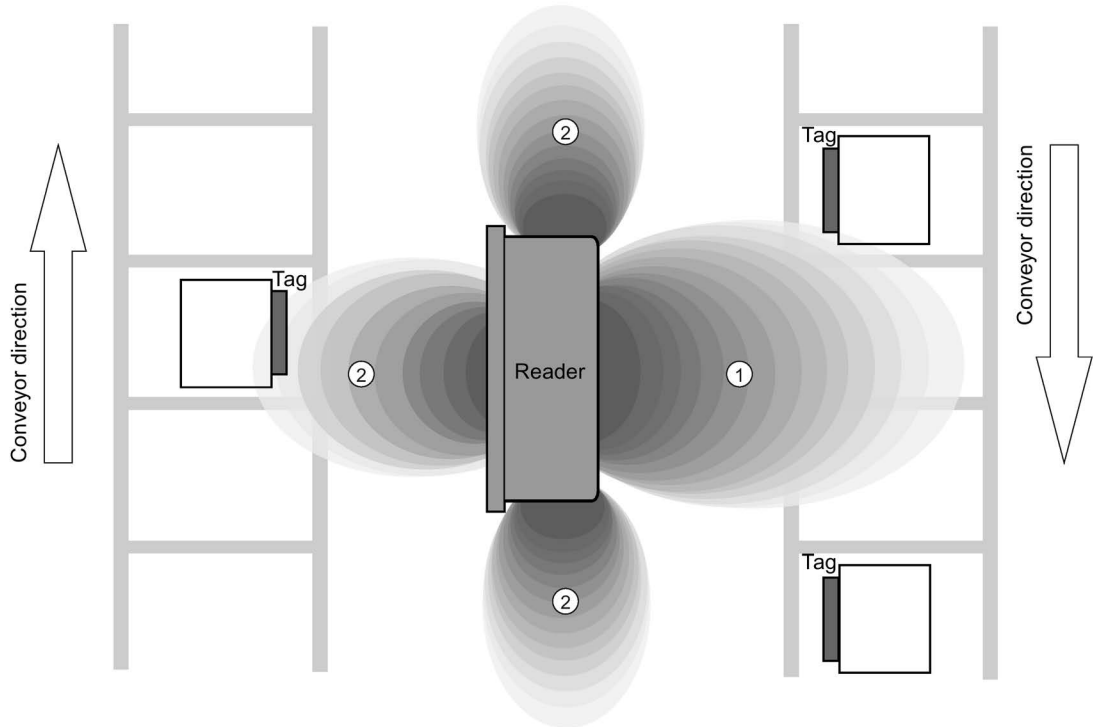


Figure 4-3 Gap in the field resulting from secondary fields

### Secondary fields without shielding

The following graphic shows typical primary and secondary fields, if no shielding measures are taken.



- ① Main field
- ② Secondary field

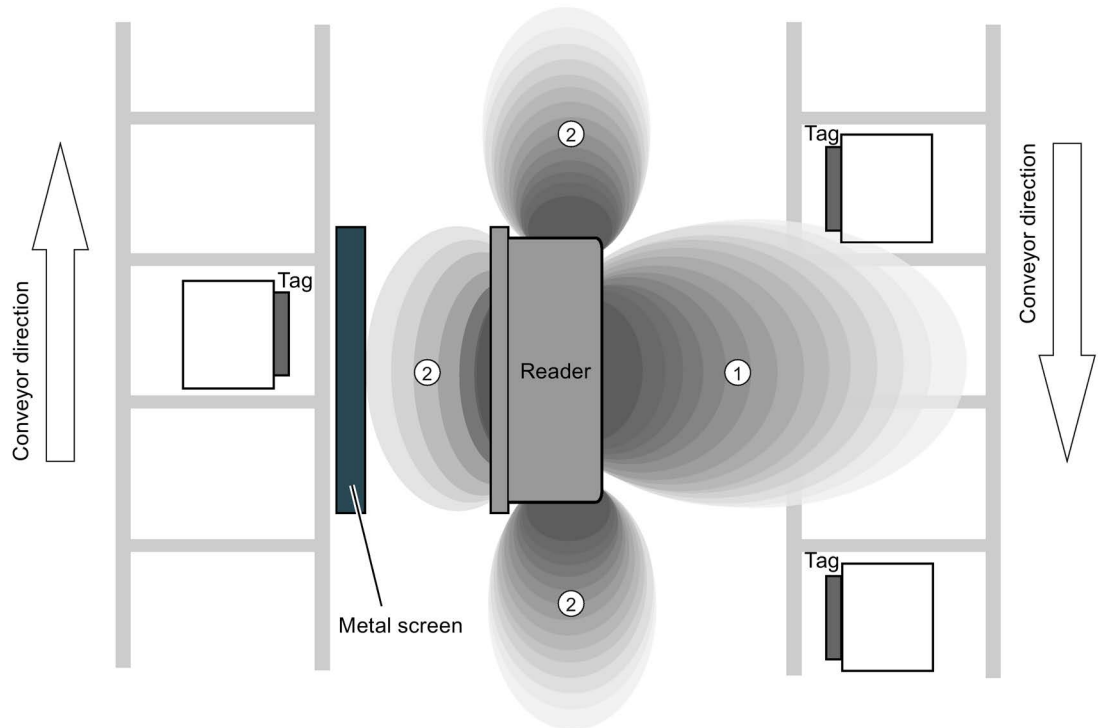
Figure 4-4 Secondary field without shielding

In this arrangement, the reader can also read tags via the secondary field. Shielding is required in order to prevent unwanted reading via the secondary field, as shown and described in the following.

## Secondary fields with shielding

The following graphic shows typical primary and secondary fields, with metal shielding this time.

The metal shielding prevents the reader from detecting tags via the secondary field.



- ① Main field
- ② Secondary field

Figure 4-5 Secondary field with shielding

### 4.1.5 Permissible directions of motion of the transponder

#### Detection area and direction of motion of the transponder

The transponder and reader have no polarization axis, i.e. the transponder can come in from any direction, assume any position as parallel as possible to the reader, and cross the transmission window. The figure below shows the active area for various directions of transponder motion:

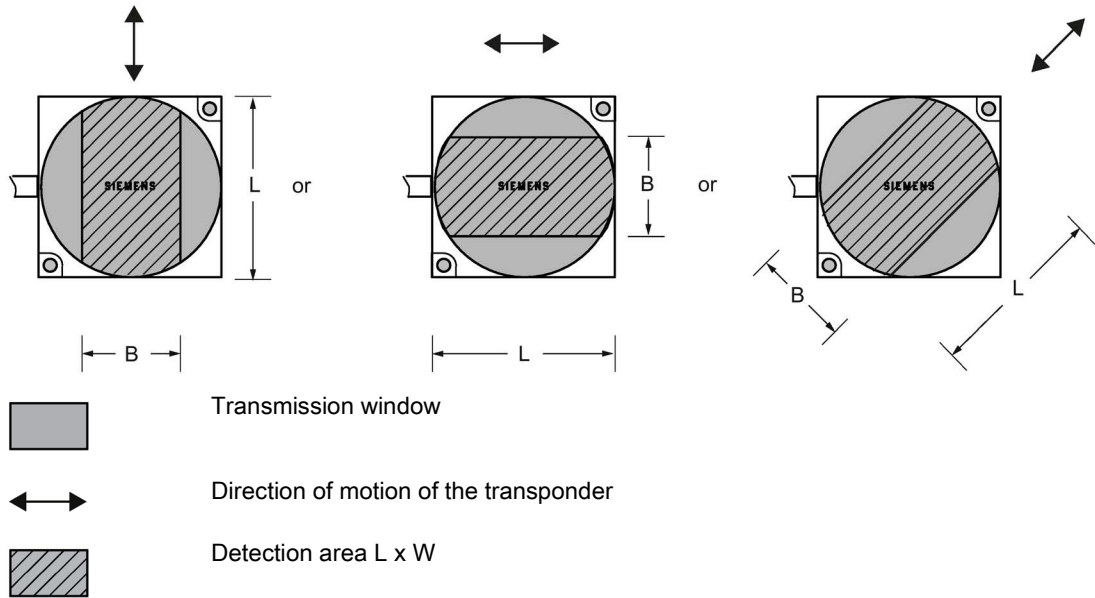


Figure 4-6 Detection areas of the reader for different directions of transponder motion

## 4.1.6 Operation in static and dynamic mode

### Operation in static mode

If working in static mode, the transponder can be operated up to the limit distance ( $S_g$ ). The transponder must then be positioned exactly over the reader:

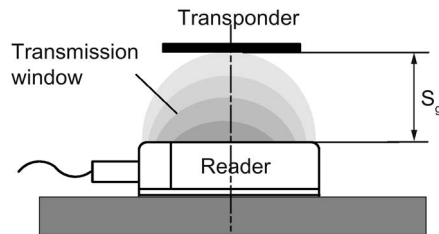


Figure 4-7 Operation in static mode

#### Note

Note that in a metallic environment the values for the limit distance are reduced.

### Operation in dynamic mode

When working in dynamic mode, the transponder moves past the reader. The transponder can be used as soon as the intersection (SP) of the transponder enters the circle of the transmission window. In dynamic mode, the operating distance ( $S_a$ ) is of primary importance. [Operating distances, see Chapter Field data of transponders and readers (Page 38)]

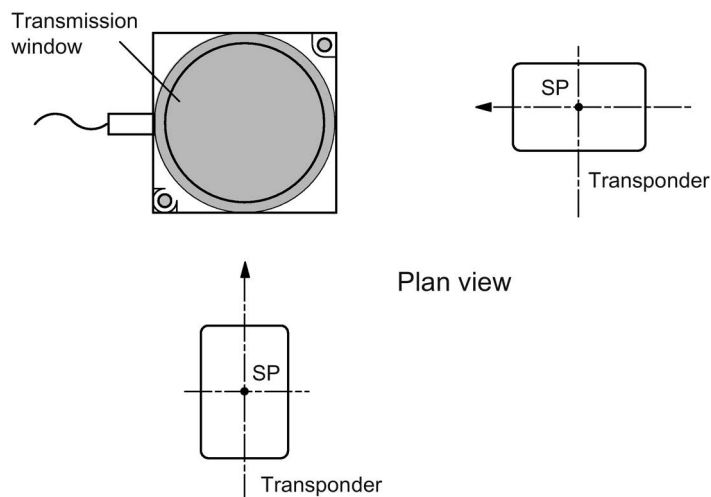


Figure 4-8 Operation in dynamic mode

### 4.1.7 Dwell time of the transponder

The dwell time is the time in which the transponder remains within the transmission window of the reader. The reader can exchange data with the transponder during this time.

The dwell time is calculated as follows:

$$t_v = (L * 0,8 [m]) : V_{Tag} [m/s]$$

- tv: Dwell time of the transponder
- L: Length of the transmission window
- v<sub>Tag</sub>: Speed of the transponder (tag) in dynamic mode
- 0.8: Constant factor used to compensate for temperature influence and production tolerances

The dwell time can be of any duration in static mode. The dwell time must be sufficiently long to allow communication with the transponder.

The dwell time is defined by the system environment in dynamic mode. The volume of data to be transferred must be matched to the dwell time or vice versa. As a general rule:

$$t_v \geq t_k$$

- tv: Dwell time of the data memory in the field of the reader
- tk: Communication time between transponder and communication module

$$t_k = K + t_{Byte} * n$$

or Calculation of the maximum amount of user data

$$n_{max} = (t_v - K) : t_{Byte}$$

- tk: Communication time between transponder and communication module
- K Constant; the constant is an internal system time. This includes the time for power buildup on the MDS and for command transfer
- t<sub>Byte</sub> Transmission time for 1 byte
- n Amount of user data in bytes
- n<sub>max</sub> Maximum amount of user data in bytes in dynamic mode
- tv Dwell time of the data memory in the field of the reader



## 4.1.8 Communication between communication module, reader and transponder

### Aids for calculating the data transmission times

User-friendly calculation tools are available for the communications modules ASM 456, RF160C, RF170C and RF180C to calculate data transfer times. The calculation tools can be found on the DVD "Ident Systems Software & Documentation", article number 6GT2080-2AA20.

**ASM 456 Command Processing Time Calculation** V2.2 - 01/2010

**Parameter Input**

= Input field

<b>CPU</b>	DP-Master
Cycle Time	5 ms
counter_customer	2
Transfer Time	3 ms
Acyc for DP-cycle	2
Acyc parallel	4
Supply level	40 %

**Command Parameter:**

Data length	1000 Byte
Number of working readers	1

**PROFIBUS**

Other PROFIBUS Slaves

Slave number	0
Sum I/O	0

ASM 456

Number: 1

Baud rate: 1.5 Mbaud

Profibus Cycle Time: 0.5 ms

Baudrate SLG: 115.2 kBaud

SLG / READER

HF transfer

t Byte	0,13 ms/Byte
K	8,5 ms

MDS / TAG

**Calculation RESULTS**

Processing Time ( Estimation )	231 ms
Processing Time HF Field ( dynamic mode )	173 ms

Figure 4-9 User interface of the calculation tool for command processing time

**Aids for calculating the field data**

You will also find a tool for calculating field data on the DVD "Ident Systems, Software & Documentation". Using this tool, among other things you can calculate the operating distance ( $S_a$ ), limit distance ( $S_g$ ) and transmission window (L).

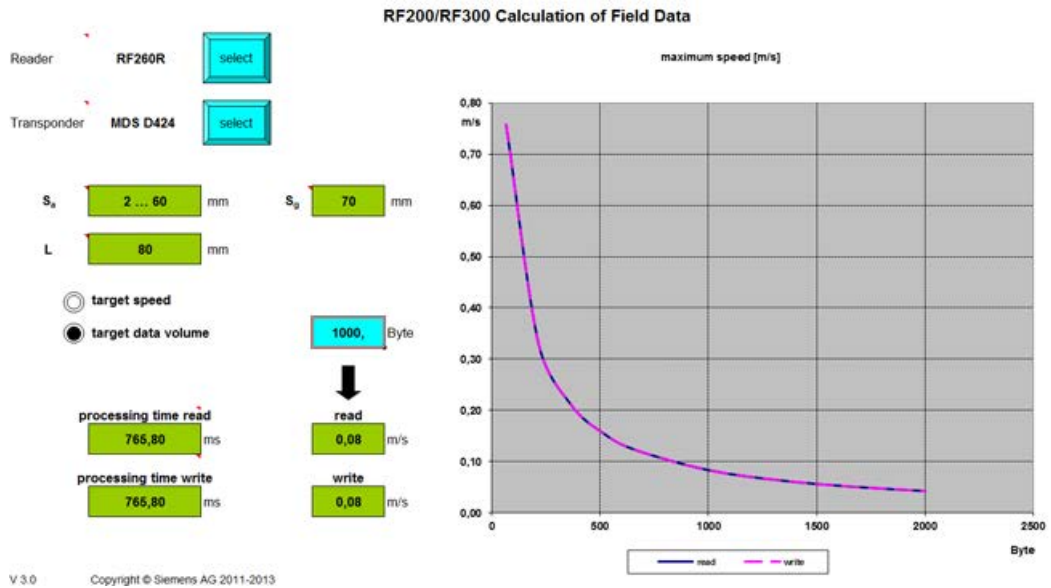


Figure 4-10 User interface of the calculation tool for field data acquisition

**4.2 Field data of transponders and readers**

The following tables show the field data for all SIMATIC RF200 components of transponders and readers. This makes the correct selection of a transponder and reader particularly easy.

All the technical specifications listed are typical data and are applicable for an ambient temperature between 0 °C and +50 °C, a supply voltage between 22 and 27 VDC and a metal-free environment. **Tolerances of ±20 % are permitted due to production or temperature conditions.**

If the entire voltage range at the reader of 20 VDC to 30 VDC and/or the entire temperature range of transponders and readers is used, the field data is subject to further tolerances.

**Note**

**Transmission gaps**

If the minimum operating distance ( $S_a$ ) is not observed, a transmission gap can occur in the center of the field. Communication with the transponder is not possible in the transmission gap.

**Note**

**Possible reader-transponder combinations**

The tables of the following section show the possible reader-transponder combinations.

## 4.2.1 Field data

The limit distances ( $S_g$ ) and operating distances ( $S_a$ ) along with the length of the transmission window for each reader-transponder combination are listed in the tables below.

Table 4- 1 SIMATIC RF210R field data

	Length of the transmission window ( $L_d$ )	Operating distance ( $S_a$ )	Limit distance ( $S_g$ )
MDS D124	25	1 ... 18	20
MDS D127 <sup>1)</sup>	3	0 ... 2	2
MDS D160	20	1 ... 10	12
MDS D324	20	1 ... 8	9
MDS D421	5	0 ... 3	4
MDS D422	8	1 ... 9	10
MDS D423	20	2 ... 10	12
MDS D424	24	1 ... 16	18
MDS D425	12	1 ... 6	7
MDS D428	20	1 ... 10	11
MDS D460	8	1 ... 8	9
MDS D521	5	0 ... 3	4
MDS D522	8	1 ... 8	9
MDS D522 Special variants	8	1 ... 8	9
MDS D524	20	1 ... 15	17
MDS D525	12	1 ... 6	7
MDS D528	15	1 ... 10	11

<sup>1)</sup> The transponder is only suitable for static mode.

All dimensions in mm.

Table 4- 2 SIMATIC RF220R field data

	Length of the transmission window (L <sub>d</sub> )	Operating distance (S <sub>a</sub> )	Limit distance (S <sub>g</sub> )
MDS D124	35	1 ... 28	31
MDS D126	45	2 ... 30	35
MDS D160	20	1 ... 20	22
MDS D324	30	2 ... 21	25
MDS D422	18	1 ... 12	14
MDS D423	30	2 ... 24	28
MDS D424	30	2 ... 25	29
MDS D425	20	1 ... 11	13
MDS D426	40	2 ... 25	30
MDS D428	25	1 ... 18	21
MDS D460	25	1 ... 18	20
MDS D522	15	1 ... 10	12
MDS D522 Special variants	15	1 ... 10	12
MDS D524	25	2 ... 22	25
MDS D525	20	1 ... 11	13
MDS D526	30	2 ... 25	30
MDS D528	20	1 ... 15	20

All dimensions in mm.

Table 4- 3 SIMATIC RF240R field data

	Length of the transmission window (L)	Operating distance (S <sub>a</sub> )	Limit distance (S <sub>g</sub> )
MDS D100	100	2 ... 84	95
MDS D124	65	2 ... 53	60
MDS D126	80	2 ... 57	65
MDS D160	50	1 ... 33	37
MDS D165	105	2 ... 80	94
MDS D200	90	2 ... 69	78
MDS D261	70	2 ... 60	70
MDS D324	55	1 ... 36	40
MDS D400	95	2 ... 80	90
MDS D422	25	1 ... 12	15
MDS D423	45	2 ... 35	40
MDS D424	75	1 ... 47	53
MDS D425	30	1 ... 15	17
MDS D426	65	2 ... 45	55
MDS D428	50	1 ... 30	34
MDS D460	50	1 ... 30	34

	Length of the transmission window (L)	Operating distance (S <sub>a</sub> )	Limit distance (S <sub>g</sub> )
MDS D522	20	1 ... 10	12
MDS D522 Special variants	20	1 ... 10	12
MDS D524	60	1 ... 45	55
MDS D525	30	1 ... 15	17
MDS D526	60	2 ... 45	55
MDS D528	40	1 ... 30	35

All dimensions in mm.

Table 4- 4 Field data SIMATIC RF250R, with ANT 1

	Length of the transmission window (L <sub>d</sub> )	Operating distance (S <sub>a</sub> )	Limit distance (S <sub>g</sub> )
MDS D100	80	5 ... 95	115
MDS D124	55	2 ... 60	75
MDS D126	150	2 ... 80	95
MDS D139	75	5 ... 90	105
MDS D160	50	2 ... 35	45
MDS D165	140	5 ... 95	110
MDS D200	130	5 ... 90	100
MDS D261	100	2 ... 90	110
MDS D324	50	5 ... 60	70
MDS D339	110	2 ... 85	100
MDS D400	140	10 ... 95	110
MDS D423	50	2 ... 35	45
MDS D424	40	2 ... 70	80
MDS D425	40	2 ... 25	30
MDS D426	110	2 ... 80	95
MDS D428	40	2 ... 40	50
MDS D460	50	2 ... 30	40
MDS D524	50	2 ... 65	80
MDS D525	40	2 ... 25	30
MDS D526	110	2 ... 80	95
MDS D528	40	2 ... 40	45

All dimensions in mm.

Table 4- 5 Field data SIMATIC RF250R, with ANT 3

	Length of the transmission window (L <sub>d</sub> )	Operating distance (S <sub>a</sub> )	Limit distance (S <sub>g</sub> )
MDS D124	40	1 ... 32	40
MDS D126	65	0 ... 47	60
MDS D160	24	1 ... 23	30
MDS D324	32	1 ... 22	35
MDS D422	20	0 ... 12	15
MDS D423	30	2 ... 18	26
MDS D424	37	0 ... 34	48
MDS D425	22	1 ... 12	20
MDS D426	65	0 ... 44	58
MDS D428	30	1 ... 20	32
MDS D460	24	1 ... 21	27
MDS D522	20	1 ... 12	15
MDS D522 Special variants	20	1 ... 12	15
MDS D524	35	1 ... 35	40
MDS D525	22	1 ... 12	20
MDS D526	45	2 ... 35	45
MDS D528	25	1 ... 20	25

All dimensions in mm.

Table 4- 6 Field data SIMATIC RF250R, with ANT 8

	Length of the transmission window (L <sub>d</sub> )	Operating distance (S <sub>a</sub> )	Limit distance (S <sub>g</sub> )
MDS D117	2	0 ... 2	3
MDS D127	3	0 ... 3	4
MDS D421	3	0 ... 3	4
MDS D521	3	0 ... 3	4

All dimensions in mm.

Table 4- 7 Field data SIMATIC RF250R, with ANT 12

	Length of the transmission window ( $L_d$ )	Operating distance ( $S_a$ )	Limit distance ( $S_g$ )
MDS D117	3	0 ... 3	4
MDS D127	4	0 ... 4	5
MDS D160	18	0 ... 12	17
MDS D421	10	0 ... 3	4
MDS D422	22	0 ... 7	10
MDS D425	12	0 ... 8	10
MDS D428	18	1 ... 8	12
MDS D460	16	1 ... 10	14
MDS D521	5	0 ... 3	4
MDS D522	10	1 ... 7	9
MDS D522 Special variants	10	1 ... 7	9
MDS D525	12	1 ... 8	10
MDS D528	15	1 ... 8	12

All dimensions in mm.

Table 4- 8 Field data SIMATIC RF250R, with ANT 18

	Length of the transmission window ( $L_d$ )	Operating distance ( $S_a$ )	Limit distance ( $S_g$ )
MDS D124	26	0 ... 24	37
MDS D160	22	1 ... 18	26
MDS D324	30	1 ... 18	27
MDS D421	16	0 ... 3	4
MDS D422	24	1 ... 8	14
MDS D423	21	1 ... 15	18
MDS D424	26	1 ... 27	36
MDS D425	19	1 ... 11	16
MDS D428	19	1 ... 18	25
MDS D460	19	1 ... 17	21
MDS D521	6	0 ... 4	5
MDS D522	15	1 ... 10	12
MDS D522 Special variants	15	1 ... 10	12
MDS D524	30	1 ... 25	30
MDS D525	19	1 ... 11	16
MDS D528	20	1 ... 15	20

All dimensions in mm.

4.2 Field data of transponders and readers

Table 4- 9 Field data SIMATIC RF250R, with ANT 30

	Length of the transmission window (L <sub>d</sub> )	Operating distance (S <sub>a</sub> )	Limit distance (S <sub>g</sub> )
MDS D124	40	1 ... 35	48
MDS D126	65	0 ... 47	60
MDS D160	24	1 ... 23	30
MDS D324	32	1 ... 22	35
MDS D422	27	0 ... 12	15
MDS D423	30	2 ... 18	26
MDS D424	37	0 ... 34	48
MDS D425	22	1 ... 12	20
MDS D426	65	0 ... 44	58
MDS D428	30	1 ... 20	32
MDS D460	24	1 ... 21	27
MDS D522	20	1 ... 12	15
MDS D522 Special variants	20	1 ... 12	15
MDS D524	35	1 ... 35	40
MDS D525	22	1 ... 12	20
MDS D526	60	2 ... 35	45
MDS D528	25	1 ... 20	25

All dimensions in mm.

Table 4- 10 SIMATIC RF260R field data

	Length of the transmission window (L)	Operating distance (S <sub>a</sub> )	Limit distance (S <sub>g</sub> )
MDS D100	120	2 ... 110	130
MDS D124	80	2 ... 80	85
MDS D126	110	2 ... 75	100
MDS D139	120	2 ... 80	110
MDS D160	60	2 ... 40	45
MDS D165	120	2 ... 120	135
MDS D200	120	2 ... 100	120
MDS D261	80	2 ... 75	90
MDS D324	80	2 ... 60	70
MDS D339	110	5 ... 65	80
MDS D400	140	2 ... 110	140
MDS D423	55	2 ... 40	45
MDS D424	80	2 ... 60	70
MDS D426	75	2 ... 70	85
MDS D428	50	2 ... 40	45
MDS D460	50	2 ... 40	45



	Length of the transmission window (L)	Operating distance (S <sub>a</sub> )	Limit distance (S <sub>g</sub> )
MDS D524	70	2 ... 60	70
MDS D526	80	2 ... 70	85
MDS D528	50	2 ... 35	40

All dimensions in mm.

Table 4- 11 Field data SIMATIC RF280R

	Length of the transmission window (L)		Operating distance (S <sub>a</sub> )	Limit distance (S <sub>g</sub> )
	in the x direction (L <sub>x</sub> )	in the y direction (L <sub>y</sub> )		
MDS D100 <sup>1)</sup>	140	100	10 ... 160	200
MDS D124	80	80	2 ... 110	130
MDS D126	180	140	2 ... 135	160
MDS D139	140	90	5 ... 115	190
MDS D160	80	40	2 ... 55	70
MDS D165 <sup>1)</sup>	200	140	10 ... 160	190
MDS D200 <sup>2)</sup>	200	160	20 ... 140	185
MDS D261 <sup>3)</sup>	190	120	20 ... 110	150
MDS D324	100	60	2 ... 85	110
MDS D339	290	140	5 ... 115	170
MDS D400	240	120	10 ... 170	200
MDS D423	110	60	5 ... 60	70
MDS D424	100	70	2 ... 100	140
MDS D425	80	45	2 ... 30	40
MDS D426	220	160	2 ... 145	175
MDS D428	80	50	2 ... 60	88
MDS D460	80	70	2 ... 55	70
MDS D524	100	70	2 ... 110	130
MDS D525	80	45	2 ... 30	40
MDS D526	220	160	2 ... 135	165
MDS D528	80	50	2 ... 60	85

All dimensions in mm.

- 1) Be aware that the minimum distance must be increased 10 mm starting at 40 °C ambient temperature.
- 2) Be aware that the minimum distance of the reader to the transponder must be increased approximately 6 mm every 5 °C starting at an ambient temperature of 25 °C and approximately 15 mm starting at an ambient temperature of 50 °C.
- 3) Be aware that the minimum distance of the reader to the transponder must be increased approximately 3 mm every 5 °C starting at an ambient temperature of 25 °C and approximately 14 mm starting at an ambient temperature of 50 °C.

4.2 Field data of transponders and readers

Table 4- 12 Field data SIMATIC RF290R, with ANT D5 (at 4 W)

	Length of the transmission window (L)	Operating distance (S <sub>a</sub> )	Limit distance (S <sub>g</sub> )
MDS D100	320	0 ... 400	500
MDS D124	300	0 ... 200	280
MDS D126	320	0 ... 350	400
MDS D139	320	0 ... 400	500
MDS D160	300	0 ... 130	180
MDS D165	320	0 ... 350	450
MDS D200	320	0 ... 400	500
MDS D261	320	0 ... 300	400
MDS D324	300	0 ... 200	280
MDS D339	320	0 ... 300	380
MDS D400	320	0 ... 400	500
MDS D424	300	0 ... 200	280
MDS D426	320	0 ... 300	350
MDS D460	300	0 ... 120	160
MDS D524	300	0 ... 200	280
MDS D526	320	0 ... 300	350

All dimensions in mm.

Table 4- 13 Field data SIMATIC RF290R, with ANT D6 (at 4 W)

	Length of the transmission window (L)		Operating distance (S <sub>a</sub> )	Limit distance (S <sub>g</sub> )
	X direction	Y direction		
MDS D100	520	420	0 ... 550	650
MDS D124	500	400	0 ... 220	300
MDS D126	520	420	0 ... 400	500
MDS D139	520	420	0 ... 500	600
MDS D160	500	400	0 ... 130	180
MDS D165	520	420	0 ... 400	500
MDS D200	520	420	0 ... 500	600
MDS D261	520	420	0 ... 350	450
MDS D324	500	400	0 ... 200	280
MDS D339	520	420	0 ... 400	480
MDS D400	520	420	0 ... 500	650
MDS D424	500	400	0 ... 220	300
MDS D426	520	420	0 ... 350	400
MDS D524	500	400	0 ... 220	300
MDS D526	520	420	0 ... 350	400

All dimensions in mm.

Table 4- 14 Field data SIMATIC RF290R, with ANT D10 (at 4 W)

	Length of the transmission window (L)		Operating distance (S <sub>a</sub> )	Limit distance (S <sub>g</sub> )
	X direction	Y direction		
<b>MDS D100</b>	1050	350	0 ... 500	600
<b>MDS D124</b>	1000	300	0 ... 200	280
<b>MDS D126</b>	1050	350	0 ... 400	500
<b>MDS D139</b>	1050	350	0 ... 450	550
<b>MDS D160</b>	1000	300	0 ... 130	180
<b>MDS D165</b>	1050	350	0 ... 350	450
<b>MDS D200</b>	1050	350	0 ... 450	550
<b>MDS D261</b>	1050	350	0 ... 350	450
<b>MDS D324</b>	1000	300	0 ... 200	280
<b>MDS D339</b>	1050	350	0 ... 300	380
<b>MDS D400</b>	1050	350	0 ... 400	500
<b>MDS D424</b>	1000	300	0 ... 200	280
<b>MDS D426</b>	1050	350	0 ... 350	400
<b>MDS D524</b>	1000	300	0 ... 220	300
<b>MDS D526</b>	1050	350	0 ... 350	400

All dimensions in mm.

### 4.2.2 Minimum clearances

#### Minimum distance from transponder to transponder

The specified distances refer to a metal-free environment. For a metallic environment, the specified minimum distances must be multiplied by a factor of 1.5. The transponders designed specifically for installation in/on metal are an exception to this.

Table 4- 15 Minimum clearances for transponders

	RF210R	RF220R	RF240R	RF260R	RF280R
MDS D100	--	--	--	≥ 240	≥ 420
MDS D117	≥ 15	--	--	--	--
MDS D124	≥ 25	≥ 40	≥ 90	≥ 180	≥ 360
MDS D126	--	≥ 50	≥ 100	≥ 180	≥ 400
MDS D127	≥ 15	--	--	--	--
MDS D139	--	--	--	≥ 200	≥ 450
MDS D160	≥ 20	≥ 25	≥ 70	≥ 150	≥ 300
MDS D165	--	--	--	≥ 240	≥ 500
MDS D200	--	--	--	≥ 240	≥ 500
MDS D261	--	--	--	≥ 200	≥ 400
MDS D324	≥ 25	≥ 40	≥ 90	≥ 180	≥ 360
MDS D339	--	--	--	≥ 200	≥ 450
MDS D400	--	--	--	≥ 240	≥ 500
MDS D421	≥ 10	--	--	--	--
MDS D422	≥ 15	≥ 20	≥ 50	--	--
MDS D423	--	--	≥ 80	≥ 160	≥ 250
MDS D424	≥ 25	≥ 40	≥ 90	≥ 180	≥ 360
MDS D425	≥ 20	≥ 25	≥ 75	--	≥ 250
MDS D426	--	≥ 50	≥ 90	≥ 180	≥ 400
MDS D428	≥ 25	≥ 25	≥ 75	≥ 150	≥ 300
MDS D460	≥ 20	≥ 25	≥ 70	≥ 150	≥ 300
MDS D521	≥ 10	--	--	--	--
MDS D522	≥ 15	≥ 20	≥ 50	--	--
MDS D522 Special variants	≥ 15	≥ 20	≥ 50	--	--
MDS D524	≥ 25	≥ 40	≥ 90	≥ 180	≥ 360
MDS D526	--	≥ 50	≥ 90	≥ 180	≥ 400
MDS D528	≥ 25	≥ 25	≥ 75	≥ 150	≥ 300

All values are in mm, relative to the operating distance ( $S_a$ ) between reader and transponder, and between transponder edge and transponder edge

Table 4- 16 Minimum clearances for transponders

	RF250R <sup>1)</sup>					RF290R <sup>2)</sup>		
	ANT 3	ANT 8	ANT 12	ANT 18	ANT 30	ANT D5	ANT D6	ANT D10
MDS D100	--	--	--	--	--	≥ 1000	≥ 1500	≥ 2000
MDS D117	--	≥ 30	≥ 50	--	--	--	--	--
MDS D124	≥ 100	--	--	≥ 80	≥ 100	≥ 800	≥ 1200	≥ 1800
MDS D126	≥ 100	--	--	--	≥ 100	≥ 1000	≥ 1500	≥ 2000
MDS D127	--	≥ 40	≥ 60	--	--	--	--	--
MDS D139	--	--	--	--	--	≥ 1000	≥ 1500	≥ 2000
MDS D160	≥ 100	--	≥ 60	≥ 80	≥ 100	≥ 800	≥ 1200	≥ 1800
MDS D165	--	--	--	--	--	≥ 1000	≥ 1500	≥ 2000
MDS D200	--	--	--	--	--	≥ 1000	≥ 1500	≥ 2000
MDS D261	--	--	--	--	--	≥ 1000	≥ 1500	≥ 2000
MDS D324	≥ 100	--	--	≥ 80	≥ 100	≥ 800	≥ 1200	≥ 1800
MDS D339	--	--	--	--	--	≥ 1000	≥ 1500	≥ 2000
MDS D400	--	--	--	--	--	≥ 1000	≥ 1500	≥ 2000
MDS D421	--	≥ 30	≥ 40	≥ 50	--	--	--	--
MDS D422	≥ 70	--	≥ 50	≥ 60	≥ 70	--	--	--
MDS D423	≥ 100	--	--	≥ 80	≥ 100	--	--	--
MDS D424	≥ 100	--	--	≥ 80	≥ 100	≥ 800	≥ 1200	≥ 1800
MDS D425	≥ 80	--	≥ 50	≥ 60	≥ 80	--	--	--
MDS D426	≥ 100	--	--	--	≥ 100	≥ 800	≥ 1200	≥ 1800
MDS D428	≥ 80	--	≥ 50	≥ 60	≥ 80	--	--	--
MDS D460	≥ 100	--	≥ 60	≥ 80	≥ 100	≥ 800	--	--
MDS D521	--	≥ 30	≥ 40	≥ 50	--	--	--	--
MDS D522	≥ 70	--	≥ 50	≥ 60	≥ 70	--	--	--
MDS D522 Special variants	≥ 70	--	≥ 50	≥ 60	≥ 70	--	--	--
MDS D524	≥ 100	--	--	≥ 80	≥ 100	≥ 800	≥ 1200	≥ 1800
MDS D526	≥ 100	--	--	--	≥ 100	≥ 800	≥ 1200	≥ 1800
MDS D528	≥ 80	--	≥ 50	≥ 60	≥ 80	--	--	--

<sup>1)</sup> Depends on the connected antenna (ANT 3, 8, 12, 18 or 30).

<sup>2)</sup> Depends on the connected antenna (ANT D5, D6 or D10).

All values are in mm, relative to the operating distance ( $S_a$ ) between reader and transponder, and between transponder edge and transponder edge

**Minimum distance from reader to reader**

Table 4- 17 Minimum distances to readers or antennas

RF210R to RF210R	RF220R to RF220R	RF240R to RF240R	ANT x to ANT x with RF250R	RF260R to RF260R	RF280R to RF280R	ANT Dx to ANT Dx with RF290R
≥ 60	≥ 100	≥ 120	ANT 3: ≥ 100	≥ 150	with 2 readers ≥ 400 with multiple readers ≥ 500	ANT D5: ≥ 2000
			ANT 8: ≥ 50			ANT D10: ≥ 2000
			ANT 12: ≥ 60			
			ANT 18: ≥ 80			
			ANT 30: ≥ 100			

All values are in mm

**Note**

**Effect on inductive fields by not maintaining the minimum distances of the readers**

If the values fall below those specified in the "minimum distance readers or antennas", there is a risk of the function being affected by inductive fields. In this case, the data transfer time would increase unpredictably or a command would be aborted with an error.

Keeping to the values specified in the "Minimum distance readers or antennas" table is therefore essential.

If the specified minimum distance cannot be complied with due to the physical configuration, the SET-ANT command can be used to activate and deactivate the HF field of the reader. The application software must be used to ensure that only one reader is active (antenna is switched on) at a time.

**4.3 Installation guidelines**

**4.3.1 Overview**

The transponder and reader complete with their antennas are inductive devices. Any type of metal in the vicinity of these devices affects their functionality. Some points need to be considered during planning and installation if the values described in the "Field data (Page 39)" section are to retain their validity:

- Minimum spacing between two readers or their antennas
- Minimum distance between two adjacent data memories
- Metal-free area for flush-mounting of readers or their antennas and transponders in metal
- Mounting of multiple readers or their antennas on metal frames or racks

The following sections describe the impact on the operation of the RFID system when mounted in the vicinity of metal.

### 4.3.2 Reduction of interference due to metal

Table 4- 18 Interference due to metal rack

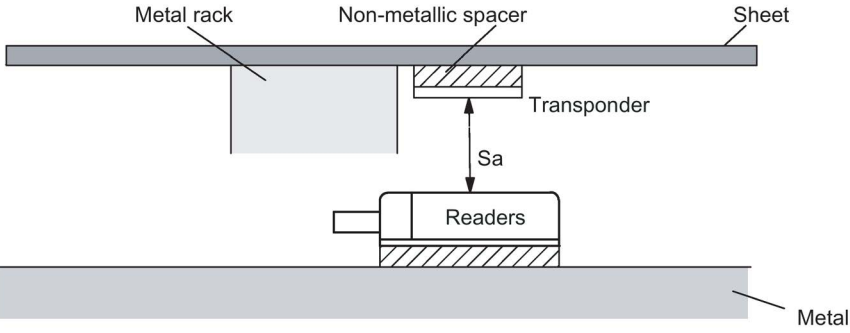
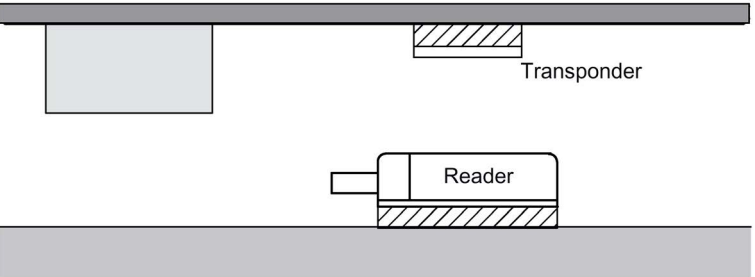
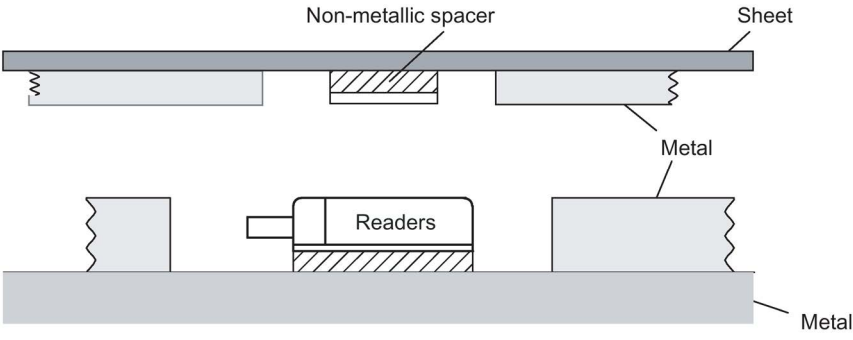
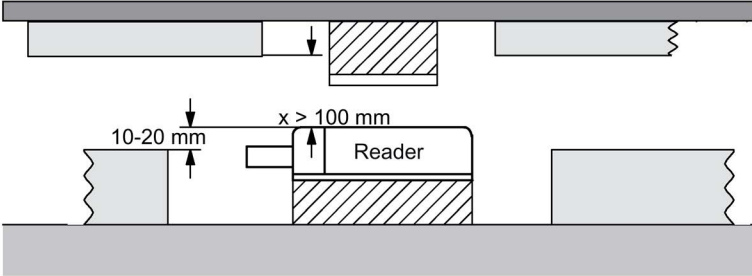
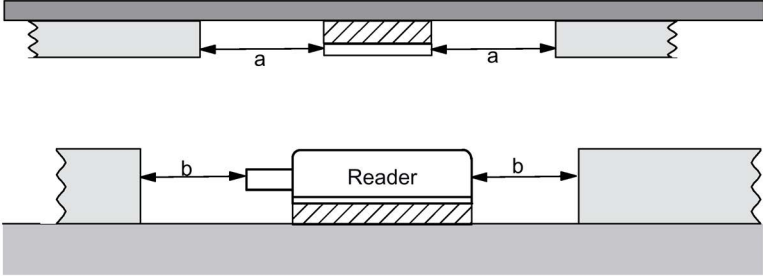
Representation	Description
 <p>The diagram illustrates a cross-section of an RFID system. At the top, a horizontal bar represents a 'Metal rack'. Below it, a 'Non-metallic spacer' is positioned. Underneath the spacer is a 'Transponder'. A double-headed arrow labeled 'Sa' indicates the distance between the 'Readers' (part of a 'Reader' unit) and the 'Transponder'. At the bottom, a thick grey bar represents 'Metal'.</p>	<p><b>Problem:</b> A metal rack is located above the transmission window of the reader. This affects the entire field. In particular, the transmission window between reader and transponder is reduced.</p>
 <p>The diagram shows the same setup as the previous one, but the 'Metal rack' and 'Non-metallic spacer' have been removed. The 'Transponder' is now mounted directly on the 'Metal' surface. The 'Reader' is still positioned below the transponder.</p>	<p><b>Remedy:</b> The transmission window is no longer affected if the transponder is mounted differently.</p>

Table 4- 19 Flush-mounting of transponders and readers

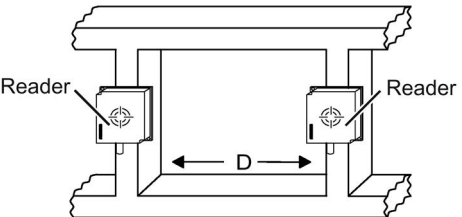
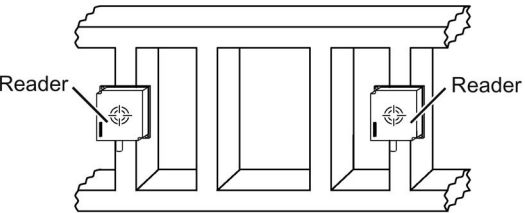
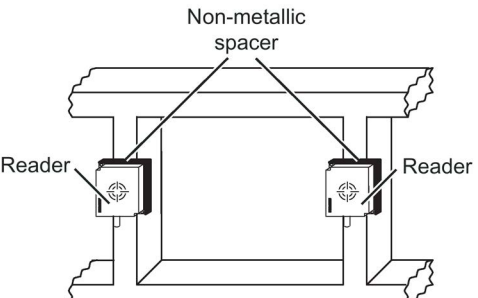
Representation	Description
	<p><b>Problem:</b></p> <p>Flush-mounting of transponders and readers is possible in principle. However, the size of the transmission window is significantly reduced. The following measures can be used to counteract the reduction of the window:</p>
	<p><b>Remedy:</b></p> <p>Enlargement of the non-metallic spacer below the transponder and/or reader.</p> <p>The transponder and/or reader are 10 to 20 mm higher than the metal surround.</p> <p>(The value <math>x \geq 100</math> mm is valid, for example, for RF260R. It indicates that, for a distance <math>x \geq 100</math> mm, the reader can no longer be significantly affected by metal.)</p>
	<p><b>Remedy:</b></p> <p>Increase the distances a, b to metal.</p> <p>The following rule of thumb can be used:</p> <ul style="list-style-type: none"> <li>• Increase a, b by a factor of 2 to 3 over the values specified for metal-free areas</li> <li>• Increasing a, b has a greater effect for readers or transponders with a large limit distance than for readers or transponders with a small limit distance.</li> </ul>



### Mounting of several readers on metal frames or racks

Any reader mounted on metal couples part of the field to the metal frame. There is normally no interaction as long as the minimum distance  $D$  and metal-free areas  $a$ ,  $b$  are maintained. However, interaction may take place if an iron frame is positioned unfavorably. Longer data transfer times or sporadic error messages at the communication module are the result.

Table 4- 20 Mounting of several readers on metal frames or racks

Representation	Description
 <p>The diagram shows two rectangular readers mounted on a metal frame. A double-headed arrow between the two readers is labeled 'D', representing the distance between them.</p>	<p><b>Problem:</b> Interaction between readers</p> <p><b>Remedy:</b> Increase the distance <math>D</math> between the two readers.</p>
 <p>The diagram shows two rectangular readers mounted on a metal frame. An iron strut is positioned between the two readers, connecting the top and bottom rails of the frame.</p>	<p><b>Remedy:</b> Introduce one or more iron struts in order to short-circuit the stray fields.</p>
 <p>The diagram shows two rectangular readers mounted on a metal frame. Non-metallic spacers are placed between the readers and the metal frame rails. A label 'Non-metallic spacer' points to one of these spacers.</p>	<p><b>Remedy:</b> Insert a non-metallic spacer of 20 to 40 millimeter thickness between the reader and the iron frame. This will significantly reduce the induction of stray fields on the rack:</p>

### 4.3.3 Effects of metal on different transponders and readers

#### Mounting different transponders and readers on metal or flush-mounting

Certain conditions have to be observed when mounting the transponders and readers on metal or flush-mounting. For more information, please refer to the descriptions of the individual transponders and readers in the relevant section.

#### 4.3.4 Impact of metal on the transmission window

In general, the following points should be considered when mounting RFID components:

- Direct mounting on metal is allowed only in the case of specially approved transponders.
- Flush-mounting of the components in metal reduces the field data; a test is recommended in critical applications.
- When working inside the transmission window, make sure that no metal rail (or similar part) intersects the transmission field.  
The metal rail would affect the field data.
- With readers with a large antenna surface (e.g. RF340R) for reasons of communication reliability, when the transponders are flush-mounted in metal, a metal-free space around the transponders is recommended. This metal-free space should match the size of the antenna surface.
- The reduction of field data is also based on the minimum distance between the reader and transponder. The respective recommendations are listed in the following table.

The impact of metal on the field data ( $S_g$ ,  $S_a$ ,  $L$ ) is shown in a table in this section. The values in the tables describe field data reduction and show the reduced range as a percentage. The range relates to use in a non-metallic environment. A value of 100% means no influence on the range.

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#### Note

##### Possible reader-transponder combinations

The tables of the following section show the possible reader-transponder combinations.

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### 4.3.4.1 RF210R

The RF210R can be flush-mounted in metal. Please allow for a possible reduction in the field data values. To avoid reduction in the case of d), the distance  $a$  should be  $\geq 10$  mm.

The following table shows the different arrangements for the reader with and without a metallic environment:

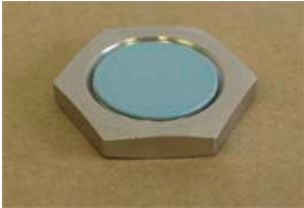
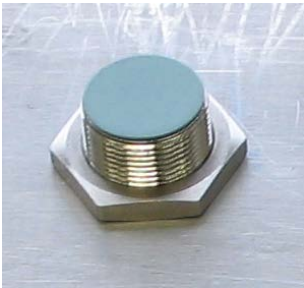
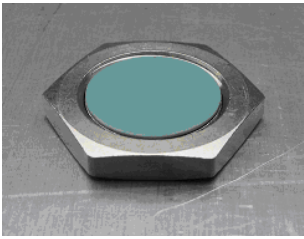
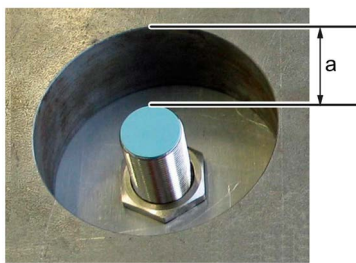
Case	Diagram	Description
a)		Reader metal-free
b)		Reader on metal, distance from metal $\geq 12$ mm
c)		Reader in metal, flush against M18 nut
d)		Reader in metal, all around

Table 4- 21 Reduction of field data due to metal, range as %: Transponder and RF210R

Transponder		Reader without direct metal influence (Case a, b and d)	Reader flush-mounted in metal (Case c)
MDS D124 <sup>1)</sup>	Metal-free	100	82
	On metal, distance 15 mm	90	90
	Flush-mounted in metal; distance all round 15 mm	85	80
MDS D127	Flush-mounted in metal; distance all round 0 mm	100	75
MDS D160 <sup>1)</sup>	Metal-free	100	95
	On metal, distance 10 mm	100	95
MDS D324 <sup>1)</sup>	Metal-free	100	90
	On metal, distance 15 mm	90	90
	Flush-mounted in metal; distance all round 25 mm	80	90
MDS D421	Metal-free	100	90
	Flush-mounted in metal; distance all round 0 mm	75	50
MDS D422	Metal-free	100	80
	Flush-mounted in metal; distance all round 0 mm	90	40
MDS D423	Metal-free	100	90
	On metal, distance 0 mm	110 <sup>2)</sup>	100 <sup>2)</sup>
	Flush-mounted in metal; distance all round 10 mm	95	85
MDS D424 <sup>1)</sup>	Metal-free	100	60
	On metal, distance 15 mm	90	80
	Flush-mounted in metal; distance all round 25 mm	85	75
MDS D425	Metal-free	100	85
	On metal, distance 0 mm	100	85
MDS D428	Metal-free	100	90
	On metal, distance 0 mm	100	80
MDS D460 <sup>1)</sup>	Metal-free	100	90
	On metal, distance 25 mm	100	90
MDS D521	Metal-free	100	90
	Flush-mounted in metal; distance all round 0 mm	75	50
MDS D522	Metal-free	100	80
	Flush-mounted in metal; distance all round 0 mm	90	40
MDS D522 Special variants	Metal-free	100	80
	Flush-mounted in metal; distance all round 0 mm	90	40

Transponder		Reader without direct metal influence (Case a, b and d)	Reader flush-mounted in metal (Case c)
MDS D524 <sup>1)</sup>	Metal-free	100	60
	On metal, distance 15 mm	90	80
	Flush-mounted in metal; distance all round 25 mm	85	75
MDS D528	Metal-free	100	90
	On metal, distance 0 mm	100	80

- 1) Mounting the transponder on or in metal is only possible with the appropriate spacer or if there is adequate clearance to the metal.
- 2) Values of > 100 % related to non metal surroundings can occur if transponders were developed specifically for mounting in/on metallic surroundings.

4.3.4.2 RF220R

The RF220R can be flush-mounted in metal. Please allow for a possible reduction in the field data values. To avoid reduction in the case of d), the distance a should be  $\geq 15$  mm.

The following table shows the different arrangements for the reader with and without a metallic environment:

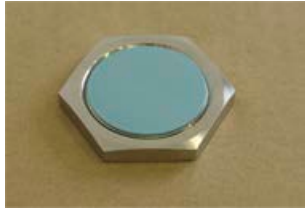

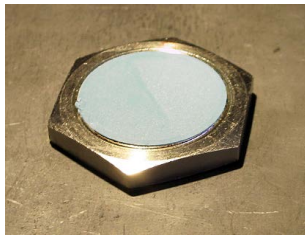
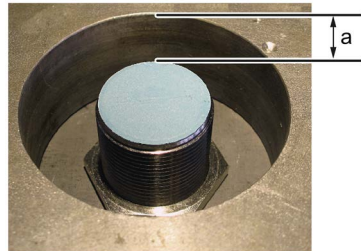
Case	Diagram	Description
a)		Reader metal-free
b)		Reader on metal, distance from metal $\geq 12$ mm
c)		Reader in metal, flush against M30 nut
d)		Reader in metal, all round

Table 4- 22 Reduction of field data due to metal, range as %: Transponder and RF220R

Transponder		Reader without direct metal influence (Case a, b and d)	Reader flush-mounted in metal (Case c)
MDS D124 <sup>1)</sup>	Metal-free	100	94
	On metal, distance 15 mm	97	89
	Tag flush-mounted in metal; distance all round 15 mm	86	83
MDS D126 <sup>1)</sup>	Metal-free	100	75
	On metal, distance 25 mm	85	70
	Flush-mounted in metal; distance all round 50 mm	80	65
MDS D160 <sup>1)</sup>	Metal-free	100	89
	On metal, distance 10 mm	100	89
MDS D324 <sup>1)</sup>	Metal-free	100	90
	On metal, distance 15 mm	97	86
	Flush-mounted in metal; distance all round 25 mm	93	86
MDS D422	Metal-free	100	90
	Flush-mounted in metal; distance all round 0 mm	85	85
MDS D423	Metal-free	100	90
	On metal, distance 0 mm	125 <sup>2)</sup>	115 <sup>2)</sup>
	Flush-mounted in metal; distance all round 10 mm	80	75
MDS D424 <sup>1)</sup>	Metal-free	100	93
	On metal, distance 15 mm	96	89
	Flush-mounted in metal; distance all round 25 mm	86	82
MDS D425	Metal-free	100	90
	Screwed onto metal	100	75
	Flush-mounted in metal; distance all round 25 mm	95	75
MDS D426 <sup>1)</sup>	Metal-free	100	90
	On metal, distance 25 mm	90	75
	Flush-mounted in metal; distance all round 50 mm	80	70
MDS D428	Metal-free	100	94
	On metal, distance 0 mm	100	94
MDS D460 <sup>1)</sup>	Metal-free	100	92
	On metal, distance 0 mm	100	92
MDS D522	Metal-free	100	90
	Flush-mounted in metal; distance all round 0 mm	85	85

Transponder		Reader without direct metal influence (Case a, b and d)	Reader flush-mounted in metal (Case c)
<b>MDS D522</b> Special variants	Metal-free	100	90
	Flush-mounted in metal; distance all round 0 mm	85	85
<b>MDS D524</b> <sup>1)</sup>	Metal-free	100	93
	On metal, distance 0 mm	96	89
	Flush-mounted in metal; distance all round 0 mm	86	82
<b>MDS D526</b> <sup>1)</sup>	Metal-free	100	90
	On metal, distance 25 mm	90	75
	Flush-mounted in metal; distance all round 50 mm	80	70
<b>MDS D528</b>	Metal-free	100	94
	On metal, distance 0 mm	100	94

- 1) Mounting the transponder on or in metal is only possible with the appropriate spacer or if there is adequate clearance to the metal.
- 2) Values of > 100 % related to non metal surroundings can occur if transponders were developed specifically for mounting in/on metallic surroundings.

4.3.4.3 RF240R

The RF240R can be flush-mounted in metal. Please allow for a possible reduction in the field data values. To avoid reduction, the distance a should be ≥ 20 mm.

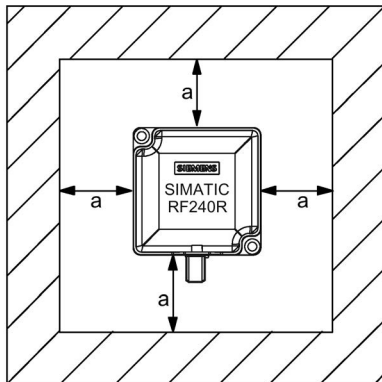


Figure 4-11 Metal-free space RF240R



Table 4- 23 Reduction of field data due to metal, range as %: Transponder and RF240R

Transponder		Reader without direct metal influence	Reader on metal (metal plate)	Reader flush-mounted in metal (all round 20 mm)
MDS D100 <sup>1)</sup>	Without metal	100	95	80
	On metal, distance 20 mm	95	90	75
	Flush-mounted in metal; distance all round 20 mm	90	75	70
MDS D124 <sup>1)</sup>	Without metal	100	85	75
	On metal, distance 15 mm	90	80	75
	Flush-mounted in metal; distance all round 25 mm	85	70	65
MDS D126 <sup>1)</sup>	Without metal	100	80	70
	On metal, distance 25 mm	80	75	60
	Flush-mounted in metal; distance all round 50 mm	70	55	55
MDS D160 <sup>1)</sup>	Without metal	100	90	80
	On metal, distance 10 mm	90	85	80
MDS D165	Without metal	100	95	75
	On metal, distance 25 mm	75	70	65
MDS D200 <sup>1)</sup>	Without metal	100	95	85
	On metal, distance 20 mm	95	80	70
	Flush-mounted in metal, distance all round 20 mm	70	60	50
MDS D261	Without metal	100	90	90
	On metal, distance 25 mm	85	80	70
MDS D324 <sup>1)</sup>	Without metal	100	90	80
	On metal, distance 15 mm	95	85	80
	Flush-mounted in metal; distance all round 25 mm	90	75	70
MDS D400 <sup>1)</sup>	Without metal	100	90	80
	On metal, distance 20 mm	80	75	55
	Flush-mounted in metal, distance all round 20 mm	75	70	50
MDS D422	Without metal	100	90	85
	Flush-mounted in metal; distance all round 0 mm	90	60	40
MDS D423	Without metal	100	95	90
	On metal, distance 0 mm	150 <sup>2)</sup>	140 <sup>2)</sup>	140 <sup>2)</sup>
	Flush-mounted in metal; distance all round 10 mm	70	60	60
MDS D424 <sup>1)</sup>	Without metal	100	85	80
	On metal, distance 15 mm	90	80	75

Transponder		Reader without direct metal influence	Reader on metal (metal plate)	Reader flush-mounted in metal (all round 20 mm)
	Flush-mounted in metal; distance all round 25 mm	80	70	65
<b>MDS D425</b>	Without metal	100	90	85
	On metal, distance 0 mm	95	85	80
<b>MDS D426</b> <sup>1)</sup>	Without metal	100	80	70
	On metal, distance 25 mm	90	80	70
	Flush-mounted in metal; Distance all-round 50 mm	85	65	60
<b>MDS D428</b>	Without metal	100	90	85
	On metal, distance 0 mm	95	85	83
<b>MDS D460</b> <sup>1)</sup>	Without metal	100	90	80
	On metal, distance 0 mm	90	85	80
<b>MDS D522</b>	Metal-free	100	90	85
	Flush-mounted in metal; distance all round 0 mm	90	60	40
<b>MDS D522 Special variant</b>	Metal-free	100	90	85
	Flush-mounted in metal; distance all round 0 mm	90	60	40
<b>MDS D524</b> <sup>1)</sup>	Metal-free	100	85	80
	On metal, distance 0 mm	90	80	75
	Flush-mounted in metal; distance all round 0 mm	80	70	65
<b>MDS D526</b> <sup>1)</sup>	Metal-free	100	80	70
	On metal, distance 25 mm	90	80	70
	Flush-mounted in metal; distance all round 50 mm	85	65	60
<b>MDS D528</b>	Metal-free	100	90	85
	On metal, distance 0 mm	95	85	83

1) Mounting the transponder on or in metal is only possible with the appropriate spacer or if there is adequate clearance to the metal.

2) Values of > 100 % related to non metal surroundings can occur if transponders were developed specifically for mounting in/on metallic surroundings.

### 4.3.4.4 RF250R

The RF250R reader is operated with the external antennas ANT 3, 8, 12, 18 and 30. The antennas can be flush-mounted in metal. Please allow for a possible reduction in the field data values.

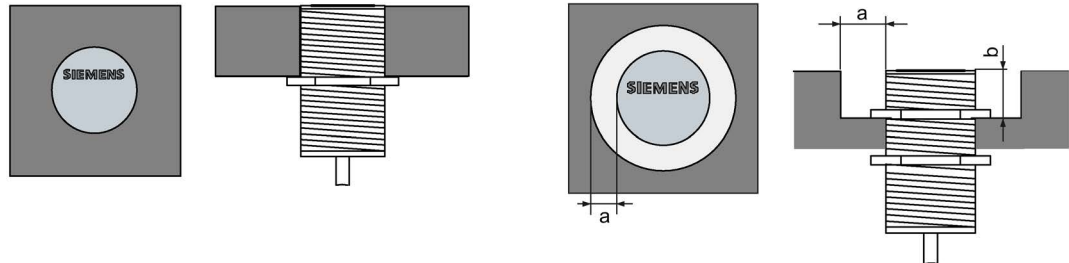


Figure 4-12 Metal-free space for ANT 8 / ANT 12 and ANT 18 / ANT 30

Table 4- 24 Reduction of field data due to metal, range as %: Transponder and RF250R with ANT 1

Transponder		ANT 1 without metal	ANT 1 on metal	ANT 1 mounted in metal (all round 40 mm)
MDS D100 <sup>1)</sup>	Without metal	100	85	80
	On metal; distance 20 mm	70	60	65
	Flush-mounted in metal; distance all round 20 mm	60	45	45
MDS D124 <sup>1)</sup>	Without metal	100	95	85
	On metal; distance 15 mm	85	85	80
	Flush-mounted in metal; distance all round 20 mm	85	80	50
MDS D126 <sup>1)</sup>	Without metal	100	85	85
	On metal; distance 25 mm	85	75	75
	Flush-mounted in metal; distance all round 50 mm	80	70	70
MDS D139 <sup>1)</sup>	Without metal	100	90	85
	On metal; distance 30 mm	95	85	85
	Flush-mounted in metal; distance all round 100 mm	95	85	85
MDS D160 <sup>1)</sup>	Without metal	100	95	90
	On metal; distance 10 mm	85	85	80
MDS D165	Without metal	100	85	85
	On metal; distance 25 mm	90	80	75
MDS D200 <sup>1)</sup>	Without metal	100	85	80
	On metal; distance 20 mm	85	75	75
	Flush-mounted in metal; distance all round 20 mm	75	65	65

Transponder		ANT 1 without metal	ANT 1 on metal	ANT 1 mounted in metal (all round 40 mm)
<b>MDS D261</b>	Without metal	100	90	85
	On metal; distance 25 mm	85	80	80
<b>MDS D324<sup>1)</sup></b>	Without metal	100	85	85
	On metal; distance 15 mm	90	80	80
	Flush-mounted in metal; distance all round 25 mm	80	75	65
<b>MDS D339<sup>1)</sup></b>	Without metal	100	90	85
	On metal; distance 30 mm	95	85	85
	Flush-mounted in metal; distance all round 100 mm	95	85	85
<b>MDS D400<sup>1)</sup></b>	Without metal	100	90	85
	On metal; distance 20 mm	80	70	65
	Flush-mounted in metal; distance all round 20 mm	65	60	60
<b>MDS D423</b>	Without metal	100	90	90
	On metal; distance 0 mm	115 <sup>2)</sup>	115 <sup>2)</sup>	115 <sup>2)</sup>
	Flush-mounted in metal; distance all round 0 mm	80	65	65
<b>MDS D424<sup>1)</sup></b>	Without metal	100	90	75
	On metal; distance 15 mm	85	80	75
	Flush-mounted in metal; distance all round 25 mm	75	70	70
<b>MDS D425</b>	Without metal	100	95	95
	On metal; distance 0 mm	90	85	85
<b>MDS D426<sup>1)</sup></b>	Without metal	100	90	85
	On metal; distance 25 mm	85	80	75
	Flush-mounted in metal; distance all round 50 mm	80	75	70
<b>MDS D428</b>	Without metal	100	90	85
	On metal; distance 0 mm	85	80	80
<b>MDS D460<sup>1)</sup></b>	Without metal	100	90	80
	On metal; distance 10 mm	85	80	75
<b>MDS D524<sup>1)</sup></b>	Without metal	100	90	75
	On metal; distance 15 mm	85	80	75
	Flush-mounted in metal; distance all round 25 mm	75	70	70
<b>MDS D525</b>	Without metal	100	95	95
	On metal; distance 0 mm	90	85	85
<b>MDS D526<sup>1)</sup></b>	Without metal	100	90	85
	On metal; distance 25 mm	85	80	75

Transponder		ANT 1 without metal	ANT 1 on metal	ANT 1 mounted in metal (all round 40 mm)
	Flush-mounted in metal; distance all round 50 mm	80	75	70
<b>MDS D528</b>	Without metal	100	90	85
	On metal; distance 0 mm	85	80	80

- 1) Mounting the transponder on or in metal is only possible with the appropriate spacer or if there is adequate clearance to the metal.
- 2) Values of > 100 % can occur if transponders were developed specifically for mounting in/on metallic surroundings.

Table 4- 25 Reduction of field data due to metal, range as %: Transponder and RF250R with ANT 3

Transponder		RF250R with ANT 3	
		Antenna without metal	Antenna flush-mounted in metal (all round 20 mm)
<b>MDS D124</b> <sup>1)</sup>	Without metal	100	80
	On metal, distance 15 mm	90	75
	Flush-mounted in metal; distance all round 25 mm	75	70
<b>MDS D126</b> <sup>1)</sup>	Without metal	100	80
	On metal, distance 25 mm	85	75
	Flush-mounted in metal; distance all round 50 mm	60	50
<b>MDS D160</b> <sup>1)</sup>	Without metal	100	85
	On metal, distance 10 mm	95	80
<b>MDS D324</b> <sup>1)</sup>	Without metal	100	80
	On metal, distance 15 mm	95	75
	Flush-mounted in metal; distance all round 25 mm	85	70
<b>MDS D422</b>	Without metal	100	95
	Flush-mounted in metal; distance all round 0 mm	95	80
<b>MDS D423</b>	Without metal	100	90
	On metal, distance 0 mm	130 <sup>2)</sup>	110 <sup>2)</sup>
	Flush-mounted in metal; distance all round 10 mm	80	70
<b>MDS D424</b> <sup>1)</sup>	Without metal	100	85
	On metal, distance 15 mm	90	75
	Flush-mounted in metal; distance all round 25 mm	75	70

Transponder		RF250R with ANT 3	
		Antenna without metal	Antenna flush-mounted in metal (all round 20 mm)
MDS D425	Without metal	100	90
	On metal, distance 0 mm	95	75
MDS D426 <sup>1)</sup>	Without metal	100	70
	On metal, distance 25 mm	90	65
	Flush-mounted in metal; distance all round 25 mm	55	45
MDS D428	Without metal	100	90
	On metal, distance 0 mm	100	90
MDS D460 <sup>1)</sup>	Without metal	100	85
	On metal, distance 10 mm	90	75
MDS D522	Without metal	100	95
	Flush-mounted in metal; distance all round 0 mm	95	80
MDS D522 Special variants	Without metal	100	95
	Flush-mounted in metal; distance all round 0 mm	95	80
MDS D524 <sup>1)</sup>	Without metal	100	85
	On metal, distance 15 mm	90	75
	Flush-mounted in metal; distance all round 25 mm	75	70
MDS D526 <sup>1)</sup>	Without metal	100	70
	On metal, distance 25 mm	90	65
	Flush-mounted in metal; distance all round 25 mm	55	45
MDS D528	Without metal	100	90
	On metal, distance 0 mm	100	90

1) Mounting the transponder on or in metal is only possible with the appropriate spacer or if there is adequate clearance to the metal.

2) Values of > 100 % related to non metal surroundings can occur if transponders were developed specifically for mounting in/on metallic surroundings.

Table 4- 26 Reduction of field data due to metal, range as %: Transponder and RF250R with ANT 8

Transponder		RF250R with ANT 8	
		Antenna without metal	Antenna flush-mounted in metal
MDS D117	Without metal	100	85
	Flush-mounted in metal; distance all round 0 mm	65	55
MDS D127	Without metal	100	85
	Flush-mounted in metal; distance all round 0 mm	70	60
MDS D421	Without metal	100	85
	Flush-mounted in metal; distance all round 0 mm	75	70
MDS D521	Without metal	100	85
	Flush-mounted in metal; distance all round 0 mm	75	70

Table 4- 27 Reduction of field data due to metal, range as %: Transponder and RF250R with ANT 12

Transponder		RF250R with ANT 12	
		Antenna without metal	Antenna flush-mounted in metal (all round 7 mm)
MDS D117	Without metal	100	85
	Flush-mounted in metal; distance all round 0 mm	50	40
MDS D127	Without metal	100	85
	Flush-mounted in metal; distance all round 0 mm	65	50
MDS D160 <sup>1)</sup>	Without metal	100	90
	On metal, distance 10 mm	90	85
MDS D421	Without metal	100	90
	Flush-mounted in metal; distance all round 0 mm	65	45
MDS D422	Without metal	100	90
	Flush-mounted in metal; distance all round 0 mm	90	75
MDS D425	Without metal	100	90
	On metal, distance 0 mm	115 <sup>2)</sup>	100
MDS D428	Without metal	100	85
	On metal, distance 0 mm	110 <sup>2)</sup>	95
MDS D460 <sup>1)</sup>	Without metal	100	95
	On metal, distance 10 mm	90	80
	Flush-mounted in metal; distance all round 0 mm	85	75

Transponder		RF250R with ANT 12	
		Antenna without metal	Antenna flush-mounted in metal (all round 7 mm)
MDS D521	Without metal	100	90
	Flush-mounted in metal; distance all round 0 mm	65	45
MDS D522	Without metal	100	90
	Flush-mounted in metal; distance all round 0 mm	90	75
MDS D528	Without metal	100	85
	On metal, distance 0 mm	110 <sup>2)</sup>	95

- 1) Mounting the transponder on or in metal is only possible with the appropriate spacer or if there is adequate clearance to the metal.
- 2) Values of > 100 % related to non metal surroundings can occur if transponders were developed specifically for mounting in/on metallic surroundings.

Table 4- 28 Reduction of field data due to metal, range as %: Transponder and RF250R with ANT 18

Transponder		RF250R with ANT 18	
		Antenna without metal	Antenna flush-mounted in metal (all round 10 mm)
MDS D124 <sup>1)</sup>	Without metal	100	80
	On metal, distance 15 mm	100	80
	Flush-mounted in metal; distance all round 25 mm	95	70
MDS D160 <sup>1)</sup>	Without metal	100	90
	On metal, distance 10 mm	100	90
MDS D324 <sup>1)</sup>	Without metal	100	80
	On metal, distance 15 mm	100	80
	Flush-mounted in metal; distance all round 25 mm	95	75
MDS D421	Without metal	100	85
	Flush-mounted in metal; distance all round 0 mm	65	50
MDS D422	Without metal	100	100
	Flush-mounted in metal; distance all round 0 mm	90	90
MDS D423	Without metal	100	85
	On metal, distance 0 mm	120 <sup>2)</sup>	110 <sup>2)</sup>
	Flush-mounted in metal; distance all round 10 mm	90	75
MDS D424 <sup>1)</sup>	Without metal	100	75
	On metal, distance 15 mm	95	75



Transponder	RF250R with ANT 18		
	Antenna without metal	Antenna flush-mounted in metal (all round 10 mm)	
	Flush-mounted in metal; distance all round 25 mm	95	75
<b>MDS D425</b>	Without metal	100	90
	On metal, distance 0 mm	100	90
<b>MDS D428</b>	Without metal	100	85
	On metal, distance 0 mm	100	85
<b>MDS D460</b> <sup>1)</sup>	Without metal	100	85
	On metal, distance 10 mm	100	85
<b>MDS D521</b>	Without metal	100	85
	Flush-mounted in metal; distance all round 0 mm	65	50
<b>MDS D522</b>	Without metal	100	100
	Flush-mounted in metal; distance all round 0 mm	90	90
<b>MDS D522 Special variants</b>	Without metal	100	100
	Flush-mounted in metal; distance all round 0 mm	90	90
<b>MDS D524</b> <sup>1)</sup>	Without metal	100	75
	On metal, distance 15 mm	95	75
	Flush-mounted in metal; distance all round 25 mm	95	75
<b>MDS D528</b>	Without metal	100	85
	On metal, distance 0 mm	100	85

- <sup>1)</sup> Mounting the transponder on or in metal is only possible with the appropriate spacer or if there is adequate clearance to the metal.
- <sup>2)</sup> Values of > 100 % related to non metal surroundings can occur if transponders were developed specifically for mounting in/on metallic surroundings.

Table 4- 29 Reduction of field data due to metal, range as %: Transponder and RF250R with ANT 30

Transponder		RF250R with ANT 30	
		Antenna without metal	Antenna flush-mounted in metal (all round 20 mm)
MDS D124 <sup>1)</sup>	Without metal	100	80
	On metal, distance 15 mm	90	75
	Flush-mounted in metal; distance all round 25 mm	75	70
MDS D126 <sup>1)</sup>	Without metal	100	80
	On metal, distance 25 mm	85	75
	Flush-mounted in metal; distance all round 50 mm	60	50
MDS D160 <sup>1)</sup>	Without metal	100	85
	On metal, distance 10 mm	95	80
MDS D324 <sup>1)</sup>	Without metal	100	80
	On metal, distance 15 mm	95	75
	Flush-mounted in metal; distance all round 25 mm	85	70
MDS D422	Without metal	100	95
	Flush-mounted in metal; distance all round 0 mm	95	80
MDS D423	Without metal	100	90
	On metal, distance 0 mm	130 <sup>2)</sup>	110 <sup>2)</sup>
	Flush-mounted in metal; distance all round 10 mm	80	70
MDS D424 <sup>1)</sup>	Without metal	100	85
	On metal, distance 15 mm	90	75
	Flush-mounted in metal; distance all round 25 mm	75	70
MDS D425	Without metal	100	90
	On metal, distance 0 mm	95	75
MDS D426 <sup>1)</sup>	Without metal	100	70
	On metal, distance 25 mm	90	65
	Flush-mounted in metal; distance all round 25 mm	55	45
MDS D428	Without metal	100	90
	On metal, distance 0 mm	100	90
MDS D460 <sup>1)</sup>	Without metal	100	85
	On metal, distance 10 mm	90	75
MDS D522	Without metal	100	95
	Flush-mounted in metal; distance all round 0 mm	95	80

Transponder		RF250R with ANT 30	
		Antenna without metal	Antenna flush-mounted in metal (all round 20 mm)
<b>MDS D522</b> Special variants	Without metal	100	95
	Flush-mounted in metal; distance all round 0 mm	95	80
<b>MDS D524</b> <sup>1)</sup>	Without metal	100	85
	On metal, distance 15 mm	90	75
	Flush-mounted in metal; distance all round 25 mm	75	70
<b>MDS D526</b> <sup>1)</sup>	Without metal	100	70
	On metal, distance 25 mm	90	65
	Flush-mounted in metal; distance all round 25 mm	55	45
<b>MDS D528</b>	Without metal	100	90
	On metal, distance 0 mm	100	90

1) Mounting the transponder on or in metal is only possible with the appropriate spacer or if there is adequate clearance to the metal.

2) Values of > 100 % related to non metal surroundings can occur if transponders were developed specifically for mounting in/on metallic surroundings.

#### 4.3.4.5 RF260R

The RF260R can be flush-mounted in metal. Please allow for a possible reduction in the field data values. To avoid reduction, the distance a should be  $\geq 20$  mm.

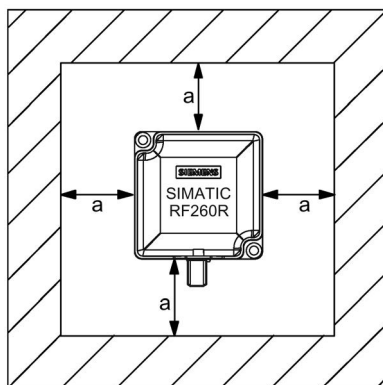


Figure 4-13 Metal-free space for RF260R

Table 4- 30 Reduction of field data due to metal, range as %: Transponder and RF260R

Transponder		Reader without metal direct metal influence	Reader on metal (metal plate)	Reader flush-mounted in metal (all round 20 mm)
MDS D100 <sup>1)</sup>	Without metal	100	85	65
	On metal, distance 20 mm	70	65	50
	Flush-mounted in metal; distance all round 20 mm <sup>4)</sup>	65	50	40
MDS D124 <sup>1)</sup>	Without metal	100	93	75
	On metal, distance 15 mm	95	85	70
	Flush-mounted in metal; distance all round 25 mm <sup>2)</sup>	78	75	65
MDS D126 <sup>1)</sup>	Without metal	100	85	73
	On metal, distance 25 mm	75	68	60
	Flush-mounted in metal; distance all round 50 mm <sup>3)</sup>	55	53	40
MDS D139 <sup>1)</sup>	Without metal	100	90	75
	On metal; distance 30 mm <sup>4)</sup>	95	90	75
MDS D160 <sup>1)</sup>	Without metal	100	90	75
	On metal, distance 10 mm	90	80	80
MDS D165	Without metal	100	85	65
	On metal; distance 25 mm <sup>4)</sup>	65	60	45
MDS D200 <sup>1)</sup>	Without metal	100	85	70
	On metal, distance 20 mm	70	65	50
	Flush-mounted in metal, distance all round 20 mm <sup>3)</sup>	55	50	45
MDS D261	Without metal	100	85	70
	On metal; distance 25 mm <sup>3)</sup>	80	70	60
MDS D324 <sup>1)</sup>	Without metal	100	90	75
	On metal, distance 15 mm	90	80	70
	Flush-mounted in metal; distance all round 25 mm <sup>2)</sup>	70	65	55
MDS D339 <sup>1)</sup>	Without metal	100	90	75
	On metal; distance 30 mm <sup>4)</sup>	95	90	75
MDS D400 <sup>1)</sup>	Without metal	100	85	70
	On metal, distance 20 mm	70	65	50
	Flush-mounted in metal; distance all round 20 mm <sup>4)</sup>	55	50	45
MDS D423	Without metal	100	95	85
	On metal, distance 0 mm	120 <sup>5)</sup>	115 <sup>5)</sup>	110 <sup>5)</sup>
	Flush-mounted in metal; distance all round 10 mm <sup>2)</sup>	75	65	60

Transponder		Reader without metal direct metal influence	Reader on metal (metal plate)	Reader flush-mounted in metal (all round 20 mm)
<b>MDS D424</b> <sup>1)</sup>	Without metal	100	90	80
	On metal, distance 15 mm	90	80	70
	Flush-mounted in metal; distance all round 25 mm <sup>2)</sup>	60	60	50
<b>MDS D426</b> <sup>1)</sup>	Without metal	100	100	73
	On metal, distance 25 mm	88	85	68
	Flush-mounted in metal; distance all round 50 mm <sup>3)</sup>	65	55	55
<b>MDS D428</b>	Without metal	100	90	90
	On metal, distance 0 mm	90	90	85
<b>MDS D460</b> <sup>1)</sup>	Without metal	100	95	90
	On metal, distance 10 mm	90	85	80
<b>MDS D524</b> <sup>1)</sup>	Without metal	100	90	80
	On metal, distance 15 mm	90	80	70
	Flush-mounted in metal; distance all round 25 mm <sup>2)</sup>	60	60	50
<b>MDS D526</b> <sup>1)</sup>	Without metal	100	100	73
	On metal, distance 25 mm	88	85	68
	Flush-mounted in metal; distance all round 50 mm <sup>3)</sup>	65	55	55
<b>MDS D528</b>	Without metal	100	90	90
	On metal, distance 0 mm	90	90	85

<sup>1)</sup> Mounting the transponder on or in metal is only possible with the appropriate spacer or if there is adequate clearance to the metal.

<sup>2)</sup> Transponder flush-mounted in metal; minimum distance to reader 5 mm

<sup>3)</sup> Transponder flush-mounted in metal; minimum distance to reader 10 mm

<sup>4)</sup> Transponder flush-mounted in metal; minimum distance to reader 15 mm

<sup>5)</sup> Values > 100 % can occur if transponders were developed specifically for mounting in/on metallic surroundings.

4.3.4.6 RF280R

The RF280R can be flush-mounted in metal. Please allow for a possible reduction in the field data values. To avoid reduction, the distance a should be  $\geq 20$  mm.

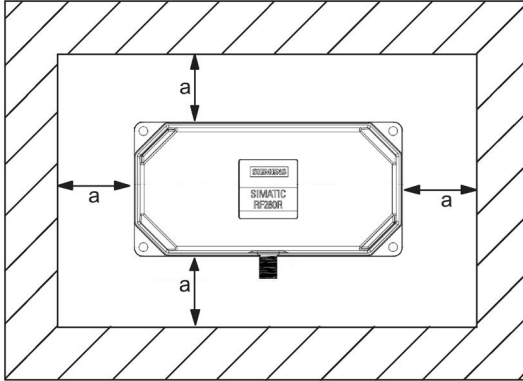


Figure 4-14 Metal-free area RF280R

Table 4- 31 Reduction of field data due to metal, range as %: Transponder and RF280R

Transponder		Reader without metal direct metal influence	Reader on metal (metal plate)	Flush-mounted in metal (20 mm all-round)
MDS D100 <sup>1)</sup>	Without metal	100	95	80
	On metal; distance 20 mm	65	60	55
	Flush-mounted in metal; distance all round 20 mm <sup>2)</sup>	55	50	45
MDS D124 <sup>1)</sup>	Without metal	100	95	90
	On metal; distance 15 mm	95	90	85
	Flush-mounted in metal; distance all round 20 mm <sup>2)</sup>	70	65	50
MDS D126 <sup>1)</sup>	Without metal	100	90	80
	On metal; distance 25 mm	80	75	70
	Flush-mounted in metal; distance all round 50 mm <sup>3)</sup>	75	65	65
MDS D139 <sup>1)</sup>	Without metal	100	90	75
	On metal; distance 30 mm	95	85	70
	Flush-mounted in metal; distance all round 100 mm <sup>4)</sup>	90	80	70
MDS D160 <sup>1)</sup>	Without metal	100	95	90
	On metal; distance 10 mm <sup>2)</sup>	85	85	80
MDS D165	Without metal	100	90	80
	On metal; distance 25 mm <sup>4)</sup>	80	75	70
MDS D200 <sup>1)</sup>	Without metal	100	90	80
	On metal; distance 20 mm	80	75	70

Transponder		Reader without metal direct metal influence	Reader on metal (metal plate)	Flush-mounted in metal (20 mm all-round)
	Flush-mounted in metal; distance all round 20 mm <sup>3)</sup>	65	60	55
<b>MDS D261</b>	Without metal	100	95	85
	On metal; distance 25 mm <sup>4)</sup>	85	80	75
<b>MDS D324<sup>1)</sup></b>	Without metal	100	95	85
	On metal; distance 15 mm	85	85	80
	Flush-mounted in metal; distance all round 25 mm <sup>2)</sup>	70	65	60
<b>MDS D339<sup>1)</sup></b>	Without metal	100	90	80
	On metal; distance 30 mm	85	80	75
	Flush-mounted in metal; distance all round 100 mm <sup>4)</sup>	80	75	70
<b>MDS D400<sup>1)</sup></b>	Without metal	100	90	80
	On metal; distance 20 mm	75	70	60
	Flush-mounted in metal; distance all round 20 mm <sup>4)</sup>	60	60	55
<b>MDS D423</b>	Without metal	100	95	85
	On metal; distance 0 mm	100 <sup>5)</sup>	100 <sup>5)</sup>	90 <sup>5)</sup>
	Flush-mounted in metal; distance all round 10 mm <sup>2)</sup>	75	65	60
<b>MDS D424<sup>1)</sup></b>	Without metal	100	90	75
<b>MDS D524<sup>1)</sup></b>	On metal; distance 15 mm	75	75	60
	Flush-mounted in metal; distance all round 25 mm <sup>2)</sup>	60	55	40
<b>MDS D425</b>	Without metal	100	70	90
<b>MDS D525</b>	On metal; distance 0 mm <sup>2)</sup>	75	70	60
<b>MDS D426<sup>1)</sup></b>	Without metal	100	90	80
<b>MDS D526<sup>1)</sup></b>	On metal; distance 25 mm	80	75	70
	Flush-mounted in metal; distance all round 50 mm <sup>3)</sup>	75	65	65
<b>MDS D428</b>	Without metal	100	90	80
<b>MDS D528</b>	On metal; distance 0 mm <sup>2)</sup>	85	80	65
<b>MDS D460<sup>1)</sup></b>	Without metal	100	95	80
	On metal; distance 10 mm <sup>2)</sup>	80	75	60

- 1) Mounting the transponder on or in metal is only possible with the appropriate spacer or if there is adequate clearance to the metal.
- 2) Transponder flush-mounted in metal; minimum distance to reader 5 mm
- 3) Transponder flush-mounted in metal; minimum distance to reader 10 mm
- 4) Transponder flush-mounted in metal; minimum distance to reader 15 mm
- 5) Values > 100 % in relation to non-metal surroundings can occur if transponders were developed specifically for mounting in/on metallic surroundings.

4.3.4.7 RF290R

The RF290R reader is operated with the external antennas ANT D5, D6 and D10. The antennas can be flush-mounted in metal. Please allow for a possible reduction in the field data values. To avoid reduction, the distance *a* should be  $\geq 150$  or  $200$  mm.

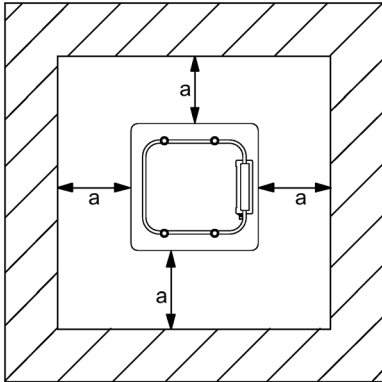


Figure 4-15 Metal-free space for ANT D5

Table 4- 32 Reduction of field data due to metal, range as %: Transponder and RF290R with ANT D5

Transponder		RF290R with ANT D5	
		Antenna on metal (metal plate)	Antenna flush-mounted in metal (all round 150 mm)
MDS D100 <sup>1)</sup>	Without metal	100	95
	On metal, distance 20 mm	65	60
	Flush-mounted in metal; distance all round 20 mm	45	40
MDS D124 <sup>1)</sup>	Without metal	100	95
	On metal, distance 15 mm	85	80
	Flush-mounted in metal; distance all round 25 mm	65	60
MDS D126 <sup>1)</sup>	Without metal	100	95
	On metal, distance 25 mm	70	65
	Flush-mounted in metal; distance all round 50 mm	55	50
MDS D139 <sup>1)</sup>	Without metal	100	95
	On metal, distance 30 mm	90	85
MDS D160 <sup>1)</sup>	Without metal	100	95
	On metal, distance 10 mm	70	65
MDS D165	Without metal	100	95
	On metal, distance 25 mm	65	60
MDS D200 <sup>1)</sup>	Without metal	100	95
	On metal, distance 20 mm	65	60



Transponder	RF290R with ANT D5		
	Antenna on metal (metal plate)	Antenna flush-mounted in metal (all round 150 mm)	
	Flush-mounted in metal; distance all round 20 mm	45	40
<b>MDS D261</b>	Without metal	100	95
	On metal, distance 25 mm	65	60
<b>MDS D324</b> <sup>1)</sup>	Without metal	100	95
	On metal, distance 15 mm	75	70
<b>MDS D339</b> <sup>1)</sup>	Without metal	100	95
	On metal, distance 30 mm	90	85
<b>MDS D400</b> <sup>1)</sup>	Without metal	100	95
	On metal, distance 20 mm	65	60
	Flush-mounted in metal; distance all round 20 mm	45	40
<b>MDS D424</b> <sup>1)</sup>	Without metal	100	95
	On metal, distance 15 mm	75	70
<b>MDS D426</b> <sup>1)</sup>	Without metal	100	95
	On metal, distance 25 mm	70	65
	Flush-mounted in metal; distance all round 50 mm	50	45
<b>MDS D460</b> <sup>1)</sup>	Without metal	100	95
	On metal, distance 10 mm	70	65

<sup>1)</sup> Mounting the transponder on or in metal is only possible with the appropriate spacer or if there is adequate clearance to the metal.

Table 4- 33 Reduction of field data due to metal, range as %: Transponder and RF290R with ANT D6

Transponder		RF290R with ANT D6	
		Antenna on metal (metal plate)	Antenna flush-mounted in metal (all round 200 mm)
MDS D100 <sup>1)</sup>	Without metal	100	95
	On metal, distance 20 mm	65	60
MDS D124 <sup>1)</sup>	Without metal	100	95
	On metal, distance 25 mm	80	75
MDS D126 <sup>1)</sup>	Without metal	100	95
	On metal, distance 25 mm	65	60
MDS D139 <sup>1)</sup>	Without metal	100	90
	On metal, distance 30 mm	80	70
MDS D160 <sup>1)</sup>	Without metal	100	90
	On metal, distance 25 mm	60	55
MDS D165	Without metal	100	95
	On metal, distance 20 mm	50	45
MDS D200 <sup>1)</sup>	Without metal	100	95
	On metal, distance 20 mm	65	60
MDS D261	Without metal	100	95
	On metal, distance 20 mm	50	45
MDS D324 <sup>1)</sup>	Without metal	100	95
	On metal, distance 25 mm	75	70
MDS D339 <sup>1)</sup>	Without metal	100	90
	On metal, distance 30 mm	80	70
MDS D400 <sup>1)</sup>	Without metal	100	95
	On metal, distance 20 mm	60	55
MDS D424 <sup>1)</sup>	Without metal	100	95
	On metal, distance 25 mm	75	70
MDS D426 <sup>1)</sup>	Without metal	100	95
	On metal, distance 25 mm	65	60

<sup>1)</sup> Mounting the transponder on or in metal is only possible with the appropriate spacer or if there is adequate clearance to the metal.

Table 4- 34 Reduction of field data due to metal, range as %: Transponder and RF290R with ANT D10

Transponder		RF290R with ANT D10	
		Antenna on metal (metal plate)	Antenna flush-mounted in metal (all round 200 mm)
MDS D100 <sup>1)</sup>	Without metal	100	95
	On metal, distance 20 mm	50	40
MDS D124 <sup>1)</sup>	Without metal	100	90
	On metal, distance 25 mm	70	60
MDS D126 <sup>1)</sup>	Without metal	100	95
	On metal, distance 25 mm	65	60
MDS D139 <sup>1)</sup>	Without metal	100	90
	On metal, distance 30 mm	80	70
MDS D160 <sup>1)</sup>	Without metal	100	90
	On metal, distance 25 mm	60	55
MDS D165	Without metal	100	90
	On metal, distance 20 mm	40	30
MDS D200 <sup>1)</sup>	Without metal	100	95
	On metal, distance 20 mm	50	40
MDS D261	Without metal	100	90
	On metal, distance 20 mm	40	30
MDS D324 <sup>1)</sup>	Without metal	100	90
	On metal, distance 25 mm	70	60
MDS D339 <sup>1)</sup>	Without metal	100	90
	On metal, distance 30 mm	80	70
MDS D400 <sup>1)</sup>	Without metal	100	95
	On metal, distance 20 mm	50	40
MDS D424 <sup>1)</sup>	Without metal	100	90
	On metal, distance 25 mm	70	60
MDS D426 <sup>1)</sup>	Without metal	100	95
	On metal, distance 25 mm	70	65
MDS D524 <sup>1)</sup>	Without metal	100	90
	On metal, distance 25 mm	70	60
MDS D526 <sup>1)</sup>	Without metal	100	95
	On metal, distance 25 mm	70	65

<sup>1)</sup> Mounting the transponder on or in metal is only possible with the appropriate spacer or if there is adequate clearance to the metal.

### 4.3.5 Installation and connection of 2 to 6 antennas with one RF290R reader

If several antennas need to be operated on one reader, this can be achieved by using the antenna splitter or the antenna multiplexer RF260X.

Note that the antenna splitter is a purely passive device that splits the power at the input to two outputs and therefore halves it. This is possible both in PC mode (RS-232) and CM mode (RS-422). You can cascade the antenna splitters in such a way that up to 4 antennas can be connected at the same time.

The antenna multiplexer RF260X works only in PC mode (RS-232) in time division multiplex mode. This means that each antenna operates with full power for a certain time before the device moves on automatically to the next antenna. The antenna multiplexer normally operates in scan mode or buffered read mode which with suitable parameter assignment add the information about the antenna number to the reply of the transponder. You can operate up to six antennas on one reader via the multiplexer.

#### 4.3.5.1 Installation options with the antenna splitter (2-4 antennas)

##### Possible configurations of the antennas

The antenna installations described here have been designed for reading smartlabels (transponders) on goods on conveyor belts, conveyor systems or pallets.

A prerequisite is that there are no magnetically conducting materials (e.g. metal) in the vicinity of the antenna or the label.

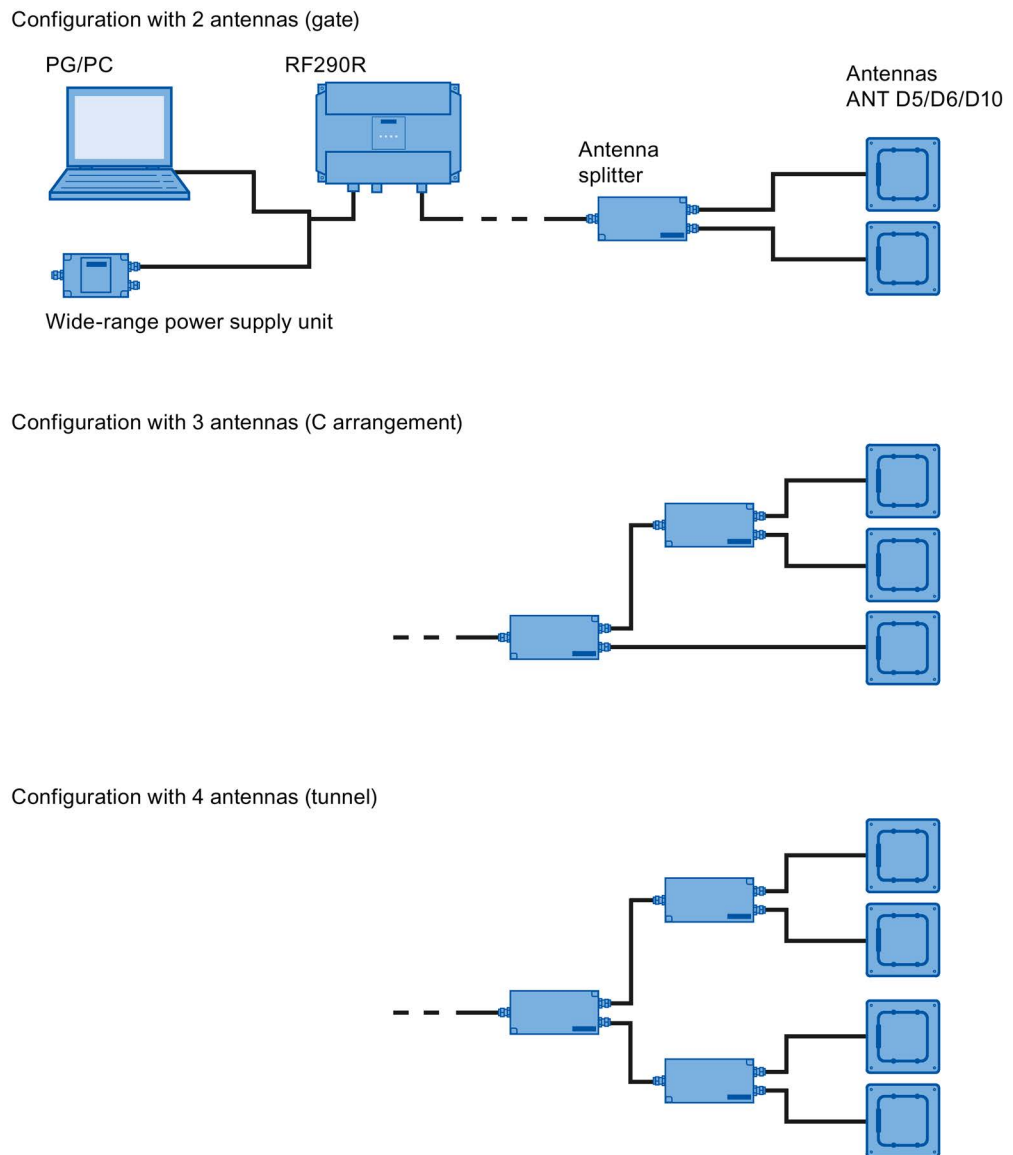


Figure 4-16 Possible configuration of RF290R with ANT D5/D6/D10

### Installation examples

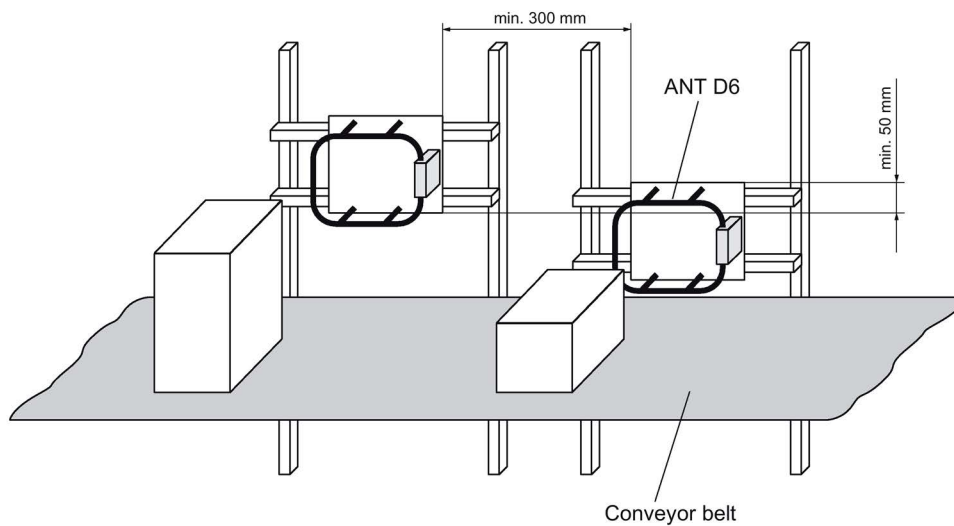


Figure 4-17 Installation example with 2 ANT D6 (portal)

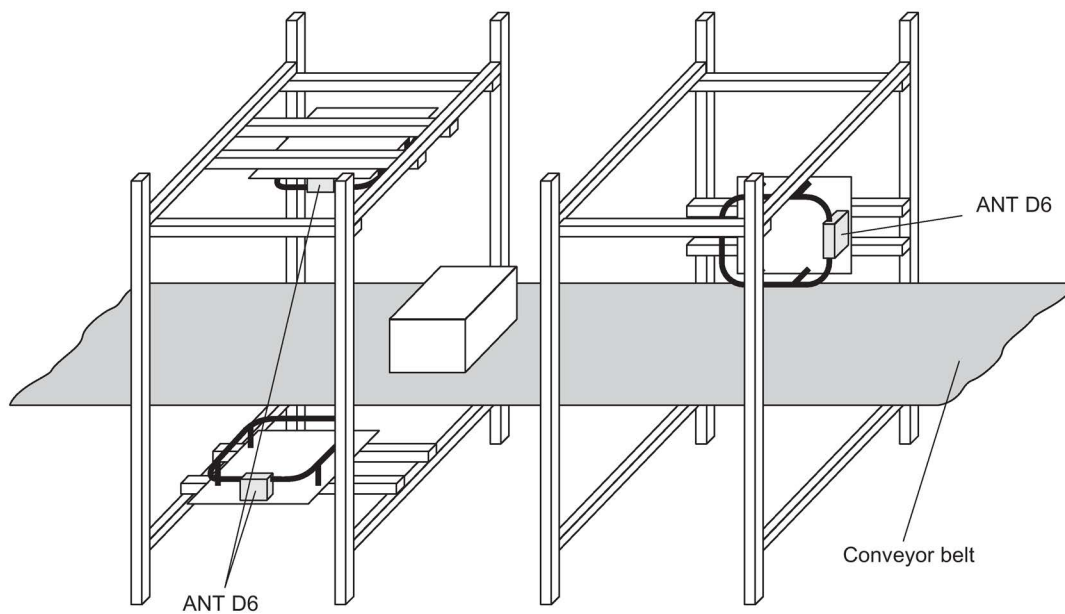


Figure 4-18 Installation example with ANT D6 (C arrangement)

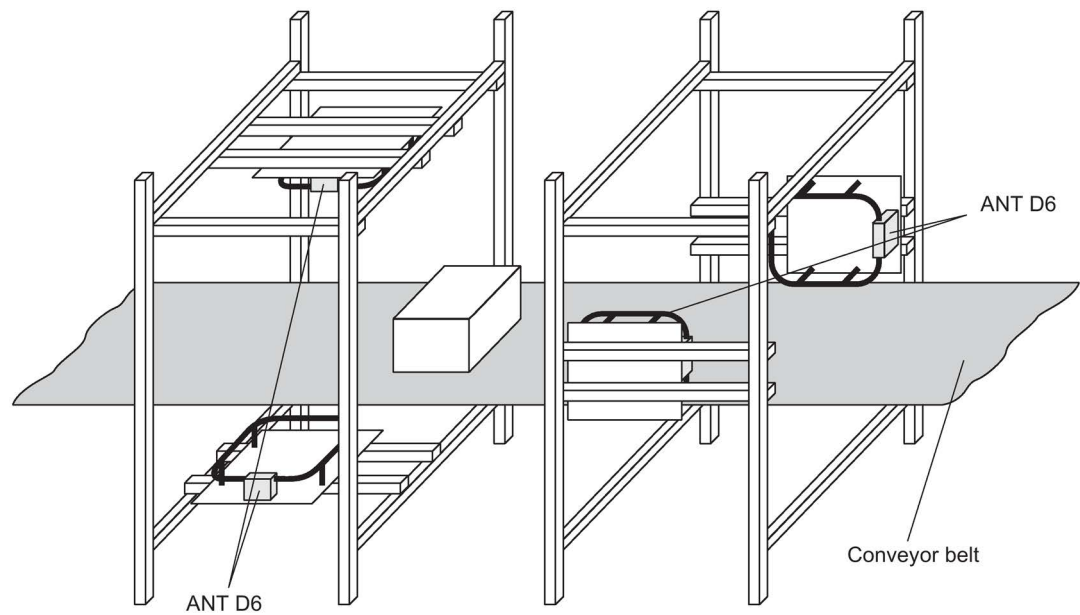


Figure 4-19 Installation example with ANT D6 (tunnel)

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**Note**

The minimum spacings between the antennas for operation with only one reader may be less than the distances described because this configuration has the same phase.

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### 4.3.5.2 Antenna installation

#### Configuring instructions

The antenna installation described below enables detection of transponders moving horizontally through the installation. Depending on the installation (antennas exactly opposite each other or offset in parallel), the label is aligned in parallel with the antennas or arbitrarily.

The size of the sensing range depends on the label alignment:

---

#### Note

Remember that the entire acquisition range of the antenna is larger than the transmission window in which the transponder is normally configured. This means there can be label alignments where even labels outside the transmission window will be identified. Labels aligned in parallel with the antennas, for example, can also be detected at larger distances beside or outside the antenna range.

For this reason, goods with labels must not be stored within a distance of up to 0.5 m from the installation. If this cannot be complied with, the antennas must be shielded.

To achieve three-dimensional detection of the labels in the sensing range, the following requirements must be met:

- The gate width must be less than or equal to 800 mm.
- The antenna size of the labels should be at least the size of an ISO card (85 mm x 54 mm).
- The distance from label to label must be greater than 100 mm. The distance from label to label can be reduced if the gate width is correspondingly reduced. This applies especially for distances under 50 mm.
- There should be no more than 16 labels within the sensing range of the antennas at the same time.  
The number of labels can be increased if the gate width is correspondingly reduced and the maximum speed suitably adapted.
- The maximum speed of the labels must not exceed 1 m/s. (This depends on the number and alignment of the labels, the number of data blocks to be processed, the data protocol required and the label type).
- To the front and sides of the antenna, there must be a distance of more than 150 mm to metal parts.
- There must be no interference to the write/read device from other electrical equipment in the surrounding area.

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#### Note

The RF290R reader is not capable of multitag operation in the CM mode.

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## Required components

For installation with

- 2 antennas (gate)
- 3 antennas (C arrangement)
- 4 antennas (tunnel)

the following components are required:

Table 4- 35 Components required for setting up with 2, 3 or 4 antennas

Number for installation with			Component	Article number
2 ant.	3 ant.	4 ant.		
1	1	1	Basic device: RF290R (↔ CM or PC)	RF290R: 6GT2821-0AC12 optionally: ASM 475: 6GT2002-0GA10 ASM 456: 6GT2002-0ED00 RF170C: 6GT2002-0HD00 RF180C: 6GT2002-0JD00 RF182C: 6GT2002-0JD10
2	3	4	Antenna ANT D5 / D6 / D10	optionally: ANT D5: 6GT2698-5AA10 ANT D6: 6GT2698-5AB00 ANT D10: 6GT2698-5AF00
2	3	4	With ANT D6 if required: cover	6GT2698-5AD00
1	2	3	Antenna splitter	6GT2603-0AC00
1	1	1	Wide-range power supply unit for SIMATIC RF systems (for PC mode only)	EU: 6GT2898-0AA00 UK: 6GT2898-0AA10 US: 6GT2898-0AA20
1	1	1	24 V connecting cable, length 5 m (for PC mode only)	6GT2491-1HH50
1	1	1	Connecting cable: RF290R ↔ PC or RF290R ↔ CM	6GT2891-4KH ... optionally: 6GT2891-4F ... 6GT2891-4EH ...

## Installation information

The cables on the antennas and the antenna splitter are 3.3 m or 10.5 m long. The write/read device must be installed in the vicinity of the antennas. If there are greater distances between the write/read device and the antennas, the antenna cable can be increased by 7.2 m with the extension (6GT2691-0DH72). This results in shorter ranges.

### Metal-free space

To guarantee perfect functioning of the individual installation versions, all larger metal parts in the vicinity of the antennas must be removed.

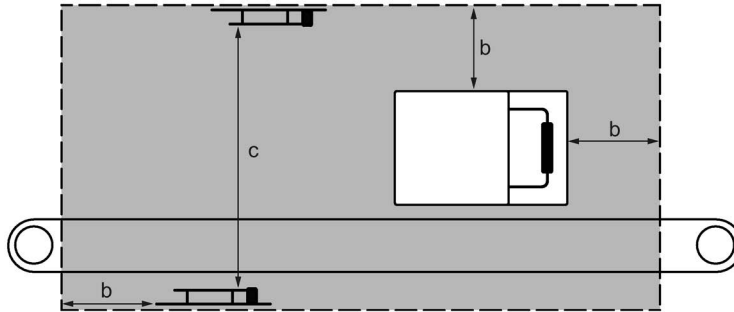
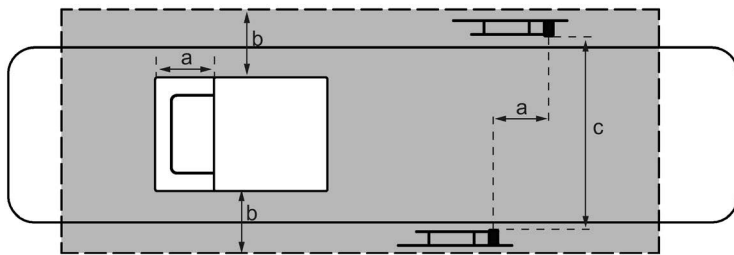


Figure 4-20 Metal-free space, side view (based on the example of a tunnel arrangement on a conveyor belt)



- a approx. half antenna length
- b min. 100 mm
- c max. 600 mm
- Metal-free space

Figure 4-21 Metal-free space, view from above (based on the example of a tunnel arrangement on a conveyor belt)

### Metal in the vicinity of the antennas

If metal in the vicinity of the antennas cannot be avoided, the following must be noted:

- There must be a minimum allround gap of 100 mm between the antenna and metal. Serious loss of sensing range must be expected above 50 mm. There is no discernible influence at distances greater than 150 mm from the metal.
- The influence of the metal depends heavily on its size and shape. Thin metal rods have less influence on the magnetic field than large surfaces.
- Larger metal surfaces (edge length > 50 mm) in parallel with the antennas or labels result in a short-circuit of the magnetic lines of force. As a result, the labels cannot be read.
- Metal parts under the conveyor belt change the direction of the magnetic lines of force. Serious loss of sensing range must be expected as a result. Horizontally aligned labels cannot be read in such cases.

- **The metal parts must not form closed loops or circuits. If necessary, these must be electrically interrupted at one point.**
- The metal parts in the immediate vicinity of the antenna must be grounded in a mesh with a good HF connection.
- Since the write/read device is installed in a metal housing, and the antennas can couple into the cables to the write/read device, it must be installed at a distance of at least 500 mm from the antennas.

### Notes on installing and laying the antenna cable

To suppress possible interference, an EMC hinged ferrite choke must be fitted to the antenna cables (as well as the antenna cable between the reader and the antenna splitter). The coaxial cable must be wound tightly at least four times through the EMC ring core. The maximum distance between the connecting plug for the reader or the antenna splitter and the ring core must be 100 mm.

The antenna cable must always be run vertically from the antennas. A minimum distance of 200 mm to the antennas must be observed as the cables continue. Otherwise, performance losses must be expected.

There must be a distance of at least 300 mm between antenna cables and parallel power cables.

Unrequired cable length must be secured in a bundle with a diameter of 100 to 150 mm.

If the standard antenna cable is too short, it can be increased by 7.20 m with the extension. Slight range losses must be expected here.

To achieve optimal read ranges, the antenna cable should not be shortened or lengthened.

### 4.3.5.3 Installation options with the antenna multiplexer (2-6 antennas)

You can operate up to six antennas on one reader via the multiplexer.

The data is processed sequentially.

Antenna switchover is performed in time-multiplex mode, so by connecting several antennas together, the processing time / activation time per antenna is lengthened accordingly.

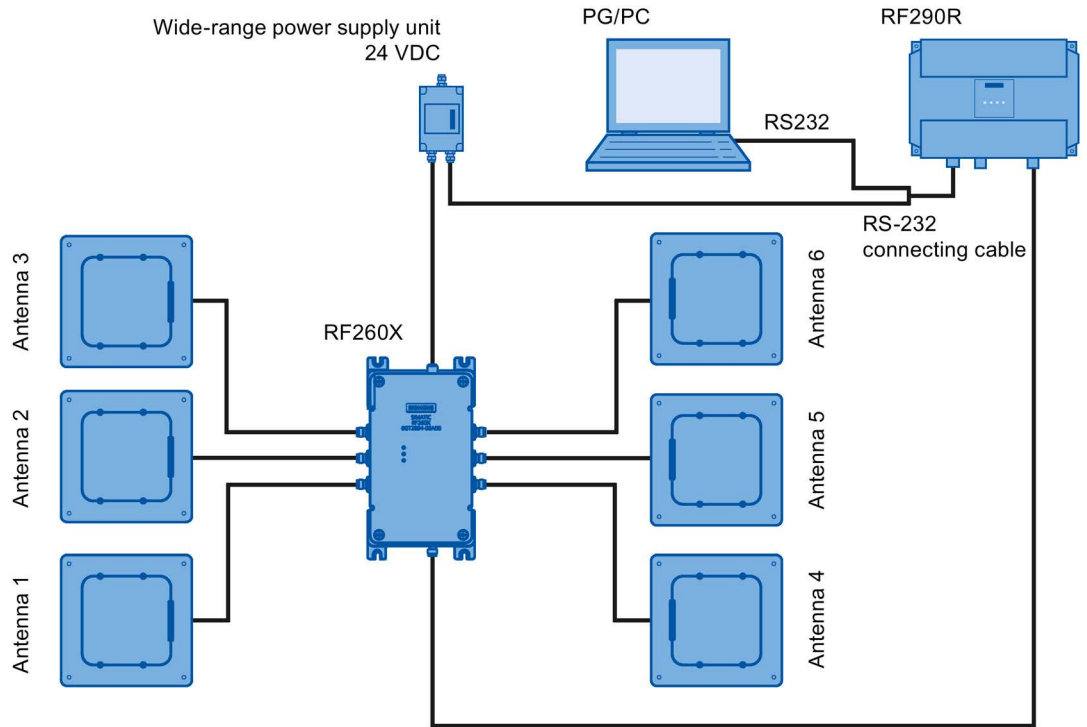


Figure 4-22 Configuration example of the antenna multiplexer with ANT D5

## 4.3.6 Chemical resistance of the reader and transponders

### 4.3.6.1 Readers

#### Overview of the readers and their housing materials

The following sections describe the chemical resistance of the various transponders. The chemical resistance depends on the housing materials used to manufacture the reader. The following table provides an overview of the housing materials used for the readers RF210R, RF220R, RF240R, RF250R, RF260R and RF280R:

Readers	Individual parts of the reader	Housing material of the reader
RF210R, RF220R	Sleeves	Brass (copper alloy) CuZn40Pb2
	Fiber-optic cable	Makrolon®2405
	Cap (antenna)	Thermocomp OF-1008-L-EM Valox 357
RF240R, RF250R, RF260R	Top shell and base plate	Polyamide 6.6 GF30; The chemical resistance of this plastic is listed in the section "Polyamide 6 and Polyamide 6.6 GF30 (Page 90)".
	Fiber-optic cable	Makrolon®2405
	Decorative foil <sup>1)</sup>	Autotex V200
RF280R	Top shell and base plate	Polyamide 12; The chemical resistance of this plastic is listed in the section "Polyamide 12 (Page 91)".
	Fiber-optic cable	Makrolon®2405
	Decorative foil <sup>1)</sup>	Autotex V200

<sup>1)</sup> Component irrelevant for resistance of the overall housing

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#### Note

If you have any questions, please contact Siemens Support, see section "Service & Support (Page 377)".

---

### Polyamide 6 and Polyamide 6.6 GF30

Table 4- 36 Chemical resistance - PA6 and PA6.6 GF30

Substance	Test conditions		Rating
	Concentration [%]	Temperature [°C]	
Mineral lubricants	-	-	++++
Aliphatic hydrocarbons	-	-	++++
Aromatic hydrocarbons	-	-	++++
Gasoline	-	-	++++
Weak mineral acids	-	-	+++
Strong mineral acids	-	-	○
Weak organic acids	-	-	++
Strong organic acids	-	-	○
Oxidizing acids	-	-	○
Weak alkaline solutions	-	-	++
Strong alkaline solutions	-	-	○
Trichloroethylene	-	-	++++
Perchloroethylene	-	-	++++
Acetone	-	-	++++
Alcohols	-	-	++++
Hot water (hydrolysis resistance)	-	-	++

Explanation of the rating	
++++	Resistant
+++	Practically resistant
++	Conditionally resistant
+	Less resistant
○	Not resistant

## Polyamide 12

The resistance of the plastic housing to chemicals used in the automobile sector (e.g.: oils, greases, diesel fuel, gasoline, etc.) is not listed extra.

Table 4- 37 Chemical resistance - Polyamide 12

Substance	Test conditions		Rating
	Concentration [%]	Temperature [°C]	
Battery acid	30%	20 °C	++
Ammonia, gaseous	-	60 °C	++++
Ammonia, w.	conc.	60 °C	++++
	10%	60 °C	++++
Benzene	-	20 °C	++++
	-	60 °C	+++
Bleach solution (12.5% effective chlorine)	-	20 °C	++
Butane, gas, liquid	-	60 °C	++++
Butyl acetate (acetic acid butyl ester)	-	60 °C	++++
n(n)	-	20 °C	++++
	-	60 °C	+++
Calcium chloride, w.	-	20 °C	++++
	-	60 °C	+++
Calcium nitrate, w.	c. s.	20 °C	++++
	c. s.	60 °C	+++
Chlorine	-	20 °C	○
Chrome baths, tech.	-	20 °C	○
Iron salts, w.	c. s.	60 °C	++++
Acetic acid, w.	50%	20 °C	○
Ethyl alcohol, w., undenaturated	95%	20 °C	++++
	95%	60 °C	+++
	50%	60 °C	++++
Formaldehyde, w.	30%	20 °C	+++
	10%	20 °C	++++
	10%	60 °C	+++
Formalin	-	20 °C	+++
Glycerine	-	60 °C	++++
Isopropyl alcohol	-	20 °C	++++
	-	60 °C	+++
Potassium hydroxide, w.	50%	60 °C	++++
Lysol	-	20 °C	++
Magnesium salts, w.	c. s.	60 °C	++++
Methyl alcohol, w.	50%	60 °C	++++
Lactic acid, w.	50%	20 °C	++
	10%	20 °C	+++

4.3 Installation guidelines

Substance	Test conditions		Rating
	Concentration [%]	Temperature [°C]	
	10%	60 °C	++
Sodium carbonate, w. (soda)	c. s.	60 °C	++++
Sodium chloride, w.	c. s.	60 °C	++++
Sodium hydroxide	-	60 °C	++++
Nickel salts, w.	c. s.	60 °C	++++
Nitrobenzene	-	20 °C	+++
	-	60 °C	++
Phosphoric acid	10%	20 °C	+
Propane	-	60 °C	++++
Mercury	-	60 °C	++++
Nitric acid	10%	20 °C	+
Hydrochloric acid	10%	20 °C	+
Sulfur dioxide	low	60 °C	++++
Sulfuric acid	25%	20 °C	++
	10%	20 °C	+++
Hydrogen sulfide	low	60 °C	++++
Carbon tetrachloride	-	60 °C	++++
Toluene	-	20 °C	++++
	-	60 °C	+++
Detergent	high	60 °C	++++
Plasticizer	-	60 °C	++++

Explanation of the rating	
++++	Resistant
+++	Practically resistant
++	Conditionally resistant
+	Less resistant
o	Not resistant
w.	Water solution
c. s.	Cold saturated



### 4.3.6.2 Transponder

#### Overview of the transponders and their housing materials

The following sections describe the resistance to chemicals of the various transponders. Resistance to chemicals depends on the housing material used to manufacture the transponders.

The following table provides an overview of the housing materials of the transponders:

Table 4- 38 Overview of the housing materials of the transponders

Housing material	Transponder
Polyphenylene sulfide (PPS)	MDS D117 MDS D124 (6GT2600-0AC10) MDS D139 MDS D160 MDS D339 MDS D423
Polycarbonate (PC)	MDS D100 (6GT2600-0AD10)
Polyvinyl chloride (PVC)	MDS D100 (6GT2600-0AD00-0AX0) MDS D200 MDS D400
Epoxy resin	MDS D124 (6GT2600-0AC00) MDS D324 MDS D421 MDS D424 MDS D460 MDS D521 MDS D524
PA6	MDS D127
PA6.6 GF30	MDS D126 MDS D422 MDS D425 MDS D426 MDS D428 MDS D522 MDS D526 MDS D528

**Note**

**Chemical substances not listed**

The following sections describe the resistance of the various transponders to specific substances. If you require information about chemical substances that are not listed, contact Customer Support.

**Polyphenylene sulfide (PPS)**

The data memory has special chemical resistance to solutions up to a temperature of 200 °C. A reduction in the mechanical properties has been observed in aqueous solutions of hydrochloric acid (HCl) and nitric acid (HNO3) at 80 °C. The plastic housings are resistant to all types of fuel including methanol.

Table 4- 39 Chemical resistance - polyphenylene sulfide (PPS)

Substance	Test conditions		Rating
	Concentration [%]	Temperature [°C]	
Acetone	-	55 °C	++++
n-Butanol (butyl alcohol)	-	80 °C	++++
Butanone-2 (methyl ethyl ketone)	-	60 °C	++++
n-Butyl acetate	-	80 °C	++++
Brake fluid	-	80 °C	++++
Calcium chloride (saturated)	-	80 °C	++++
Diesel fuel	-	80 °C	++++
Diethyl ether	-	23 °C	++++
Frigen 113	-	23 °C	++++
Anti-freeze	-	120 °C	++++
Kerosene	-	60 °C	++++
Methanol	-	60 °C	++++
Engine oil	-	80 °C	++++
Sodium chloride (saturated)	-	80 °C	++++
Sodium hydroxide	30%	80 °C	++++
Sodium hypochlorite (30 or 180 days)	5%	80 °C	++
	5%	80 °C	-
Sodium hydroxide solution	30%	90 °C	++++
Nitric acid	10%	23 °C	++++
Hydrochloric acid	10%	80 °C	-
Sulfuric acid	10%	23 °C	++++
	10%	80 °C	++
	30%	23 °C	++++
Tested fuels	-	80 °C	++++

Substance	Test conditions		Rating
	Concentration [%]	Temperature [°C]	
FAM testing fluid acc. to DIN 51 604-A Toluene	-	80 °C	++
1, 1, 1-Trichloroethane Xylene	-	80 °C	++++
Zinc chloride (saturated)	-	80 °C	++
	-	75 °C	++++

Explanation of the rating	
++++	Resistant
+++	Practically resistant
++	Conditionally resistant
+	Less resistant
○	Not resistant

**Polycarbonate (PC)**

Table 4- 40 Chemical resistance - polycarbonate (PPS)

Substance	Test conditions		Rating
	Concentration [%]	Temperature [°C]	
Mineral lubricants	-	-	++
Aliphatic hydrocarbons	-	-	++++
Aromatic hydrocarbons	-	-	○
Gasoline	-	-	○
Weak mineral acids	-	-	++++
Strong mineral acids	-	-	++
Weak organic acids	-	-	++++
Strong organic acids	-	-	++
Oxidizing acids	-	-	○
Weak alkaline solutions	-	-	○
Strong alkaline solutions	-	-	○
Trichloroethylene	-	-	○
Perchloroethylene	-	-	○
Acetone	-	-	○
Alcohols	-	-	++
Hot water (hydrolysis resistance)	-	-	○

Explanation of the rating	
++++	Resistant
+++	Practically resistant
++	Conditionally resistant
+	Less resistant
○	Not resistant

## Polyvinyl chloride (PVC)

Table 4- 41 Chemical resistance - polyvinyl chloride (PVC)

Substance	Test conditions		Rating
	Concentration [%]	Temperature [°C]	
Salt water	5%	-	++++
Sugared water	10%	-	++++
Acetic acid, w.	5%	-	++++
Sodium carbonate, w.	5%	-	++++
Ethyl alcohol, w.	60%	-	++++
Ethylene glycol	50%	-	++++
Fuel B (acc. to ISO 1817)	-	-	++++
Human sweat	-	-	++++

Explanation of the rating	
++++	Resistant
++++	Practically resistant
++	Conditionally resistant
+	Less resistant
o	Not resistant

## Epoxy resin

Table 4- 42 Chemical Resistance - epoxy resin

Substance	Test conditions		Rating
	Concentration [%]	Temperature [°C]	
Allyl chloride	-	20 °C	++++
Formic acid	50%	20 °C	++++
	100%	20 °C	++
Ammonia, gaseous	-	20 °C	++++
Ammonia, liquid, water-free	-	20 °C	o
Ammonium hydroxide	10%	20 °C	++++
Ethanol	-	40 °C	++++
	-	60 °C	++++
Ethyl acrylate	-	20 °C	++++
Ethyl glycol	-	60 °C	++++
Gasoline, aroma-free	-	20 °C	++++
Gasoline, containing benzene	-	20 °C	++++
Benzoates (Na-, Ca- among others)	-	40 °C	++++
Benzoic acid	-	20 °C	++++

Substance	Test conditions		Rating
	Concentration [%]	Temperature [°C]	
Benzene	-	20 °C	++++
Borax	-	60 °C	++++
Boric acid	-	20 °C	++++
Bromine, liquid	-	20 °C	○
Bromides (K-, Na- among others)	-	60 °C	++++
Bromoform	100%	20 °C	++++
Bromine water	-	20 °C	○
Butadien (1.3-)	-	20 °C	++++
Butane, gaseous	-	20 °C	++++
Butanol	-	20 °C	○
Butyric acid	100%	20 °C	++
Carbonates (ammonium-, Na- among others)	-	60 °C	++++
Chlorine, liquid	-	20 °C	○
Chlorine, gaseous, dry	100%	20 °C	○
Chlorobenzene	-	20 °C	++++
Chlorides (ammonium-, Na- among others)	-	60 °C	++++
Chloroform	-	20 °C	○
Chlorophyll	-	20 °C	++++
Chlorosulfuric acid	100%	20 °C	○
Chlorine water (saturated solution)	-	20 °C	++
Chromates (K-, Na- among others)	Up to 50 %	40 °C	++++
Chromic acid	Up to 30 %	20 °C	○
Chromosulfuric acid	-	20 °C	○
Citric acid	-	20 °C	++++
Cyanamide	-	20 °C	++++
Cyanides (K-, Na- among others)	-	60 °C	++++
Dextrin, w.	-	60 °C	++++
Diethyl ether	-	20 °C	++++
Diethylene glycol	-	60 °C	++++
Dimethyl ether	-	20 °C	++++
Dioxane	-	20 °C	○
Developer	-	40 °C	++++
Acetic acid	100%	20 °C	++
Ethanol	-	60 °C	++++
Fixing bath	-	40 °C	++++
Fluorides (ammonium-, K-, Na- among others)	-	40 °C	++++
Hydrofluoric acid	Up to 40 %	20 °C	++++
Formaldehyde	50%	20 °C	++++
Formamide	100%	20 °C	++++

Substance	Test conditions		Rating
	Concentration [%]	Temperature [°C]	
Gluconic acid	-	20 °C	++++
Glycerine	-	60 °C	++++
Glycol	-	60 °C	++++
Urine	-	20 °C	++++
Uric acid	-	20 °C	++++
Hydroxides (ammonium...)	10%	20 °C	++++
Hydroxides (Na-, K-)	40%	20 °C	++++
Hydroxides (alkaline earth metal)	-	60 °C	++++
Hypochlorites (K-, Na- among others)	-	60 °C	++++
Iodides (K-, Na- among others)	-	60 °C	++++
Silicic acid	-	60 °C	++++
Cresol	Up to 90 %	20 °C	○
Methanol	100%	40 °C	++++
Methylene chloride	-	20 °C	○
Lactic acid	100%	20 °C	++
Mineral oils	-	40 °C	++++
Nitrates (ammonium..., K- among others)	-	60 °C	++++
Nitroglycerin	-	20 °C	○
Oxalic acid	-	20 °C	++++
Phenol	1%	20 °C	++++
Phosphates (ammonium..., Na- among others)		60 °C	++++
Phosphoric acid	50%	60 °C	++++
	85%	20 °C	++++
Propanol	-	20 °C	++++
Nitric acid	25%	20 °C	○
Hydrochloric acid	10%	20 °C	○
Brine	-	60 °C	○
Sulfur dioxide	100%	20 °C	++
Carbon disulfide	100%	20 °C	○
Sulfuric acid	40%	20 °C	○
Sulfurous acid	-	20 °C	++
Soap solution	-	60 °C	++++
Sulphates (ammonium..., Na- among others)	-	60 °C	++++
Sulfites (ammonium..., Na- among others)	-	60 °C	○
Tar, aroma-free	-	60 °C	++++
Turpentine	-	20 °C	++++
Trichloroethylene	-	20 °C	○

Substance	Test conditions		Rating
	Concentration [%]	Temperature [°C]	
Hydrogen peroxide	30%	20 °C	++++
Tartaric acid	-	20 °C	++++

Explanation of the rating	
++++	Resistant
+++	Practically resistant
++	Conditionally resistant
+	Less resistant
○	Not resistant

### Polyamide 6 and Polyamide 6.6 GF30

Table 4- 43 Chemical resistance - PA6 and PA6.6 GF30

Substance	Test conditions		Rating
	Concentration [%]	Temperature [°C]	
Mineral lubricants	-	-	++++
Aliphatic hydrocarbons	-	-	++++
Aromatic hydrocarbons	-	-	++++
Gasoline	-	-	++++
Weak mineral acids	-	-	+++
Strong mineral acids	-	-	○
Weak organic acids	-	-	++
Strong organic acids	-	-	○
Oxidizing acids	-	-	○
Weak alkaline solutions	-	-	++
Strong alkaline solutions	-	-	○
Trichloroethylene	-	-	++++
Perchloroethylene	-	-	++++
Acetone	-	-	++++
Alcohols	-	-	++++
Hot water (hydrolysis resistance)	-	-	++

Explanation of the rating	
++++	Resistant
+++	Practically resistant
++	Conditionally resistant
+	Less resistant
○	Not resistant



## **4.4 Further information**

Further information on "Fundamentals of application planning" and "EMC" can be found in RF300 system manual (<https://support.industry.siemens.com/cs/ww/en/view/21738946>).



<b>NOTICE</b>
<b>Pulling and plugging readers</b>
Pull or plug the reader only when the power supply is turned off
If this is not observed, under certain conditions, the reader will not start up correctly and communication with a transponder will not be possible.

---

**Note****IO-Link variants of the RF200 readers**


The IO-Link variants of the readers are not included in the system manual. You will find these in the "SIMATIC RF200 IO-Link

(<https://support.industry.siemens.com/cs/ww/en/view/60641859>)" operating instructions.

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## 5.1 SIMATIC RF210R

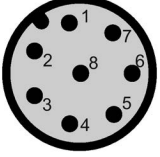
### 5.1.1 Features

<b>SIMATIC RF210R</b>	<b>Characteristics</b>	
	Design	① RS422 interface ② Status display
	Application	Identification tasks on assembly lines in harsh industrial environments

### 5.1.2 RF210R ordering data

	<b>Article number</b>
RF210R with RS422 interface (3964R)	6GT2821-1AC10






### 5.1.3 Pin assignment RF210R with RS422 interface

Pin	Pin Device end 8-pin M12	Assignment
	1	+ 24 V
	2	- Transmit
	3	0 V
	4	+ Transmit
	5	+ Receive
	6	- Receive
	7	Unassigned
	8	Ground (shield)

### 5.1.4 LED operating display

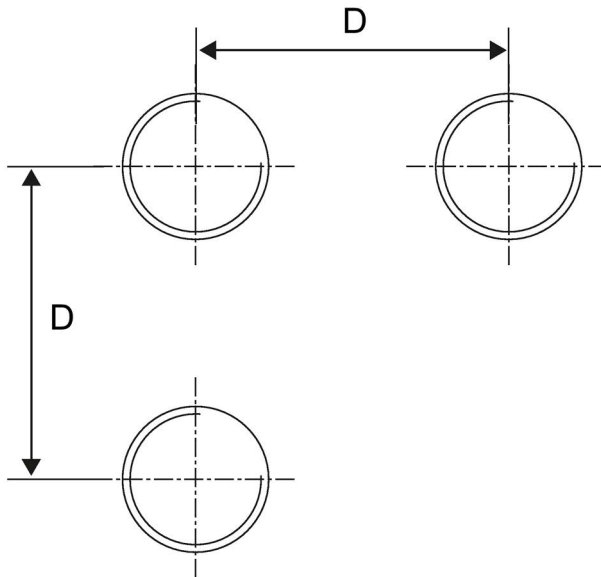
The operational statuses of the reader are displayed by the LEDs. The LED can adopt the colors green, red or yellow and the statuses off , on , flashing :

Table 5- 1 LED operating display on the reader

LED	Meaning
	The reader is turned off.
	Operating voltage present, reader not initialized or antenna switched off
	Operating voltage present, reader initialized and antenna switched on
	<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 "Error codes of the RF200 readers (Page 329)". The optical error display is only reset if the corresponding reset parameter ("option_1 = 2") is set (see product information "SIMATIC RF200 Command Set ( <a href="https://support.industry.siemens.com/cs/ww/en/view/44864850">https://support.industry.siemens.com/cs/ww/en/view/44864850</a> )").

### 5.1.5 Minimum distance between RF210R readers

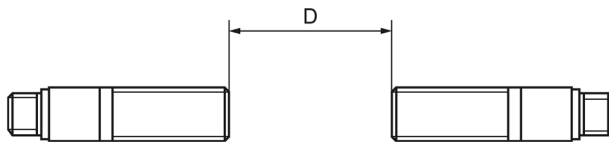
#### RF210R side by side



$D \geq 60 \text{ mm}$

Figure 5-1 Minimum distance between RF210R readers

#### RF210R face to face



$D \geq 100 \text{ mm}$

Figure 5-2 Face-to-face distance between two RF210Rs

## 5.1.6 Technical specifications of the RF210R reader

Table 5- 2 Technical specifications of the RF210R reader

<b>6GT2821-1AC10</b>	
Product type designation	SIMATIC RF210R
<b>Radio frequencies</b>	
Operating frequency, rated value	13.56 MHz
<b>Electrical data</b>	
Maximum range	20 mm
Maximum data transmission speed reader ↔ transponder	ISO tags
• Read	• approx. 1500 bytes/s
• Write	• approx. 1500 bytes/s
Typical transmission time for user data per byte	
• for write access	• 0.6 ms
• for read access	• 0.6 ms
Transmission speed	19.2, 57.6, 115.2 kBd
Read/write distances of the reader	see section "Field data (Page 39)"
MTBF (Mean Time Between Failures)	505 years
<b>Interfaces</b>	
Electrical connector design	M12, 8-pin
Standard for interfaces for communication	RS-422
Antenna	integrated
<b>Mechanical specifications</b>	
Housing	
• Material	• Brass, nickel-plated
• Color	• Silver
Recommended distance to metal	0 mm
<b>Supply voltage, current consumption, power loss</b>	
Supply voltage	24 VDC
Typical current consumption	50 mA
<b>Permitted ambient conditions</b>	
Ambient temperature	
• During operation	• -20 ... +70 °C

<b>6GT2821-1AC10</b>	
• During transportation and storage	• -25 ... +85 °C
Degree of protection to EN 60529	IP67
Shock-resistant to EN 60721-3-7, Class 7 M3	500 m/s <sup>2</sup>
Vibration-resistant to EN 60721-3-7, Class 7 M3	200 m/s <sup>2</sup>
Torsion and bending load	Not permitted
<b>Design, dimensions and weight</b>	
Dimensions (Ø x thread x L)	M18 x 1 x 83 mm
Weight	65 g
Type of mounting	2x nuts M18 x 1
Cable length for RS-422 interface, maximum	1000 m
LED display design	3-color LED (operating voltage, presence, error)

### 5.1.7 Approvals

#### FCC information

##### Siemens SIMATIC RF210R (MLFB 6GT2821-1AC10) FCC ID NXW-RF210R

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.

### 5.1.8 Dimension drawing

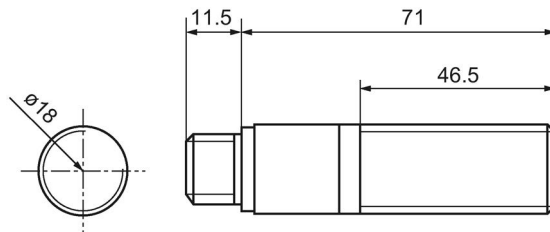



Figure 5-3 RF210R dimension drawing

Dimensions in mm

## 5.2 SIMATIC RF210M

### 5.2.1 Features

SIMATIC RF210M	Characteristics	
	Design	① RS422 interface ② Status display
	Application	Reader for hand work and rework places, picking, track and trace, tool Ident

### 5.2.2 Ordering data RF210M

	Article number
RF210M with RS-422 interface (3964R)	6GT2823-0AA00

### 5.2.3 Installing the RF210M reader

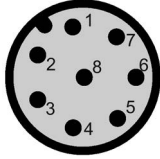
The following figure shows the completely mounted reader. Note that you can mount the suspension bracket at two different points ①. If you do not mount the handle, we recommend that you close the opening ② with the protective cap.



- ① Holes for mounting the suspension bracket
- ② Thread for mounting the handle

Figure 5-4 Installing the reader






### 5.2.4 Pin assignment RF210M with RS-422 interface

Pin	Pin Device end 8-pin M12	Assignment
	1	+ 24 V
	2	- Transmit
	3	0 V
	4	+ Transmit
	5	+ Receive
	6	- Receive
	7	Unassigned
	8	Ground (shield)

### 5.2.5 LED operating display

The operational statuses of the reader are displayed by the LEDs. The LED can adopt the colors green, red or yellow and the statuses off , on , flashing :

Table 5- 3 LED operating display on the reader

LED	Meaning
	The reader is turned off.
	Operating voltage present, reader not initialized or antenna switched off
	Operating voltage present, reader initialized and antenna switched on
	<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 "Error codes of the RF200 readers (Page 329)". The optical error display is only reset if the corresponding reset parameter ("option_1 = 2") is set (see product information "SIMATIC RF200 Command Set ( <a href="https://support.industry.siemens.com/cs/ww/en/view/44864850">https://support.industry.siemens.com/cs/ww/en/view/44864850</a> )").

## 5.2.6 Technical specifications of the RF210M reader

Table 5- 4 Technical specifications of the RF210M reader

<b>6GT2823-0AA00</b>	
Product type designation	SIMATIC RF210M
<b>Radio frequencies</b>	
Operating frequency, rated value	13.56 MHz
<b>Electrical data</b>	
Maximum range	20 mm
Maximum data transmission speed reader ↔ transponder	ISO tags
• Read	• approx. 1500 bytes/s
• Write	• approx. 1500 bytes/s
Typical transmission time for user data per byte	
• for write access	• 0.6 ms
• for read access	• 0.6 ms
Transmission speed	19.2, 57.6, 115.2 kBd
Read/write distances of the reader	see section "Field data (Page 39)"
MTBF (Mean Time Between Failures)	505 years
<b>Interfaces</b>	
Electrical connector design	M12, 8-pin
Standard for interfaces for communication	RS-422
Antenna	integrated
<b>Mechanical specifications</b>	
Housing	
• Material	• POM
• Color	• Black
<b>Supply voltage, current consumption, power loss</b>	
Supply voltage	24 VDC
Typical current consumption	50 mA
<b>Permitted ambient conditions</b>	
Ambient temperature	
• During operation	• -20 ... +50 °C
• During transportation and storage	• -25 ... +60 °C

<b>6GT2823-0AA00</b>	
Degree of protection to EN 60529	IP54
Shock-resistant to EN 60721-3-7, Class 7 M3	500 m/s <sup>2</sup>
Vibration-resistant to EN 60721-3-7, Class 7 M3	200 m/s <sup>2</sup>
<b>Design, dimensions and weight</b>	
<b>Dimensions</b>	
• Reader with handle (L x W x H)	195 x 26 x 140 mm
• Reader without handle (L x W x H)	195 x 26 x 46 mm
• Spiral connecting cable (L)	2 m maximum working length 3.5 m
<b>Weight</b>	460 g
<b>Type of mounting</b>	Bracket for for hanging up
<b>Cable length for RS-422 interface, maximum</b>	1000 m
<b>LED display design</b>	3-color LED (operating voltage, presence, error)

## 5.2.7 Approvals

### FCC information

#### Siemens SIMATIC RF210R (MLFB 6GT2821-1AC10) FCC ID NXW-RF210R

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.

## 5.2.8 Dimension drawing

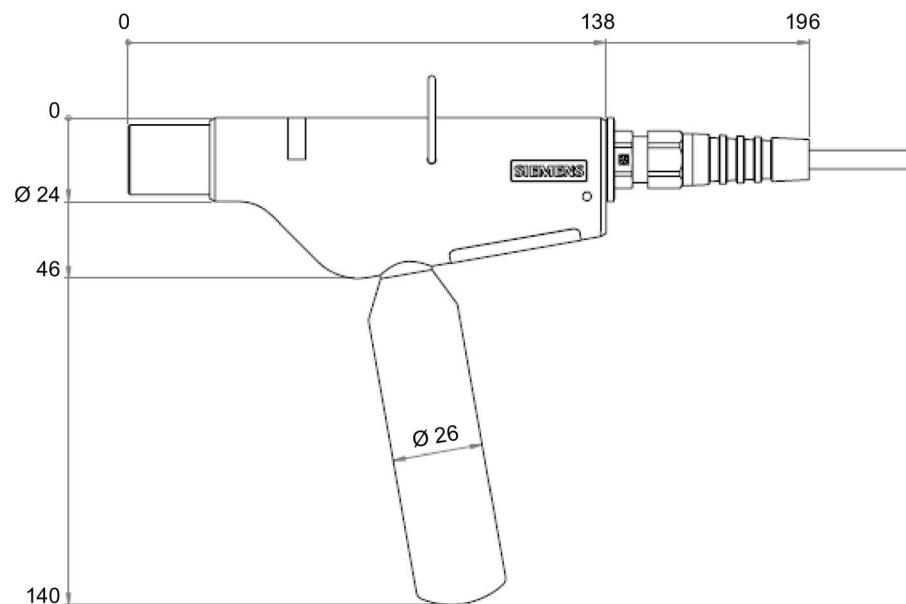



Figure 5-5 Dimension drawing RF210M

All dimensions in mm, tolerances  $\pm 1$  mm

## 5.3 SIMATIC RF220R

### 5.3.1 Features

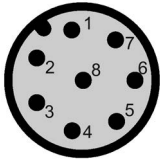
SIMATIC RF220R	<b>Characteristics</b>	
	Design	<ul style="list-style-type: none"> <li>① RS422 interface</li> <li>② Status display</li> </ul>
	Application	Identification tasks on assembly lines in harsh industrial environments

### 5.3.2 RF220R ordering data

	Article number
RF220R with RS-422 interface (3964R)	6GT2821-2AC10








### 5.3.3 RF220R pin assignment with RS422 interface

Pin	Pin Device end 8- pin M12	Assignment
	1	+ 24 V
	2	- Transmit
	3	0 V
	4	+ Transmit
	5	+ Receive
	6	- Receive
	7	Unassigned
	8	Ground (shield)

### 5.3.4 LED operating display

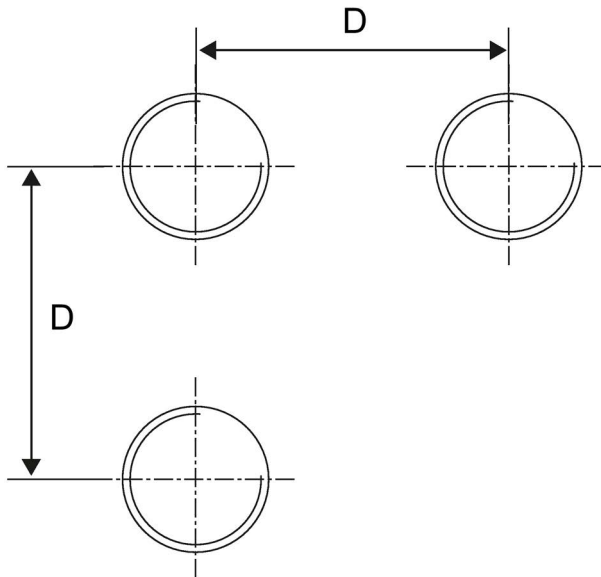
The operational statuses of the reader are displayed by the LEDs. The LED can adopt the colors green, red or yellow and the statuses off , on , flashing :

Table 5- 5 LED operating display on the reader

LED	Meaning
	The reader is turned off.
	Operating voltage present, reader not initialized or antenna switched off
	Operating voltage present, reader initialized and antenna switched on
	<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 "Error codes of the RF200 readers (Page 329)". The optical error display is only reset if the corresponding reset parameter ("option_1 = 2") is set (see product information "SIMATIC RF200 Command Set ( <a href="https://support.industry.siemens.com/cs/ww/en/view/44864850">https://support.industry.siemens.com/cs/ww/en/view/44864850</a> )").

### 5.3.5 Minimum distance between RF220R readers

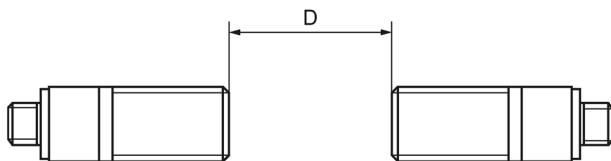
#### RF220R side by side



$D \geq 100 \text{ mm}$

Figure 5-6 Minimum distance between RF220R readers

#### RF220R face to face



$D \geq 150 \text{ mm}$

Figure 5-7 Face-to-face distance between two RF220Rs

### 5.3.6 Technical specifications of the RF220R reader

Table 5- 6 Technical specifications of the RF220R reader

<b>6GT2821-2AC10</b>	
Product type designation	SIMATIC RF220R
<b>Radio frequencies</b>	
Operating frequency, rated value	13.56 MHz
<b>Electrical data</b>	
Maximum range	35 mm
Maximum data transmission speed reader ↔ transponder	ISO tags
• Read	• approx. 1500 bytes/s
• Write	• approx. 1500 bytes/s
Typical transmission time for user data per byte	
• for write access	• 0.6 ms
• for read access	• 0.6 ms
Transmission speed	19.2, 57.6, 115.2 kBd
Read/write distances of the reader	see section "Field data (Page 39)"
MTBF (Mean Time Between Failures)	501 years
<b>Interfaces</b>	
Electrical connector design	M12, 8-pin
Standard for interfaces for communication	RS-422
Antenna	integrated
<b>Mechanical specifications</b>	
Housing	
• Material	• Brass, nickel-plated
• Color	• Silver
Recommended distance to metal	0 mm
<b>Supply voltage, current consumption, power loss</b>	
Supply voltage	24 VDC
Typical current consumption	50 mA
<b>Permitted ambient conditions</b>	
Ambient temperature	
• During operation	• -20 ... +70 °C

<b>6GT2821-2AC10</b>	
• During transportation and storage	• -25 ... +85 °C
Degree of protection to EN 60529	IP67
Shock-resistant to EN 60721-3-7, Class 7 M3	500 m/s <sup>2</sup>
Vibration-resistant to EN 60721-3-7, Class 7 M3	200 m/s <sup>2</sup>
Torsion and bending load	Not permitted
<b>Design, dimensions and weight</b>	
Dimensions (Ø x thread x L)	M30 x 1.5 x 83 mm
Weight	140 g
Type of mounting	2x nuts M30 x 1.5
Cable length for RS-422 interface, maximum	1000 m
LED display design	3-color LED (operating voltage, presence, error)

### 5.3.7 Approvals

#### FCC information

##### Siemens SIMATIC RF220R (MLFB 6GT2821-2AC10) FCC ID NXW-RF220R

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.

### 5.3.8 Dimension drawing

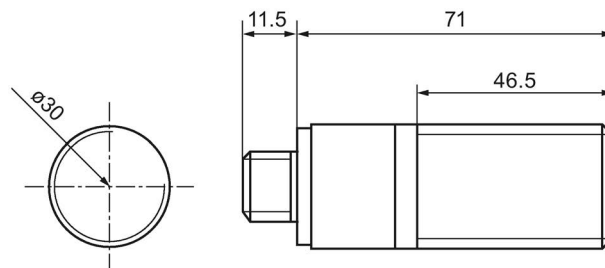



Figure 5-8 RF220R dimension drawing

Dimensions in mm

## 5.4 SIMATIC RF240R

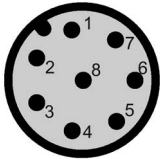
### 5.4.1 Features

SIMATIC RF240R	Characteristics	
	Structure	① RS-422 or RS-232 interface ② Operating indicator
	Field of application	Identification tasks on assembly lines in harsh industrial environments

### 5.4.2 RF240R ordering data

	Article number
RF240R with RS-422 interface (3964R)	6GT2821-4AC10
RF240R with RS-232 interface (3964R)	6GT2821-4AC11
RF240R with RS-232 interface (ASCII)	6GT2821-4AC40






### 5.4.3 Pin assignment RF240R

Pin	Pin Device end 8- pin M12	Interface assignment	
		RS-422	RS-232
	1	+24 V	+24 V
	2	- Transmit	RXD
	3	0 V	0 V
	4	+ Transmit	TXD
	5	+ Receive	Unassigned
	6	- Receive	Unassigned
	7	Unassigned	Unassigned
	8	Ground (shield)	Ground (shield)

### 5.4.4 LED operating display

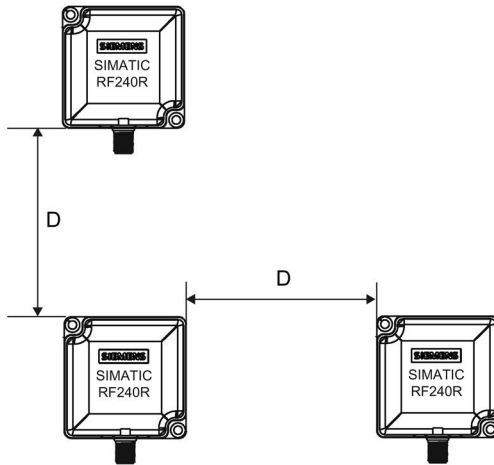
The operational statuses of the reader are displayed by the LEDs. The LED can adopt the colors green, red or yellow and the statuses off , on , flashing :

Table 5- 7 LED operating display on the reader

LED	Meaning
	The reader is turned off.
	Operating voltage present, reader not initialized or antenna switched off
	Operating voltage present, reader initialized and antenna switched on
	<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 "Error codes of the RF200 readers (Page 329)". The optical error display is only reset if the corresponding reset parameter ("option_1 = 2") is set (see product information "SIMATIC RF200 Command Set ( <a href="https://support.industry.siemens.com/cs/ww/en/view/44864850">https://support.industry.siemens.com/cs/ww/en/view/44864850</a> )").

### 5.4.5 Minimum distance between several RF240R readers

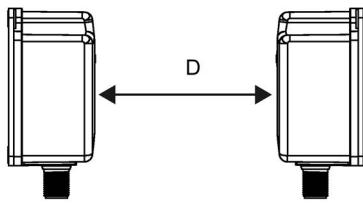
#### RF240R readers side by side



- D ≥ 120 mm (with 2 readers)
- D ≥ 200 mm (with more than 2 readers)

Figure 5-9 Minimum distance between several RF240R readers

#### RF240R face-to-face



- D ≥ 400 mm

Figure 5-10 Face-of-face distance between two RF240R readers



## 5.4.6 Technical specifications of the RF240R reader

Table 5- 8 Technical specifications of the RF240R reader

	6GT2821-4AC10 6GT2821-4AC11 6GT2821-4AC40
Product type designation	SIMATIC RF240R
<b>Radio frequencies</b>	
Operating frequency, rated value	13.56 MHz
<b>Electrical data</b>	
Maximum range	65 mm
Maximum data transmission speed reader ↔ transponder	ISO tags
• Read	• approx. 1500 bytes/s
• Write	• approx. 1500 bytes/s
Typical transmission time for user data per byte	
• for write access	• 0.6 ms
• for read access	• 0.6 ms
Transmission speed	19.2, 57.6, 115.2 kBd
Read/write distances of the reader	see section "Field data (Page 39)"
MTBF (Mean Time Between Failures)	430 years
<b>Interfaces</b>	
Electrical connector design	M12, 8-pin
Standard for interfaces for communication	
• 6GT2821-4AC10	• RS-422 (3964R protocol)
• 6GT2821-4AC11	• RS-232 (3964R protocol)
• 6GT2821-4AC40	• RS-232 (ASCII protocol)
Antenna	integrated
<b>Mechanical specifications</b>	
Housing	
• Material	• Plastic PA 6.6
• Color	• Anthracite
Recommended distance to metal	0 mm

	6GT2821-4AC10
	6GT2821-4AC11
	6GT2821-4AC40

**Supply voltage, current consumption, power loss**

Supply voltage	24 VDC
Typical current consumption	25 mA

**Permitted ambient conditions**

Ambient temperature	
• During operation	• -20 ... +70 °C
• During transportation and storage	• -25 ... +85 °C
Degree of protection to EN 60529	IP67
Shock-resistant to EN 60721-3-7, Class 7 M3	500 m/s <sup>2</sup>
Vibration-resistant to EN 60721-3-7, Class 7 M3	200 m/s <sup>2</sup>
Torsion and bending load	Not permitted

**Design, dimensions and weight**

Dimensions (L x W x H)	50 × 50 × 30 mm
Weight	60 g
Type of mounting	2 x M5 screw 1.5 Nm
Cable length, maximum	• RS-422: max. 1000 m • RS-232: max. 30 m
LED display design	3-color LED (operating voltage, presence, error)

## 5.4.7 Approvals

### FCC information

**Siemens SIMATIC RF240R (MLFB 6GT2821-4AC10) FCC ID NXW-RF240R**

**Siemens SIMATIC RF240R (MLFB 6GT2821-4AC11) FCC ID NXW-RF240R**

**Siemens SIMATIC RF240R (MLFB 6GT2821-4AC40) FCC ID NXW-RF240R**

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.

5.4.8 Dimension drawing

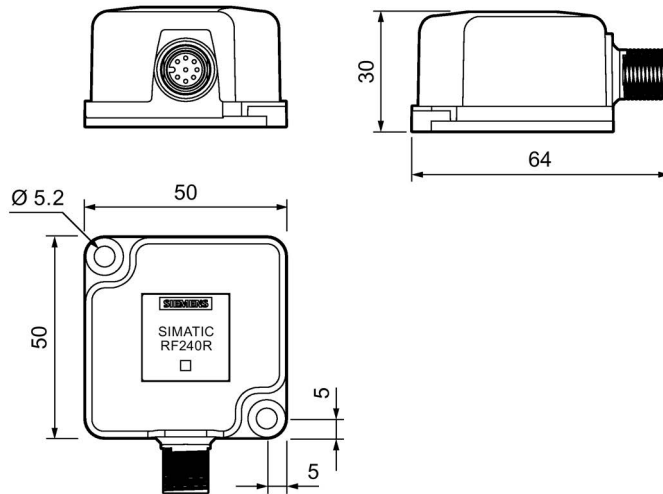


Figure 5-11 Dimension drawing RF240R

Dimensions in mm

5.5 SIMATIC RF250R

5.5.1 Features

SIMATIC RF250R	Characteristics	
<p>The photograph shows the SIMATIC RF250R device with three callouts: 1 points to the RS-422 or RS-232 interface connector at the bottom; 2 points to the operating indicator on the front panel; 3 points to the antenna connector at the top.</p>	Structure	<ul style="list-style-type: none"> <li>① RS-422 or RS-232 interface</li> <li>② Operating indicator</li> <li>③ Antenna connector, M8</li> </ul>
	Area of application	Identification tasks on assembly lines in harsh industrial environments

**Note**

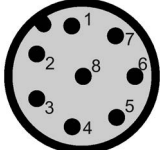
**Reader requires external antennas**

Note that the RF250R reader is designed only for operation with external antennas and can only be operated in conjunction with the antennas ANT 3, ANT 8, ANT 12, ANT 18 or ANT 30.

### 5.5.2 Ordering data RF250R

	Article number
RF250R with RS-422 interface (3964R)	6GT2821-5AC10
RF250R with RS-232 interface (ASCII)	6GT2821-5AC40

### 5.5.3 Pin assignment RF250R

Pin	Pin Device end 8- pin M12	Interface assignment	
		RS-422	RS-232
	1	+24 V	+24 V
	2	- Transmit	RXD
	3	0 V	0 V
	4	+ Transmit	TXD
	5	+ Receive	Unassigned
	6	- Receive	Unassigned
	7	Unassigned	Unassigned
	8	Ground (shield)	Ground (shield)

### 5.5.4 LED operating display









The operational statuses of the reader are displayed by the LEDs. The LED can adopt the colors green, red or yellow and the statuses off , on , flashing :

Table 5- 9 LED operating display on the reader

LED	Meaning
	The reader is turned off.
	Operating voltage present, reader not initialized or antenna switched off
	Operating voltage present, reader initialized and antenna switched on

LED	Meaning
	<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>
	<p>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 "Error codes of the RF200 readers (Page 329)". The optical error display is only reset if the corresponding reset parameter ("option_1 = 2") is set (see product information "SIMATIC RF200 Command Set (<a href="https://support.industry.siemens.com/cs/ww/en/view/44864850">https://support.industry.siemens.com/cs/ww/en/view/44864850</a>)").</p>

### 5.5.5 Technical specifications of the RF250R reader

Table 5- 10 Technical specifications of the RF250R reader

	6GT2821-5AC10
	6GT2821-5AC40
Product type designation	SIMATIC RF250R
<b>Radio frequencies</b>	
Operating frequency, rated value	13.56 MHz
<b>Electrical data</b>	
Maximum range	35 mm
Maximum data transmission speed reader ↔ transponder	ISO tags
<ul style="list-style-type: none"> <li>Read</li> </ul>	<ul style="list-style-type: none"> <li>approx. 1500 bytes/s</li> </ul>
<ul style="list-style-type: none"> <li>Write</li> </ul>	<ul style="list-style-type: none"> <li>approx. 1500 bytes/s</li> </ul>
Typical transmission time for user data per byte	
<ul style="list-style-type: none"> <li>for write access</li> </ul>	<ul style="list-style-type: none"> <li>0.6 or 1.2 ms</li> </ul>
<ul style="list-style-type: none"> <li>for read access</li> </ul>	<ul style="list-style-type: none"> <li>0.6 or 1.2 ms</li> </ul>
Transmission speed	19.2, 57.6, 115.2 kBd
Read/write distances of the reader	see section "Field data (Page 39)"
MTBF (Mean Time Between Failures)	430 years
<b>Interfaces</b>	
Electrical connector design	M8, 4-pin
Standard for interfaces for communication	
<ul style="list-style-type: none"> <li>RS-422</li> </ul>	<ul style="list-style-type: none"> <li>3964R protocol</li> </ul>
<ul style="list-style-type: none"> <li>RS-232</li> </ul>	<ul style="list-style-type: none"> <li>ASCII protocol</li> </ul>

<b>6GT2821-5AC10</b>	
<b>6GT2821-5AC40</b>	
Antenna	external, ANT 8, ANT 12, ANT 18, ANT 30 can be connected
<b>Mechanical specifications</b>	
Housing	
• Material	• Plastic PA 6.6
• Color	• Anthracite
Recommended distance to metal	0 mm
<b>Supply voltage, current consumption, power loss</b>	
Supply voltage	24 VDC
Typical current consumption	50 mA
<b>Permitted ambient conditions</b>	
Ambient temperature	
• During operation	• -20 ... +70 °C
• During transportation and storage	• -25 ... +85 °C
Degree of protection to EN 60529	IP65
Shock-resistant to EN 60721-3-7, Class 7 M3	500 m/s <sup>2</sup>
Vibration-resistant to EN 60721-3-7, Class 7 M3	200 m/s <sup>2</sup>
Torsion and bending load	Not permitted
<b>Design, dimensions and weight</b>	
Dimensions (L x W x H)	50 x 50 x 30 mm
Weight	60 g
Type of mounting	2 x M5 screw 1.5 Nm
Cable length, maximum	• RS-422: max. 1000 m • RS-232: max. 30 m
LED display design	3-color LED

## 5.5.6 Approvals

### FCC information

Siemens SIMATIC RF250R (MLFB 6GT2821-5AC10) FCC ID NXW-RF250R

Siemens SIMATIC RF250R (MLFB 6GT2821-5AC40) FCC ID NXW-RF250R

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.

If the antenna is detachable, require the following two conditions:

- (1) To reduce potential radio interference to other users, the antenna type should be chosen that the radiated power is not more than that permitted for successful communication.
- (2) This device has been designed to operate with the antennas listed below. Antennas not included in this list are strictly prohibited for use with this device. The required antenna impedance is 50  $\Omega$ .

Si l'antenne est amovible, demandez les deux conditions suivantes :

- (1) Afin de réduire le risque d'interférence aux autres utilisateurs, il faut choisir le type d'antenne et son gain de façon à ce que la puissance rayonnée ne soit pas supérieure au niveau requis pour l'obtention d'une communication satisfaisante.



(2) Ce dispositif a été conçu pour fonctionner avec les antennes énumérées ci-dessous. Les antennes non incluses dans cette liste sont strictement interdites pour l'exploitation de ce dispositif. L'impédance d'antenne requise est 50  $\Omega$ .

### 5.5.7 Dimension drawing

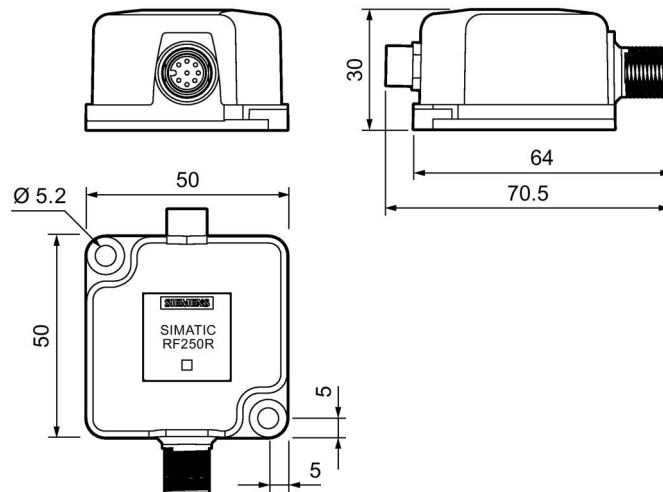



Figure 5-12 Dimension drawing RF250R

Dimensions in mm

## 5.6 SIMATIC RF260R

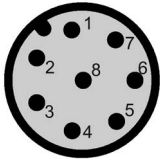
### 5.6.1 Features

SIMATIC RF260R	Characteristics	
	Structure	① RS-422 or RS-232 interface ② Operating indicator
	Field of application	Identification tasks on assembly lines in harsh industrial environments

### 5.6.2 Ordering data for RF260R

	Article number
RF260R with RS-422 interface (3964R)	6GT2821-6AC10
RF260R with RS-232 interface (3964R)	6GT2821-6AC11
RF260R with RS-232 interface (ASCII)	6GT2821-6AC40






### 5.6.3 Pin assignment RF260R

Pin	Pin Device end 8- pin M12	Interface assignment	
		RS-422	RS-232
	1	+24 V	+24 V
	2	- Transmit	RXD
	3	0 V	0 V
	4	+ Transmit	TXD
	5	+ Receive	Unassigned
	6	- Receive	Unassigned
	7	Unassigned	Unassigned
	8	Ground (shield)	Ground (shield)

### 5.6.4 LED operating display

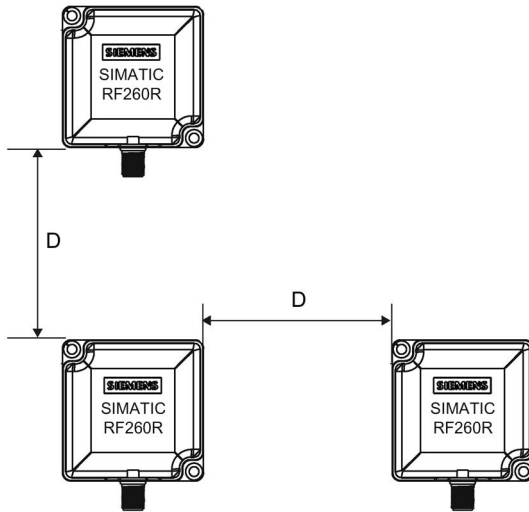
The operational statuses of the reader are displayed by the LEDs. The LED can adopt the colors green, red or yellow and the statuses off , on , flashing :

Table 5- 11 LED operating display on the reader

LED	Meaning
	The reader is turned off.
	Operating voltage present, reader not initialized or antenna switched off
	Operating voltage present, reader initialized and antenna switched on
	<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 "Error codes of the RF200 readers (Page 329)". The optical error display is only reset if the corresponding reset parameter ("option_1 = 2") is set (see product information "SIMATIC RF200 Command Set ( <a href="https://support.industry.siemens.com/cs/ww/en/view/44864850">https://support.industry.siemens.com/cs/ww/en/view/44864850</a> )").

### 5.6.5 Minimum distance between several RF260R

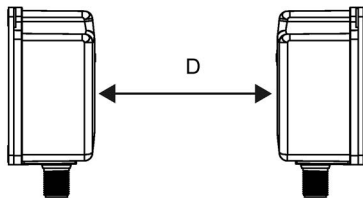
#### RF260R side by side



- D ≥ 150 mm (with 2 readers)
- D ≥ 250 mm (with more than 2 readers)

Figure 5-13 Minimum distance between several RF260R

#### RF260R face to face



- D ≥ 500 mm

Figure 5-14 Face-to-face distance between two RF260R

## 5.6.6 Technical data of the RF260R reader

Table 5- 12 Technical specifications of the RF260R reader

	6GT2821-6AC10 6GT2821-6AC11 6GT2821-6AC40
Product type designation	SIMATIC RF260R
<b>Radio frequencies</b>	
Operating frequency, rated value	13.56 MHz
<b>Electrical data</b>	
Maximum range	135 mm
Maximum data transmission speed reader ↔ transponder	ISO tags
• Read	• approx. 1500 bytes/s
• Write	• approx. 1500 bytes/s
Typical transmission time for user data per byte	
• for write access	• 0.6 ms
• for read access	• 0.6 ms
Transmission speed	19.2, 57.6, 115.2 kBd
Read/write distances of the reader	see section "Field data (Page 39)"
MTBF (Mean Time Between Failures)	480 years
<b>Interfaces</b>	
Electrical connector design	M12, 8-pin
Standard for interfaces for communication	
• 6GT2821-6AC10	• RS-422 (3964R protocol)
• 6GT2821-6AC11	• RS-232 (3964R protocol)
• 6GT2821-6AC40	• RS-232 (ASCII protocol)
Antenna	integrated
<b>Mechanical specifications</b>	
Housing	
• Material	• Plastic PA 6.6
• Color	• Anthracite
Recommended distance to metal	0 mm
<b>Supply voltage, current consumption, power loss</b>	

	6GT2821-6AC10
	6GT2821-6AC11
	6GT2821-6AC40
Supply voltage	24 VDC
Typical current consumption	50 mA
<b>Permitted ambient conditions</b>	
Ambient temperature	
• During operation	• -20 ... +70 °C
• During transportation and storage	• -25 ... +80 °C
Degree of protection to EN 60529	IP67
Shock-resistant to EN 60721-3-7, Class 7 M3	500 m/s <sup>2</sup>
Vibration-resistant to EN 60721-3-7, Class 7 M3	200 m/s <sup>2</sup>
Torsion and bending load	Not permitted
<b>Design, dimensions and weight</b>	
Dimensions (L x W x H)	75 × 75 × 41 mm
Weight	200 g
Type of mounting	2 x M5 screw 1.5 Nm
Cable length, maximum	• RS-422: max. 1000 m • RS-232: max. 30 m
LED display design	3-color LED (operating voltage, presence, error)

## 5.6.7 Approvals

### FCC information

Siemens SIMATIC RF260R (MLFB 6GT2821-6AC10) FCC ID NXW-RF260R

Siemens SIMATIC RF260R (MLFB 6GT2821-6AC11) FCC ID NXW-RF260R

Siemens SIMATIC RF260R (MLFB 6GT2821-6AC40) FCC ID NXW-RF260R

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.

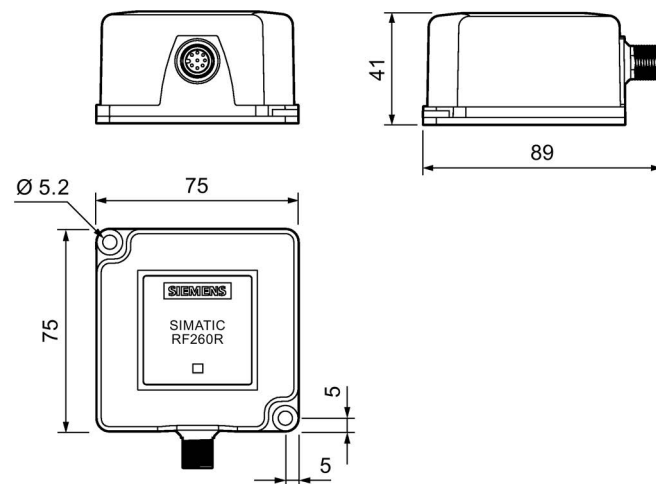

**5.6.8 Dimension drawing**

Figure 5-15 Dimension drawing RF260R

Dimensions in mm

## 5.7 SIMATIC RF280R

### 5.7.1 Features

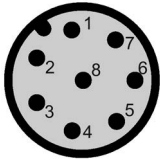
<p><b>SIMATIC RF280R</b></p> 	<p><b>Characteristics</b></p>	
	<p>Structure</p>	<p>① RS-422 or RS-232 interface ② Operating indicator</p>
	<p>Field of application</p>	<p>Identification tasks on assembly lines in harsh industrial environments</p>

### 5.7.2 Ordering data RF280R

	Article number
RF280R with RS422 interface (3964R)	6GT2821-8AC10
RF280R with RS232 interface (ASCII)	6GT2821-8AC40








### 5.7.3 Pin assignment RF280R

Pin	Pin Device end 8- pin M12	Interface assignment	
		RS-422	RS-232
	1	+24 V	+24 V
	2	- Transmit	RXD
	3	0 V	0 V
	4	+ Transmit	TXD
	5	+ Receive	Unassigned
	6	- Receive	Unassigned
	7	Unassigned	Unassigned
	8	Ground (shield)	Ground (shield)

### 5.7.4 LED operating display

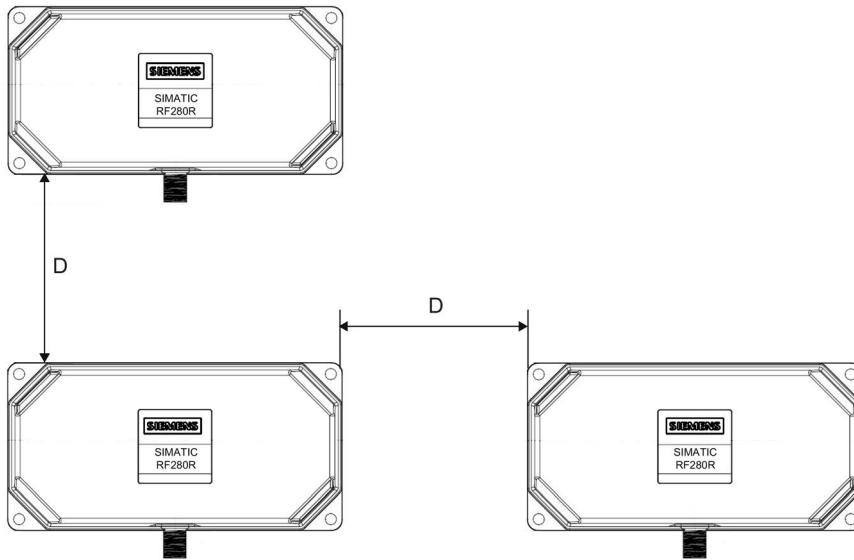
The operational statuses of the reader are displayed by the LEDs. The LED can adopt the colors green, red or yellow and the statuses off , on , flashing :

Table 5- 13 LED operating display on the reader

LED	Meaning
	The reader is turned off.
	Operating voltage present, reader not initialized or antenna switched off
	Operating voltage present, reader initialized and antenna switched on
	<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 "Error codes of the RF200 readers (Page 329)". The optical error display is only reset if the corresponding reset parameter ("option_1 = 2") is set (see product information "SIMATIC RF200 Command Set ( <a href="https://support.industry.siemens.com/cs/ww/en/view/44864850">https://support.industry.siemens.com/cs/ww/en/view/44864850</a> )").

### 5.7.5 Minimum distance between RF280R readers

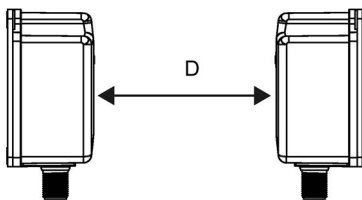
#### RF280R side-by-side



- D ≥ 150 mm (with 2 readers)
- D ≥ 250 mm (with more than 2 readers)

Figure 5-16 Minimum distance between RF280R readers

#### RF280R Face-to-Face



- D ≥ 800 mm

Figure 5-17 Face-to-face distance between two RF280R

## 5.7.6 Technical specifications of the RF280R reader

Table 5- 14 Technical specifications of the RF280R reader

	6GT2821-8AC10 6GT2821-8AC40
Product type designation	SIMATIC RF280R
<b>Radio frequencies</b>	
Operating frequency, rated value	13.56 MHz
<b>Electrical data</b>	
Maximum range	200 mm
Maximum data transmission speed reader ↔ transponder	ISO transponder
• Read	• approx. 1500 bytes/s
• Write	• approx. 1500 bytes/s
Typical transmission time for user data per byte	
• for write access	• 0.6 ms
• for read access	• 0.6 ms
Transmission speed	19.2, 57.6, 115.2 kBd
Read/write distances of the reader	see section "Field data (Page 39)"
MTBF (Mean Time Between Failures)	172.6 years
<b>Interfaces</b>	
Electrical connector design	M12, 8-pin
Standard for interfaces for communication	
• 6GT2821-6AC10	• RS-422 (3964R protocol)
• 6GT2821-6AC40	• RS-232 (ASCII protocol)
Antenna	integrated
<b>Mechanical specifications</b>	
Housing	
• 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	130 mA

	<b>6GT2821-8AC10</b>
	<b>6GT2821-8AC40</b>
<b>Permitted ambient conditions</b>	
Ambient temperature	
• During operation	• -25 ... +70 °C
• During transportation and storage	• -40 ... +85 °C
Degree of protection to EN 60529	IP67
Shock-resistant to EN 60721-3-7, Class 7 M3	500 m/s <sup>2</sup>
Vibration-resistant to EN 60721-3-7, Class 7 M3	200 m/s <sup>2</sup>
Torsion and bending load	Not permitted
<b>Design, dimensions and weight</b>	
Dimensions (L x W x H)	160 x 80 x 41 mm
Weight	470 g
Type of mounting	4x screws M5 ≤ 1.5 Nm
Cable length, maximum	• RS-422: max. 1000 m • RS-232: max. 30 m
LED display design	3-color LED (operating voltage, presence, error)
<b>Standards, specifications, approvals</b>	
Proof of suitability	Radio according to R&TTE directives EN 300330, EN 301489, CE, FCC, UL/CSA

### 5.7.7 Approvals

#### FCC information

**Siemens SIMATIC RF280R (MLFB 6GT2821-8AC10) FCC ID NXW-RF280R**

**Siemens SIMATIC RF280R (MLFB 6GT2821-8AC40) FCC ID NXW-RF280R**

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.

### 5.7.8 Dimension drawing

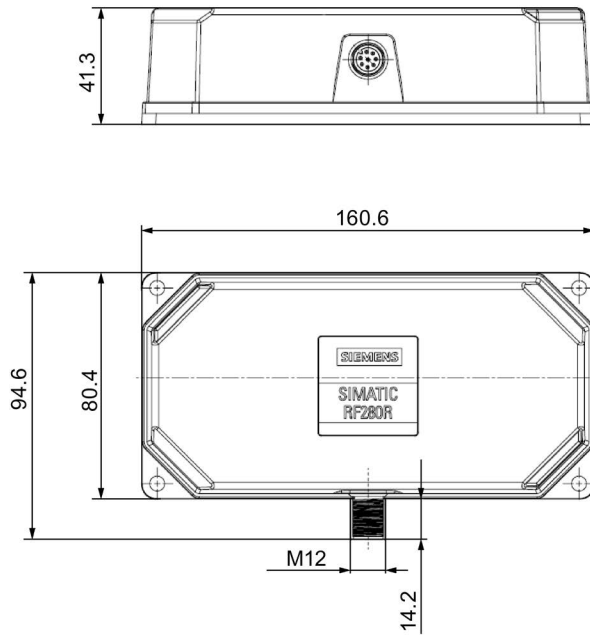



Figure 5-18 Dimensional drawing of RF280R

Dimensions in mm

## 5.8 SIMATIC RF290R

### 5.8.1 Features

SIMATIC RF290R	Characteristics	
	Design	<ul style="list-style-type: none"> <li>① RS-422/RS-232 interface, 24 V power supply</li> <li>② Digital I/O</li> <li>③ External antenna</li> <li>④ Operating display, 4 LEDs: <ul style="list-style-type: none"> <li>• Power (PWR)</li> <li>• Active (ACT)</li> <li>• Present (PRE)</li> <li>• Error (ERR)</li> </ul> </li> </ul>
	Application	<p>Identification tasks in production control and in intra-logistics, e.g. skid identification, container management, HF gates (F&amp;B)</p> <p>When connected via a PC multitag operation is possible.</p>

#### Note

##### Reader requires external antennas

Note that the RF290R reader is designed only for operation with external antennas and can only be operated in conjunction with the antennas ANT D5, D6 or D10.

#### Note

##### Note on operating the reader with ANT D6 / D10

When operating with a power  $\geq 3$  W, the limits are adhered to according to 2004/40/EC (minimum requirements concerning the protection of workers). Note that the antennas may only be used in an "industrial environment" and not in buildings used by the public.

### 5.8.2 Ordering data RF290R

Table 5- 15 Ordering data RF290R

	Article number
RF290R with RS-232 interface for PC mode and RS-422 interface for CM mode	6GT2821-0AC12

Table 5- 16 Ordering data - accessories - RF290R

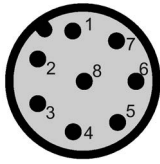
		Article number
24 V connecting cable	5 m	6GT2491-1HH50
RS-232 connecting cable, with 4-pin M12 connector for 24 V for connection to the wide-range power supply unit	5 m	6GT2891-4KH50
RS-232 connecting cable with open cable ends for 24 V	5 m	6GT2891-4KH50-0AX0
Adapter for mounting on a DIN rail (pack of 3)		6GK5798-8ML00-0AB3
Wide-range power supply unit for SIMATIC RF-systems (100 - 240 VAC / 24 VDC / 3 A) with 2 m connecting cable with country-specific plug		EU: 6GT2898-0AA00 UK: 6GT2898-0AA10 US: 6GT2898-0AA20
<b>Connecting cables</b>		
Reader ↔ ASM 475	2 m	6GT2891-4EH20
	5 m	6GT2891-4EH50
<b>Connecting / extension cable</b>		
Reader ↔ CM/ASM for RF200 / RF300 / RF600 / MV400 or extension cable MOBY U/D	2 m	6GT2891-4FH20
	5 m	6GT2891-4FH50
	10 m	6GT2891-4FN10
	20 m	6GT2891-4FN20
	50 m	6GT2891-4FN50
<b>Antennas</b>		
Antenna ANT D5		6GT2698-5AA10
Antenna ANT D6		6GT2698-5AB00
Covering hood for ANT D6		6GT2690-0AD00
Antenna ANT D10		6GT2698-5AF00
<b>Accessories for connecting multiple antennas to SIMATIC RF290R</b>		
Antenna multiplexer incl. one antenna connecting cable 0.4 m		6GT2894-0EA00
Antenna splitter incl. one antenna connecting cable 3.3 m		6GT2690-0AC00
<b>Antenna cables</b>		
Antenna cable	3.3 m	6GT2691-0CH33
	10.5 m	6GT2691-0CN10
Antenna cable extension	7.2 m	6GT2691-0DH72



### 5.8.3 Pin assignment RF290R

#### RS422/RS232

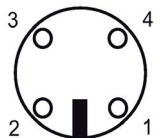
Table 5- 17 Pin assignment of the RS-422/RS 232 interface

Pin	Pin Device end 8- pin M12	Interface assignment	
		RS-422	RS-232
	1	+24 V	+24 V
	2	- Transmit	RXD
	3	0 V	0 V
	4	+ Transmit	TXD
	5	+ Receive	not used
	6	- Receive	not used
	7	not used	not used
	8	Ground (shield)	Ground (shield)

#### Digital I/O

only possible in PC mode (RS-232)

Table 5- 18 Pin assignment of the digital I/O interface

Pin	Pin Device end 4- pin M12	Socket assignment
	1	DO - relay contact COM (Common)
	2	DO - relay contact NO (Normally Open, NO contact)
	3	DI - switched input, +24 V
	4	DI - ground, 0 V

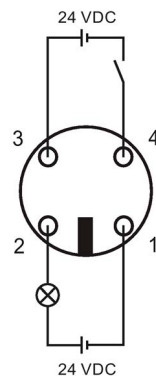


Figure 5-19 Pin assignment of the power supply connector

**Digital input (DI):**

The opto-coupler input is electrically isolated from the reader electronics. The external 24 V must be connected to the DI according to the circuit diagram. Make sure that the polarity of the 24 V is correct. The current is limited to < 10 mA by the integrated resistor.

<b>NOTICE</b>
<b>Reader may be damaged</b> If you exceed the maximum permitted supply voltage, the reader may be damaged. Make sure that the input voltage does not exceed the maximum permitted supply voltage of the reader.

**Digital output (DO):**

At the relay output, a NO contact is available. The output is electrically isolated from the reader electronics and therefore needs to be supplied externally.

<b>NOTICE</b>
<b>Reader may be damaged</b> If you exceed the maximum permitted voltage of 24 V / 1 A at the relay output, the reader may be damaged. Make sure that the voltage does not exceed 24 V.  The output is intended only for switching resistive loads. If it is used to switch inductive loads, the reader may be damaged. Make sure that if inductive loads occur, the relay contacts are protected by an external suppressor circuit.

## 5.8.4 LED operating display











The operational statuses of the reader are displayed by the LEDs. The LED can adopt the colors green, red or yellow and the statuses off , on , flashing :

Table 5- 19 LED operating display on the reader

Labeling	LED	Meaning
-		The reader is turned off.
PWR		CM mode: Operating voltage present, reader not initialized or antenna switched off
		CM mode: Operating voltage present, reader initialized and antenna switched on  PC mode: Supply voltage is on
ACT		Communication on the data line
PRE		<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>
ERR		CM mode: 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 "Error codes of the RF200 readers (Page 329)". The optical error display is only reset if the corresponding reset parameter ("option_1 = 2") is set (see Product Information " Product information "SIMATIC RF200 command set" ( <a href="https://support.industry.siemens.com/cs/ww/en/view/44864850">https://support.industry.siemens.com/cs/ww/en/view/44864850</a> )).
		PC mode: Error when connecting the antenna or the interference level in the antenna environment is too high

## 5.8.5 Installing the RF290R reader

### 5.8.5.1 Wall mounting

Use the holes in the housing to screw the device to the wall or onto a horizontal surface. The position of the drill holes is shown in the following figure:

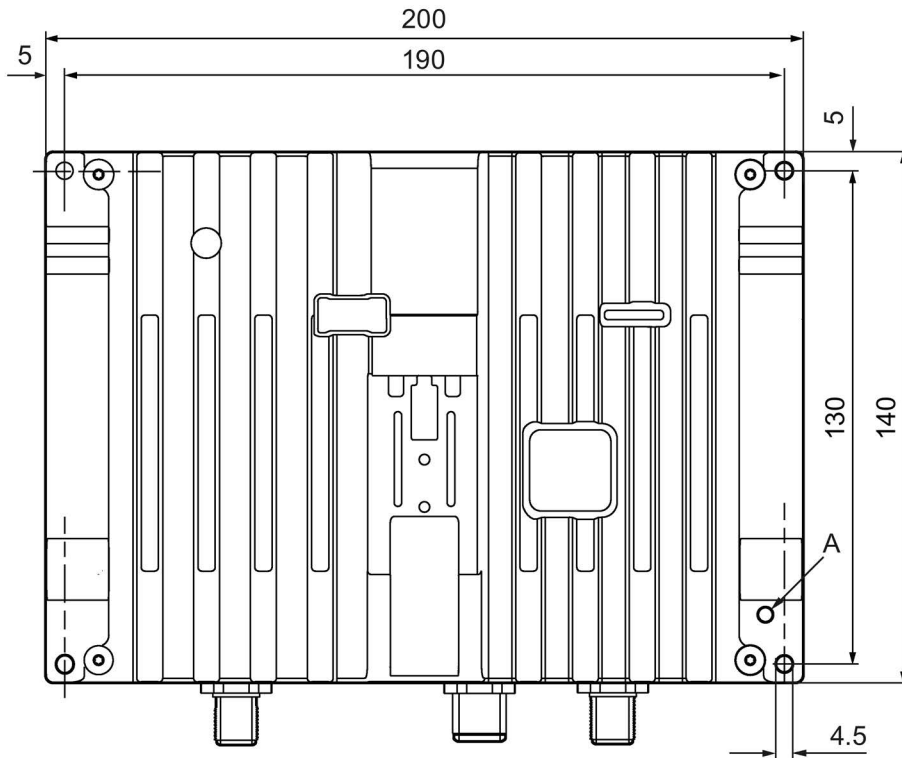


Figure 5-20 Drilling pattern for the RF290R (dimensions in mm)

A: M4 threaded socket for potential connection of the reader. You will find further information on the potential connection in the section "Further information (Page 101)".

### 5.8.5.2 Installing on the S7-300 standard rail

Follow the steps below to mount the RF290R reader on a vertical S7-300 standard rail:

1. Place the device on the upper edge of the S7-300 standard rail (position A).
2. Screw the device to the mounting rail (position B).

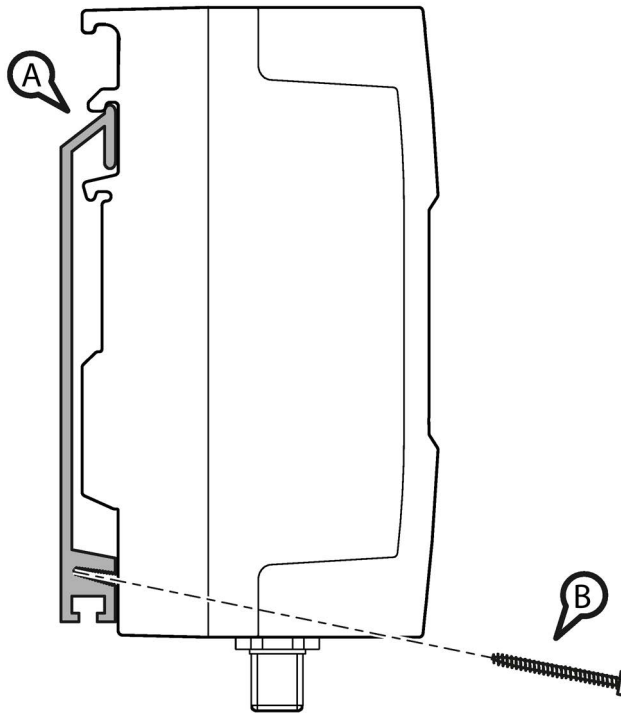


Figure 5-21 Installing the RF290R reader on the S7-300 standard rail

### 5.8.5.3 Installation on a DIN rail

The RF290R reader is suitable for installation on 35 mm rails that comply with DIN EN 50022.

---

#### Note

**The adapter for mounting on a DIN rail does not ship with the RF290R**

The adapter for mounting on a DIN rail does not ship with the product. You can obtain a pack of three with the following article number: 6GK5798-8ML00-0AB3.

The mounting fittings consist of the following parts:

- 1 DIN rail slider
  - 1 spring
  - 2 screws
- 

Fit the adapter to the rear of the device as shown in the following figure:

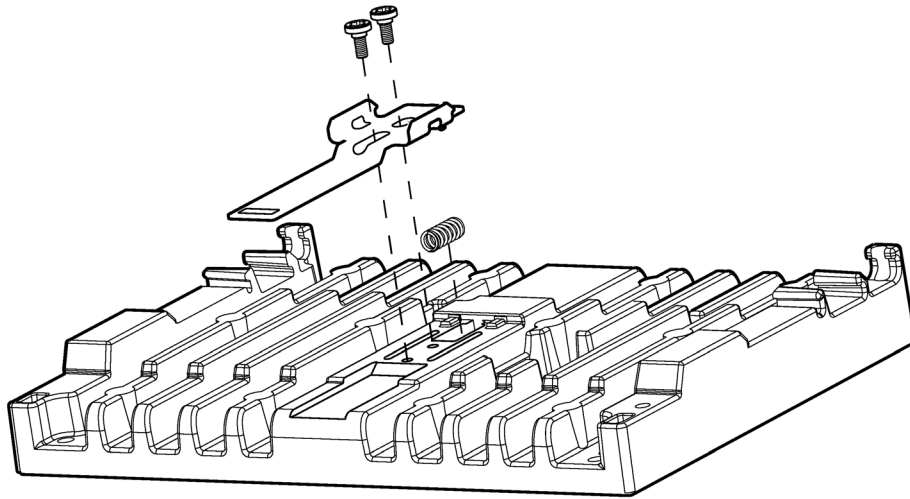


Figure 5-22 Mounting the DIN rail adapter

Follow the steps below to mount the RF290R reader on a DIN rail:

1. Place the device on the upper edge of the DIN rail (position A).
2. Pull the spring-mounted DIN rail slider (position B) down and press the device against the DIN rail until it locks in place.

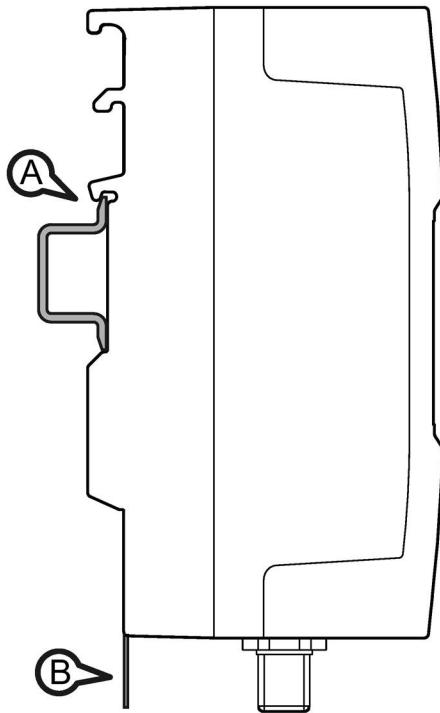


Figure 5-23 Mounting the RF290R reader on a DIN rail

## 5.8.6 Technical specifications of the RF290R reader

Table 5- 20 Technical specifications of the RF290R reader

<b>6GT2821-0AC12</b>	
Product type designation	SIMATIC RF290R
<b>Radio frequencies</b>	
Operating frequency, rated value	13.56 MHz
<b>Electrical data</b>	
Maximum range	65 mm
Maximum data transmission speed reader ↔ transponder	ISO tags
• Read	• approx. 1500 bytes/s
• Write	• approx. 1500 bytes/s
Typical transmission time for user data per byte	
• for write access	• 0.6 ms
• for read access	• 0.6 ms
Multitag capability	When connected via a PC
Transmission speed	19.2, 57.6, 115.2 kBd
Read/write distances of the reader	see section "Field data (Page 39)"
MTBF (Mean Time Between Failures)	18 years
<b>Interfaces</b>	
Electrical connector design	TNC
Standard for interfaces for communication	<ul style="list-style-type: none"> <li>• RS-422</li> <li>• RS-232</li> </ul>
Antenna	external, ANT D5, D6 or D10 can be connected
<b>Mechanical specifications</b>	
Housing	
• Material	• Aluminum die-casting
• Color	• Silver/anthracite
Recommended distance to metal	0 mm
<b>Supply voltage, current consumption, power loss</b>	
Supply voltage	24 VDC (± 10%)
Typical current consumption	400 mA (at 24 V and 5 W)

6GT2821-0AC12

**Permitted ambient conditions**

## Ambient temperature

- |                                     |                  |
|-------------------------------------|------------------|
| • During operation                  | • -20 ... +55 °C |
| • During transportation and storage | • -25 ... +85 °C |

Degree of protection to EN 60529 IP65

Shock-resistant to EN 60721-3-7, Class 7 M3 300 m/s<sup>2</sup>Vibration-resistant to EN 60721-3-7, Class 7 M3 20 m/s<sup>2</sup>

Torsion and bending load Not permitted

**Design, dimensions and weight**

Dimensions (W x H x D) 200 × 80 × 140 mm

Weight 1.8 kg

Type of mounting 2 x M5 screw  
1.5 NmCable length, maximum

- RS-422: max. 1000 m
- RS-232: max. 30 m

LED display design 4 LEDs

**5.8.7 Approvals****FCC information****Siemens SIMATIC RF290R (MLFB 6GT2821-0AC12) FCC ID NXW-RF290R**

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.

If the antenna is detachable, require the following two conditions:

- (1) To reduce potential radio interference to other users, the antenna type should be chosen that the radiated power is not more than that permitted for successful communication.
- (2) This device has been designed to operate with the antennas listed below. Antennas not included in this list are strictly prohibited for use with this device. The required antenna impedance is 50  $\Omega$ .

Si l'antenne est amovible, demandez les deux conditions suivantes :

- (1) Afin de réduire le risque d'interférence aux autres utilisateurs, il faut choisir le type d'antenne et son gain de façon à ce que la puissance rayonnée ne soit pas supérieure au niveau requis pour l'obtention d'une communication satisfaisante.
- (2) Ce dispositif a été conçu pour fonctionner avec les antennes énumérées ci-dessous. Les antennes non incluses dans cette liste sont strictement interdites pour l'exploitation de ce dispositif. L'impédance d'antenne requise est 50  $\Omega$ .

### 5.8.8 Note on the use of the RF290R as a replacement for SLG D10 / SLG D10S

The RF290R reader is the successor to the MOBY D readers SLG D10 / SLG D10S rounding off the RF200 family; it is operated with external antennas. The following features distinguish the RF290R from the SLG models:

Table 5- 21 Differences between the RF290R readers and SLG D10 / SLG D10S

Properties SLG D10/SLG D10S	Properties RF290R
Two devices with different interfaces	RS-232/RS-422 interface and PC/CM functionality in one device
M 12, 4-pin male connector for the power supply 9-pin D-sub male connector for connection to the various communications modules	M12, 8-pin male connector for the power supply and for direct connection to the various communications modules <sup>1)</sup>
no digital I/O	M12, 4-pin female connector for digital I/O (can only be used in PC mode)
no operating display via LEDs	operating display by four LEDs
Maximum transmit power of 10 W	Maximum transmit power of 5 W
One securing option	Different securing options
Standard protocol in ISO host mode (in PC mode)	Advanced protocol in ISO host mode (in PC mode) <sup>2)</sup>
Amplitude Shift Keying (ASK) and Frequency Shift Keying (FSK) modes possible	Amplitude Shift Keying (ASK) mode possible
Support of "ICode1" and "TagIt" and ISO 15693-compatible transponders	Support of ISO 15693-compatible transponders
The total memory for "repeat_command" is limited to 32 kB	The total memory for "repeat_command" is limited to 16 kB

<sup>1)</sup> The RF290R reader connectors are compatible with the SLG D10 if a Y connecting cable is used (6GT2891-4KH50, 6GT2891-4KH50-0AX0).

<sup>2)</sup> In ISO host mode (in PC mode), a program adaptation is necessary

## 5.8.9 Dimension drawing

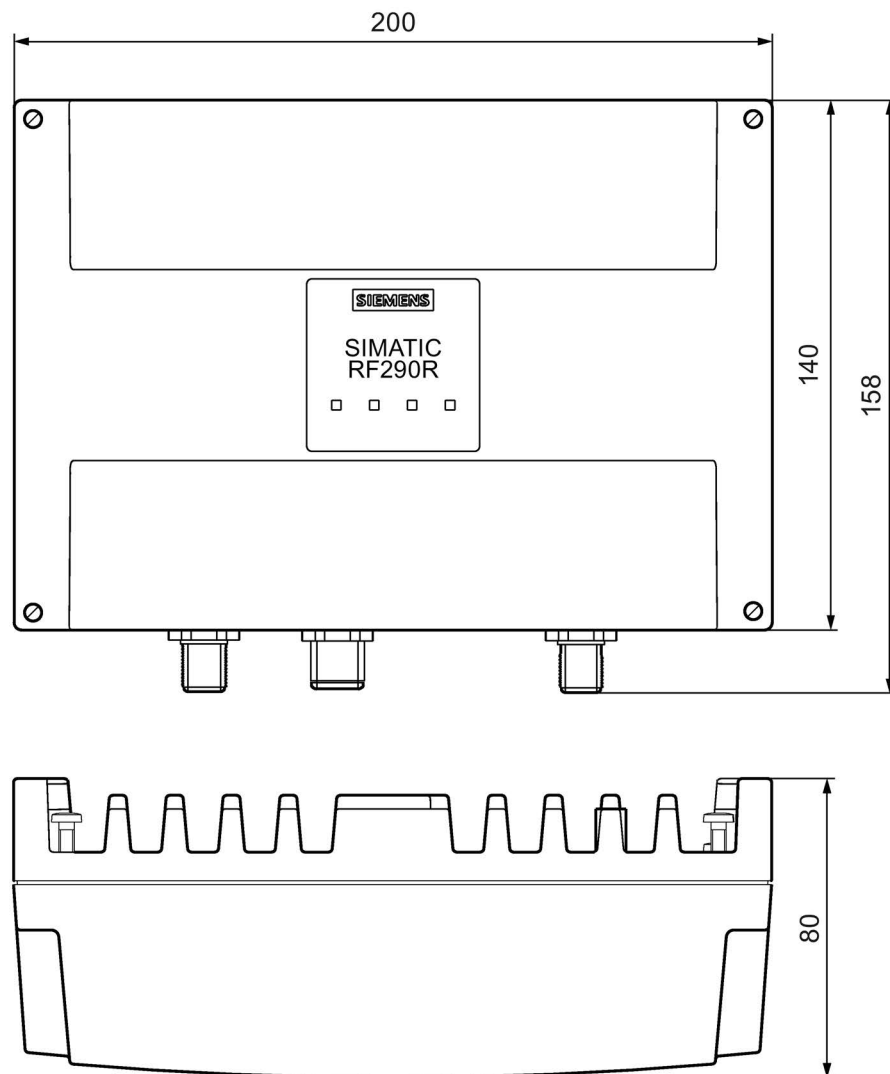


Figure 5-24 Dimensional drawing RF290R (dimensions in mm)



## Antennas

### Note


The RF250R and RF290R readers require external antennas

Note that the RF250R and RF290R readers are designed for operation with external antennas.

The RF250R reader can only be used in conjunction with the antennas ANT 3, 8, 12, 18 or 30. The RF290R reader can only be used in conjunction with the antennas ANT D5, D6 or D10.

## 6.1 ANT 1

### 6.1.1 Characteristics

ANT 1	Characteristics	
	Area of application	Small assembly lines
	Read/write distance	up to 140 mm (depending on the transponder)
	Connecting cable	3 m (plug-in antenna cable)
	Connectable readers	RF250R
	Degree of protection	IP67

### 6.1.2 Ordering data

Table 6- 1 Ordering data ANT 1

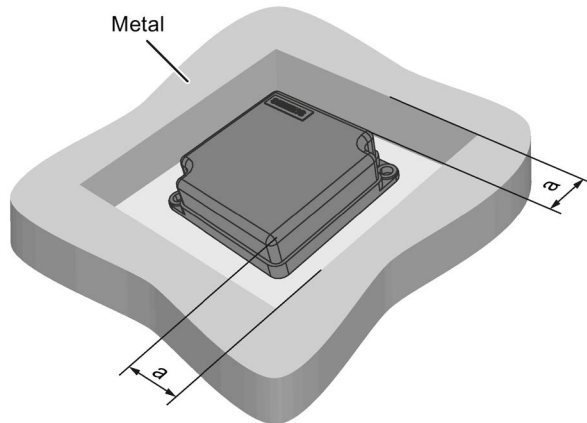
Antenna	Article number
ANT 1 (including one plug-in antenna cable 3 m)	6GT2398-1CB00

Table 6- 2 Ordering data ANT 1 accessories

Accessories	Article number
Antenna cable, 3 m	6GT2398-0AH30

### 6.1.3 Flush-mounted in metal

The tuning of the ANT 1 antenna is optimized for mounting in metal.



a = 40 mm

Figure 6-1 ANT 1 flush-mounted in metal

### 6.1.4 Operating / limit distances

The operating / limit distances listed in the following table relate to an ANT 1 mounted in metal.

Table 6-3 Operating / limit distances of the transponders

	RF250R with ANT 1 Operating distance (S <sub>a</sub> )	RF250R with ANT 1 Limit distance (S <sub>g</sub> )
MDS D100	5...110	140
MDS D124	2...65	85
MDS D126	2...90	120
MDS D139	5...85	115
MDS D160	2...35	60
MDS D165	5...100	120
MDS D200	5...95	115
MDS D261	5...80	95
MDS D324	2...66	78
MDS D339	5...90	105
MDS D400	2...110	135
MDS D423	10...40	50
MDS D424	2...75	88
MDS D425	2...25	35
MDS D426	2...85	95
MDS D428	2...40	50

	RF250R with ANT 1 Operating distance (S <sub>a</sub> )	RF250R with ANT 1 Limit distance (S <sub>g</sub> )
MDS D460	2...32	38
MDS D524	2...65	85
MDS D525	2...25	35
MDS D526	2...85	105
MDS D528	2...35	50

All values are in mm

## 6.1.5 Minimum clearances

### Note

#### Extension of the data transmission time if distance values are undershot

If the distance values specified in the tables are undershot, it is possible that the inductive fields will be affected. In this case, the data transmission time can increase unpredictably or a command is aborted with an error.

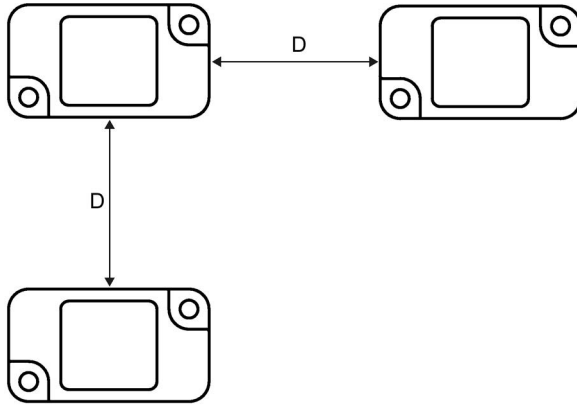
For this reason, please observe the values in the tables.

### Minimum distances from transponder to transponder (without multitag mode)

Table 6- 4 Minimum distances transponder edge to transponder edge

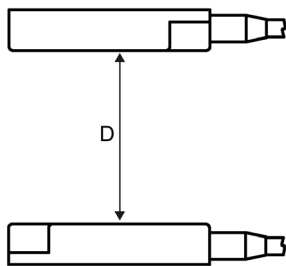
	MDS D423 / MDS D425	MDS D126 / MDS D160 / MDS D165 / MDS D200 / MDS D339 / MDS D426 / MDS D428 / MDS D460	MDS D100 / MDS D124 / MDS D139 / MDS D 261 / MDS D400 / MDS D424
RF250R with ANT 1	≥ 120 mm	≥ 150 mm	≥ 240 mm

Minimum distances from antenna to antenna



$D \geq 300 \text{ mm}$

Figure 6-2 Minimum distance ANT 1



$D \geq 500 \text{ mm}$

Figure 6-3 Face-to-face minimum distance ANT 1

6.1.6 Technical specifications

<b>6GT2398-1CB00</b>	
Product type designation	ANT 1
<b>Electrical data</b>	
Maximum write/read distance ANT ↔ Transponder (S <sub>g</sub> )	140 mm
<b>Interfaces</b>	
Plug connection	M8, 4-pin; pins on antenna side



6GT2398-1CB00

**Mechanical specifications**

Housing

• Material	• Plastic PA 12
• Color	• Anthracite
MTBF	13698 years

**Permitted ambient conditions**

Ambient temperature

• During operation	• -25 °C ... +70 °C
• During transportation and storage	• -40 °C ... +85 °C

Degree of protection to EN 60529	IP67
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Shock according to EN 60721-3-7 Class 7 M3 <sup>1)</sup>	500 m/s <sup>2</sup>
--	----------------------

Vibration according to EN 60721-3-7 Class 7 M3 <sup>1)</sup>	200 m/s <sup>2</sup>
--	----------------------

**Design, dimensions and weight**

Dimensions (L × W × H)	75 x 75 x 20 mm
------------------------	-----------------

Weight	225 g
--------	-------

Type of mounting	2 x M5 screws
------------------	---------------

Cable length	3 m (plug-in antenna cable)
--------------	-----------------------------

<sup>1)</sup> Warning: The values for shock and vibration are maximum values and must not be applied continuously.

6.1.7 Dimension drawing

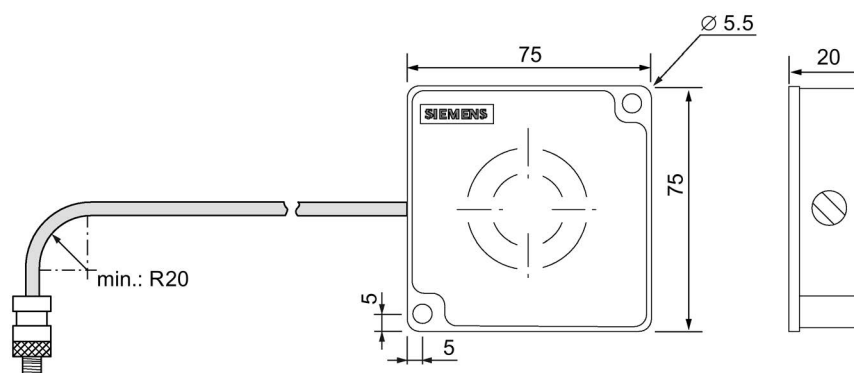



Figure 6-4 Dimensional drawing of ANT 1 (all values in mm)

## 6.2 ANT 3

### 6.2.1 Features

ANT 3	Characteristics	
	Area of application	Small assembly lines
	Writing/reading distance	up to 50 mm (depending on the transponder)
	Connecting cable	3 m (plug-in antenna cable)
	Connectable readers	RF250R
	Degree of protection	IP67

### 6.2.2 Ordering data

Table 6- 5 Ordering data ANT 3

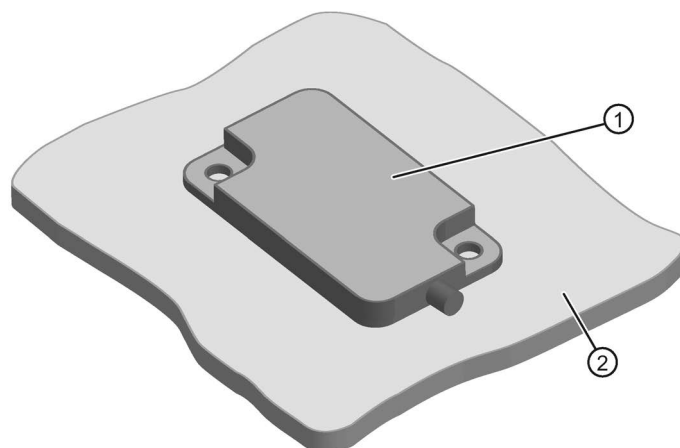
Antenna	Article number
ANT 3 (without antenna cable)	6GT2398-1CD30-0AX0
ANT 3 (incl. one plug-in antenna cable 3 m)	6GT2398-1CD40-0AX0

Table 6- 6 Ordering data ANT 3 accessories

Accessories	Article number
Antenna cable, 3 m	6GT2398-0AH30

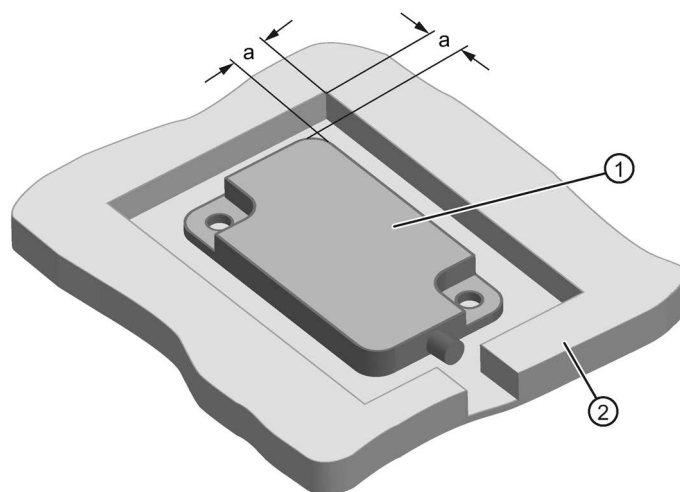
### 6.2.3 Mounting on/in metal

The tuning of the ANT 3 antenna is optimized for mounting on metal.



- ① ANT 3
- ② Metal

Figure 6-5 ANT 3 mounted on metal



- ① ANT 3
- ② Metal
- a = 10 mm

Figure 6-6 ANT 3 flush-mounted in metal

## 6.2.4 Operating / limit distances

The operating / limit distances listed in the following table relate to an ANT 3 mounted on metal.

Table 6- 7 Operating / limit distances of the transponders

	RF250R with ANT 3 Operating distance (S <sub>a</sub> )	RF250R with ANT 3 Limit distance (S <sub>g</sub> )
MDS D124	2 ... 32	40
MDS D160	1 ... 16	20
MDS D324	2 ... 32	40
MDS D422	1 ... 12	15
MDS D423 (without metal)	0 ... 20	25
MDS D423 (on metal)	0 ... 24	30
MDS D423 (in metal - 10 mm clearance all round)	0 ... 24	30
MDS D423 (in metal - 0 mm clearance all round)	0 ... 16	20
MDS D424	0 ... 45	50
MDS D425	0 ... 16	20
MDS D428	0 ... 25	32
MDS D460	0 ... 18	25
MDS D522	1 ... 12	15
MDS D522 Special variant	1 ... 12	15
MDS D524	1 ... 30	40
MDS D528	1 ... 20	25

All values are in mm

## 6.2.5 Minimum spacing

### Note

#### Extension of the data transmission time if distance values are undershot

If the distance values specified in the tables are undershot, it is possible that the inductive fields will be affected. In this case, the data transmission time can increase unpredictably or a command is aborted with an error.

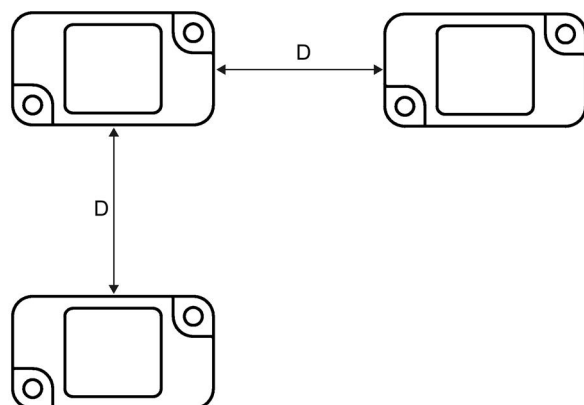
For this reason, please observe the values in the tables.

### Minimum distances from transponder to transponder (without multitag mode)

Table 6- 8 Minimum distances transponder edge to transponder edge

	MDS D124 / MDS D160 / MDS D324 / MDS D423 / MDS D424 / MDS D428 / MDS D460 / MDS D524 / MDS D528	MDS D422 / MDS D425 / MDS D522
RF250R with ANT 3	> 80 mm	> 60 mm

### Minimum distances from antenna to antenna



$D \geq 150 \text{ mm}$

Figure 6-7 Minimum distance for ANT 3

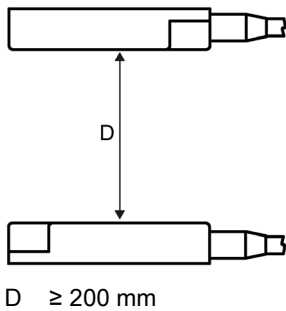


Figure 6-8 Face-to-face distance between two ANT 3s

### 6.2.6 Technical data

	6GT2398-1CD30-0AX0 6GT2398-1CD40-0AX0
Product type designation	ANT 3
<b>Electrical data</b>	
Maximum write/read distance ANT ↔ Transponder (S <sub>g</sub> )	50 mm
<b>Interfaces</b>	
Plug connection	M8, 4-pin socket on antenna side (with antenna connecting cable: pin cable end)
<b>Mechanical specifications</b>	
Housing	
• Material	• Plastic PA6-V0
• Color	• Black
MTBF	13698 years
<b>Permitted ambient conditions</b>	
Ambient temperature	
• During operation	• -25 °C ... +70 °C
• During transportation and storage	• -40 °C ... +85 °C
Degree of protection to EN 60529	IP67
Shock according to EN 60721-3-7 Class 7 M3 <sup>1)</sup>	500 m/s <sup>2</sup>
Vibration according to EN 60721-3-7 Class 7 M3 <sup>1)</sup>	200 m/s <sup>2</sup>
<b>Design, dimensions and weight</b>	
Dimensions (L × W × H)	

6GT2398-1CD30-0AX0	
6GT2398-1CD40-0AX0	
• Housing without antenna connector	• 50 × 28 × 10 mm
• Housing with antenna connector	• 240 × 28 × 10 mm
<b>Weight</b>	
• Housing with antenna connector	• Approx. 35 g
• Housing with antenna connector and antenna cable	• Approx. 160 g
<b>Type of mounting</b>	2 x M4 screws
<b>Cable length</b>	3 m (plug-in antenna cable)

1) Warning: The values for shock and vibration are maximum values and must not be applied continuously.

## 6.2.7 Dimension drawing

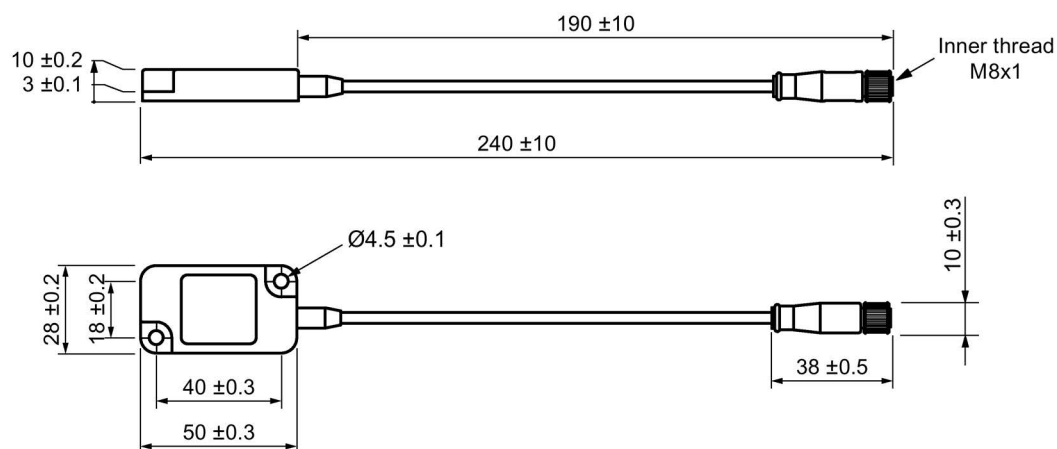



Figure 6-9 Dimension drawing ANT 3 (all values in mm)

## 6.3 ANT 8

### 6.3.1 Features

ANT 8	Characteristics	
	Area of application	Tool identification
	Writing/reading distance	up to 4 mm (depending on the transponder)
	Connecting cable	3 m
	Connectable readers	RF250R
	Degree of protection	IP67

### 6.3.2 Ordering data

Table 6- 9 Ordering data ANT 8

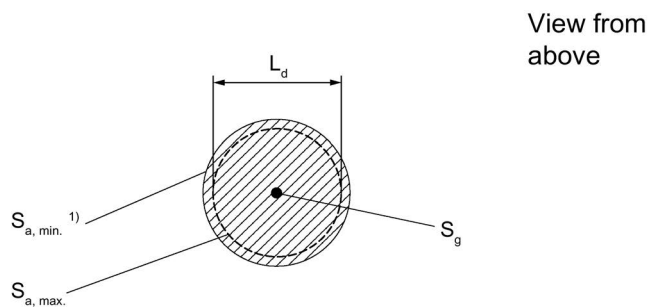
Antenna	Article number
ANT 8 (without antenna cable)	6GT2398-1CF00
ANT 8 (including one plug-in antenna cable 3 m)	6GT2398-1CF10

Table 6- 10 Ordering data ANT 8 accessories

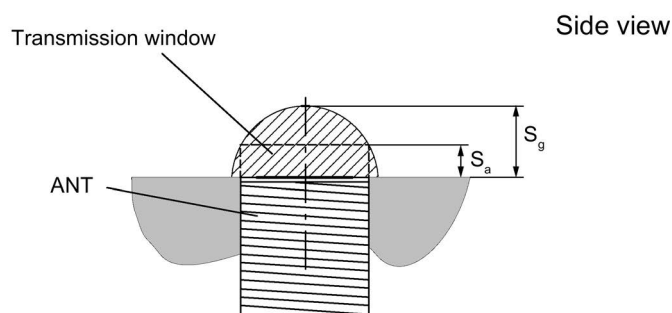
Accessories	Article number
Antenna cable, 3 m	6GT2398-0AH30



### 6.3.3 Transmission window



1) At  $S_{a, \min.}$  the transmission window is enlarged



$L_d$  Length of the transmission window (= 3 mm)

$S_a$  Operating distance between antenna and transponder

$S_g$  Limit distance (maximum clear distance between upper surface of the reader and the antenna, at which the transmission can still function under normal conditions)

Figure 6-10 Transmission window ANT 8

### 6.3.4 Flush-mounted in metal

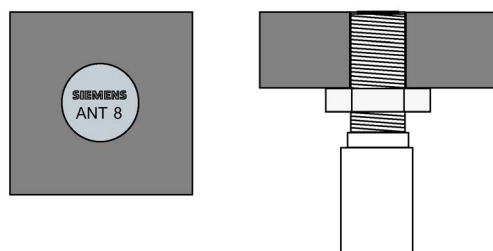


Figure 6-11 ANT 8 flush-mounted in metal

### 6.3.5 Minimum spacing

**Note**

**Extension of the data transmission time if distance values are undershot**

If the distance values specified in the tables are undershot, it is possible that the inductive fields will be affected. In this case, the data transmission time can increase unpredictably or a command is aborted with an error.

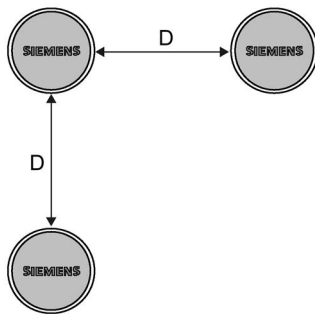
For this reason, please observe the values in the tables.

#### Minimum distances from transponder to transponder (without multitag mode)

Table 6- 11 Minimum distances transponder edge to transponder edge

	MDS D117 / MDS D127	MDS D421 / MDS D521
RF250R with ANT 8	≥ 20 mm	≥ 30 mm

#### Definition of distance D



D ≥ 50 mm

Figure 6-12 Minimum distance for ANT 8



$D \geq 50 \text{ mm}$

Figure 6-13 Face-to-face distance between two ANT 8s

### 6.3.6 Technical data

	6GT2398-1CF10 6GT2398-1CF00
Product type designation	ANT 8
<b>Electrical data</b>	
Maximum write/read distance ANT ↔ transponder (S <sub>g</sub> )	4 mm
<b>Interfaces</b>	
Plug connection	4-pin (pin on antenna side)
<b>Mechanical specifications</b>	
Housing	
• Material	• Stainless steel
• Color	• silver

6GT2398-1CF10

6GT2398-1CF00

**Permitted ambient conditions**

Ambient temperature

- During operation • -25 °C ... +70 °C
- During transportation and storage • -40 °C ... +85 °C

Degree of protection to EN 60529 IP67

Shock according to EN 60721-3-7 Class 7 M3<sup>1)</sup> 500 m/s<sup>2</sup>

Vibration according to EN 60721-3-7 Class 7 M3<sup>1)</sup> 200 m/s<sup>2</sup>

**Design, dimensions and weight**

Dimensions (∅ x thread x L) M8 x 1 x 38 mm

Weight 10 g without cable  
140 g with cable

Type of mounting 2x stainless steel nuts M8 x 1

Cable length 3 m

<sup>1)</sup> Warning: The values for shock and vibration are maximum values and must not be applied continuously.

**6.3.7 Dimension drawing**

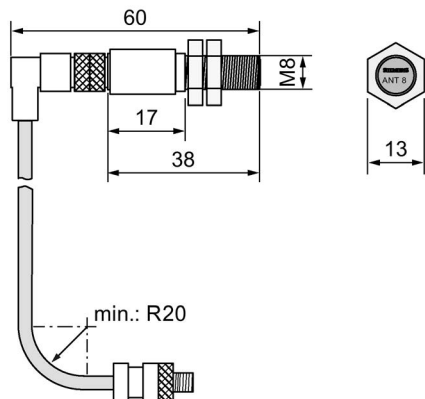



Figure 6-14 Dimension drawing ANT 8 (all values in mm)

## 6.4 ANT 12

### 6.4.1 Features

ANT 12	Characteristics	
	Area of application	Tool identification
	Writing/reading distance	up to 16 mm (depending on the transponder)
	Connecting cable	3 m or 0.6 m
	Connectable readers	RF250R
	Degree of protection	IP67 (front)

### 6.4.2 Ordering data

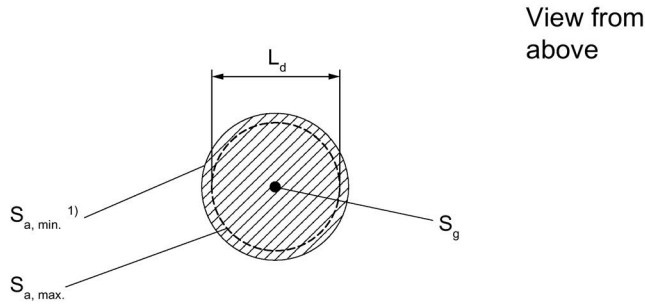
Table 6- 12 Ordering data ANT 12

Antenna	Article number
ANT 12 (including one plug-in antenna cable 3 m)	6GT2398-1CC00

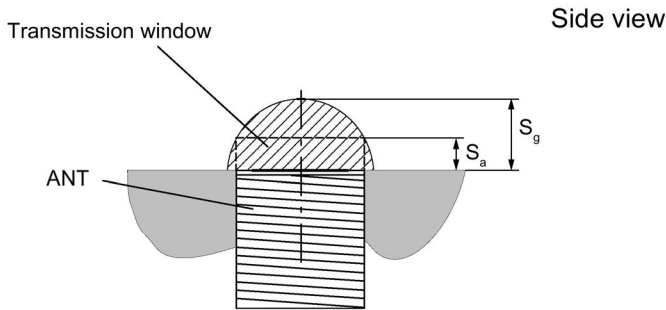
Table 6- 13 Ordering data ANT 12 accessories

Accessories	Article number
Antenna cable, 3 m	6GT2398-0AH30

### 6.4.3 Transmission window



<sup>1)</sup> At  $S_{a, min.}$  the transmission window is enlarged



- $L_d$  Length of the transmission window (= 20 mm)
- $S_a$  Operating distance between antenna and transponder
- $S_g$  Limit distance (maximum clear distance between upper surface of the reader and the antenna, at which the transmission can still function under normal conditions)

Figure 6-15 Transmission window ANT 12

### 6.4.4 Flush-mounted in metal

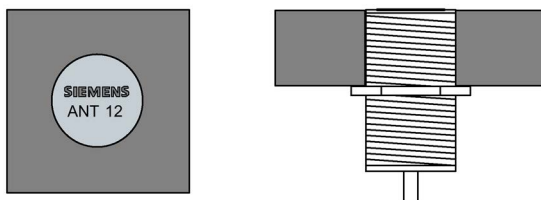


Figure 6-16 ANT 12 flush-mounted in metal

## 6.4.5 Minimum spacing

### Note

#### Extension of the data transmission time if distance values are undershot

If the distance values specified in the tables are undershot, it is possible that the inductive fields will be affected. In this case, the data transmission time can increase unpredictably or a command is aborted with an error.

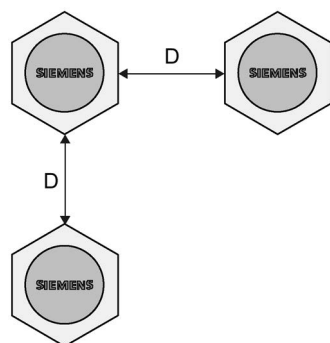
For this reason, please observe the values in the tables.

### Minimum distances from transponder to transponder (without multitag mode)

Table 6- 14 Minimum distances transponder edge to transponder edge

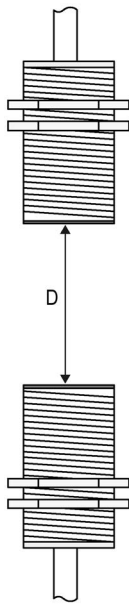
	MDS D117 / MDS D127	MDS D421 / MDS D422 / MDS D428 / MDS D460 / MDS D522 / MDS D528
RF250R with ANT 12	≥ 60 mm	≥ 80 mm

### Definition of distance D



$D \geq 70 \text{ mm}$

Figure 6-17 Minimum distance for ANT 12



D ≥ 100 mm

Figure 6-18 Face-to-face distance between two ANT 12s

### 6.4.6 Technical data

	6GT2398-1CC00 6GT2398-1CC10
Product type designation	ANT 12
<b>Electrical data</b>	
Maximum write/read distance ANT ↔ transponder (S <sub>g</sub> )	16 mm
<b>Interfaces</b>	
Plug connection	4-pin (pin on antenna side)
<b>Mechanical specifications</b>	
Housing	
• Material	• Plastic Crastin
• Color	• Pale turquoise
<b>Permitted ambient conditions</b>	
Ambient temperature	
• During operation	• -20 °C ... +70 °C



<b>6GT2398-1CC00</b>	
<b>6GT2398-1CC10</b>	
• During transportation and storage	• -40 °C ... +85 °C
Degree of protection to EN 60529	IP67 (front)
Shock according to EN 60721-3-7 Class 7 M3 <sup>1)</sup>	500 m/s <sup>2</sup>
Vibration according to EN 60721-3-7 Class 7 M3 <sup>1)</sup>	200 m/s <sup>2</sup>
<b>Design, dimensions and weight</b>	
Dimensions (∅ x thread x L)	M12 x 1 x 40 mm
Weight	145 g
Type of mounting	2x plastic nuts M12 x 1
Cable length	3 m or 0.6 m

<sup>1)</sup> Warning: The values for shock and vibration are maximum values and must not be applied continuously.

### 6.4.7 Dimension drawing

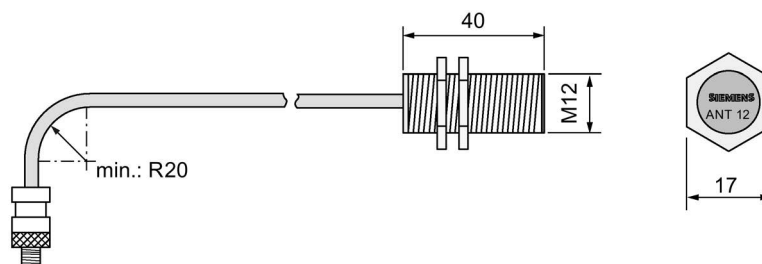



Figure 6-19 Dimension drawing ANT 12 (all values in mm)

## 6.5 ANT 18

### 6.5.1 Features

	<b>ANT 18</b>		<b>Characteristics</b>
	Area of application		Small assembly lines
	Writing/reading distance		up to 35 mm (depending on the transponder)
	Connecting cable		3 m or 0.6 m
	Connectable readers		RF250R
	Degree of protection		IP67 (front)

### 6.5.2 Ordering data

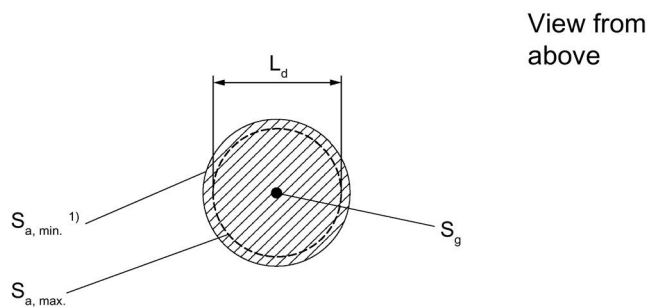
Table 6- 15 Ordering data ANT 18

Antenna	Article number
ANT 18 (including one plug-in antenna cable 3 m)	6GT2398-1CA00

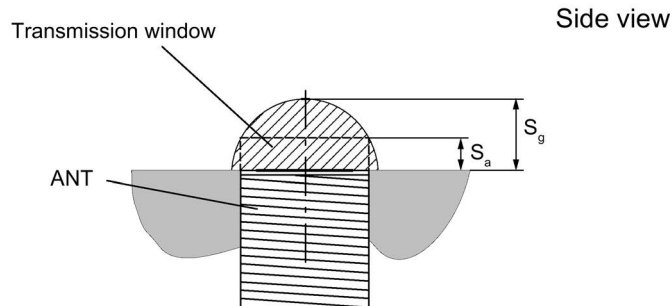
Table 6- 16 Ordering data ANT 18 accessories

Accessories	Article number
Antenna cable, 3 m	6GT2398-0AH30

### 6.5.3 Transmission window



1) At  $S_{a, min.}$  the transmission window is enlarged



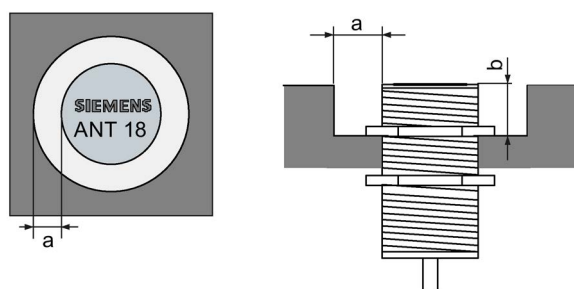
$L_d$  Length of the transmission window (= 30 mm)

$S_a$  Operating distance between antenna and transponder

$S_g$  Limit distance (maximum clear distance between upper surface of the reader and the antenna, at which the transmission can still function under normal conditions)

Figure 6-20 Transmission window ANT 18

### 6.5.4 Flush-mounted in metal



$a$  = 10 mm

$b$  = 10 mm

Figure 6-21 ANT 18 flush-mounted in metal

### 6.5.5 Minimum spacing

**Note**

**Extension of the data transmission time if distance values are undershot**

If the distance values specified in the tables are undershot, it is possible that the inductive fields will be affected. In this case, the data transmission time can increase unpredictably or a command is aborted with an error.

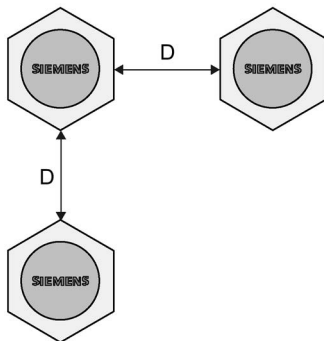
For this reason, please observe the values in the tables.

#### Minimum distances from transponder to transponder (without multitag mode)

Table 6- 17 Minimum distances transponder edge to transponder edge

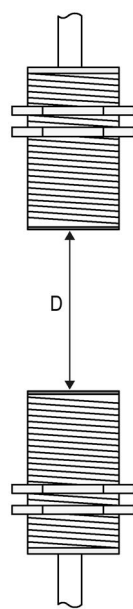
	MDS D124 / MDS D160 / MDS D324	MDS D421 / MDS D422 / MDS D423 / MDS D424 / MDS D425 / MDS D428 / MDS D460 / MDS D522 / MDS D524 / MDS D528
RF250R with ANT 18	≥ 80 mm	≥ 100 mm

#### Definition of distance D



D ≥ 100 mm

Figure 6-22 Minimum distance for ANT 18



$D \geq 100 \text{ mm}$

Figure 6-23 Face-to-face distance between two ANT 18s

## 6.5.6 Technical data

	6GT2398-1CA00
	6GT2398-1CA10
Product type designation	ANT 18
<b>Electrical data</b>	
Maximum write/read distance ANT ↔ transponder (S <sub>g</sub> )	35 mm
<b>Interfaces</b>	
Plug connection	4-pin (pin on antenna side)
<b>Mechanical specifications</b>	
Housing	
• Material	• Plastic Crastin
• Color	• Pale turquoise
<b>Permitted ambient conditions</b>	
Ambient temperature	
• During operation	• -20 °C ... +70 °C

<b>6GT2398-1CA00</b>	
<b>6GT2398-1CA10</b>	
• During transportation and storage	• -40 °C ... +85 °C
Degree of protection to EN 60529	IP67 (front)
Shock according to EN 60721-3-7 Class 7 M3 <sup>1)</sup>	500 m/s <sup>2</sup>
Vibration according to EN 60721-3-7 Class 7 M3 <sup>1)</sup>	200 m/s <sup>2</sup>
<b>Design, dimensions and weight</b>	
Dimensions (∅ x thread x L)	M18 x 1 x 55 mm
Weight	130 g
Type of mounting	2x plastic nuts M18 x 1
Cable length	3 m or 0.6 m

1) Warning: The values for shock and vibration are maximum values and must not be applied continuously.

6.5.7 Dimension drawing

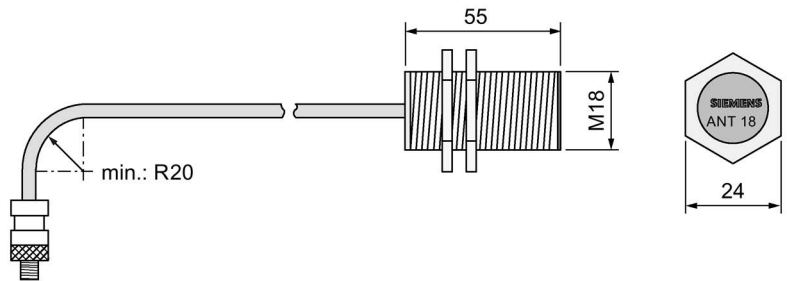



Figure 6-24 Dimension drawing ANT 18 (all values in mm)

## 6.6 ANT 30

### 6.6.1 Features

ANT 18	Characteristics	
	Area of application	Small assembly lines
	Writing/reading distance	up to 55 mm (depending on the transponder)
	Connecting cable	3 m
	Connectable readers	RF250R
	Degree of protection	IP67 (front)

### 6.6.2 Ordering data

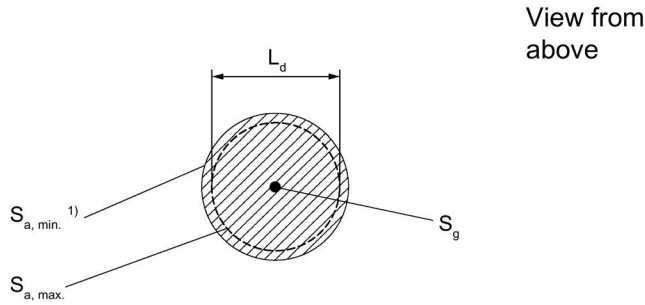
Table 6- 18 Ordering data ANT 30

Antenna	Article number
ANT 30 (including one plug-in antenna cable 3 m)	6GT2398-1CD00

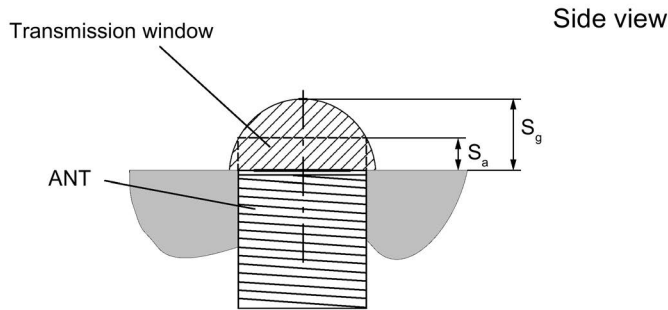
Table 6- 19 Ordering data ANT 30 accessories

Accessories	Article number
Antenna cable, 3 m	6GT2398-0AH30

### 6.6.3 Transmission window



<sup>1)</sup> At  $S_{a, min.}$  the transmission window is enlarged



$L_d$  Length of the transmission window (= 60 mm)

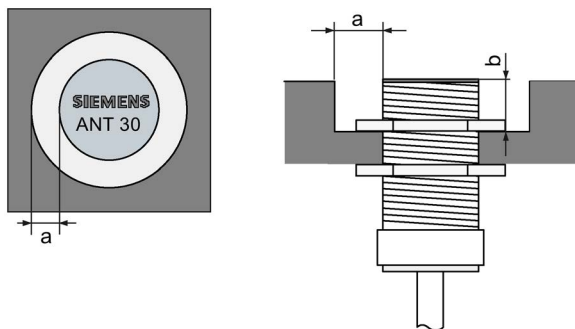
$S_a$  Operating distance between antenna and transponder

$S_g$  Limit distance (maximum clear distance between upper surface of the reader and the antenna, at which the transmission can still function under normal conditions)

Figure 6-25 Transmission window ANT 30



### 6.6.4 Flush-mounted in metal



a = 20 mm  
b = 20 mm

Figure 6-26 ANT 30 flush-mounted in metal

### 6.6.5 Minimum spacing

#### Note

#### Extension of the data transmission time if distance values are undershot

If the distance values specified in the tables are undershot, it is possible that the inductive fields will be affected. In this case, the data transmission time can increase unpredictably or a command is aborted with an error.

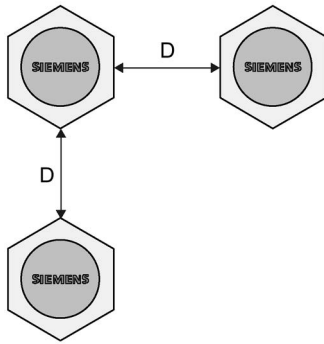
For this reason, please observe the values in the tables.

#### Minimum distances from transponder to transponder (without multitag mode)

Table 6- 20 Minimum distances transponder edge to transponder edge

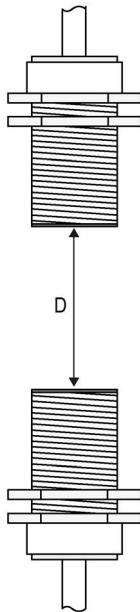
	MDS D124 / MDS D160 / MDS D324 / MDS D423 / MDS D424 / MDS D460 / MDS D524	MDS D422 / MDS D425 / MDS D428 / MDS D522 / MDS D528	MDS D126 / MDS D426 / MDS D526
RF250R with ANT 30	≥ 100 mm	≥ 80 mm	≥ 150 mm

**Definition of distance D**



$D \geq 100 \text{ mm}$

Figure 6-27 Minimum distance for ANT 30



$D \geq 200 \text{ mm}$

Figure 6-28 Face-to-face distance between two ANT 30s

**6.6.6 Technical data**

<b>6GT2398-1CD00</b>	
Product type designation	ANT 30
<b>Electrical data</b>	
Maximum write/read distance ANT ↔ transponder (S <sub>g</sub> )	60 mm

6GT2398-1CD00

**Interfaces**

Plug connection 4-pin (pin on antenna side)

**Mechanical specifications**

Housing

- Material • Plastic Crastin
- Color • Pale turquoise

**Permitted ambient conditions**

Ambient temperature

- During operation • -20 °C ... +70 °C
- During transportation and storage • -40 °C ... +85 °C

Degree of protection to EN 60529 IP67 (front)

Shock according to EN 60721-3-7 Class 7 M3<sup>1)</sup> 500 m/s<sup>2</sup>

Vibration according to EN 60721-3-7 Class 7 M3<sup>1)</sup> 200 m/s<sup>2</sup>

**Design, dimensions and weight**

Dimensions (∅ x thread x L) M30 x 1.5 x 61 mm

Weight 180 g

Type of mounting 2x plastic nuts M30 x 1.5

Cable length 3 m

<sup>1)</sup> Warning: The values for shock and vibration are maximum values and must not be applied continuously.

**6.6.7 Dimension drawing**

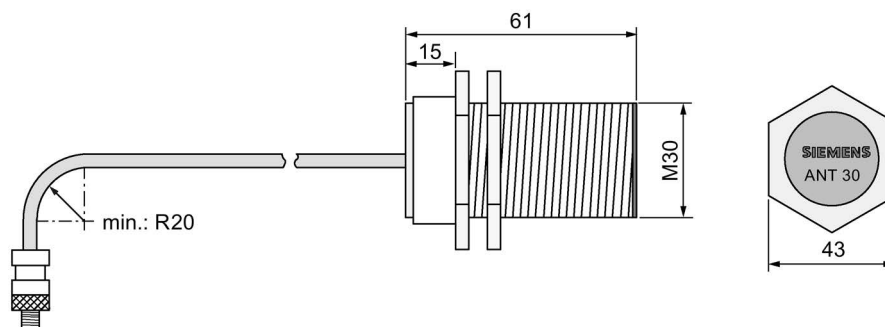



Figure 6-29 Dimension drawing ANT 30 (all values in mm)

## 6.7 ANT D5

### 6.7.1 Features

ANT D5	Characteristics	
	Area of application	Storage, logistics and distribution
	Writing/reading distance	up to 500 mm (depending on the transponder)
	Connecting cable	3.3 m
	Readers that can be connected	RF290R
	Degree of protection	IP65

### 6.7.2 Ordering data

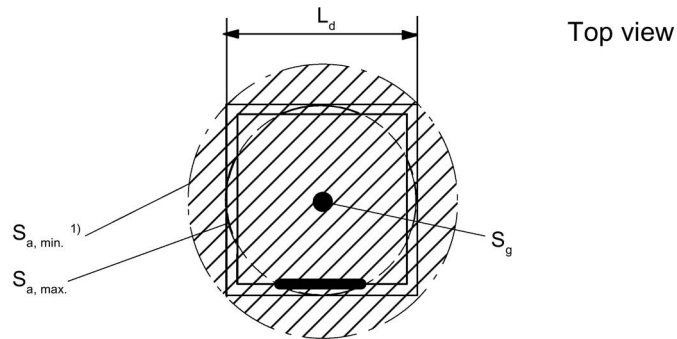
Table 6- 21 Ordering data of ANT D5

Antenna	Article number
ANT D5 (incl. one antenna connecting cable 3.3 m)	6GT2698-5AA10

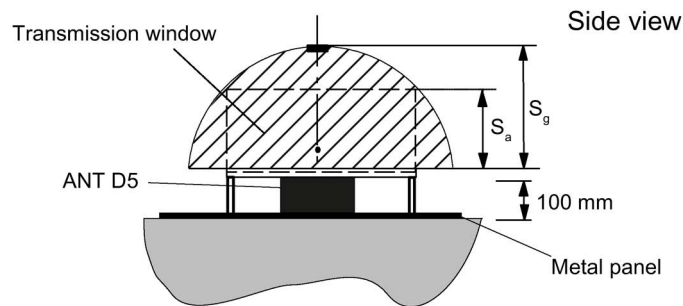
Table 6- 22 Ordering data of ANT D5 accessories

Accessories	Article number	
Antenna splitter (incl. one antenna connecting cable 3.3 m)	6GT2690-0AC00	
Antenna multiplexer (incl. one antenna connecting cable 0.4 m)	6GT2894-0EA00	
Antenna cable	Length 3.3 m	6GT2691-0CH33
	Length 10.5 m	6GT2691-0CN10
Antenna extension cable, length 7.2 m	6GT2691-0DH72	

### 6.7.3 Transmission window



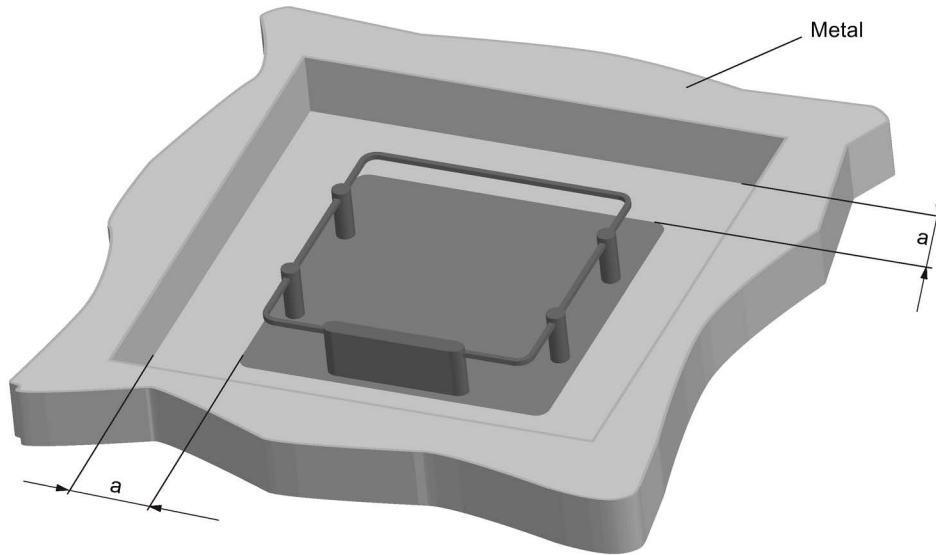
<sup>1)</sup> At  $S_{a, \min.}$  the transmission window is extended



- $L_d$  Length of the transmission window (= 300 mm)
- $S_a$  Operating distance between antenna and transponder
- $S_g$  Limit distance (maximum clear distance between upper surface of the reader and the antenna, at which the transmission can still function under normal conditions)

Figure 6-30 Transmission window for ANT D5

6.7.4 Flush-mounted in metal



a = 150 mm

Figure 6-31 Metal-free area for ANT D5

6.7.5 Minimum spacing

**Note**

**Extension of the data transmission time if distance values are undershot**

If the distance values specified in the tables are undershot, it is possible that the inductive fields will be affected. In this case, the data transmission time can increase unpredictably or a command is aborted with an error.

For this reason, please observe the values in the tables.

**Minimum distances from transponder to transponder (without multitag mode)**

	MDS D100 / MDS D126 / MDS D139 / MDS D165 / MDS D200 / MDS D261 / MDS D339 / MDS D400 / MDS D426 / MDS D526	MDS D124 / MDS D160 / MDS D324 / MDS D424 / MDS D428 / MDS D460 / MDS D524 / MDS D528 / MDS D560
RF290R	≥ 1 m	≥ 0.8 m

### Minimum distances from antenna to antenna

	RF290R with ANT D5	RF290R with ANT D6	RF290R with ANT D10
RF290R with ANT D5	≥ 2 m	≥ 2 m	≥ 2 m
RF290R with ANT D6	≥ 2 m	≥ 2 m	≥ 2 m
RF290R with ANT D10	≥ 2 m	≥ 2 m	≥ 2 m

### Definition of distance D

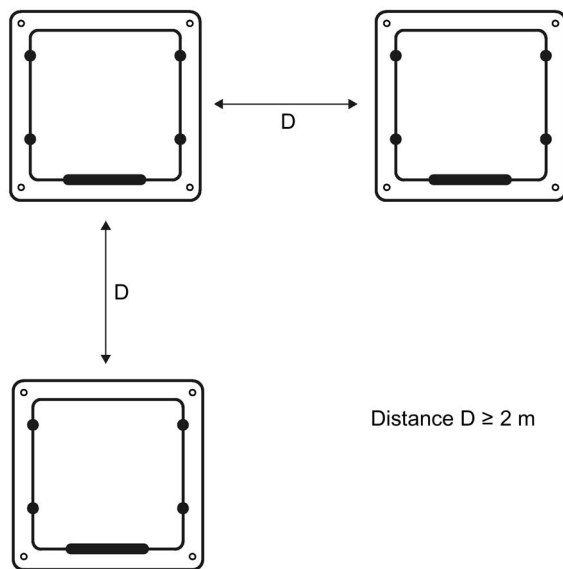


Figure 6-32 Distance D: ANT D5

## 6.7.6 Technical data

<b>6GT2698-5AA10</b>	
Product type designation	ANT D5
<b>Electrical data</b>	
Maximum write/read distance ANT ↔ transponder (S <sub>g</sub> )	500 mm
<b>Interfaces</b>	
Plug connection	1-pin TNC plug
<b>Mechanical specifications</b>	
Housing	
• Material	• Aluminum/plastic

<b>6GT2698-5AA10</b>	
• Color	• gray/black
<b>Permitted ambient conditions</b>	
Ambient temperature	
• During operation	• -20 °C ... +55 °C
• During transportation and storage	• -25 °C ... +70 °C
Degree of protection to EN 60529	IP65 (UL: for indoor use only)
Shock according to EN 60721-3-7 Class 7 M3 <sup>1)</sup>	300 m/s <sup>2</sup>
Vibration according to EN 60721-3-7 Class 7 M3 <sup>1)</sup>	<ul style="list-style-type: none"> <li>• 10 m/s<sup>2</sup> (9 ... 200 Hz)</li> <li>• 15 m/s<sup>2</sup> (200 ... 500 Hz)</li> </ul>
<b>Design, dimensions and weight</b>	
Dimensions (L x W x H)	380 x 380 x 110 mm
Weight	1.2 kg
Type of mounting	4x M6 or alternatively M8 screws
Cable length	3.3 m

<sup>1)</sup> Warning: The values for shock and vibration are maximum values and must not be applied continuously.



### 6.7.7 Dimension drawing

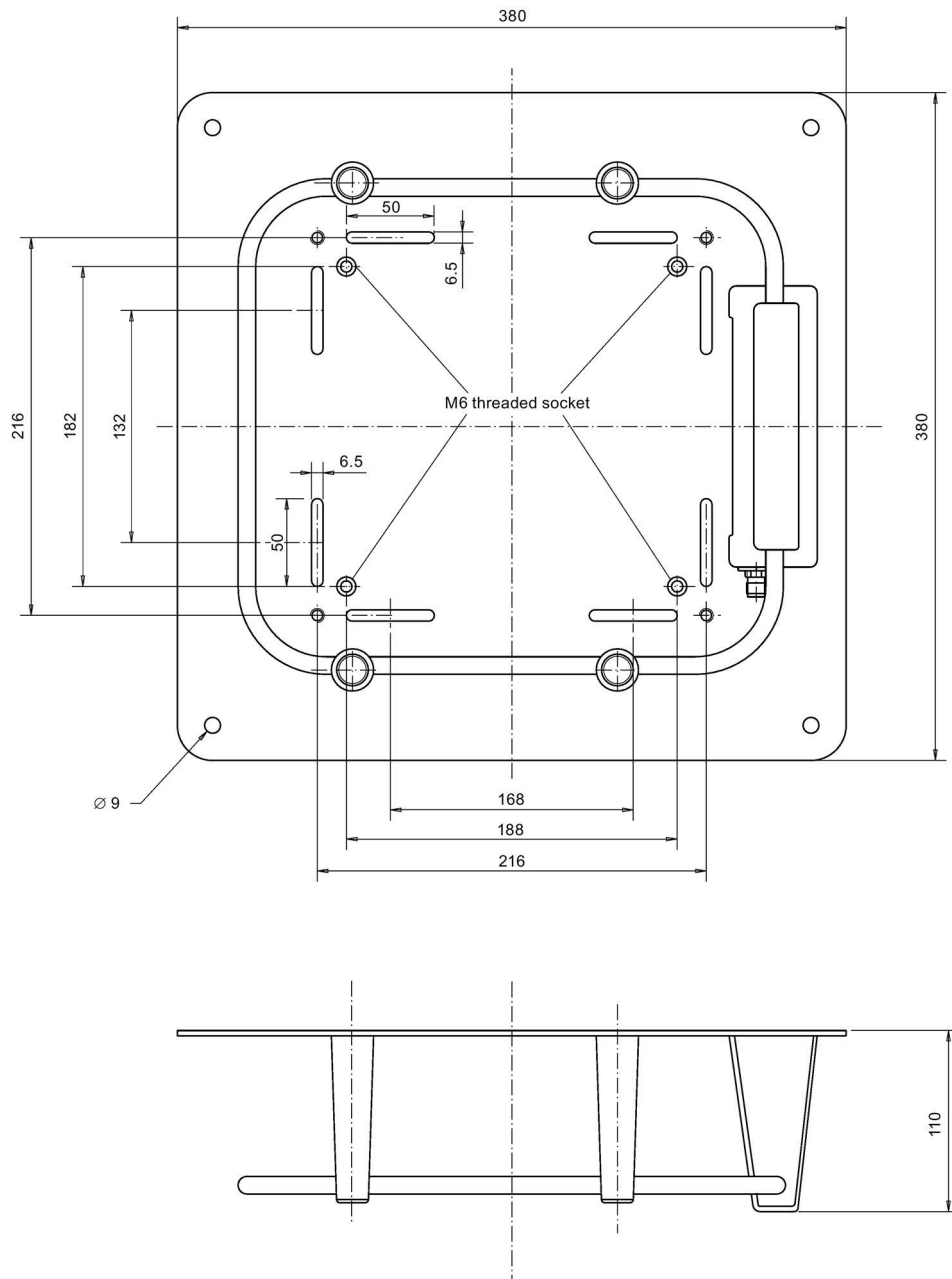



Figure 6-33 Dimension drawing for ANT D5

## 6.8 ANT D6

### 6.8.1 Features

 <p>ANT D6                      Covering hood</p>	<b>Characteristics</b>	
	Area of application	<ul style="list-style-type: none"> <li>Storage, logistics and distribution</li> <li>Suitable for high-speed applications with large writing/reading distance</li> </ul>
	Writing/reading distance	up to 650 mm (depending on the transponder)
	Connecting cable	3.3 m; included in scope of supply
	Cover	Available as accessory
	Readers that can be connected	RF290R
	Degree of protection	IP65 (also without cover)

### 6.8.2 Ordering data

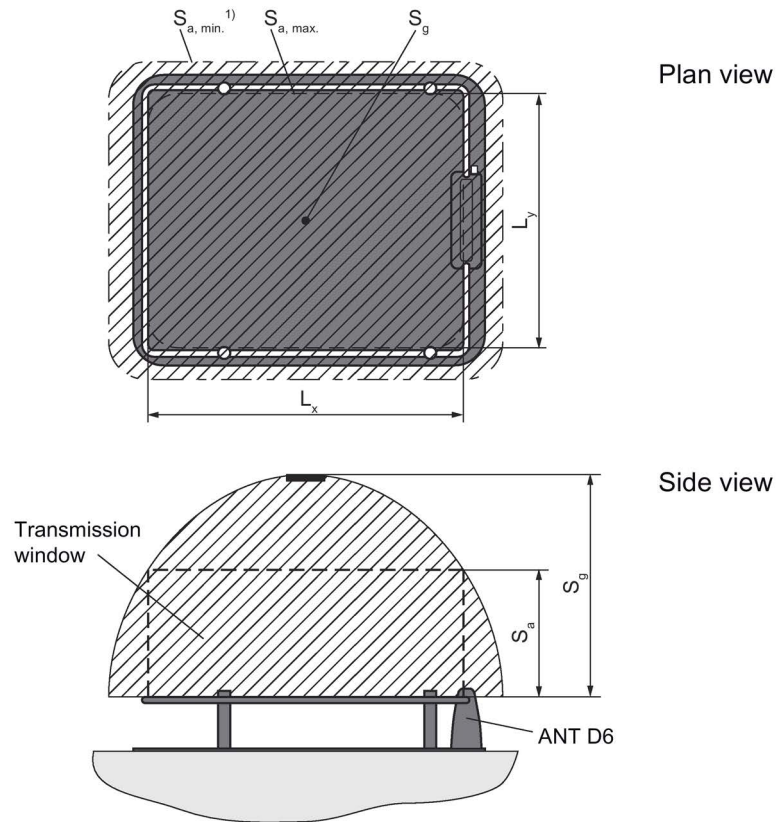
Table 6- 23 ANT D6 ordering data

Antenna	Article number
ANT D6 (without cover, incl. one antenna connecting cable 3.3 m)	6GT2698-5AB00

Table 6- 24 Ordering data for ANT D6 accessories

Accessories	Article number	
Covering hood for ANT D6	6GT2690-0AD00	
Antenna splitter (incl. one antenna connecting cable 3.3 m)	6GT2690-0AC00	
Antenna multiplexer (incl. one antenna connecting cable 0.4 m)	6GT2894-0EA00	
Antenna cable	Length 3.3 m	6GT2691-0CH33
	Length 10.5 m	6GT2691-0CN10
Antenna extension cable, length 7.2 m	6GT2691-0DH72	

### 6.8.3 Transmission window



<sup>1)</sup> For  $S_{a, min.}$ , the transmission window is extended

$L_x = 520 \text{ mm}$

$L_y = 420 \text{ mm}$

Figure 6-34 Transmission window for ANT D6

### 6.8.4 Metal-free area

Flush-mounted in metal

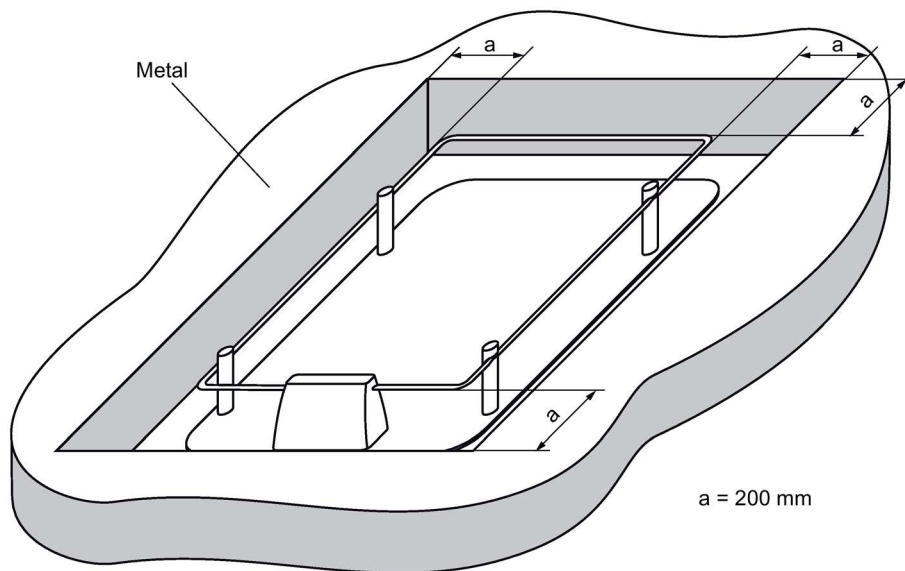


Figure 6-35 Metal-free area for ANT D6

### 6.8.5 Minimum spacing

Definition of distance D

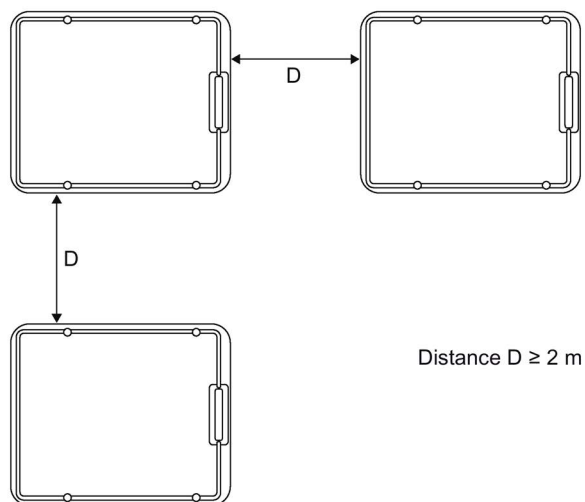


Figure 6-36 Distance D: ANT D6

## 6.8.6 Technical data

<b>6GT2698-5AB00</b>	
Product type designation	ANT D6
<b>Electrical data</b>	
Maximum write/read distance ANT ↔ transponder (S <sub>g</sub> )	650 mm
<b>Interfaces</b>	
Plug connection	1-pin TNC plug
<b>Mechanical specifications</b>	
Housing	
• Material	• Aluminum/plastic
• Color	• gray/black
<b>Permitted ambient conditions</b>	
Ambient temperature	
• During operation	• -20 °C ... +55 °C
• During transportation and storage	• -25 °C ... +70 °C
Degree of protection to EN 60529	IP65 (UL: for indoor use only)
Shock according to EN 60721-3-7 Class 7 M3 <sup>1)</sup>	300 m/s <sup>2</sup>
Vibration according to EN 60721-3-7 Class 7 M3 <sup>1)</sup>	<ul style="list-style-type: none"> <li>• 10 m/s<sup>2</sup> (9 ... 200 Hz)</li> <li>• 15 m/s<sup>2</sup> (200 ... 500 Hz)</li> </ul>
<b>Design, dimensions and weight</b>	
Dimensions (L x W x H)	580 x 480 x 110 mm
Weight	3.3 kg (without cover)

<b>6GT2698-5AB00</b>	
Type of mounting	4 x M6 screws
Cable length	3.3 m

1) Warning: The values for shock and vibration are maximum values and must not be applied continuously.

**6.8.7 Dimensional diagram**

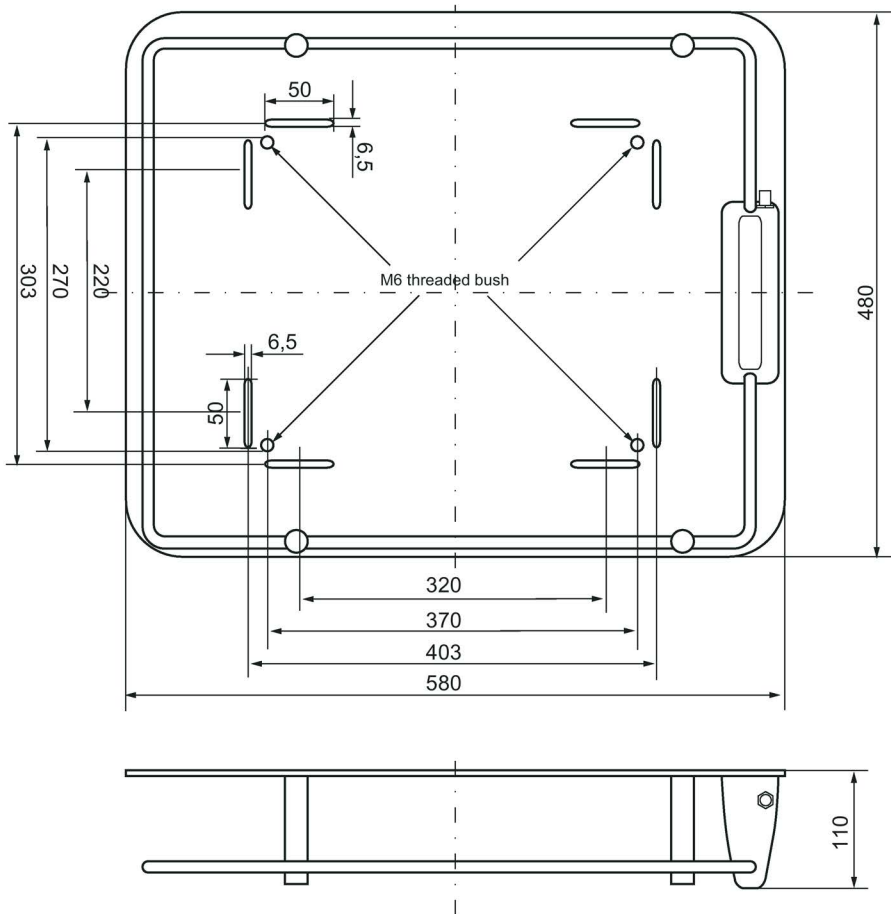



Figure 6-37 Dimension drawing for ANT D6

## 6.9 ANT D10

### 6.9.1 Features

ANT D10	Characteristics	
	Area of application	<ul style="list-style-type: none"> <li>• Storage, logistics and distribution, e.g. clothing industry, laundries</li> <li>• Particularly when small MDS are used (e.g. MDS D124, MDS D160) and when there is a long transmission field</li> </ul>
	Writing/reading distance	up to 480 mm (depending on the transponder)
	Connecting cable	3.3 m; included in scope of supply
	Cover	Included in scope of supply
	Readers that can be connected	RF290R

### 6.9.2 Ordering data

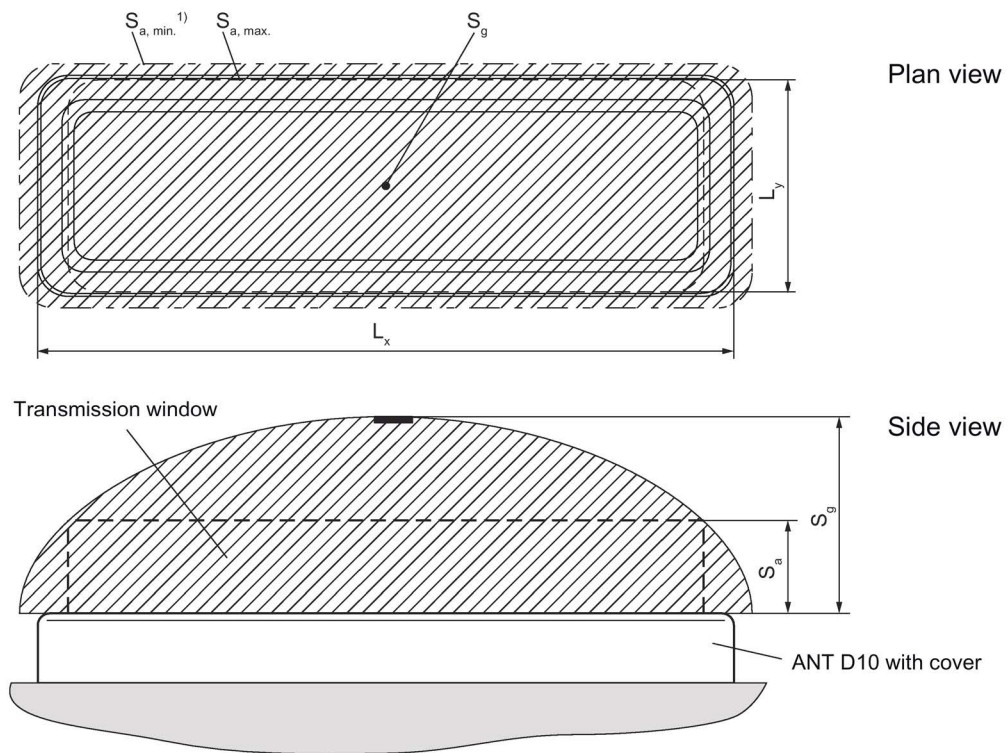
Table 6- 25 Ordering data of ANT D10

Antenna	Article number
ANT D10 (incl. cover and one antenna connecting cable 3.3 m)	6GT2698-5AF00

Table 6- 26 Ordering data of ANT D10 accessories

Accessories	Article number	
Antenna splitter (incl. one antenna connecting cable 3.3 m)	6GT2690-0AC00	
Antenna multiplexer (incl. one antenna connecting cable 0.4 m)	6GT2894-0EA00	
Antenna cable	Length 3.3 m	6GT2691-0CH33
	Length 10.5 m	6GT2691-0CN10
Antenna extension cable, length 7.2 m	6GT2691-0DH72	

### 6.9.3 Transmission window



<sup>1)</sup> For  $S_{a, \min.}$  the transmission window is extended

$L_x$  1050 mm

$L_y$  350 mm

Figure 6-38 Transmission window for ANT D10



## 6.9.4 Metal-free area

### Flush-mounted in metal

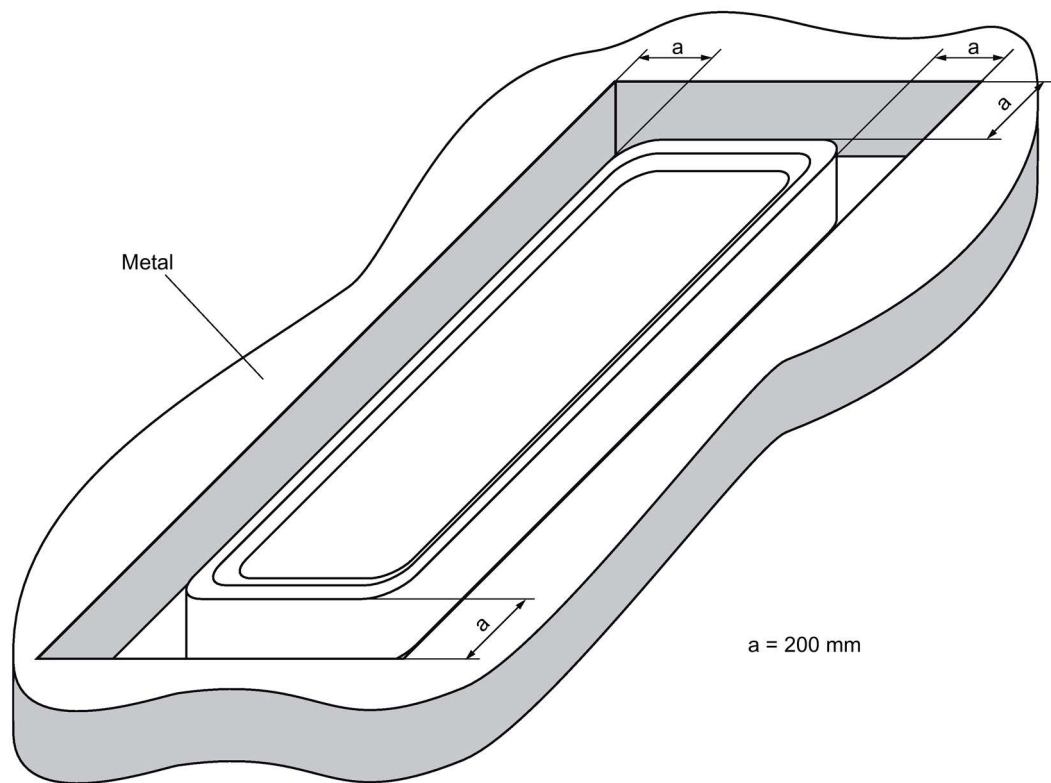


Figure 6-39 Metal-free area for ANT D10

### 6.9.5 Minimum spacing

#### Definition of distance D

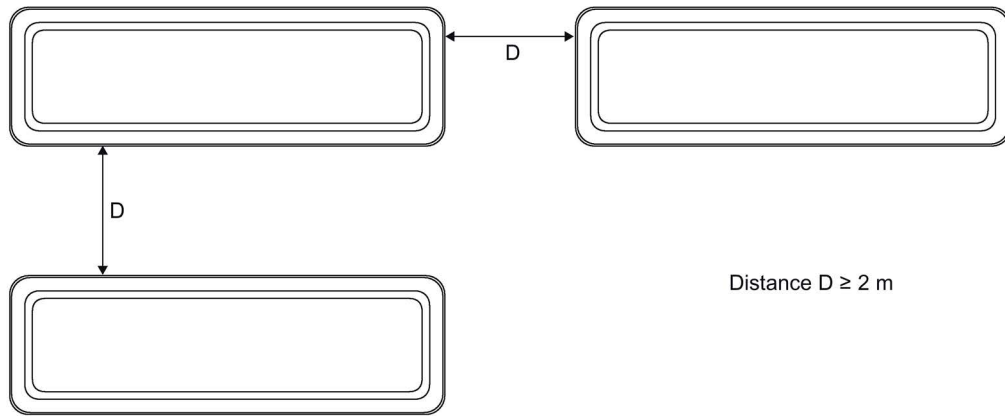


Figure 6-40 Distance D: ANT D10

### 6.9.6 Technical data

<b>6GT2698-5AF00</b>	
Product type designation	ANT D10
<b>Electrical data</b>	
Maximum write/read distance ANT ↔ transponder (S <sub>g</sub> )	480 mm
<b>Interfaces</b>	
Plug connection	1-pin TNC plug
<b>Mechanical specifications</b>	
Housing	
• Material	• Aluminum/plastic
• Color	• gray/black
<b>Permitted ambient conditions</b>	
Ambient temperature	
• During operation	• -20 °C ... +55 °C
• During transportation and storage	• -25 °C ... +70 °C
Degree of protection to EN 60529	IP65 (UL: for indoor use only)
Shock according to EN 60721-3-7 Class 7 M3 <sup>1)</sup>	300 m/s <sup>2</sup>

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**6GT2698-5AF00**

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- Vibration according to EN 60721-3-7 Class 7 M3<sup>1)</sup>
- 10 m/s<sup>2</sup> (9 ... 200 Hz)
  - 15 m/s<sup>2</sup> (200 ... 500 Hz)
- 

**Design, dimensions and weight**

---

Dimensions (L x W x H)	1150 x 365 x 115 mm (with cover)
Weight	10 kg
Type of mounting	4 x M6 screws
Cable length	3.3 m

---

<sup>1)</sup> Warning: The values for shock and vibration are maximum values and must not be applied continuously.

6.9.7 Dimensional diagram

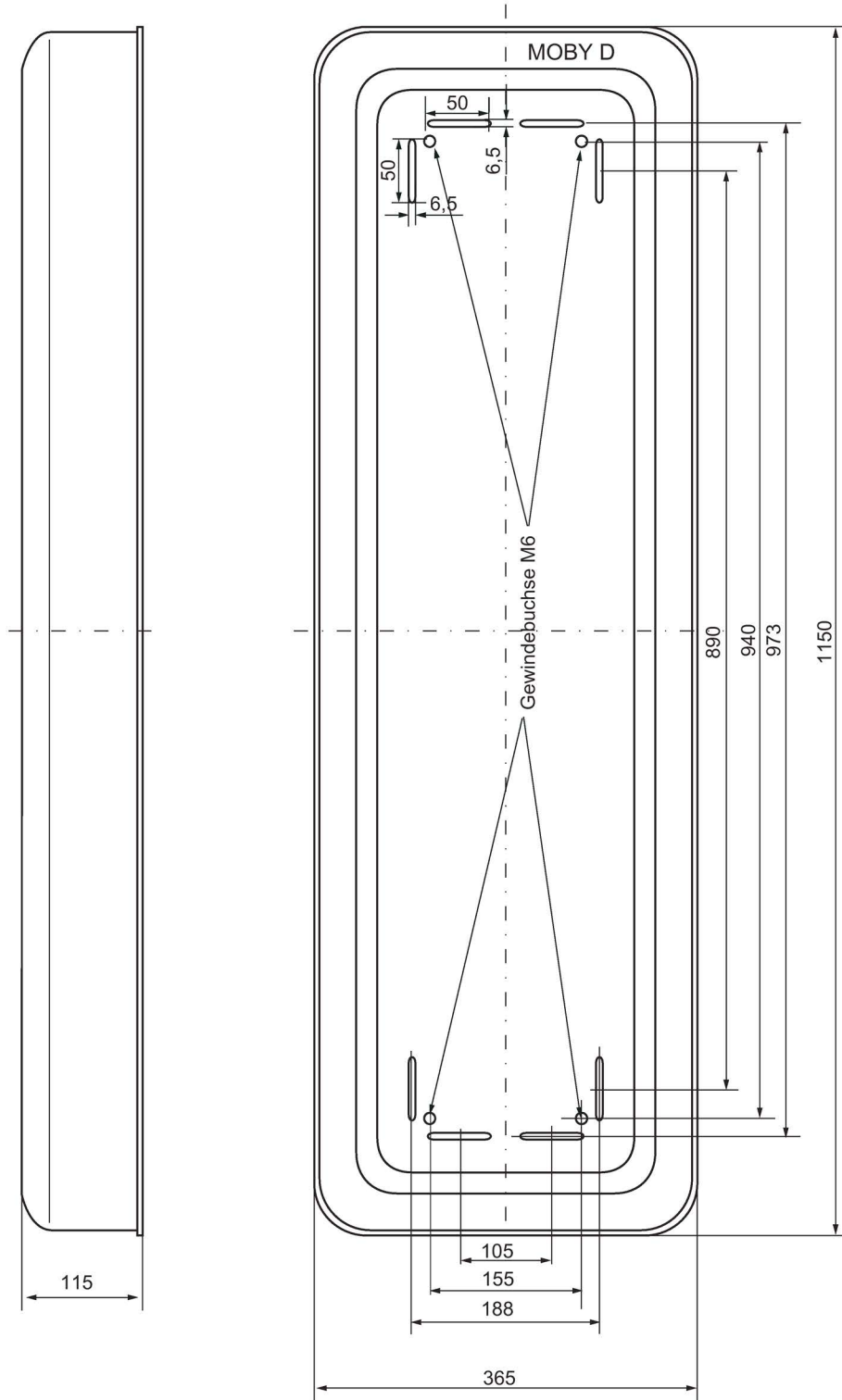


Figure 6-41 Dimension drawing for ANT D10

## Transponder

### 7.1 Memory configuration of ISO the transponders

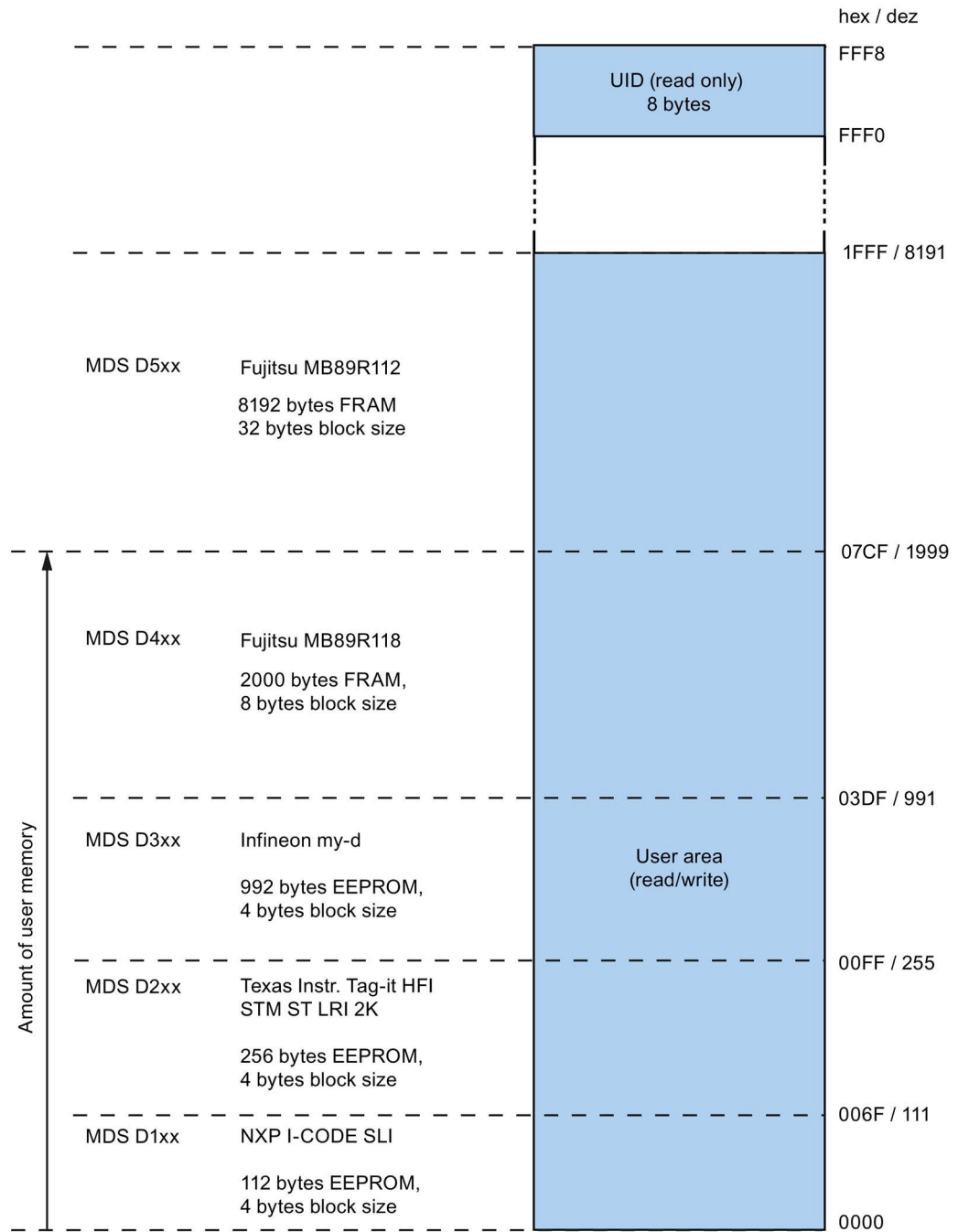


Figure 7-1 Memory configuration of ISO the transponders

## Memory areas

Depending on the manufacturer of the transponder chip, the memory configuration of an ISO transponder consists of varying sizes of user memory.

The typical sizes are 112 bytes, 256 bytes, 992 bytes EEPROM or 2000 bytes, 8192 bytes FRAM. Each ISO transponder chip has an 8-byte long unique serial number (UID, read only). This UID is transferred as an 8 byte value through a read command to address FFF0 with a length of 8.


### Note

#### OPT memory

The transponders have an OTP memory. This was previously only supported by the RF300 readers.

## 7.2 MDS D100

### 7.2.1 Characteristics

MDS D100	Characteristics	
 <p>The image shows a rectangular Siemens MDS D100 transponder chip. It features the Siemens logo in the top left, the model name 'MDS D100' in the top right, and the CE and ENEC certification marks in the bottom right. Text at the bottom left reads 'Siemens AG, DE-76181 Karlsruhe' and at the bottom right '6GT2600-0AD10 AS.10'.</p>	Area of application	From simple identification such as electronic barcode replacement/supplementation, through warehouse and distribution logistics, right up to product identification.
	Memory size	112 bytes of EEPROM user memory
	Write/read range	See section Field data (Page 39).
	Mounting on metal	Yes, with spacer
	ISO standard	ISO 15693
	Degree of protection	IP68

### 7.2.2 Ordering data

Table 7- 1 Ordering data for MDS D100

	Article number
MDS D100	6GT2600-0AD10

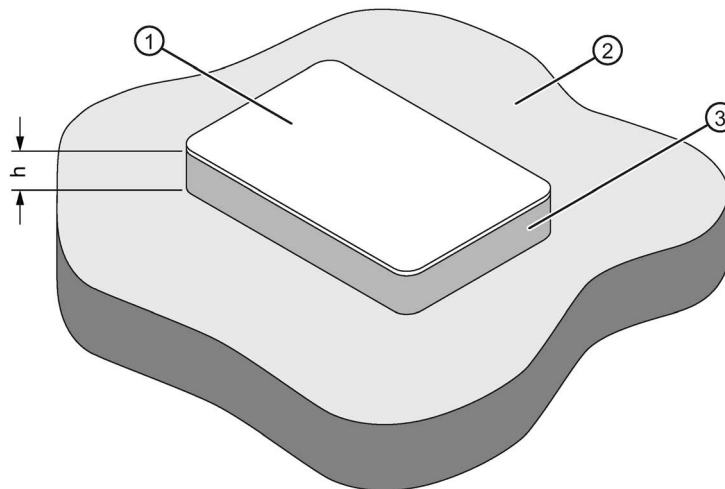
Table 7- 2 Ordering data for MDS D100 accessory

	Article number
Spacer (in conjunction with fixing pocket 6GT2190-0AB00)	6GT2190-0AA00
Fixing pocket (in conjunction with spacer 6GT2190-0AA00)	6GT2190-0AB00
Fixing pocket (not suitable for fixing directly onto metal)	6GT2390-0AA00

### 7.2.3 Metal-free area

Direct mounting of the MDS D100 on metal is not allowed. A distance of  $\geq 20$  mm is recommended. This can be achieved using the spacer 6GT2190-0AA00 in combination with the fixing pocket 6GT2190-0AB00.

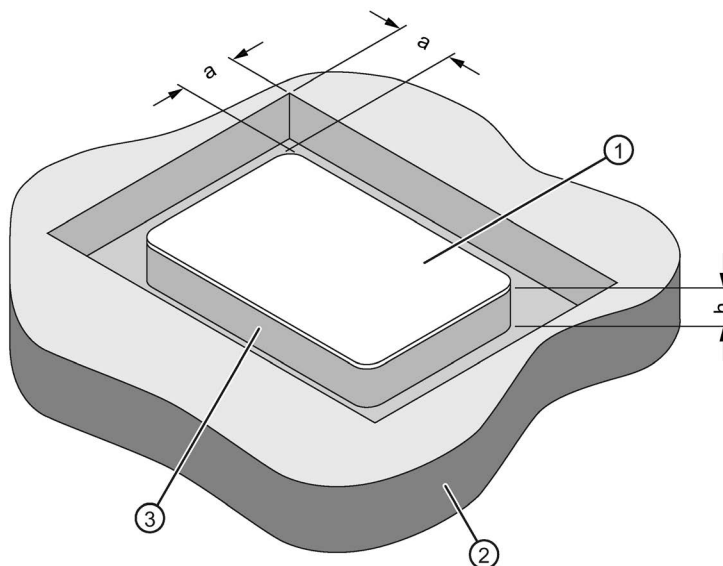
#### Mounting on metal



- h  $\geq 20$  mm
- ① Transponder
- ② Metal
- ③ Non-metal

Figure 7-2 Mounting of the MDS D100 on metal with spacer

Flush-mounting



- a     $\geq 20$  mm
- h     $\geq 20$  mm
- ①    Transponder
- ②    Metal
- ③    Non-metal

Figure 7-3    Flush-mounting of MDS D100 in metal with spacer

**Note**

If the minimum guide values (h or a) are not observed, a reduction of the field data results.

7.2.4    Technical data

Table 7- 3    Technical specifications for MDS D100

<b>6GT2600-0AD10</b>	
Product type designation	SIMATIC MDS D100
<b>Memory</b>	
Memory configuration	
• UID	• 8 bytes
• User memory	• 112 bytes EEPROM
• OTP memory	• 16 bytes (EEPROM)



<b>6GT2600-0AD10</b>	
Read cycles (at < 40 °C)	> 10 <sup>14</sup>
Write cycles (at < 40 °C)	> 10 <sup>6</sup>
Data retention time (at < 40 °C)	> 10 years
Write/read distance (S <sub>g</sub> )	Dependent on the reader used, see section "Field data (Page 39)"
MTBF (Mean Time Between Failures)	228 years

#### **Mechanical specifications**

##### **Housing**

• Material	• PET
• Color	• White/black
Recommended distance to metal	≥ 20 mm
Power supply	Inductive, without battery

#### **Permitted ambient conditions**

##### **Ambient temperature**

• during write/read access	• -25 to +80 °C
• outside the read/write field	• -25 to +80 °C
• during storage	• -25 to +80 °C
Degree of protection to EN 60529	IP68
Shock-resistant to EN 60721-3-7 class 7M3	ISO 10373 / ISO 7810 <sup>1)</sup>
Vibration-resistant to EN 60721-3-7, class 7M3	ISO 10373 / ISO 7810 <sup>1)</sup>
Torsion and bending load	ISO 10373/ISO 7816-1

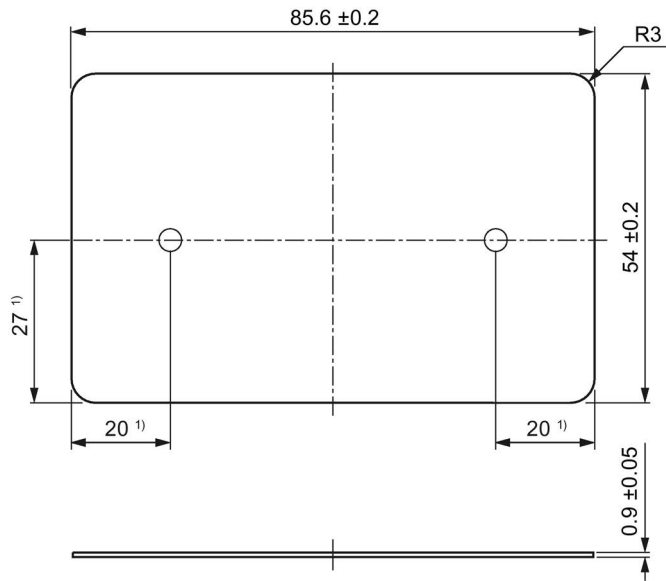
#### **Design, dimensions and weight**

Dimensions (L x W x H)	85.6 x 54 x 0.9 mm
Weight	5 g
Type of mounting	<ul style="list-style-type: none"> <li>• Fixing pocket</li> <li>• Glued <sup>2)</sup></li> </ul>

<sup>1)</sup> The values for shock and vibration are maximum values and must not be applied continuously.

<sup>2)</sup> The processing instructions of the adhesive manufacturer must be observed.

### 7.2.5 Dimension drawing




Dimensions in mm

1) Dimensions for mounting holes

Figure 7-4 MDS D100 dimension drawing

## 7.3 MDS D117

### 7.3.1 Features

MDS D117	Characteristics	
	Area of application	Very compact data carrier that can be cemented into objects where precise positioning is necessary; e.g. tool identification, workpiece holders etc..
	Memory size	112 bytes of EEPROM user memory
	Write/read range	See section "Field data (Page 39)."
	Mounting in metal	Yes, flush-mounted in metal
	ISO standard	ISO 15693
	Degree of protection	IP68/IPx9K

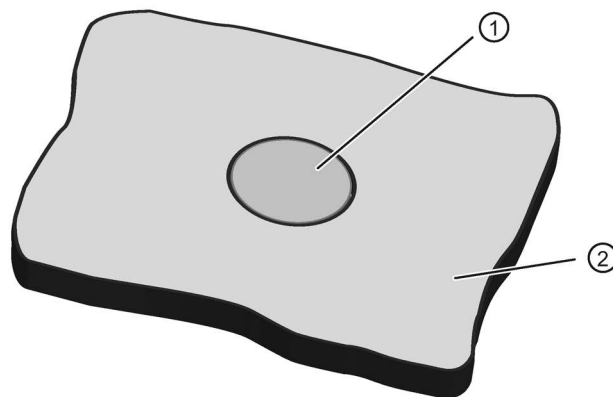
### 7.3.2 Ordering data

Table 7- 4 Ordering data for MDS D117

	Article number
MDS D117 Pack of 10	6GT2600-0AG00

### 7.3.3 Mounting in metal

#### Flush-mounted in metal



- ① Transponder
- ② Metal

## 7.3.4 Technical specifications

Table 7- 5 Technical specifications for MDS D117

<b>6GT2600-0AG00</b>	
Product type designation	SIMATIC MDS D117
<b>Memory</b>	
Memory configuration	
• UID	• 8 bytes
• User memory	• 112 bytes EEPROM
• OTP memory	• 16 bytes (EEPROM)
Read cycles (at < 40 °C)	> 10 <sup>14</sup>
Write cycles (at < 40 °C)	> 10 <sup>6</sup>
Data retention time (at < 40 °C)	> 10 years
Write/read distance (S <sub>9</sub> )	Dependent on the reader used, see section "Field data (Page 39)"
MTBF (Mean Time Between Failures)	228 years
<b>Mechanical specifications</b>	
Housing	
• Material	• PPS
• Color	• Black
Recommended distance to metal	≥ 0 mm
Power supply	Inductive, without battery
<b>Permitted ambient conditions</b>	
Ambient temperature	
• during write/read access	• -25 to +85 °C
• outside the read/write field	• -40 to +125 °C
• during storage	• -40 to +125 °C
Degree of protection to EN 60529	IP68 2 hours, 2 bar, +20 °C
Shock according to EN 60721-3-7 Class 7M3 <sup>1)</sup>	1000 m/s <sup>2</sup>
Vibration according to EN 60721-3-7 Class 7M3 <sup>1)</sup>	200 m/s <sup>2</sup>
Torsion and bending load	Not permitted
<b>Design, dimensions and weight</b>	
Dimensions (Ø x H)	4 x 5.2 mm

6GT2600-0AG00	
Weight	1 g
Type of mounting	<ul style="list-style-type: none"><li>• Fixing pocket</li><li>• Glued <sup>2)</sup></li></ul>

- 1) The values for shock and vibration are maximum values and must not be applied continuously.  
2) The processing instructions of the adhesive manufacturer must be observed.

### 7.3.5 Dimension drawing

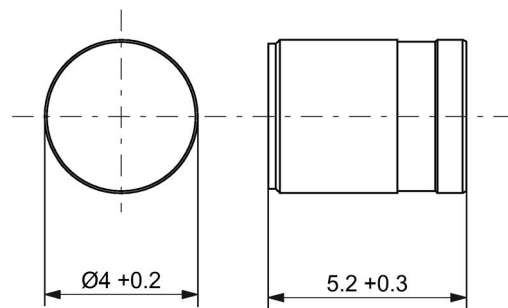



Figure 7-5 Dimensions in mm

## 7.4 MDS D124

### 7.4.1 Characteristics

MDS D124	Characteristics	
	Area of application	Application areas in production automation (e.g. small paintshops up to +180 °C)
	Memory size	112 bytes of EEPROM user memory
	Write/read range	See section "Field data (Page 39)".
	Mounting on metal	Yes, with spacer
	ISO standard	ISO 15693
	Degree of protection	IP68/IPx9K

### 7.4.2 Ordering data

Table 7- 6 Ordering data for MDS D124

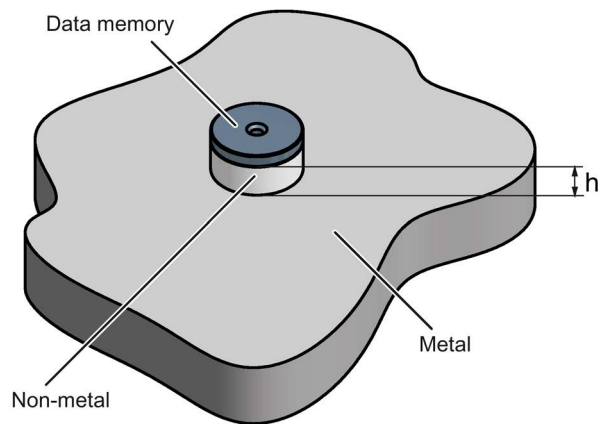
	Article number
MDS D124	6GT2600-0AC10

Table 7- 7 Ordering data for MDS D124 accessories

	Article number
Spacer	6GT2690-0AK00

### 7.4.3 Mounting on metal

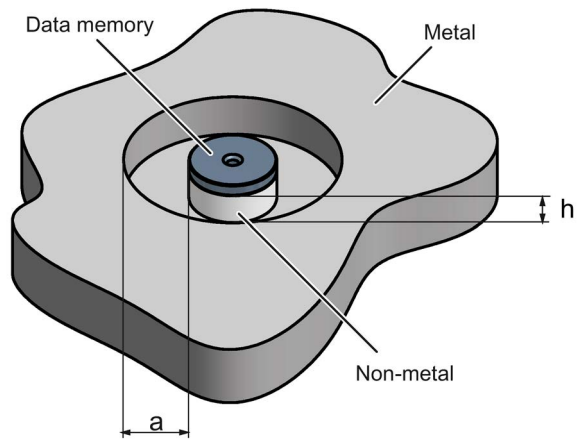
#### Mounting on metal



$$h \geq 15 \text{ mm}$$

Figure 7-6 Mounting the MDS D124/D324/D424/D524/E624 and RF320T on metal with spacer

#### Flush-mounting



$$h \geq 15 \text{ mm}$$

$$a \geq 25 \text{ mm}$$

Figure 7-7 Flush-mounting of the MDS D124/D324/D424/D524/E624 and RF320T in metal with spacer

**Note**

**Going below the distances**

If the distances (a and h) are not observed, a reduction of the field data results. It is possible to mount the MDS with metal screws (M3 countersunk head screws). This has no tangible impact on the range.

**7.4.4 Technical specifications**

Table 7- 8 Technical specifications for MDS D124

<b>6GT2600-0AC10</b>	
Product type designation	SIMATIC MDS D124
<b>Memory</b>	
Memory configuration	
• UID	• 8 bytes
• User memory	• 112 bytes EEPROM
• OTP memory	• 16 bytes (EEPROM)
Read cycles (at < 40 °C)	> 10 <sup>14</sup>
Write cycles (at < 40 °C)	> 10 <sup>6</sup>
Data retention time (at < 40 °C)	> 10 years
Write/read distance (S <sub>g</sub> )	Dependent on the reader used, see section "Field data (Page 39)"
MTBF (Mean Time Between Failures)	228 years
<b>Mechanical specifications</b>	
Housing	
• Material	• PPS
• Color	• Black
Recommended distance to metal	≥ 15 mm
Power supply	Inductive, without battery
<b>Permitted ambient conditions</b>	
Ambient temperature	
• during write/read access	• -25 ... +140 °C
	• from +125 °C: 20% reduction in the limit distance
• outside the read/write field	• -40 to +180 °C



<b>6GT2600-0AC10</b>	
	<ul style="list-style-type: none"> <li>at +180 °C: Tested up to 5000 hours or 3000 cycles</li> </ul>
<ul style="list-style-type: none"> <li>during storage</li> </ul>	<ul style="list-style-type: none"> <li>-40 to +125 °C</li> </ul>
Degree of protection to EN 60529	<ul style="list-style-type: none"> <li>IP68 2 hours, 2 bar, +20 °C</li> <li>IPx9K steam jet: 150 mm; 10 to 15 l/min; 100 bar; 75 °C</li> </ul>
Shock according to EN 60721-3-7 Class 7M3 <sup>1)</sup>	1000 m/s <sup>2</sup>
Vibration according to EN 60721-3-7 Class 7M3 <sup>1)</sup>	200 m/s <sup>2</sup>
Torsion and bending load	Not permitted

#### **Design, dimensions and weight**

Dimensions (Ø x H)	4 x 5.2 mm
Weight	5 g
Type of mounting	<ul style="list-style-type: none"> <li>1 x M3 screw <sup>2)</sup> ≤ 1 Nm</li> <li>Glued <sup>3)</sup></li> <li>With spacer</li> </ul>

<sup>1)</sup> The values for shock and vibration are maximum values and must not be applied continuously.

<sup>2)</sup> ) To prevent it loosening during operation, secure the screw with screw locking varnish.

<sup>3)</sup> The processing instructions of the adhesive manufacturer must be observed.

### **7.4.5 Use of the MDS D124 in hazardous area**

The mobile data memory MDS D124, device group II, category 1G or 1D may be installed and operated in zones 0, 1 and 2 or in the zones 20, 21 and 22.

The following requirements of the 94/9/EC directive are met:

- EN 60079-0:2009
- EN 60079-11:2007
- EN 61241-11:2006
- EN 60079-26:2007

When used in hazardous areas, the MDS D124 must not be operated with field strengths > 5 A / m to avoid impermissible heating. This is not the case with readers from the SIMATIC RF range (MOBY D, RF200 and RF300).

### Identification



II 1 G Ex ia IIC T3 to T6 Ga

or

II 1 D Ex ia IIIC T80 °C to T180 °C Da

TÜV 12 ATEX 084413 X

The temperature class or the maximum surface temperature depends on the maximum ambient temperature. The relationship between temperature class (gas) or maximum surface temperature (dust) can be found in the following table.

Table 7- 9 Ambient temperature

Ambient temperature range	Temperature class	Max. surface temperature
-25 ... +150 °C	T3	T180
-25 ... +100 °C	T4	T130
-25 ... +65 °C	T5	T95
-25 ... +50 °C	T6	T80

#### Note

##### Safety markings for hazardous areas

Since there is not enough space on the MDS D124 for the safety mark, this is supplied as a label with the device.

This must be affixed immediately next to the MDS D124 so that the label clearly relates to the device.



**WARNING**  
Gefahr durch elektrostatische Entladungen  
Potential electrostatic charging hazard  
Danger potentiel de charges électrostatiques

---

**Note**

**Installation and operating conditions for hazardous areas:**

- Use of the device in the vicinity of processes generating high charges is not allowed.
  - The device must be installed so that it is mechanically protected.
  - For applications requiring devices of category 1, the device must be mounted on a grounded, conductive base.
  - It must only be cleaned with a damp cloth.
  - The device is suitable for use in atmospheres containing dust, however not for full immersion in dust.
- 

**7.4.6 Dimension drawing**

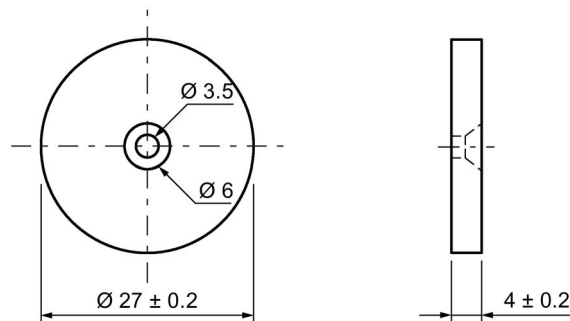



Figure 7-8 Dimension drawing of MDS D124

All dimensions in mm

## 7.5 MDS D126

### 7.5.1 Characteristics

MDS D126	Characteristics	
 <p>The image shows a circular black transponder with a central hole. The text on the transponder reads: 'SIEMENS' at the top, '6GT2600-0AE00' below it, 'MDS D126' in the center, 'MOBY D' below that, and 'AS: A' at the bottom.</p>	Area of application	Compact and rugged ISO transponder; suitable for identification of transport units in production-related logistics; can also be deployed in harsh conditions
	Memory size	112 bytes of EEPROM user memory
	Write/read range	See section Field data (Page 39)
	Mounting on metal	Yes, with spacer
	ISO standard	ISO-15693
	Degree of protection	IP68

### 7.5.2 Ordering data

Table 7- 10 Ordering data for MDS D126

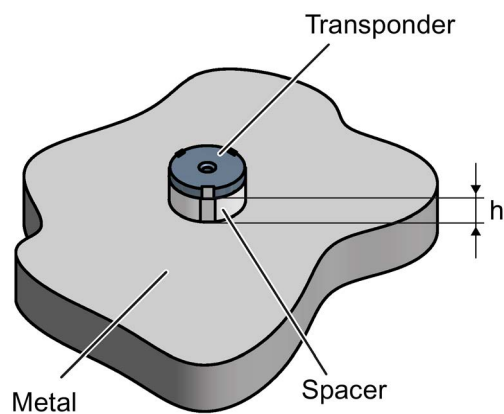
	Article number
MDS D126	6GT2600-0AE00

Table 7- 11 Ordering data for MDS D126 accessories

	Article number
Spacer	6GT2690-0AL00

### 7.5.3 Mounting on metal

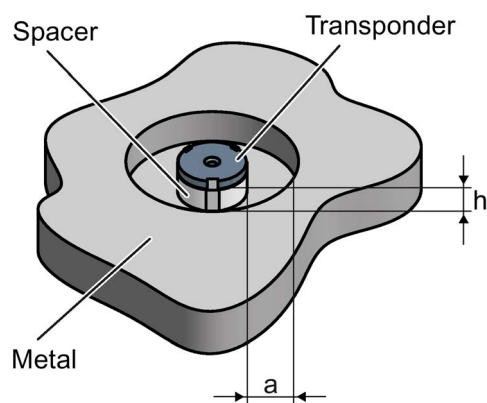
#### Mounting on metal



$h \geq 25 \text{ mm}$

Figure 7-9 Mounting the MDS D126 / D426 / D526 on metal with spacer

#### Flush-mounted in metal



$h \geq 25 \text{ mm}$

$a \geq 50 \text{ mm}$

Figure 7-10 Flush installation of the MDS D126 / D426 / D526 in metal with spacer

## 7.5.4 Technical specifications

Table 7- 12 Technical specifications for the MDS D126

<b>6GT2600-0AE00</b>	
Product type designation	SIMATIC MDS D126
<b>Memory</b>	
Memory configuration	
• UID	• 8 bytes
• User memory	• 112 bytes EEPROM
• OTP memory	• 16 bytes (EEPROM)
Read cycles (at < 40 °C)	> 10 <sup>14</sup>
Write cycles (at < 40 °C)	> 10 <sup>6</sup>
Data retention time (at < 40 °C)	> 10 years
Write/read distance (S <sub>9</sub> )	Dependent on the reader used, see section "Field data (Page 39)"
MTBF (Mean Time Between Failures)	228 years
<b>Mechanical specifications</b>	
Housing	
• Material	• PA6.6 GF
• Color	• Black
Recommended distance to metal	≥ 25 mm
Power supply	Inductive, without battery
<b>Permitted ambient conditions</b>	
Ambient temperature	
• during write/read access	• -25 to +85 °C
• outside the read/write field	• -40 to +100 °C
• during storage	• -40 to +100 °C
Degree of protection to EN 60529	IP68 2 hours, 2 bar, +20 °C
Shock according to EN 60721-3-7 Class 7M3 <sup>1)</sup>	500 m/s <sup>2</sup>
Vibration according to EN 60721-3-7 Class 7M3 <sup>1)</sup>	200 m/s <sup>2</sup>
Torsion and bending load	Not permitted
<b>Design, dimensions and weight</b>	
Dimensions (Ø x H)	50 x 3.6 mm

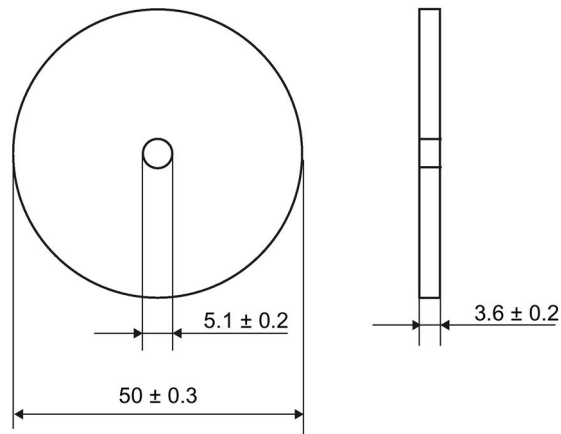
<b>6GT2600-0AE00</b>	
Weight	13 g
Type of mounting	<ul style="list-style-type: none"> <li>• 1 x M4 screw <sup>2)</sup> ≤ 1 Nm</li> <li>• Glued <sup>3)</sup></li> </ul>

<sup>1)</sup> The values for shock and vibration are maximum values and must not be applied continuously.

<sup>2)</sup> ) To prevent it loosening during operation, secure the screw with screw locking varnish.

<sup>3)</sup> The processing instructions of the adhesive manufacturer must be observed.

### 7.5.5 Dimension drawing




Dimensions in mm

Figure 7-11 Dimension drawing of MDS D126

## 7.6 MDS D127

### 7.6.1 Features

	<b>Characteristics</b>	
Area of application	Very compact data carrier that can be screwed into areas where precise positioning is necessary; e.g. tool identification, workpiece holders etc.	
Memory size	112 bytes of EEPROM user memory	
Write/read range	See section "Field data (Page 39)"	
Mounting on metal	Yes, flush-mounted in metal	
ISO standard	ISO 15693	
Degree of protection	IP68/IPx9K	

### 7.6.2 Ordering data

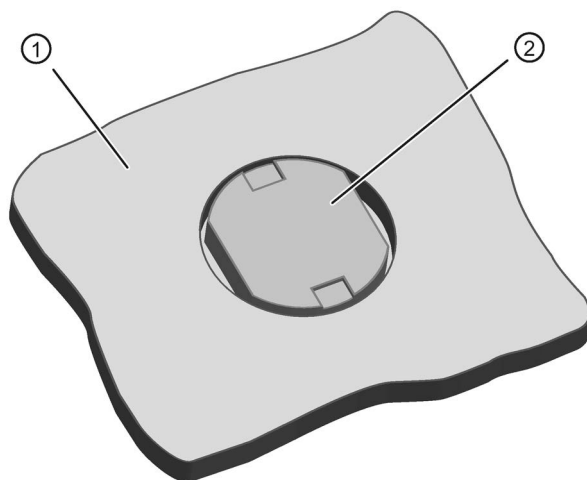
Table 7- 13 Ordering data for MDS D127

	<b>Article number</b>
MDS D127 Pack of 10 (A screw-in aid is supplied with each pack)	6GT2600-0AF00



### 7.6.3 Mounting in metal

#### Flush-mounted in metal



- ① Metal
- ② Transponders

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#### Note

##### Damage to the transponder due to improper mounting

To screw the MDS D127 into a suitable thread, use the supplied screw-in tool. This avoids damage to the MDS D127.

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Figure 7-12 Screw-in aid for mounting the MDS D127

## 7.6.4 Technical specifications

Table 7- 14 Technical specifications for MDS D127

<b>6GT2600-0AF00</b>	
Product type designation	SIMATIC MDS D127
<b>Memory</b>	
Memory configuration	
• UID	• 8 bytes
• User memory	• 112 bytes EEPROM
• OTP memory	• 16 bytes (EEPROM)
Read cycles (at < 40 °C)	> 10 <sup>14</sup>
Write cycles (at < 40 °C)	> 10 <sup>6</sup>
Data retention time (at < 40 °C)	> 10 years
Write/read distance (S <sub>g</sub> )	Dependent on the reader used, see section "Field data (Page 39)"
MTBF (Mean Time Between Failures)	228 years
<b>Mechanical specifications</b>	
Housing	
• Material	• PA6
• Color	• Black
Recommended distance to metal	≥ 0 mm
Power supply	Inductive, without battery
<b>Permitted ambient conditions</b>	
Ambient temperature	
• during write/read access	• -25 to +100 °C
• outside the read/write field	• -40 to +125 °C
• during storage	• -40 to +125 °C
Degree of protection to EN 60529	<ul style="list-style-type: none"> <li>• IP68 2 hours, 2 bar, +20 °C</li> <li>• IPx9K steam jet: 150 mm; 10 to 15 l/min; 100 bar; 75 °C</li> </ul>
Shock according to EN 60721-3-7 Class 7M3 <sup>1)</sup>	1000 m/s <sup>2</sup>
Vibration according to EN 60721-3-7 Class 7M3 <sup>1)</sup>	200 m/s <sup>2</sup>
Torsion and bending load	Not permitted

6GT2600-0AF00

**Design, dimensions and weight**

Dimensions (Ø x H)	M6 x 5.8 mm
Weight	1 g
Type of mounting	<ul style="list-style-type: none"> <li>• Glued <sup>2)</sup></li> <li>• 1 x M3 screw</li> </ul>

1) The values for shock and vibration are maximum values and must not be applied continuously.

2) The processing instructions of the adhesive manufacturer must be observed.

**7.6.5 Dimension drawing**

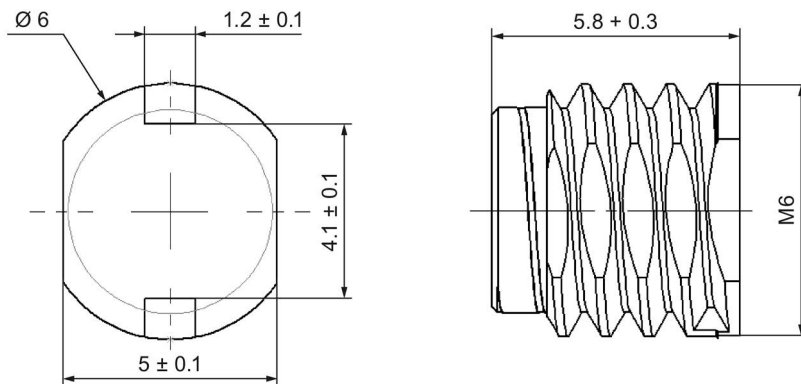



Figure 7-13 Dimensions in mm

## 7.7 MDS D139

### 7.7.1 Characteristics

<b>MDS D139</b>	<b>Characteristics</b>	
	Area of application	<p>Applications in production logistics and in assembly lines subject to high temperatures (up to +220 °C)</p> <p>Typical application areas:</p> <ul style="list-style-type: none"> <li>• Paintshops and their preparatory treatments)</li> <li>• Primer coat, electrolytic dip area, cataphoresis with the associated drying furnaces</li> <li>• Top coat area with drying furnaces</li> <li>• Washing areas at temperatures &gt; 85 °C</li> <li>• Other applications with higher temperatures</li> </ul>
	Memory size	112 bytes of EEPROM user memory
	Write/read range	See section Field data (Page 39).
	Mounting on metal	Yes, with spacer
	ISO standard	ISO 15693
	Degree of protection	IP68/IPx9K

### 7.7.2 Ordering data

Table 7- 15 Ordering data for MDS D139

	Article number
MDS D139	6GT2600-0AA10

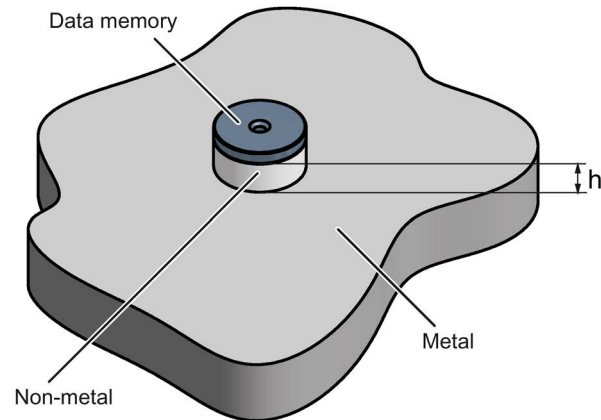
Table 7- 16 Ordering data for MDS D139 accessory

	Article number
Spacer	6GT2690-0AA00
Quick change holder (Ø x H): 22 x 60 mm	6GT2690-0AH00
Quick change holder (Ø x H): 22 x 47 mm	6GT2690-0AH10

### 7.7.3 Metal-free area

Direct mounting of the MDS D139 on metal is not allowed. A distance of  $\geq 30$  mm is recommended. This can be achieved using spacers (see "Transponder holders (Page 355)").

#### Mounting on metal

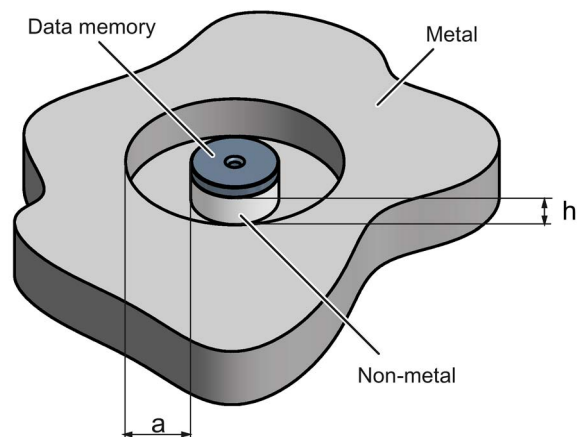


$$h \geq 30 \text{ mm}$$

Figure 7-14 Mounting the MDS D139 on metal with spacer

#### Flush-mounting

It is possible to mount the MDS D139 in metal. With large antennas, for example ANT D5, this leads to a reduction of ranges.



$$h \geq 30 \text{ mm}$$

$$a \geq 100 \text{ mm}$$

Figure 7-15 Flush-mounting of the MDS D139 in metal with spacer

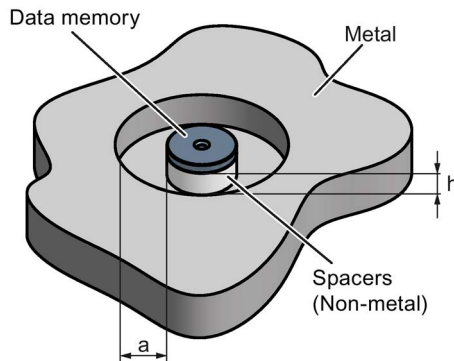
**Note**

**Going below the distances**

If the distances (a and h) are not observed, a reduction of the field data results. It is possible to mount the MDS with metal screws (M5). This has no tangible impact on the range. It is recommended that a test is performed in critical applications.

**7.7.4 Mounting in metal**

It is possible to mount the MDS D139 in metal. With large antennas, for example ANT D5, this leads to a reduction of ranges.



a = 100 mm  
h = 30 mm

Figure 7-16 MDS D139: Mounting in metal

**7.7.5 Cleaning the transponder**

**NOTICE**

**Cleaning the transponder**

Do not clean the transponder with mechanical tools, sand-blasting or pressure hose. These cleaning methods result in damage to the transponder.

Clean the transponder only with the chemical cleansing agents listed in the section Chemical resistance of the reader and transponders (Page 89).

## 7.7.6 Technical specifications

Table 7- 17 Technical specifications for MDS D139

<b>6GT2600-0AA10</b>	
Product type designation	SIMATIC MDS D139
<b>Memory</b>	
Memory configuration	
• UID	• 8 bytes
• User memory	• 112 bytes EEPROM
• OTP memory	• 16 bytes (EEPROM)
Read cycles (at < 40 °C)	> 10 <sup>14</sup>
Write cycles (at < 40 °C)	> 10 <sup>6</sup>
Data retention time (at < 40 °C)	> 10 years
Write/read distance (S <sub>g</sub> )	Dependent on the reader used, see section "Field data (Page 39)"
MTBF (Mean Time Between Failures)	228 years
<b>Mechanical specifications</b>	
Housing	
• Material	• PPS
• Color	• Black
Recommended distance to metal	≥ 30 mm
Power supply	Inductive, without battery
<b>Permitted ambient conditions</b>	
Ambient temperature	
• during write/read access	• -25 ... +140 °C
	• from +125 °C: 20% reduction in the limit distance
• outside the read/write field	• -40 to +220 °C
	• at +200 °C: Tested up to 5000 hours or 6000 cycles
	• at +220 °C: Tested up to 2000 hours or 2000 cycles
• during storage	• -40 to +100 °C

<b>6GT2600-0AA10</b>	
Degree of protection to EN 60529	<ul style="list-style-type: none"> <li>• IP68 2 hours, 2 bar, +20 °C</li> <li>• IPx9K steam jet: 150 mm; 10 to 15 l/min; 100 bar; 75 °C</li> </ul>
Shock according to EN 60721-3-7 Class 7M3 <sup>1)</sup>	500 m/s <sup>2</sup>
Vibration according to EN 60721-3-7 Class 7M3 <sup>1)</sup>	200 m/s <sup>2</sup>
Torsion and bending load	Not permitted
<b>Design, dimensions and weight</b>	
Dimensions (Ø x H)	85 x 15 mm
Weight	50 g
Type of mounting	1 x M5 screw <sup>2)</sup> 1.5 Nm

<sup>1)</sup> The values for shock and vibration are maximum values and must not be applied continuously.

<sup>2)</sup> For mounting with the spacer (6GT2690-0AA00), use a stainless steel M5 screw to avoid damaging the MDS in high temperatures (expansion coefficient).

### 7.7.7 Use of the MDS D139 in hazardous areas

The MDS D139 mobile data memory is classed as a piece of simple, electrical equipment and can be operated in Protection Zone 2, Device Group II, Category 3G.

The following requirements of the 94/9/EC directive are met:

- EN 60079-0:2006
- EN 60079-15:2005
- EN 61241-0:2006
- EN 61241-1:2004



## Identification



II 3 G Ex nA II T2

II 3 D Ex tD A22 IP68 T 220°C

KEMA 09 ATEX 0133 X

Ta: -25 ... +220°C



### WARNING

**Gefahr durch elektrostatische Entladungen**

**Potential electrostatic charging hazard**

**Danger potentiel de charges électrostatiques**

### Note

#### **Installations- und Betriebsbedingungen für den Ex-Schutzbereich:**

- Der Einsatz des Gerätes in der Nähe von stark ladungserzeugenden Prozessen ist untersagt.
- Das Gerät ist mechanisch geschützt zu montieren.
- Die Montage muss auf einem geerdeten, leitenden Untergrund erfolgen.
- Die Reinigung darf nur mit feuchtem Tuch erfolgen.

#### **Installation and operating conditions for hazardous areas:**

- Use of the equipment in the vicinity of processes generating high charges is not allowed.
- The equipment must be mechanically protected when installed.
- Installation must be performed on a grounded and conductive mounting surface.
- Cleaning only with a wet cloth

#### **Conditions d'installation et de mise en oeuvre pour la zone de protection Ex :**

- L'utilisation de l'appareil près de processus générant de fortes charges est interdite.
- L'appareil doit être monté de manière à être protégé mécaniquement.
- Le montage doit être effectué sur un socle conducteur mis à la terre.
- Nettoyage uniquement avec un chiffon humide

### 7.7.8 Dimension drawings

#### Dimensional drawing of MDS D139

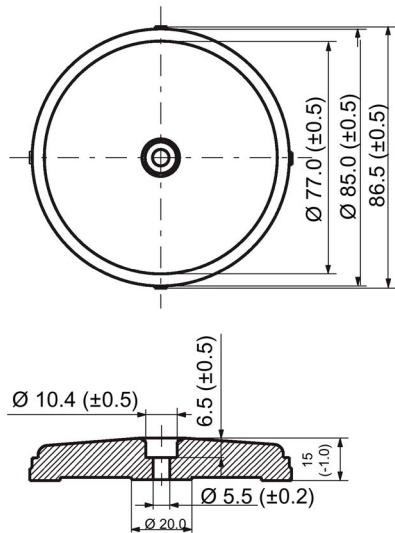



Figure 7-17 Dimensional drawing of MDS D139

Dimensions in mm

## 7.8 MDS D160

### 7.8.1 Characteristics

MDS D160	Characteristics	
 <p>SIEMENS 6GT2600-0AB10 MDS D160 MOBY D</p>	Area of application	<p>Thanks to its rugged packaging, the MDS D160 is a transponder that can be used under extreme environmental conditions. It is washable, heat-resistant and resistant to all chemicals generally used in the laundry process.</p> <p>Typical applications are, for example:</p> <ul style="list-style-type: none"> <li>• Rented work clothing</li> <li>• Hotel laundry</li> <li>• Surgical textiles</li> <li>• Hospital clothing</li> <li>• Dirt collection mats</li> <li>• Clothing for nursing homes/hostels</li> </ul>
	Memory size	112 bytes of EEPROM user memory
	Write/read range	See section Field data (Page 39).
	Mounting on metal	Yes, with spacer
	ISO standard	ISO 15693
	Degree of protection	IP68/IPx9K

### 7.8.2 Ordering data

Table 7- 18 Ordering data for MDS D160

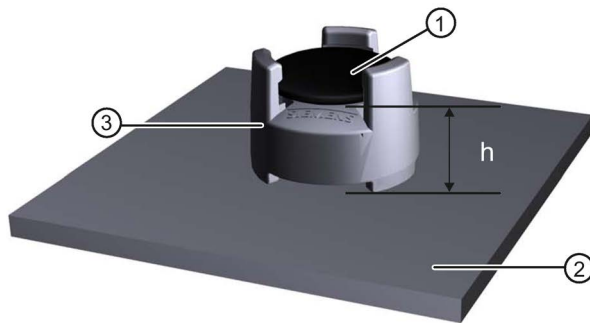
	Article number
MDS D160	6GT2600-0AB10

Table 7- 19 Ordering data for MDS D160 accessories

	Article number
Spacer	6GT2690-0AG00

### 7.8.3 Mounting on metal

#### Mounting on metal



- ① Transponder
  - ② Metal carrier
  - ③ Spacer
- $h \geq 10 \text{ mm}$

Figure 7-18 Mounting the MDS D160 on metal with spacer

#### Note

##### Going below the minimum distance (h)

If the minimum distance (h) is not observed, a reduction of the field data results. In critical applications, it is recommended that a test is performed.

#### Flush-mounting

Flush-mounting of the MDS D160 in metal is not permitted!

### 7.8.4 Technical specifications

Table 7- 20 Technical specifications for the MDS D160

<b>6GT2600-0AB10</b>	
Product type designation	SIMATIC MDS D160
<b>Memory</b>	
Memory configuration	
• UID	• 8 bytes
• User memory	• 112 bytes EEPROM

<b>6GT2600-0AB10</b>	
• OTP memory	• 16 bytes (EEPROM)
Read cycles (at < 40 °C)	> 10 <sup>14</sup>
Write cycles (at < 40 °C)	> 10 <sup>6</sup>
Data retention time (at < 40 °C)	> 10 years
Write/read distance (S <sub>g</sub> )	Dependent on the reader used, see section "Field data (Page 39)"
MTBF (Mean Time Between Failures)	228 years
<b>Mechanical specifications</b>	
Housing	
• Material	• PPS
• Color	• beige
Recommended distance to metal	≥ 10 mm
Power supply	Inductive, without battery
<b>Permitted ambient conditions</b>	
Ambient temperature	
• during write/read access	• -25 ... +85 °C
• outside the read/write field	• -40 ... +175 °C
	• from +125 °C: for 1000 hours, 20% reduction of the limit distance
	• at +175 °C: 100 washing cycles tested
	• at +220 °C: Tested once for up to 30 seconds
• during storage	• -25 to +100 °C
<b>Mechanical strength</b>	
• Isostatic pressure	• 300 bar for 5 min
• Axial pressure	• 1000 N for 10 s
• Radial pressure	• 1000 N for 10 s
Resistance to chemicals	All chemicals normally used in the washing process
MDS lifespan	At least 100 wash cycles
Degree of protection	• IP68 24 hours, 2 bar, +20 °C
	• IPx9K
Shock according to IEC 68-2-27 <sup>1)</sup>	400 m/s <sup>2</sup> 18 ms; 6 axes; 2000 repetitions/h
Vibration according to IEC 68-2-6 <sup>1)</sup>	100 m/s <sup>2</sup> 10 ... 2000 Hz; 3 axes; 2.5 h

6GT2600-0AB10	
Torsion and bending load	Not permitted
<b>Design, dimensions and weight</b>	
Dimensions (Ø x H)	16 x 3 mm
Weight	1.2 g
Type of mounting	<ul style="list-style-type: none"> <li>• Patched</li> <li>• Sewn in</li> <li>• Glued <sup>2)</sup></li> </ul>

- 1) The values for shock and vibration are maximum values and must not be applied continuously.  
2) The processing instructions of the adhesive manufacturer must be observed.

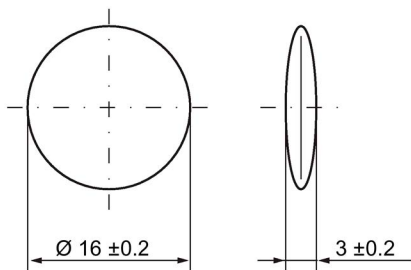
**Note**

**Regeneration time between washing cycles**

The regeneration time for the MDS D160 between washing cycles must be at least 24 hours.

**7.8.5 Dimension drawings**

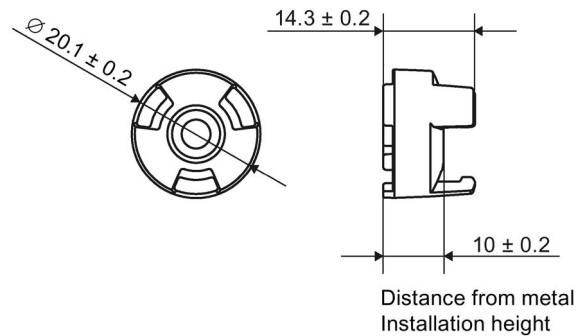
**Dimensional drawing of MDS D160**



Dimensions in mm

Figure 7-19 Dimensional drawing of MDS D160

### Dimensional drawing of spacer




Dimensions in mm

Figure 7-20 Dimensional drawing of spacer

## 7.9 MDS D165

### 7.9.1 Features

MDS D165 (special version)	Characteristics	
	Area of application	The design of the transponder (self-adhesive label) permits a variety of designs, guaranteeing optimum dimensioning for the widest variety of applications. From simple identification such as electronic barcode replacement/supplementation, through warehouse and distribution logistics, right up to product identification.
	Memory size	112 bytes of EEPROM user memory
	Write/read range	See section Field data (Page 39).
	Mounting on metal	Yes, with spacer
	ISO standard	ISO 15693
	Degree of protection	IP65

### 7.9.2 Ordering data

Table 7- 21 Ordering data for MDS D165

	Article number
MDS D165 (special version ISO-CARD)	6GT2600-1AB00-0AX0

## Type of delivery

Minimum order quantity: 1250 units (5 rolls with 250 units each)

## 7.9.3 Technical data

Table 7- 22 Technical specifications for MDS D165

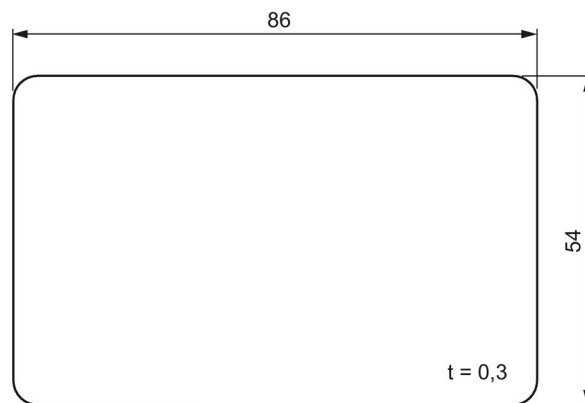
<b>6GT2600-1AB00-0AX0</b>	
Product type designation	SIMATIC MDS D165
<b>Memory</b>	
Memory configuration	
• UID	• 8 bytes
• User memory	• 112 bytes EEPROM
• OTP memory	• 16 bytes (EEPROM)
Read cycles (at < 40 °C)	> 10 <sup>14</sup>
Write cycles (at < 40 °C)	> 10 <sup>6</sup>
Data retention time (at < 40 °C)	> 10 years
Write/read distance (S <sub>g</sub> )	Dependent on the reader used, see section "Field data (Page 39)"
MTBF (Mean Time Between Failures)	228 years
<b>Mechanical specifications</b>	
Housing	
• Material	• Top
	• PET plastic (label material)
	• Inlay
	• PET plastic (carrier material)
	• Antenna
	• Aluminum
	• Bottom
	• Double-sided transfer adhesive on silicon paper
• Color	• White
Recommended distance to metal	≥ 25 mm
Power supply	Inductive, without battery
<b>Permitted ambient conditions</b>	
Ambient temperature	
• during write/read access	• -25 ... +80 °C



<b>6GT2600-1AB00-0AX0</b>	
• outside the read/write field	• -25 to +80 °C
• during storage	• +20 to +30 °C Can be stored for 2 years, determined by the durability of the adhesive.
Degree of protection	IP65
<b>Design, dimensions and weight</b>	
Dimensions (L x W x H)	86 x 54 x 0.3 mm
Weight	1 g
Type of mounting	Glued with self-adhesive label <sup>1)</sup>

<sup>1)</sup> The processing instructions of the adhesive manufacturer must be observed.

## 7.9.4 Dimension drawing




Dimensions in mm

Figure 7-21 Dimension drawing of MDS D165

## 7.10 MDS D200

### 7.10.1 Features

MDS D200	Characteristics	
 <p>SIEMENS MOBY D MDS D200 6GT2600-1AD00-0AX0 / AS 02</p>	Area of application	From simple identification such as electronic barcode replacement/supplementation, through warehouse and distribution logistics, right up to product identification.
	Memory size	256 bytes of EEPROM user memory
	Write/read range	See section Field data (Page 39).
	Mounting on metal	Yes, with spacer
	ISO standard	15693 with Tag-it HFI technology
	Degree of protection	IP67

### 7.10.2 Ordering data

Table 7- 23 Ordering data for MDS D200

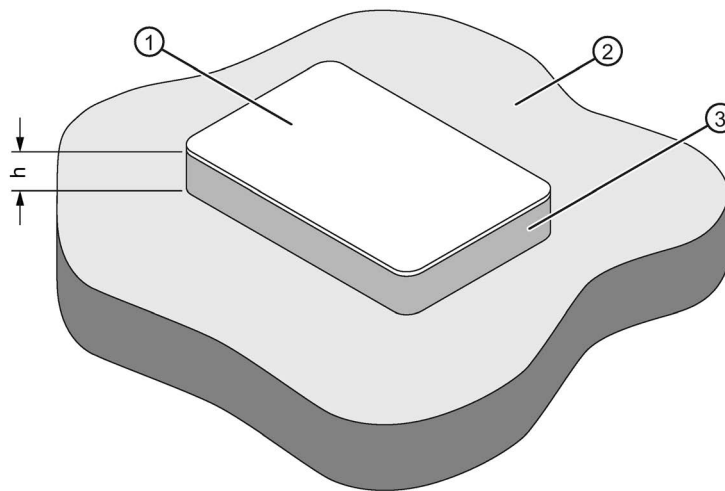
	Article number
MDS D200 (special version ISO-CARD)	6GT2600-1AD00-0AX0

Table 7- 24 Ordering data for MDS D200 accessories

	Article number
Spacer (in conjunction with fixing pocket 6GT2190-0AB00)	6GT2190-0AA00
Fixing pocket (in conjunction with spacer 6GT2190-0AA00)	6GT2190-0AB00
Fixing pocket (not suitable for fixing directly onto metal)	6GT2390-0AA00

### 7.10.3 Mounting on metal

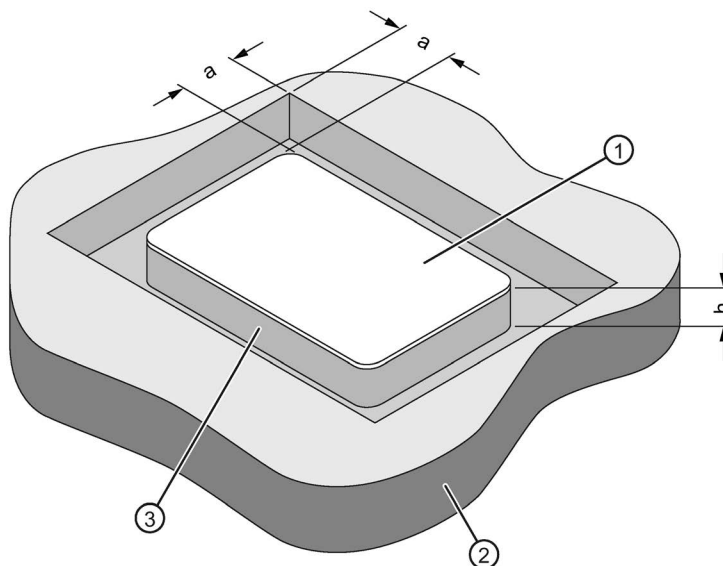
#### Mounting on metal



- h      $\geq 20$  mm  
①    Transponder  
②    Metal  
③    Non-metal

Figure 7-22 Mounting of the MDS D200 on metal with spacer

Flush-mounting



- a ≥ 20 mm
- h ≥ 20 mm
- ① Transponder
- ② Metal
- ③ Non-metal

Figure 7-23 Flush-mounting of MDS D200 in metal with spacer

**Note**

If the minimum guide values (h) are not observed, a reduction of the field data results.

7.10.4 Technical data

Table 7- 25 Technical specifications for MDS D200

<b>6GT2600-1AD00-0AX0</b>	
Product type designation	SIMATIC MDS D200
<b>Memory</b>	
Memory configuration	
• UID	• 8 bytes
• User memory	• 256 bytes EEPROM

<b>6GT2600-1AD00-0AX0</b>	
• OTP memory	• 16 bytes (EEPROM)
Read cycles (at < 25 °C)	> 10 <sup>14</sup>
Write cycles (at < 25 °C)	> 10 <sup>6</sup>
Data retention time (at < 25 °C)	> 10 years
Write/read distance (S <sub>g</sub> )	Dependent on the reader used, see section "Field data (Page 39)"
MTBF (Mean Time Between Failures)	228 years

#### **Mechanical specifications**

##### **Housing**

• Material	• PET
• Color	• White
Recommended distance to metal	≥ 20 mm
Power supply	Inductive, without battery

#### **Permitted ambient conditions**

##### **Ambient temperature**

• during write/read access	• -20 to +60 °C
• outside the read/write field	• -20 to +60 °C
• during storage	• -20 to +60 °C

Degree of protection to EN 60529	IP67
Shock-resistant to EN 60721-3-7 class 7M3	ISO 10373 / ISO 7810 <sup>1)</sup>
Vibration-resistant to EN 60721-3-7, class 7M3	ISO 10373 / ISO 7810 <sup>1)</sup>
Torsion and bending load	ISO 10373/ISO 7816-1

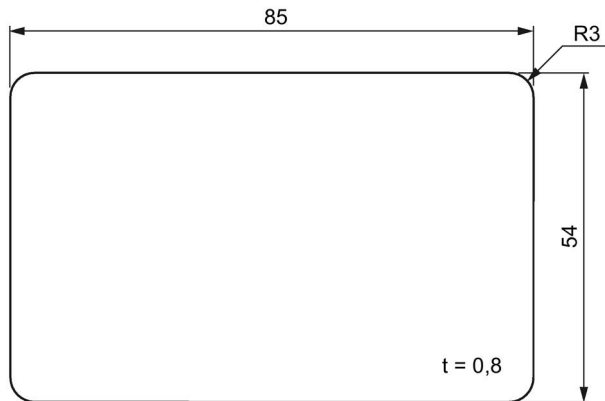
#### **Design, dimensions and weight**

Dimensions (L x W x H)	85 x 54 x 0.8 mm
Weight	5 g
Type of mounting	<ul style="list-style-type: none"> <li>• Fixing pocket</li> <li>• Glued <sup>2)</sup></li> </ul>

<sup>1)</sup> The values for shock and vibration are maximum values and must not be applied continuously.

<sup>2)</sup> The processing instructions of the adhesive manufacturer must be observed.

### 7.10.5 Dimension drawing




Dimensions in mm

Figure 7-24 Dimension drawing of MDS D200

## 7.11 MDS D261

### 7.11.1 Features

MDS D261	Characteristics	
	Area of application	The design of the transponder (self-adhesive label) permits a variety of designs, guaranteeing optimum dimensioning for the widest variety of applications. From simple identification such as electronic barcode replacement/supplementation, through warehouse and distribution logistics, right up to product identification.
	Memory size	256 bytes of EEPROM user memory
	Write/read range	See section Field data (Page 39).
	Mounting on metal	Yes, with spacer
	ISO standard	ISO 15693
	Degree of protection	IP65

### 7.11.2 Ordering data

Table 7- 26 Ordering data for MDS D261

	Article number
MDS D261	6GT2600-1AA00-0AX0

## Type of delivery

Minimum order quantity: 1250 units (5 rolls with 250 units each)

## 7.11.3 Technical data

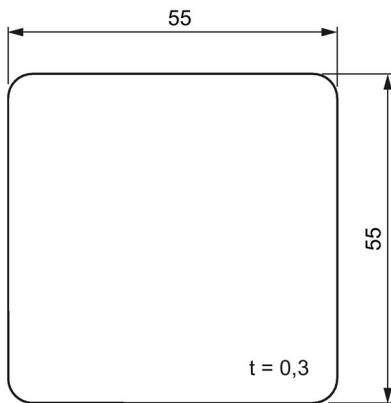
Table 7- 27 Technical specifications of MDS D261

<b>6GT2600-1AA01-0AX0</b>	
Product type designation	SIMATIC MDS D261
<b>Memory</b>	
Memory configuration	
• UID	• 8 bytes
• User memory	• 256 bytes EEPROM
• OTP memory	• 16 bytes (EEPROM)
Read cycles (at < 40 °C)	> 10 <sup>14</sup>
Write cycles (at < 40 °C)	> 10 <sup>6</sup>
Data retention time (at < 40 °C)	> 10 years
Write/read distance (S <sub>g</sub> )	Dependent on the reader used, see section "Field data (Page 39)"
MTBF (Mean Time Between Failures)	228 years
<b>Mechanical specifications</b>	
Housing	
• Material	• Top
	• PET plastic (label material)
	• Inlay
	• PET plastic (carrier material)
	• Antenna
	• Aluminum
	• Bottom
	• Double-sided transfer adhesive on silicon paper
• Color	• White
Recommended distance to metal	≥ 25 mm
Power supply	Inductive, without battery
<b>Permitted ambient conditions</b>	
Ambient temperature	
• during write/read access	• -20 ... +60 °C

<b>6GT2600-1AA01-0AX0</b>	
<ul style="list-style-type: none"> <li>• outside the read/write field</li> </ul>	<ul style="list-style-type: none"> <li>• -20 ... +85 °C</li> </ul>
<ul style="list-style-type: none"> <li>• During transportation and storage</li> </ul>	<ul style="list-style-type: none"> <li>• +20 to +30 °C</li> </ul> <p>Can be stored for 2 years, determined by the durability of the adhesive</p>
Degree of protection	IP65
<b>Design, dimensions and weight</b>	
Dimensions (L x W x H)	55 x 55 x 0.3 mm
Weight	1 g
Type of mounting	Glued with self-adhesive label <sup>1)</sup>

1) The processing instructions of the adhesive manufacturer must be observed.

### 7.11.4 Dimension drawing




Dimensions in mm

Figure 7-25 Dimension drawing of MDS D261



## 7.12 MDS D324

### 7.12.1 Characteristics

MDS D324	Characteristics	
 <p>A circular black transponder with a central hole. The text 'SIEMENS' is at the top, '6GT2600-3AC00' is below it, 'MDS D324' is in the middle, and 'MOBY D' is at the bottom.</p>	Area of application	Production and distribution logistics and product identification Can also be used in harsh environments under extreme environmental conditions (e.g. with higher temperature load).
	Memory size	992 bytes of EEPROM user memory
	Write/read range	See section "Field data (Page 39)."
	Mounting on metal	Yes, with spacer
	ISO standard	ISO 15693
	Degree of protection	IP67; IPx9K

### 7.12.2 Ordering data

Table 7- 28 Ordering data MDS D324

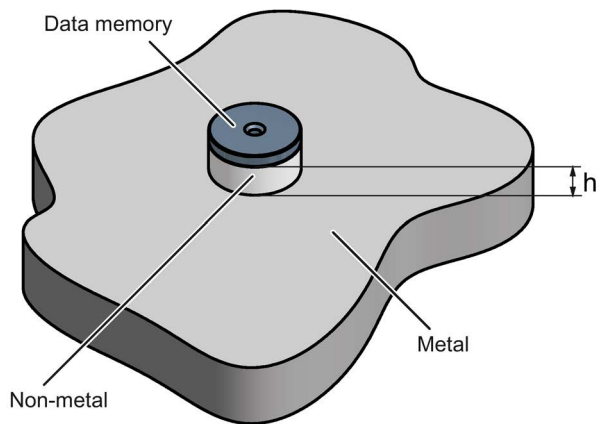
	Article number
MDS D324	6GT2600-3AC00

Table 7- 29 Ordering data MDS D324 accessories

	Article number
Spacer	6GT2690-0AK00

### 7.12.3 Mounting on metal

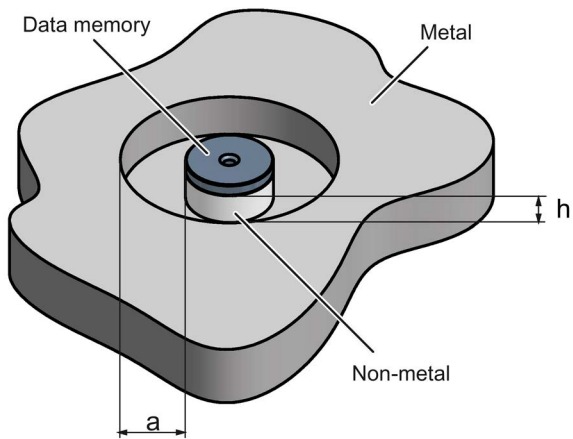
#### Mounting on metal



$$h \geq 15 \text{ mm}$$

Figure 7-26 Mounting the MDS D124/D324/D424/D524/E624 and RF320T on metal with spacer

#### Flush-mounting



$$h \geq 15 \text{ mm}$$

$$a \geq 25 \text{ mm}$$

Figure 7-27 Flush-mounting of the MDS D124/D324/D424/D524/E624 and RF320T in metal with spacer

**Note**

**Going below the distances**

If the distances (a and h) are not observed, a reduction of the field data results. It is possible to mount the MDS with metal screws (M3 countersunk head screws). This has no tangible impact on the range.

## 7.12.4 Technical specifications

Table 7- 30 Technical specifications of MDS D324

<b>6GT2600-3AC00</b>	
Product type designation	SIMATIC MDS D324
<b>Memory</b>	
Memory configuration	
• UID	• 8 bytes
• User memory	• 992 bytes EEPROM
• OTP memory	• 16 bytes (EEPROM)
Read cycles (at < 40 °C)	> 10 <sup>14</sup>
Write cycles (at < 40 °C)	> 10 <sup>6</sup>
Data retention time (at < 40 °C)	> 10 years
Write/read distance (S <sub>g</sub> )	Dependent on the reader used, see section "Field data (Page 39)"
MTBF (Mean Time Between Failures)	228 years
<b>Mechanical specifications</b>	
Housing	
• Material	• Epoxy resin
• Color	• Black
Recommended distance to metal	≥ 15 mm
Power supply	Inductive, without battery
<b>Permitted ambient conditions</b>	
Ambient temperature	
• during write/read access	• -25 to +125 °C
• outside the read/write field	• -40 to +140 °C
• during storage	• -40 to +140 °C

<b>6GT2600-3AC00</b>	
Degree of protection to EN 60529	<ul style="list-style-type: none"> <li>• IP67</li> <li>• IPx9K</li> </ul>
Shock according to EN 60721-3-7 Class 7M3 <sup>1)</sup>	1000 m/s <sup>2</sup>
Vibration according to EN 60721-3-7 Class 7M3 <sup>1)</sup>	200 m/s <sup>2</sup>
Torsion and bending load	Not permitted
<b>Design, dimensions and weight</b>	
Dimensions (Ø x H)	27 x 4 mm
Weight	5 g
Type of mounting	<ul style="list-style-type: none"> <li>• 1 x M3 screw <sup>2)</sup> ≤ 1 Nm</li> <li>• Glued <sup>3)</sup></li> </ul>

- 1) The values for shock and vibration are maximum values and must not be applied continuously.  
 2) To prevent it loosening during operation, secure the screw with screw locking varnish.  
 3) The processing instructions of the adhesive manufacturer must be observed.

### 7.12.5 Dimension drawing

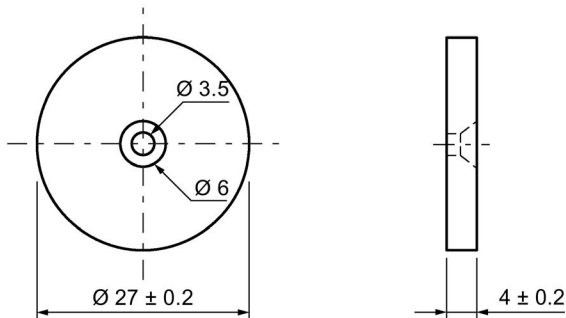



Figure 7-28 Dimension drawing of MDS D324

All dimensions in mm

## 7.13 MDS D339

### 7.13.1 Characteristics

MDS D339	Characteristics	
	Area of application	Applications in production automation with high temperature demands (up to +220 °C) Typical application areas: <ul style="list-style-type: none"> <li>• Paintshops and their preparatory treatments</li> <li>• Primer coat, electrolytic dip area, cataphoresis with the associated drying furnaces</li> <li>• Top coat area with drying furnaces</li> <li>• Washing areas at temperatures &gt; 85 °C</li> <li>• Other applications with higher temperatures</li> </ul>
	Memory size	992 bytes of EEPROM user memory
	Write/read range	See section Field data (Page 39).
	Mounting on metal	Yes, with spacer
	ISO standard	ISO 15693
	Degree of protection	IP68/IPx9K

### 7.13.2 Ordering data

Table 7- 31 Ordering data for MDS D339

	Article number
MDS D339	6GT2600-3AA10

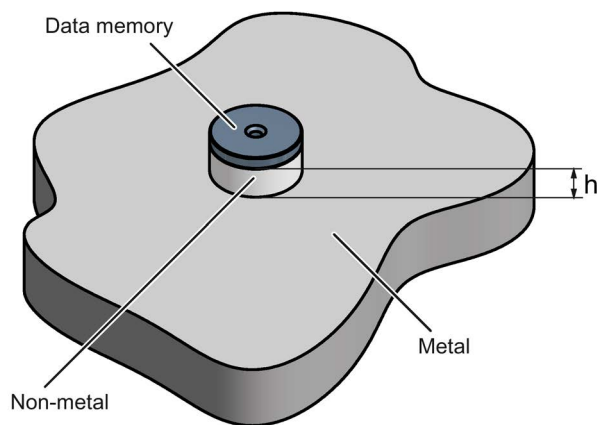
Table 7- 32 Ordering data for MDS D339 accessories

	Article number
Spacer	6GT2690-0AA00
Quick change holder (Ø x H): 22 x 60 mm	6GT2690-0AH00
Quick change holder (Ø x H): 22 x 47 mm	6GT2690-0AH10

### 7.13.3 Mounting on metal

Direct mounting of the MDS D139/D339 on metal is not allowed. A distance of  $\geq 30$  mm is recommended. This can be achieved using spacers (see "Transponder holders (Page 355)").

#### Mounting on metal

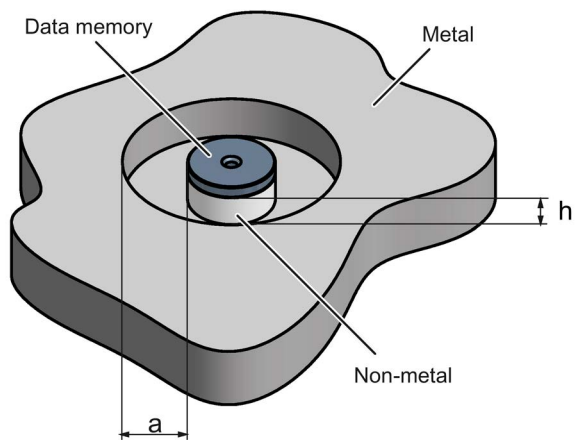


$$h \geq 30 \text{ mm}$$

Figure 7-29 Mounting the MDS D139/D339 on metal with spacer

#### Flush-mounting

It is possible to mount the MDS D139/D339 in metal. With large antennas, for example ANT D5, this leads to a reduction of ranges.



$$h \geq 30 \text{ mm}$$

$$a \geq 100 \text{ mm}$$

Figure 7-30 Flush-mounting of the MDS D139/D339 in metal with spacer

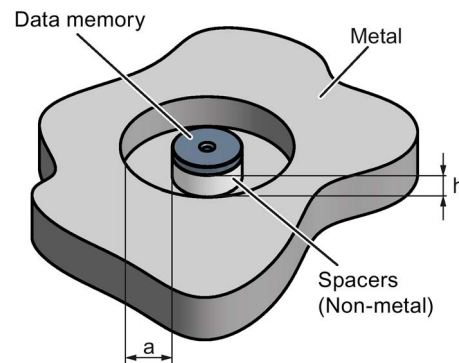
**Note**

**Going below the distances**

If the distances (a and h) are not observed, a reduction of the field data results. It is possible to mount the MDS with metal screws (M5). This has no tangible impact on the range. It is recommended that a test is performed in critical applications.

### 7.13.4 Mounting in metal

It is possible to mount the MDS D339 in metal. With large antennas, for example ANT D5, this leads to a reduction of ranges.



a = 100 mm

h = 30 mm

Figure 7-31 MDS D339: Mounting in metal

### 7.13.5 Cleaning the transponder

**NOTICE**

**Cleaning the transponder**

Do not clean the transponder with mechanical tools, sand-blasting or pressure hose. These cleaning methods result in damage to the transponder.

Clean the transponder only with the chemical cleansing agents listed in the section Chemical resistance of the reader and transponders (Page 89).

## 7.13.6 Technical specifications

Table 7- 33 Technical specifications of MDS D339

<b>6GT2600-3AA10</b>	
Product type designation	SIMATIC MDS D339
<b>Memory</b>	
Memory configuration	
• UID	• 8 bytes
• User memory	• 992 bytes EEPROM
• OTP memory	• 16 bytes (EEPROM)
Read cycles (at < 40 °C)	> 10 <sup>14</sup>
Write cycles (at < 40 °C)	> 10 <sup>6</sup>
Data retention time (at < 40 °C)	> 10 years
Write/read distance (S <sub>9</sub> )	Dependent on the reader used, see section "Field data (Page 39)"
MTBF (Mean Time Between Failures)	228 years
<b>Mechanical specifications</b>	
Housing	
• Material	• PPS
• Color	• Black
Recommended distance to metal	≥ 30 mm
Power supply	Inductive, without battery
<b>Permitted ambient conditions</b>	
Ambient temperature	
• during write/read access	• -25 to +100 °C
• outside the read/write field	• -40 to +220 °C
	• from +125 °C: 20% reduction in the limit distance
	• at +200 °C: Tested up to 5000 hours or 6000 cycles
	• at +220 °C: Tested up to 2000 hours or 2000 cycles
• during storage	• -40 to +100 °C



<b>6GT2600-3AA10</b>	
Degree of protection to EN 60529	<ul style="list-style-type: none"> <li>• IP68 2 hours, 2 bar, +20 °C</li> <li>• IPx9K steam jet: 150 mm; 10 to 15 l/min; 100 bar; 75 °C</li> </ul>
Shock according to EN 60721-3-7 Class 7M3 <sup>1)</sup>	500 m/s <sup>2</sup>
Vibration according to EN 60721-3-7 Class 7M3 <sup>1)</sup>	200 m/s <sup>2</sup>
Torsion and bending load	Not permitted

#### **Design, dimensions and weight**

Dimensions (Ø x H)	85 x 15 mm
Weight	50 g
Type of mounting	1 x M5 screw <sup>2)</sup> 1.5 Nm

<sup>1)</sup> The values for shock and vibration are maximum values and must not be applied continuously.

<sup>2)</sup> For mounting with the spacer (6GT2690-0AA00), use a stainless steel M5 screw to avoid damaging the MDS in high temperatures (expansion coefficient).

### **7.13.7 Use of the MDS D339 in hazardous areas**

The MDS D339 mobile data memory is classed as a piece of simple, electrical equipment and can be operated in Protection Zone 2, Device Group II, Category 3G.

The following requirements of the 94/9/EC directive are met:

- EN 60079-0:2006
- EN 60079-15:2005
- EN 61241-0:2006
- EN 61241-1:2004

## Identification



II 3 G Ex nA II T6

li 3 D Ex tD A22 IP68 T 210°C

KEMA 09 ATEX 0133 X



**WARNING**  
**Gefahr durch elektrostatische Entladungen**  
**Potential electrostatic charging hazard**  
**Danger potentiel de charges électrostatiques**

### Note

#### Installations- und Betriebsbedingungen für den Ex-Schutzbereich:

- a) Der Einsatz des Gerätes in der Nähe von stark ladungserzeugenden Prozessen ist untersagt.
- b) Das Gerät ist mechanisch geschützt zu montieren.
- c) Die Montage muss auf einem geerdeten, leitenden Untergrund erfolgen.
- d) Die Reinigung darf nur mit feuchtem Tuch erfolgen.

#### Installation and operating conditions for hazardous areas:

- a) Use of the equipment in the vicinity of processes generating high charges is not allowed.
- b) The equipment must be mechanically protected when installed.
- c) Installation must be performed on a grounded and conductive mounting surface.
- d) Cleaning only with a wet cloth

#### Conditions d'installation et de mise en oeuvre pour la zone de protection Ex :

- a) L'utilisation de l'appareil près de processus générant de fortes charges est interdite.
  - b) L'appareil doit être monté de manière à être protégé mécaniquement.
  - c) Le montage doit être effectué sur un socle conducteur mis à la terre.
  - d) Nettoyage uniquement avec un chiffon humide
-

### 7.13.8 Dimensional drawing

#### MDS D339

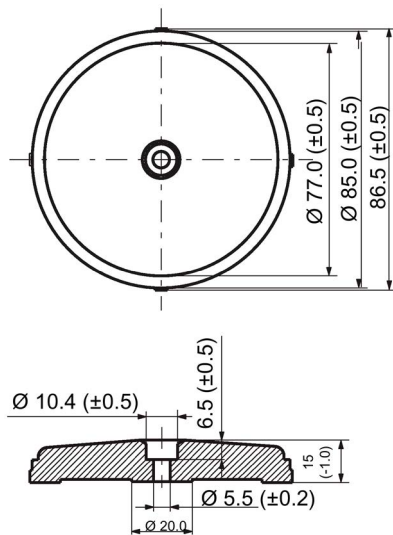



Figure 7-32 Dimension drawing of the MDS D339

Dimensions in mm

## 7.14 MDS D400

### 7.14.1 Features

MDS D400	Characteristics	
 <p>SIEMENS MDS D400 6GT2600-4AD00 / AS.01</p>	Area of application	Simple identification such as electronic barcode replacement/supplements, from warehouse and distribution logistics right through to product identification.
	Memory size	2000 bytes of FRAM user memory
	Write/read range	See section "Field data (Page 39)"
	Mounting on metal	Yes, with spacer
	ISO standard	ISO 15693
	Degree of protection	IP67

### 7.14.2 Ordering data

Table 7- 34 Ordering data of MDS D400

	Article number
MDS D400	6GT2600-4AD00

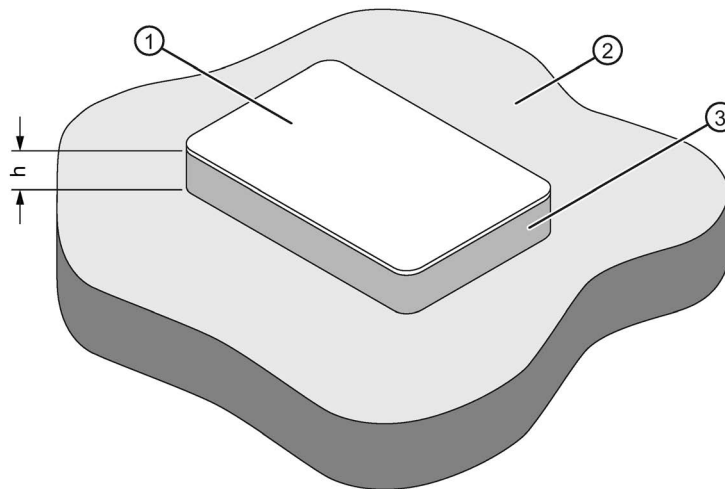
Table 7- 35 Ordering data of MDS D400 accessories

	Article number
Spacer (in conjunction with fixing pocket 6GT2190-0AB00)	6GT2190-0AA00
Fixing pocket (in conjunction with spacer 6GT2190-0AA00)	6GT2190-0AB00
Fixing pocket (not suitable for fixing directly onto metal)	6GT2390-0AA00

### 7.14.3 Mounting on metal

#### Mounting on metal

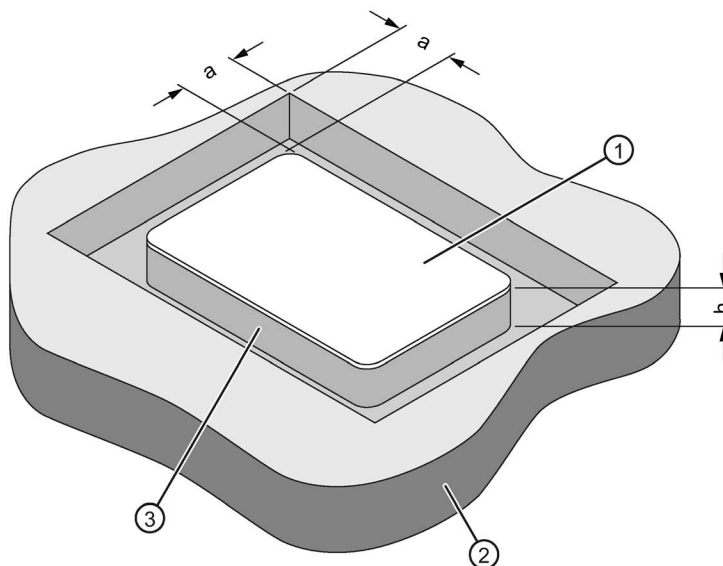
It is possible to mount the MDS D400 on metal.



- $h \geq 20 \text{ mm}$   
① Transponder  
② Metal  
③ Non-metal

Figure 7-33 Mounting of the MDS D400 on metal with spacer

Flush-mounted in metal



- a     $\geq 20$  mm
- h     $\geq 20$  mm
- ①    Transponder
- ②    Metal
- ③    Non-metal

Figure 7-34 Flush-mounting of MDS D400 in metal with spacer

**Note**

If the minimum guide values (h) are not observed, this will result in a reduction of the field data.

7.14.4 Technical specifications

Table 7- 36 Technical specifications for MDS D400

<b>6GT2600-4AD00</b>	
Product type designation	SIMATIC MDS D400
<b>Memory</b>	
Memory configuration	
• UID	• 8 bytes
• User memory	• 2000 bytes FRAM

<b>6GT2600-4AD00</b>	
• OTP memory	• 16 bytes FRAM
Read cycles (at < 25 °C)	> 10 <sup>12</sup>
Write cycles (at < 25 °C)	> 10 <sup>12</sup>
Data retention time (at < 25 °C)	> 10 years
Write/read distance (S <sub>g</sub> )	Dependent on the reader used, see section "Field data (Page 39)"
MTBF (Mean Time Between Failures)	228 years

#### **Mechanical specifications**

##### **Housing**

• Material	• PVC
• Color	• White
Recommended distance to metal	≥ 20 mm
Power supply	Inductive, without battery

#### **Permitted ambient conditions**

##### **Ambient temperature**

• during write/read access	• -20 to +60 °C
• outside the read/write field	• -20 to +60 °C
• during storage	• -20 to +60 °C
Degree of protection to EN 60529	IP67
Vibration-resistant to EN 60721-3-7, class 7M3	ISO 10373 / ISO 7810 <sup>1)</sup>
Torsion and bending load	ISO 10373/ISO 7816-1

#### **Design, dimensions and weight**

Dimensions (L x W x H)	85 x 54 x 0.8 mm
Weight	5 g
Type of mounting	<ul style="list-style-type: none"> <li>• Fixing lug</li> <li>• Glued <sup>2)</sup></li> </ul>

<sup>1)</sup> The values for vibration are maximum values and must not be applied continuously.

<sup>2)</sup> The processing instructions of the adhesive manufacturer must be observed.

### 7.14.5 Dimension drawing

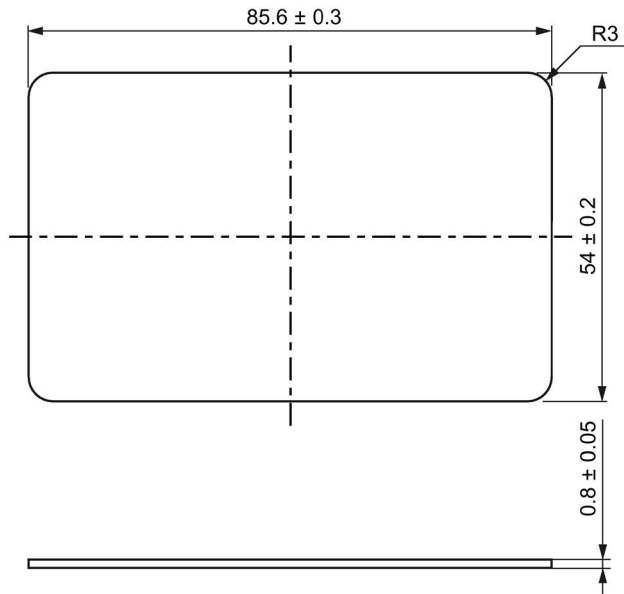



Figure 7-35 Dimensional drawing MDS D400 (dimensions in mm)



## 7.15 MDS D421

### 7.15.1 Characteristics

MDS D421	Characteristics	
	Area of application	<p>The MDS D421 is designed for tool coding in accordance with DIN 69873.</p> <p>It can be used wherever small data carriers and exact positioning are required, e.g. tool identification, workpiece holders.</p> <p>The rugged housing of the MDS D421 means that it can also be used in a harsh industrial environment without problems.</p>
	Memory size	2000 bytes of FRAM user memory
	Write/read range	See section "Field data (Page 39)"
	Mounting on metal	Yes, flush-mounted in metal
	ISO standard	ISO 15693
	Degree of protection	IP67/IPx9K

### 7.15.2 Ordering data

Table 7- 37 Ordering data of MDS D421

	Article number
MDS D421	6GT2600-4AE00

### 7.15.3 Mounting on metal

#### Mounting on metal

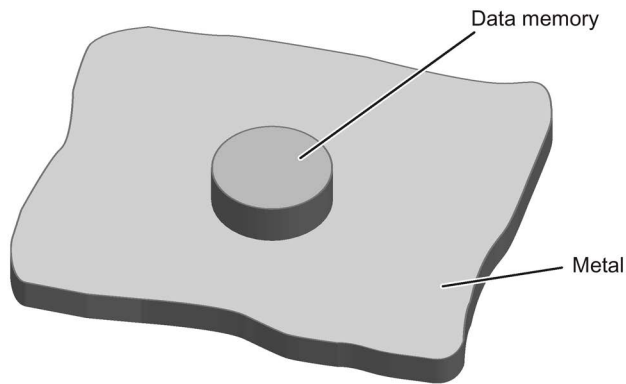


Figure 7-36 Mounting of MDS D421 on metal

#### Flush-mounting

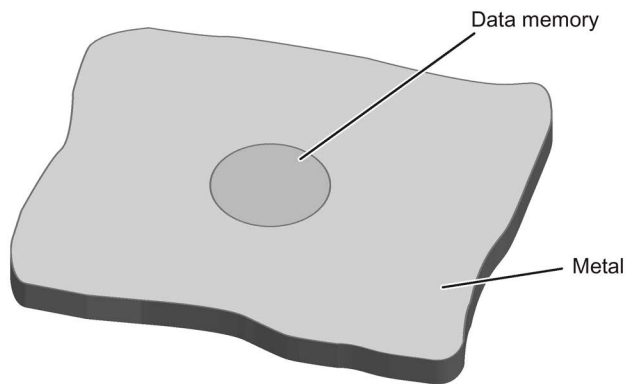


Figure 7-37 Mounting of MDS D421 in metal

#### Flush-mounting of MDS D421 in metal with tools

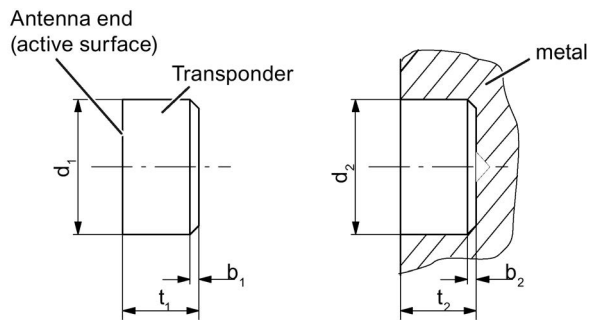


Figure 7-38 Flush-mounting of MDS D421 in metal with tools

b <sub>1</sub>	0.5 x 45°	b <sub>2</sub>	0.3 x 45° or R 0.3
d <sub>1</sub>	10 (-0.04.. -0.13)	d <sub>2</sub>	10 (+0.09... 0)
t <sub>1</sub>	4.5 (-0... -0.1)	t <sub>2</sub>	4.6 (+0.2... 0)

All dimensions in mm

### Note

#### Installation instruction

The MDS should not protrude out of the locating hole; it must be flush with the outside contour.

The mounting instructions of the MDS and the conditions associated with the application (e.g. peripheral speed, temperature, and use of coolant) must be observed during the installation.

### Mounting information for adhesion

- Drill installation hole
- The adhesive surfaces must be dry, free from dust, oil, stripping agents and other impurities
- Apply adhesive according to the manufacturer's processing instructions
- Press in MDS D421 using your finger; antenna side to the outside (see figure "Flush-mounting of MDS D421 in metal with tools")
- Remove residues of adhesive
- Allow to cure according to the manufacturer's instructions
- Flush-mounting of MDS D421 in metal with tools

### Installation examples

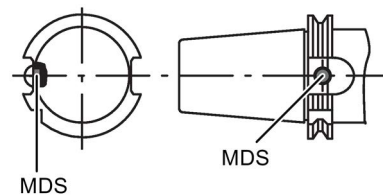


Figure 7-39 Installation example of MDS D421 in a steep cone

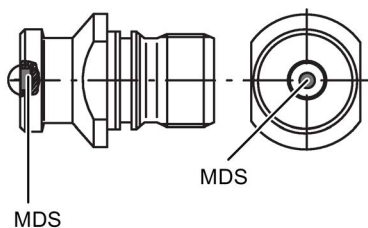


Figure 7-40 Installation example of MDS D421 in a stud bolt

### 7.15.4 Technical specifications

Table 7- 38 Technical specifications for the MDS D421

<b>6GT2600-4AE00</b>	
Product type designation	SIMATIC MDS D421
<b>Memory</b>	
Memory configuration	
• UID	• 8 bytes
• User memory	• 2000 bytes FRAM
• OTP memory	• 16 bytes FRAM
Read cycles (at < 40 °C)	> 10 <sup>12</sup>
Write cycles (at < 40 °C)	> 10 <sup>12</sup>
Data retention time (at < 40 °C)	> 10 years
Write/read distance (S <sub>9</sub> )	Dependent on the reader used, see section "Field data (Page 39)"
MTBF (Mean Time Between Failures)	228 years
<b>Mechanical specifications</b>	
Housing	
• Material	• Epoxy resin
• Color	• Black
Recommended distance to metal	≥ 0 mm
Power supply	Inductive, without battery
<b>Permitted ambient conditions</b>	
Ambient temperature	
• during write/read access	• -25 to +85 °C
• outside the read/write field	• -40 to +100 °C
• during storage	• -40 to +100 °C

<b>6GT2600-4AE00</b>	
Degree of protection to EN 60529	<ul style="list-style-type: none"> <li>• IP67</li> <li>• IPx9K steam jet: 150 mm; 10 to 15 l/min; 100 bar; 75 °C</li> </ul>
Shock according to EN 60721-3-7 Class 7M3 <sup>1)</sup>	1000 m/s <sup>2</sup>
Vibration according to EN 60721-3-7 Class 7M3 <sup>1)</sup>	200 m/s <sup>2</sup>
Torsion and bending load	Not permitted

#### Design, dimensions and weight

Dimensions (Ø x H)	10 x 4.5 mm
Weight	Approx. 1 g
Type of mounting	Glued <sup>2)</sup>

<sup>1)</sup> The values for shock and vibration are maximum values and must not be applied continuously.

<sup>2)</sup> The processing instructions of the adhesive manufacturer must be observed.

### 7.15.5 Dimension drawing

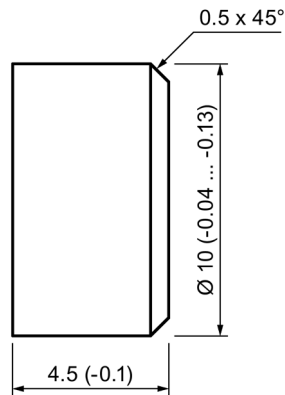



Figure 7-41 Dimension drawing of MDS D421

All dimensions in mm

## 7.16 MDS D422

### 7.16.1 Characteristics

MDS D422	Characteristics	
	Area of application	Identification of metallic workpiece holders, workpieces or containers
	Memory size	2000 bytes of FRAM user memory
	Write/read range	See section "Field data (Page 39).
	Mounting on metal	Yes
	ISO standard	ISO 15693
	Degree of protection	IP68

### 7.16.2 Ordering data

Table 7- 39 Ordering data of MDS D422

	Article number
MDS D422 A screw-in aid is included in the scope of supply per packaging unit	6GT2600-4AF00

### 7.16.3 Mounting in metal

#### Flush-mounting

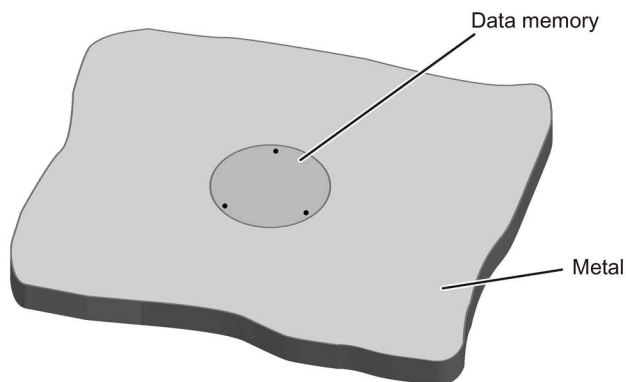


Figure 7-42 Mounting of MDS D422 in metal

### Mounting information for screws

You can screw the transponder into a pre-drilled threaded hole using the screw-in aid.

### Mounting information for adhesion

- Drill installation hole
- The adhesive surfaces must be dry, free from dust, oil, stripping agents and other impurities
- Apply adhesive according to the manufacturer's processing instructions
- Press in MDS D422 using your fingers; with antenna to the outside
- Remove residues of adhesive
- Allow to cure according to the manufacturer's instructions
- Flush-mounting of MDS D422 in metal with tools

## 7.16.4 Technical specifications

Table 7- 40 Technical specifications for the MDS D422

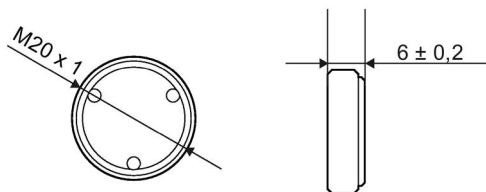
<b>6GT2600-4AF00</b>	
Product type designation	SIMATIC MDS D422
<b>Memory</b>	
Memory configuration	
• UID	• 8 bytes
• User memory	• 2000 bytes FRAM
• OTP memory	• 16 bytes FRAM
Read cycles (at < 40 °C)	> 10 <sup>12</sup>
Write cycles (at < 40 °C)	> 10 <sup>12</sup>
Data retention time (at < 40 °C)	> 10 years
Write/read distance (S <sub>g</sub> )	Dependent on the reader used, see section "Field data (Page 39)"
MTBF (Mean Time Between Failures)	285 years
<b>Mechanical specifications</b>	
Housing	
• Material	• Plastic PA 6.6 GF; brass nickel plated
• Color	• Black/silver
Recommended distance to metal	≥ 0 mm
Power supply	Inductive, without battery

<b>6GT2600-4AF00</b>	
<b>Permitted ambient conditions</b>	
Ambient temperature	
• during write/read access	• -25 to +85 °C
• outside the read/write field	• -40 to +100 °C
• during storage	• -40 to +100 °C
Degree of protection to EN 60529	IP68 2 hours, 2 bar, +20 °C
Shock according to EN 60721-3-7 Class 7M3 <sup>1)</sup>	500 m/s <sup>2</sup>
Vibration according to EN 60721-3-7 Class 7M3 <sup>1)</sup>	200 m/s <sup>2</sup>
Torsion and bending load	Not permitted
<b>Design, dimensions and weight</b>	
Dimensions (Ø x H)	20 x 6 mm
Weight	13 g
Type of mounting	<ul style="list-style-type: none"> <li>• Glued <sup>2)</sup></li> <li>• 1 x transponder thread M20 ≤ 1 Nm</li> </ul>

1) The values for shock and vibration are maximum values and must not be applied continuously.

2) The processing instructions of the adhesive manufacturer must be observed.

### 7.16.5 Dimension drawing




Dimensions in mm

Figure 7-43 Dimensional drawing of MDS D422



## 7.17 MDS D423

### 7.17.1 Characteristics

MDS D423	Characteristics	
	Area of application	Identification of metallic workpiece holders, workpieces or containers, production automation
	Memory size	2000 bytes of FRAM user memory
	Write/read range	See section "Field data (Page 39)"
	Mounting on metal	Yes, flush-mounted in metal
	ISO standard	ISO 15693
	Degree of protection	IP68/IPx9K

### 7.17.2 Ordering data

Table 7- 41 Ordering data of MDS D423

	Article number
MDS D423	6GT2600-4AA00

Table 7- 42 Ordering data of MDS D423 accessories

	Article number
Fixing hood RF330T / MDS D423	6GT2690-0AE00

### 7.17.3 Mounting on metal

#### Mounting on metal

Direct mounting of the MDS D423 on metal is possible.

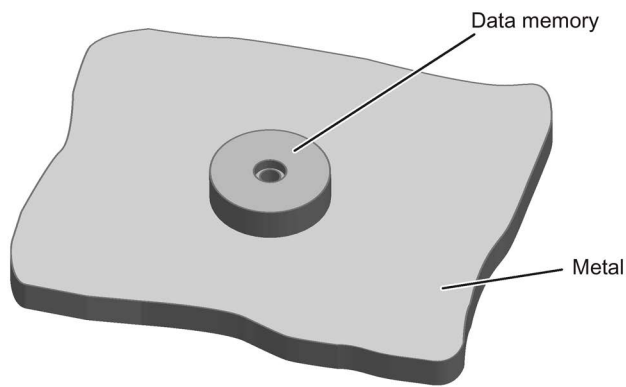
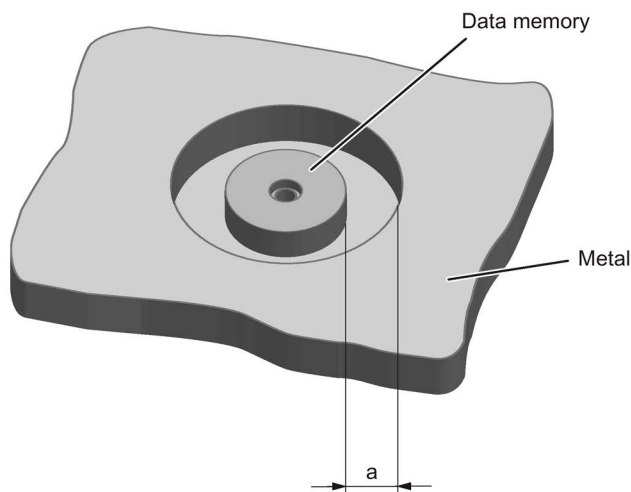


Figure 7-44 Mounting the MDS D423 on metal

**Flush-mounted in metal**

It is possible to mount the MDS D423 in metal.



$a \geq 10 \text{ mm}$

Figure 7-45 Flush-mounting of the MDS D423 in metal with 10 mm clearance

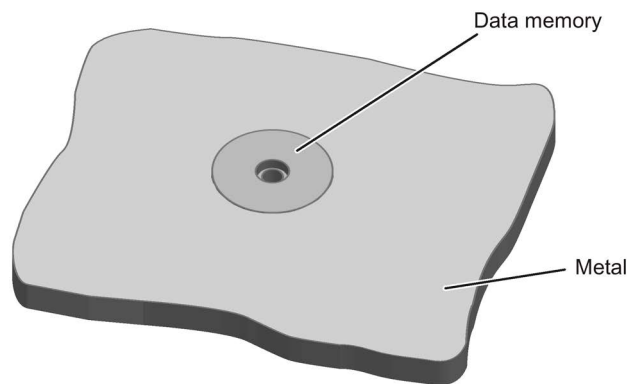


Figure 7-46 Flush-mounting of the MDS D423 in metal without clearance

**Note**

**Reduction of the write/read range**

Note that when the device is flush-mounted in metal without a surrounding clearance  $\geq 10$  mm, the write/read range is significantly reduced.

## 7.17.4 Technical specifications

Table 7- 43 Technical specifications of MDS D423

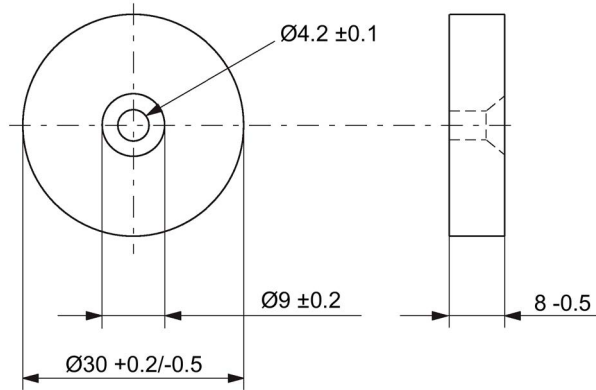
<b>6GT2600-4AA00</b>	
Product type designation	SIMATIC MDS D423
<b>Memory</b>	
Memory configuration	
• UID	• 8 bytes
• User memory	• 2000 bytes FRAM
• OTP memory	• 16 bytes FRAM
Read cycles (at $< 40$ °C)	$> 10^{12}$
Write cycles (at $< 40$ °C)	$> 10^{12}$
Data retention time (at $< 40$ °C)	$> 10$ years
Write/read distance ( $S_g$ )	Dependent on the reader used, see section "Field data (Page 39)"
MTBF (Mean Time Between Failures)	228 years
<b>Mechanical specifications</b>	
Housing	
• Material	• Plastic PPS

<b>6GT2600-4AA00</b>	
• Color	• Black
Recommended distance to metal	≥ 0 mm
Power supply	Inductive, without battery
<b>Permitted ambient conditions</b>	
Ambient temperature	
• during write/read access	• -25 to +85 °C
• outside the read/write field	• -40 to +100 °C
• during storage	• -40 to +100 °C
Degree of protection to EN 60529	<ul style="list-style-type: none"> <li>• IP68 2 hours, 2 bar, +20 °C</li> <li>• IPx9K steam jet: 150 mm; 10 to 15 l/min; 100 bar; 75 °C</li> </ul>
Shock according to EN 60721-3-7 Class 7M3 <sup>1)</sup>	500 m/s <sup>2</sup>
Vibration according to EN 60721-3-7 Class 7M3 <sup>1)</sup>	200 m/s <sup>2</sup>
Pressure resistance	<ul style="list-style-type: none"> <li>• Low pressure resistant vacuum dryer: up to 20 mbar</li> <li>• High pressure resistant (see degree of protection IPx9K)</li> </ul>
Torsion and bending load	Not permitted
<b>Design, dimensions and weight</b>	
Dimensions (Ø x H)	30 x 8 mm
Weight	15 g
Type of mounting	1 x M4 screw <sup>2)</sup> ≤ 1 Nm

1) The values for shock and vibration are maximum values and must not be applied continuously.

2) ) To prevent it loosening during operation, secure the screw with screw locking varnish.

### 7.17.5 Dimensional drawing




Dimensions in mm

Figure 7-47 Dimension drawing for MDS D423

## 7.18 MDS D424

### 7.18.1 Characteristics

MDS D424	Characteristics	
	Area of application	Production and distribution logistics as well as in assembly and production lines, can also be used in a harsh industrial environment without problem
	Memory size	2000 bytes of FRAM user memory
	Write/read range	See section "Field data (Page 39)."
	Mounting on metal	Yes, with spacer
	ISO standard	ISO 15693
	Degree of protection	IP67; IPx9K

### 7.18.2 Ordering data

Table 7- 44 Ordering data of MDS D424

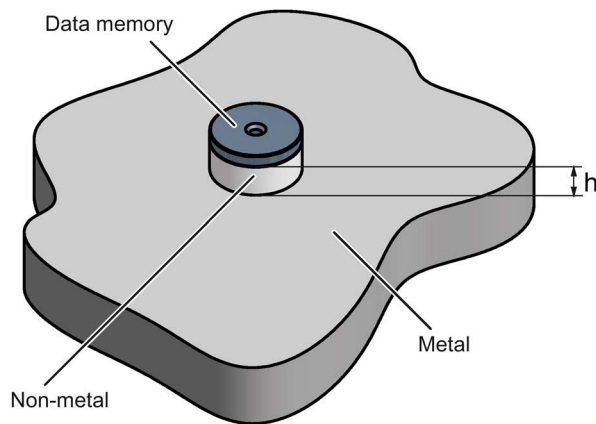
	Article number
MDS D424	6GT2600-4AC00

Table 7- 45 Ordering data of MDS D424 accessories

	Article number
Spacer	6GT2690-0AK00

### 7.18.3 Mounting on metal

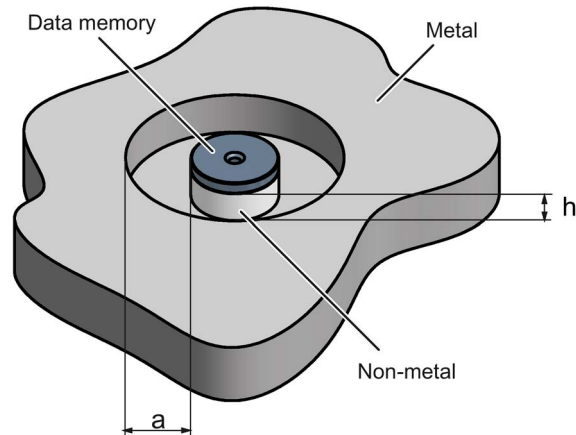
#### Mounting on metal



$h \geq 15 \text{ mm}$

Figure 7-48 Mounting the MDS D124/D324/D424/D524/E624 and RF320T on metal with spacer

## Flush-mounting



$$h \geq 15 \text{ mm}$$

$$a \geq 25 \text{ mm}$$

Figure 7-49 Flush-mounting of the MDS D124/D324/D424/D524/E624 and RF320T in metal with spacer

### Note

#### Going below the distances

If the distances (a and h) are not observed, a reduction of the field data results. It is possible to mount the MDS with metal screws (M3 countersunk head screws). This has no tangible impact on the range.

## 7.18.4 Technical specifications

Table 7- 46 Technical specifications for the MDS D424

<b>6GT2600-4AC00</b>	
Product type designation	SIMATIC MDS D424
<b>Memory</b>	
Memory configuration	
• UID	• 8 bytes
• User memory	• 2000 bytes FRAM
• OTP memory	• 16 bytes FRAM
Read cycles (at < 40 °C)	> 10 <sup>12</sup>
Write cycles (at < 40 °C)	> 10 <sup>12</sup>
Data retention time (at < 40 °C)	> 10 years

<b>6GT2600-4AC00</b>	
Write/read distance (S <sub>g</sub> )	Dependent on the reader used, see section "Field data (Page 39)"
MTBF (Mean Time Between Failures)	228 years
<b>Mechanical specifications</b>	
<b>Housing</b>	
• Material	• Epoxy resin
• Color	• Black
Recommended distance to metal	≥ 15 mm
Power supply	Inductive, without battery
<b>Permitted ambient conditions</b>	
<b>Ambient temperature</b>	
• during write/read access	• -25 to +85 °C
• outside the read/write field	• -40 to +100 °C
• during storage	• -40 to +100 °C
Degree of protection to EN 60529	• IP67 • IPx9K
Shock according to EN 60721-3-7 Class 7M3 <sup>1)</sup>	1000 m/s <sup>2</sup>
Vibration according to EN 60721-3-7 Class 7M3 <sup>1)</sup>	200 m/s <sup>2</sup>
Torsion and bending load	Not permitted
<b>Design, dimensions and weight</b>	
Dimensions (Ø x H)	27 x 4 mm
Weight	5 g
Type of mounting	• Glued <sup>2)</sup> • 1x screw M3 <sup>3)</sup> ≤ 1 Nm

1) The values for shock and vibration are maximum values and must not be applied continuously.

2) The processing instructions of the adhesive manufacturer must be observed.

3) To prevent it loosening during operation, secure the screw with screw-locking varnish.



### 7.18.5 Dimension drawing

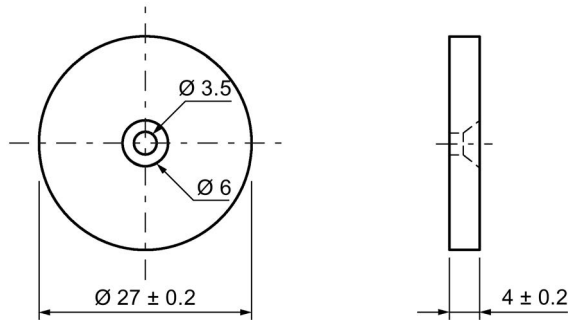



Figure 7-50 Dimension drawing of MDS D424

All dimensions in mm

## 7.19 MDS D425

### 7.19.1 Characteristics

MDS D425	Characteristics	
	Area of application	Compact and rugged ISO transponder; suitable for screw mounting  Use in assembly and production lines in the powertrain sector; ideal for mounting on motors, gearboxes, and work-piece holders  Rugged packaging of the MDS D425; can therefore also be used under extreme environmental conditions without problem
	Memory size	2000 bytes of FRAM user memory
	Write/read range	See section "Field data (Page 39)".
	Mounting on metal	Yes
	ISO standard	ISO 15693
	Degree of protection	IP68/IPx9K

### 7.19.2 Ordering data

Table 7- 47 Ordering data of MDS D425

	Article number
MDS D425	6GT2600-4AG00

### 7.19.3 Application example

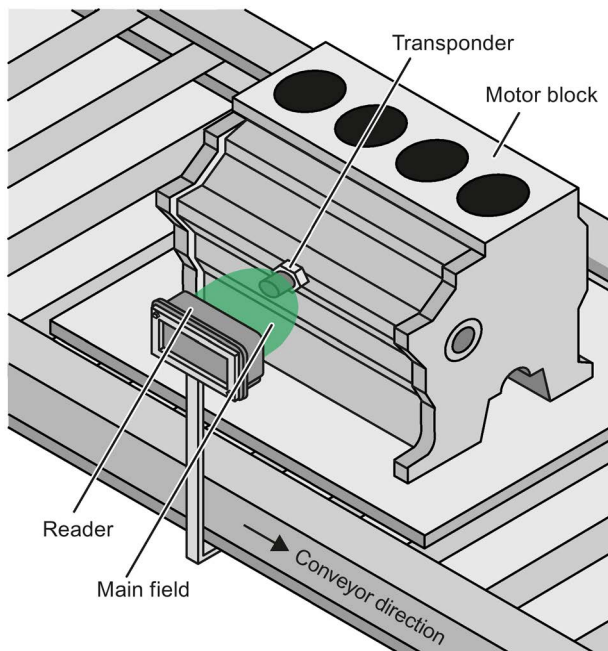


Figure 7-51 Application example

### 7.19.4 Technical specifications

Table 7- 48 Technical specifications for the MDS D425

<b>6GT2600-4AG00</b>	
Product type designation	SIMATIC MDS D425
<b>Memory</b>	
Memory configuration	
• UID	• 8 bytes
• User memory	• 2000 bytes FRAM
• OTP memory	• 16 bytes FRAM

<b>6GT2600-4AG00</b>	
Read cycles (at < 40 °C)	> 10 <sup>12</sup>
Write cycles (at < 40 °C)	> 10 <sup>12</sup>
Data retention time (at < 40 °C)	> 10 years
Write/read distance (S <sub>g</sub> )	Dependent on the reader used, see section "Field data (Page 39)"
MTBF (Mean Time Between Failures)	228 years

#### **Mechanical specifications**

##### **Housing**

• Material	• Plastic PA 6.6 GF
• Color	• Black
Recommended distance to metal	≥ 0 mm
Power supply	Inductive, without battery

#### **Permitted ambient conditions**

##### **Ambient temperature**

• during write/read access	• -25 to +85 °C
• outside the read/write field	• -40 to +125 °C
• during storage	• -40 to +125 °C

Degree of protection to EN 60529	<ul style="list-style-type: none"> <li>• IP68 2 hours, 2 bar, +20 °C</li> <li>• IPx9K steam jet: 150 mm; 10 to 15 l/min; 100 bar; 75 °C</li> </ul>
----------------------------------	--

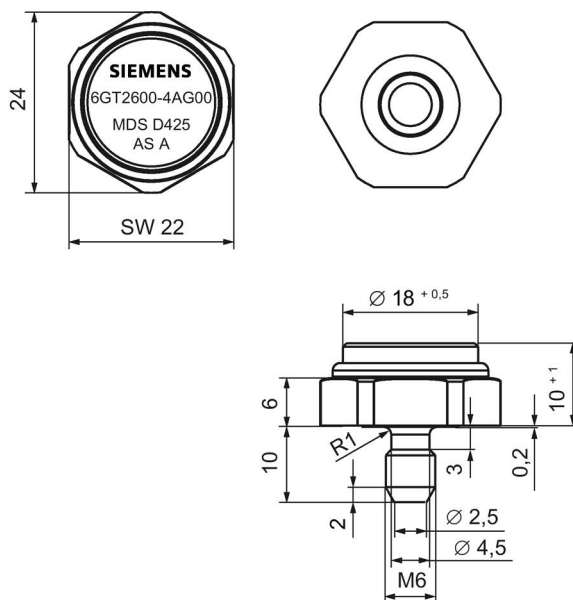
Shock according to IEC 68-2-27 <sup>1)</sup>	500 m/s <sup>2</sup>
Vibration according to IEC 68-2-6 <sup>1)</sup>	200 m/s <sup>2</sup>
Torsion and bending load	Not permitted

#### **Design, dimensions and weight**

Dimensions (Ø x H)	24 x 10 mm (without set screw)
Weight	35 g
Type of mounting	1x transponder set screw M6 SW 22; ≤ 6 Nm

<sup>1)</sup> The values for shock and vibration are maximum values and must not be applied continuously.

### 7.19.5 Dimension drawing




Dimensions in mm

Figure 7-52 Dimension drawing of MDS D425

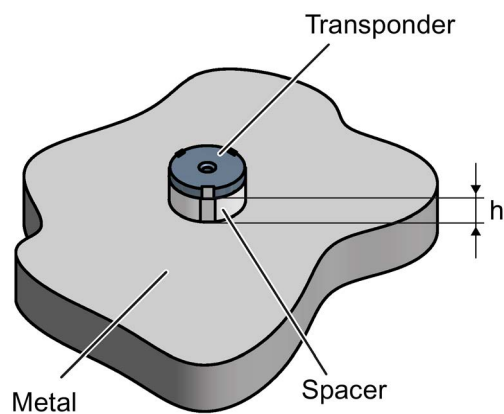
## 7.20 MDS D426

### 7.20.1 Characteristics

MDS D426	Characteristics	
	Area of application	Compact and rugged ISO transponder; suitable for identification of transport units in production-related logistics; can also be deployed in harsh conditions
	Memory size	2000 bytes of FRAM user memory
	Write/read range	See section Field data (Page 39)
	Mounting on metal	Yes, with spacer
	ISO standard	ISO 15693
	Degree of protection	IP68

## 7.20.2 Mounting on metal

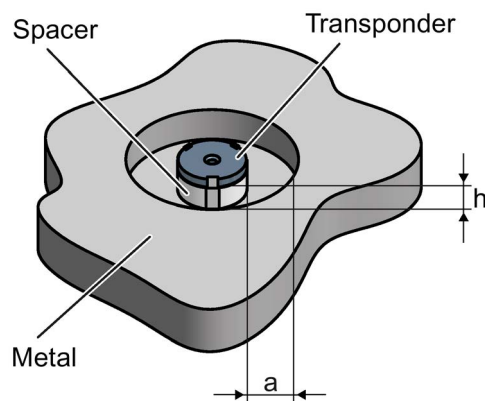
### Mounting on metal



$h \geq 25 \text{ mm}$

Figure 7-53 Mounting the MDS D126 / D426 / D526 on metal with spacer

### Flush-mounted in metal



$h \geq 25 \text{ mm}$

$a \geq 50 \text{ mm}$

Figure 7-54 Flush installation of the MDS D126 / D426 / D526 in metal with spacer

### 7.20.3 Ordering data

Table 7- 49 Ordering data of MDS D426

	Article number
MDS D426	6GT2600-4AH00

Table 7- 50 Ordering data of MDS D426 accessories

	Article number
Spacer	6GT2690-0AL00

### 7.20.4 Technical specifications

Table 7- 51 Technical specifications for the MDS D426

<b>6GT2600-4AH00</b>	
Product type designation	SIMATIC MDS D426
<b>Memory</b>	
Memory configuration	
• UID	• 8 bytes
• User memory	• 2000 bytes FRAM
• OTP memory	• 16 bytes FRAM
Read cycles (at < 40 °C)	> 10 <sup>12</sup>
Write cycles (at < 40 °C)	> 10 <sup>12</sup>
Data retention time (at < 40 °C)	> 10 years
Write/read distance (S <sub>9</sub> )	Dependent on the reader used, see section "Field data (Page 39)"
MTBF (Mean Time Between Failures)	228 years
<b>Mechanical specifications</b>	
Housing	
• Material	• Plastic PA 6.6 GF
• Color	• Black
Recommended distance to metal	≥ 25 mm
Power supply	Inductive, without battery

6GT2600-4AH00

**Permitted ambient conditions**

Ambient temperature

- |                                |                  |
|--------------------------------|------------------|
| • during write/read access     | • -25 to +85 °C  |
| • outside the read/write field | • -40 to +100 °C |
| • during storage               | • -40 to +100 °C |

Degree of protection to EN 60529	IP68 2 hours, 2 bar, +20 °C
----------------------------------	--------------------------------

Shock according to IEC 68-2-27 <sup>1)</sup>	50 m/s <sup>2</sup>
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Vibration according to IEC 68-2-6 <sup>1)</sup>	20 m/s <sup>2</sup>
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Torsion and bending load	Not permitted
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**Design, dimensions and weight**

Dimensions (Ø x H)	50 x 3.6 mm
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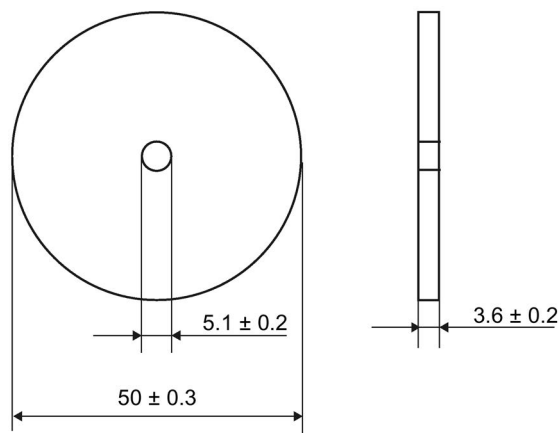
Weight	13 g
--------	------

Type of mounting	1 x M4 screw <sup>2)</sup> ≤ 1 Nm
------------------	--------------------------------------

<sup>1)</sup> The values for shock and vibration are maximum values and must not be applied continuously.

<sup>2)</sup> ) To prevent it loosening during operation, secure the screw with screw locking varnish.

**7.20.5 Dimension drawing**




Dimensions in mm

Figure 7-55 Dimension drawing of MDS D426

## 7.21 MDS D428

### 7.21.1 Characteristics

<p><b>MDS D428</b></p> 	<p><b>Characteristics</b></p>	
<p>Area of application</p>	<p>Compact and rugged ISO transponder; suitable for screw mounting. Use in assembly and production lines in the powertrain sector. The rugged housing of the MDS D428 means that it can also be used in extreme environmental conditions without problems.</p>	
<p>Memory size</p>	<p>2000 bytes of FRAM user memory</p>	
<p>Write/read range</p>	<p>See section "Field data (Page 39)"</p>	
<p>Mounting on metal</p>	<p>Yes</p>	
<p>ISO standard</p>	<p>ISO 15693</p>	
<p>Degree of protection</p>	<p>IP68/IPx9K</p>	

### 7.21.2 Ordering data

Table 7- 52 Ordering data of MDS D428

	Article number
MDS D428	6GT2600-4AK00-0AX0



### 7.21.3 Application example

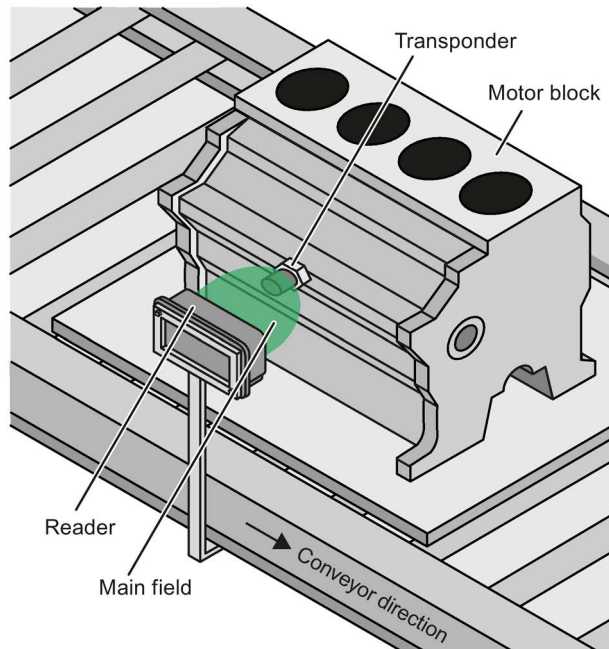


Figure 7-56 Application example

### 7.21.4 Technical specifications

Table 7- 53 Technical specifications for the MDS D428

<b>6GT2600-4AK00</b>	
Product type designation	SIMATIC MDS D428
<b>Memory</b>	
Memory configuration	
• UID	• 8 bytes
• User memory	• 2000 bytes FRAM
• OTP memory	• 16 bytes FRAM
Read cycles (at < 40 °C)	> 10 <sup>12</sup>
Write cycles (at < 40 °C)	> 10 <sup>12</sup>
Data retention time (at < 40 °C)	> 10 years
Write/read distance (S <sub>g</sub> )	Dependent on the reader used, see section "Field data (Page 39)"
MTBF (Mean Time Between Failures)	228 years

6GT2600-4AK00

**Mechanical specifications**

Housing

• Material	• Plastic PA 6.6 GF
• Color	• Black
Recommended distance to metal	≥ 0 mm
Power supply	Inductive, without battery

**Permitted ambient conditions**

Ambient temperature

• during write/read access	• -25 to +85 °C
• outside the read/write field	• -40 to +125 °C
• during storage	• -40 to +125 °C

Degree of protection to EN 60529

- IP68  
2 hours, 2 bar, +20 °C
- IPx9K  
steam jet: 150 mm; 10 to 15 l/min; 100 bar; 75 °C

Shock according to IEC 68-2-27 <sup>1)</sup>	500 m/s <sup>2</sup>
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Vibration according to IEC 68-2-6 <sup>1)</sup>	200 m/s <sup>2</sup>
---	----------------------

Torsion and bending load	Not permitted
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**Design, dimensions and weight**

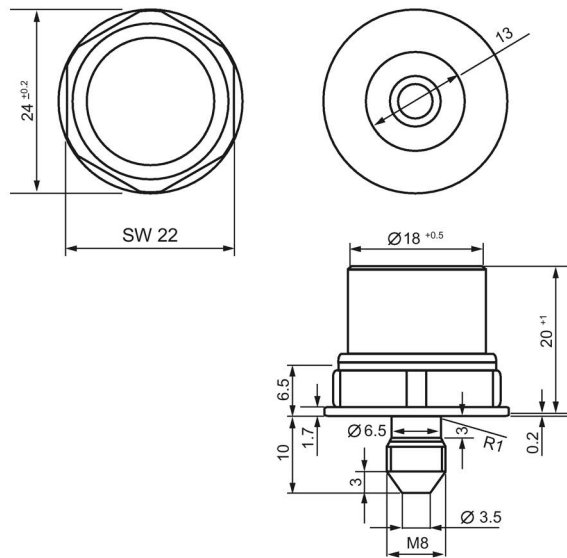
Dimensions (Ø x H)	24 x 20 mm (without set screw)
--------------------	--------------------------------

Weight	35 g
--------	------

Type of mounting	1x transponder set screw M8 SW 22; ≤ 8 Nm
------------------	--

<sup>1)</sup> The values for shock and vibration are maximum values and must not be applied continuously.

## 7.21.5 Dimension drawing




Dimensions in mm

Figure 7-57 Dimension drawing of MDS D428

## 7.22 MDS D460

### 7.22.1 Characteristics

MDS D460	Characteristics	
 <p>SIEMENS 6GT2600-4AB00 MDS D460 MOBY D</p>	Area of application	Identification in small assembly lines; can also be used in a harsh industrial environment
	Memory size	2000 bytes of FRAM user memory
	Write/read range	See section "Field data (Page 39).
	Mounting on metal	Yes, with spacer
	ISO standard	ISO 15693
	Degree of protection	IP67/IPx9K

### 7.22.2 Ordering data

Table 7- 54 Ordering data of MDS D460

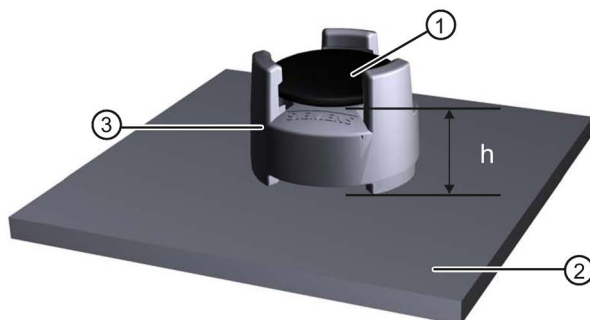
	Article number
MDS D460	6GT2600-4AB00

Table 7- 55 Ordering data of MDS D460 accessories

	Article number
Spacer	6GT2690-0AG00

### 7.22.3 Mounting on metal

#### Mounting option on metal with spacer



- ① Transponder
  - ② Metal
  - ③ Spacer
- $h \geq 10 \text{ mm}$

Figure 7-58 Mounting the MDS D460 on metal with spacer

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#### Note

If the minimum guide values (h) are not observed, a reduction of the field data results. In critical applications, it is recommended that a test is performed.

---

#### Flush-mounting

Flush-mounting of the MDS D460 in metal is not permitted!

## 7.22.4 Technical specifications

Table 7- 56 Technical specifications for MDS D460

<b>6GT2600-4AB00</b>	
Product type designation	SIMATIC MDS D460
<b>Memory</b>	
Memory configuration	
• UID	• 8 bytes
• User memory	• 2000 bytes FRAM
• OTP memory	• 16 bytes FRAM
Read cycles (at < 40 °C)	> 10 <sup>12</sup>
Write cycles (at < 40 °C)	> 10 <sup>12</sup>
Data retention time (at < 40 °C)	> 10 years
Write/read distance (S <sub>g</sub> )	Dependent on the reader used, see section "Field data (Page 39)"
MTBF (Mean Time Between Failures)	228 years
<b>Mechanical specifications</b>	
Housing	
• Material	• Epoxy resin
• Color	• Black
Recommended distance to metal	≥ 10 mm
Power supply	Inductive, without battery
<b>Permitted ambient conditions</b>	
Ambient temperature	
• during write/read access	• -25 to +85 °C
• outside the read/write field	• -40 to +100 °C
• during storage	• -40 to +100 °C
Degree of protection to EN 60529	• IP67 • IPx9K steam jet: 150 mm; 10 to 15 l/min; 100 bar; 75 °C
Shock according to IEC 68-2-27 <sup>1)</sup>	500 m/s <sup>2</sup>
Vibration according to IEC 68-2-6 <sup>1)</sup>	200 m/s <sup>2</sup>
Torsion and bending load	Not permitted

6GT2600-4AB00

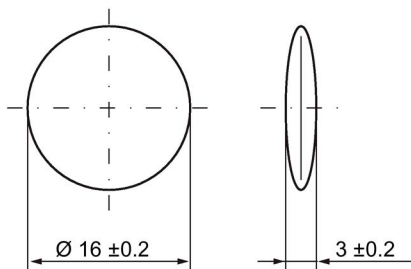
**Design, dimensions and weight**

Dimensions (Ø x H)	16 x 3 mm
Weight	3 g
Type of mounting	<ul style="list-style-type: none"> <li>• Glued <sup>2)</sup></li> <li>• With spacer</li> </ul>

- 1) The values for shock and vibration are maximum values and must not be applied continuously.
- 2) The processing instructions of the adhesive manufacturer must be observed.

**7.22.5 Dimension drawings**

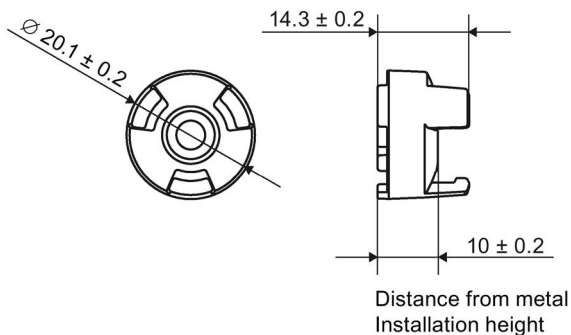
**Dimensional drawing of MDS D460**



Dimensions in mm

Figure 7-59 Dimensional drawing of MDS D460

**Dimensional drawing of spacer**




Dimensions in mm

Figure 7-60 Dimensional drawing of spacer

## 7.23 MDS D521

### 7.23.1 Characteristics

MDS D521	Characteristics	
	Area of application	<p>The MDS D521 is designed for tool coding according to DIN 69873.</p> <p>It can be used wherever small data carriers and exact positioning are required, e.g. tool identification, workpiece holders.</p> <p>The rugged housing of the MDS D521 means that it can also be used in a harsh industrial environment without problems.</p>
	Memory size	8192 bytes of FRAM user memory
	Write/read range	See section "Field data (Page 39)"
	Mounting on metal	Yes, flush-mounted in metal
	ISO standard	ISO 15693
	Degree of protection	IP67/IPx9K

### 7.23.2 Ordering data

Table 7- 57 Ordering data for MDS D521

	Article number
MDS D521	6GT2600-5AE00

### 7.23.3 Mounting on metal

#### Mounting on metal

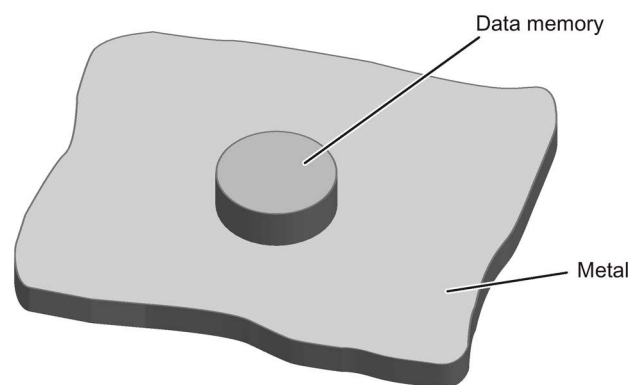


Figure 7-61 Mounting of MDS D521 on metal

### Flush-mounting

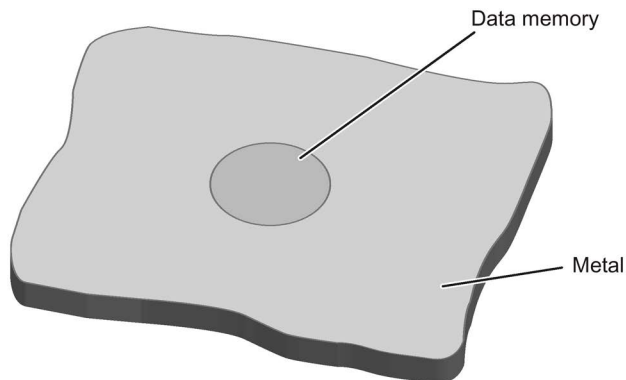


Figure 7-62 Mounting of MDS D521 in metal

### Flush-mounting of MDS D521 in metal with tools

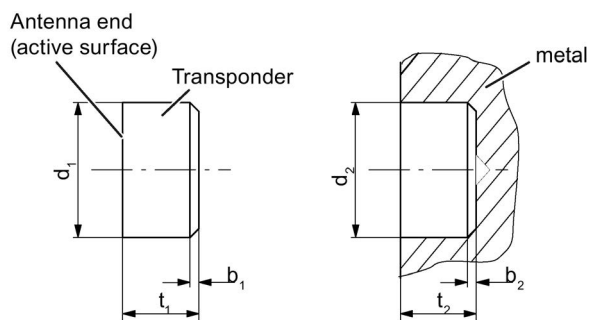


Figure 7-63 Flush-mounting of MDS D521 in metal with tools

b <sub>1</sub>	0.5 x 45°	b <sub>2</sub>	0.3 x 45° or R 0.3
d <sub>1</sub>	10 (-0.04... -0.13)	d <sub>2</sub>	10 (+0.09... 0)
t <sub>1</sub>	4.5 (-0... -0.1)	t <sub>2</sub>	4.6 (+0.2... 0)

All dimensions in mm

#### Note

##### Installation instruction

The MDS should not protrude out of the locating hole; it must be flush with the outside contour.

The mounting instructions of the MDS and the conditions associated with the application (e.g. peripheral speed, temperature, and use of coolant) must be observed during the installation.



### Mounting information for adhesion

- Drill installation hole
- The adhesive surfaces must be dry, free from dust, oil, stripping agents and other impurities
- Apply adhesive according to the manufacturer's processing instructions
- Press in MDS D521 using your finger; antenna side to the outside (see figure "Flush-mounting of MDS D521 in metal with tools")
- Remove residues of adhesive
- Allow to cure according to the manufacturer's instructions
- Flush-mounting of MDS D521 in metal with tools

### Installation examples

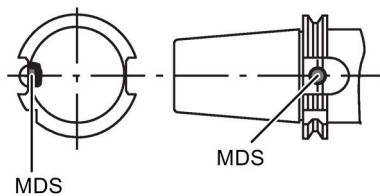


Figure 7-64 Installation example of MDS D521 in a steep cone

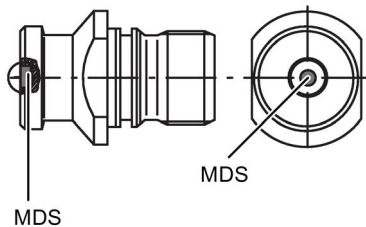


Figure 7-65 Installation example of MDS D521 in a stud bolt

## 7.23.4 Technical specifications

Table 7- 58 Technical specifications for MDS D521

<b>6GT2600-5AE00</b>	
Product type designation	SIMATIC MDS D521
<b>Memory</b>	
Memory configuration	
• UID	• 8 bytes
• User memory	• 8192 bytes FRAM

<b>6GT2600-5AE00</b>	
Read cycles (at < 40 °C)	> 10 <sup>12</sup>
Write cycles (at < 40 °C)	> 10 <sup>12</sup>
Data retention time (at < 40 °C)	> 10 years
Write/read distance (S <sub>g</sub> )	Dependent on the reader used, see section "Field data (Page 39)"
MTBF (Mean Time Between Failures)	228 years
<b>Mechanical specifications</b>	
<b>Housing</b>	
• Material	• Epoxy resin
• Color	• Black
Recommended distance to metal	≥ 0 mm
Power supply	Inductive, without battery
<b>Permitted ambient conditions</b>	
<b>Ambient temperature</b>	
• during write/read access	• -25 to +85 °C
• outside the read/write field	• -40 to +100 °C
• during storage	• -40 to +100 °C
Degree of protection to EN 60529	• IP67 • IPx9K steam jet: 150 mm; 10 to 15 l/min; 100 bar; 75 °C
Shock according to EN 60721-3-7 Class 7M3 <sup>1)</sup>	1000 m/s <sup>2</sup>
Vibration according to EN 60721-3-7 Class 7M3 <sup>1)</sup>	200 m/s <sup>2</sup>
Torsion and bending load	Not permitted
<b>Design, dimensions and weight</b>	
Dimensions (Ø x H)	10 x 4.5 mm
Weight	1 g
Type of mounting	Glued <sup>2)</sup>

1) The values for shock and vibration are maximum values and must not be applied continuously.

2) The processing instructions of the adhesive manufacturer must be observed.

### 7.23.5 Dimension drawing

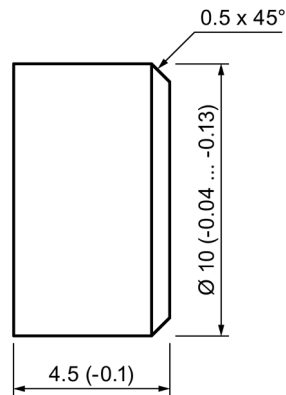



Figure 7-66 Dimension drawing of MDS D521

All dimensions in mm

## 7.24 MDS D522

### 7.24.1 Characteristics

MDS D522	Characteristics	
	Area of application	Identification of metallic workpiece holders, workpieces or containers
	Memory size	8192 bytes of FRAM user memory
	Write/read range	See "Field data (Page 39)."
	Mounting in metal	Yes
	ISO standard	ISO 15693
	Degree of protection	IP68

## 7.24.2 Ordering data

Table 7- 59 Ordering data for MDS D522

	Article number
MDS D522 Units in a package: 10 units A mounting aid is included in the scope of supply per packaging unit.	6GT2600-5AF00

## 7.24.3 Mounting in metal

### Flush-mounting

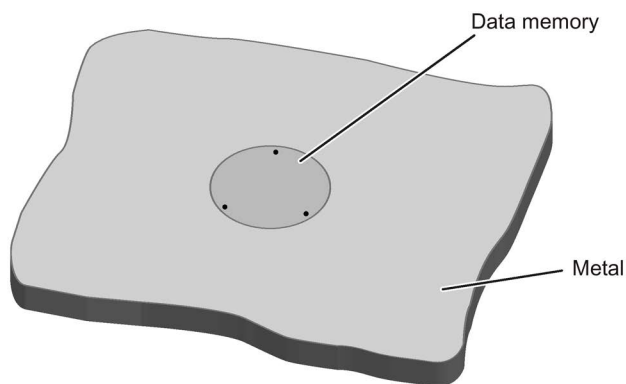


Figure 7-67 Mounting of MDS D522 in metal

### Mounting information for screws

You can screw the transponder into a pre-drilled threaded hole using the screw-in aid.

### Mounting information for adhesion

- Drill installation hole
- The adhesive surfaces must be dry, free from dust, oil, stripping agents and other impurities
- Apply adhesive according to the manufacturer's processing instructions
- Press in MDS D522 using your fingers; with antenna to the outside
- Remove residues of adhesive
- Allow to cure according to the manufacturer's instructions
- Flush-mounting of MDS D522 in metal with tools

## 7.24.4 Technical specifications

Table 7- 60 Technical specifications for MDS D522

<b>6GT2600-5AF00</b>	
Product type designation	SIMATIC MDS D522
<b>Memory</b>	
Memory configuration	
• UID	• 8 bytes
• User memory	• 8192 bytes FRAM
Read cycles (at < 40 °C)	> 10 <sup>12</sup>
Write cycles (at < 40 °C)	> 10 <sup>12</sup>
Data retention time (at < 40 °C)	> 10 years
Write/read distance (S <sub>g</sub> )	Dependent on the reader used, see section "Field data (Page 39)"
MTBF (Mean Time Between Failures)	285 years
<b>Mechanical specifications</b>	
Housing	
• Material	• Plastic PA 6.6 GF; brass nickel plated
• Color	• Black/silver
Recommended distance to metal	≥ 0 mm
Power supply	Inductive, without battery
<b>Permitted ambient conditions</b>	
Ambient temperature	
• during write/read access	• -25 to +85 °C
• outside the read/write field	• -40 to +100 °C
• during storage	• -40 to +100 °C
Degree of protection to EN 60529	IP68 2 hours, 2 bar, +20 °C
Shock according to EN 60721-3-7 Class 7M3 <sup>1)</sup>	500 m/s <sup>2</sup>
Vibration according to EN 60721-3-7 Class 7M3 <sup>1)</sup>	200 m/s <sup>2</sup>
Torsion and bending load	Not permitted
<b>Design, dimensions and weight</b>	
Dimensions (Ø x H)	20 x 6 mm

<b>6GT2600-5AF00</b>	
Weight	13 g
Type of mounting	<ul style="list-style-type: none"><li>• Glued <sup>2)</sup></li><li>• 1 x transponder thread M20 ≤ 1 Nm</li></ul>

- 1) The values for shock and vibration are maximum values and must not be applied continuously.
- 2) The processing instructions of the adhesive manufacturer must be observed.

### 7.24.5 Dimension drawing

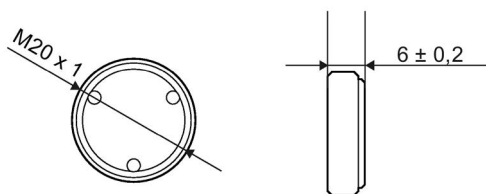



Figure 7-68 Dimensional drawing of MDS D522

All dimensions in mm

## 7.25 MDS D522 special variant

### 7.25.1 Characteristics

MDS D522 special version	Characteristics	
	Area of application	Identification of metallic workpiece holders or workpieces
	Memory size	8192 bytes of FRAM user memory
	Write/read range	See "Field data (Page 39)."
	Mounting in metal	Yes
	ISO standard	ISO 15693
	Degree of protection	IP68

### 7.25.2 Ordering data

Table 7- 61 MDS D522 special version

	Article number
MDS D522 special version Units in a package: 10 units A mounting aid is included in the scope of supply per packaging unit.	6GT2600-5AF00-0AX0

### 7.25.3 Mounting in metal

#### Flush-mounting

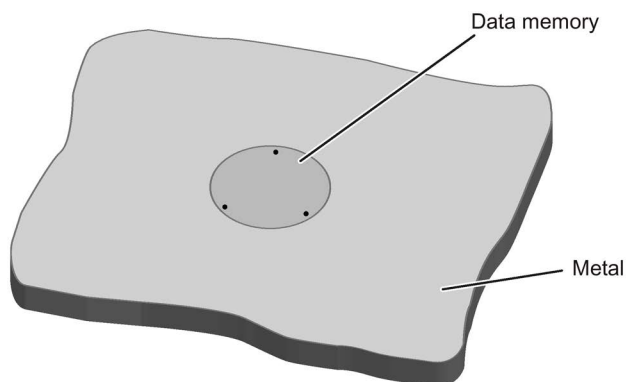


Figure 7-69 Flush installation of the MDS D522 special version in metal without clearance

### 7.25.4 Installation instructions

The transponder MDS D522 special version is designed to be mounted once.

Note the following instructions when mounting the MDS D522 in a workpiece to avoid damaging the transponder:

- Prepare the workpiece according to the following drawing.
- Using the accompanying mounting aid, press the transponder with uniform and evenly distributed pressure into the drilled hole until the transponder locks in place. Make sure that the transponder does not become tilted.



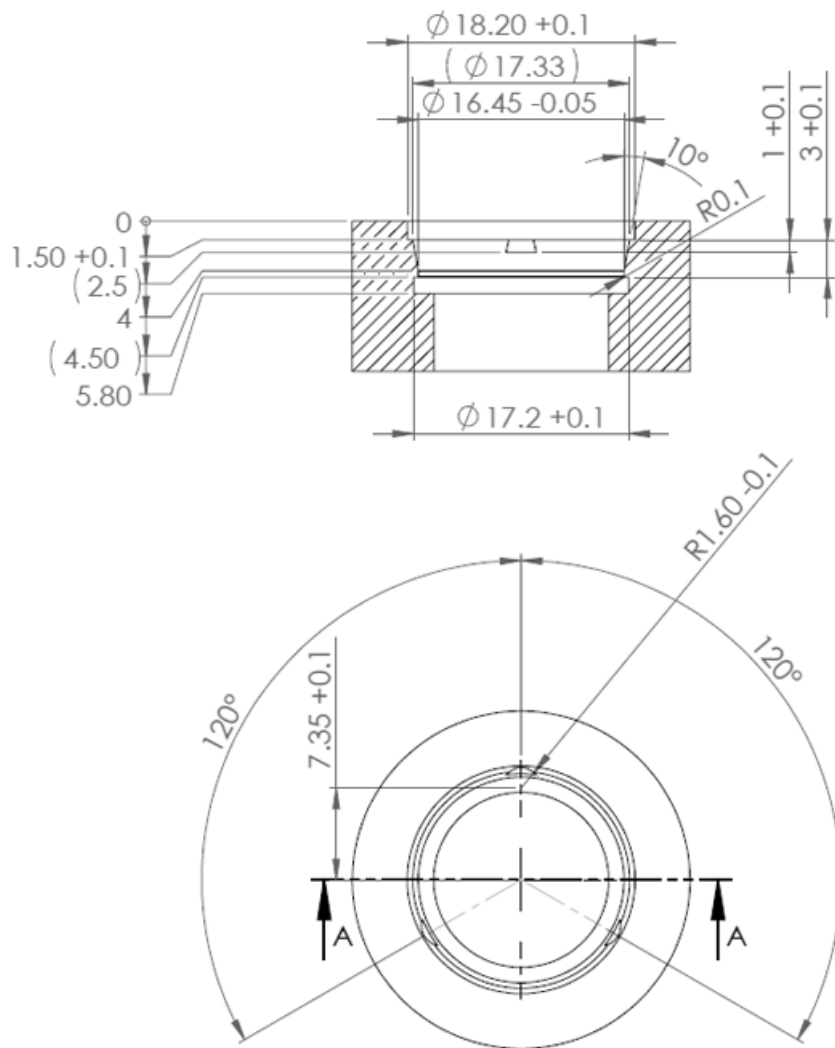


Figure 7-70 Dimension drawing: Workpiece drill hole for mounting the MDS D522 special version

## 7.25.5 Technical specifications

Table 7- 62 Technical data of MDS D522 special version

<b>6GT2600-5AF00-0AX0</b>	
Product type designation	SIMATIC MDS D522 special version
<b>Memory</b>	
Memory configuration	
• UID	• 8 bytes
• User memory	• 8192 bytes FRAM
Read cycles (at < 40 °C)	> 10 <sup>12</sup>
Write cycles (at < 40 °C)	> 10 <sup>12</sup>
Data retention time (at < 40 °C)	> 10 years
Write/read distance (S <sub>g</sub> )	Dependent on the reader used, see section "Field data (Page 39)"
MTBF (Mean Time Between Failures)	228 years
<b>Mechanical specifications</b>	
Housing	
• Material	• Plastic PA 6.6 GF
• Color	• Black
Recommended distance to metal	≥ 0 mm
Power supply	Inductive, without battery
<b>Permitted ambient conditions</b>	
Ambient temperature	
• during write/read access	• -25 to +85 °C
• outside the read/write field	• -40 to +100 °C
• during storage	• -40 to +100 °C
Degree of protection to EN 60529	IP68 2 hours, 2 bar, +20 °C
Shock according to EN 60721-3-7 Class 7M3 <sup>1)</sup>	500 m/s <sup>2</sup>
Vibration according to EN 60721-3-7 Class 7M3 <sup>1)</sup>	200 m/s <sup>2</sup>
Torsion and bending load	Not permitted
<b>Design, dimensions and weight</b>	
Dimensions (Ø x H)	18 (+0.1) × 5.2 mm
Weight	Approx. 1.2 g
Type of mounting	Clipping in once (with accompanying tool)

<sup>1)</sup> The values for shock and vibration are maximum values and must not be applied continuously.

### 7.25.6 Dimensional drawing

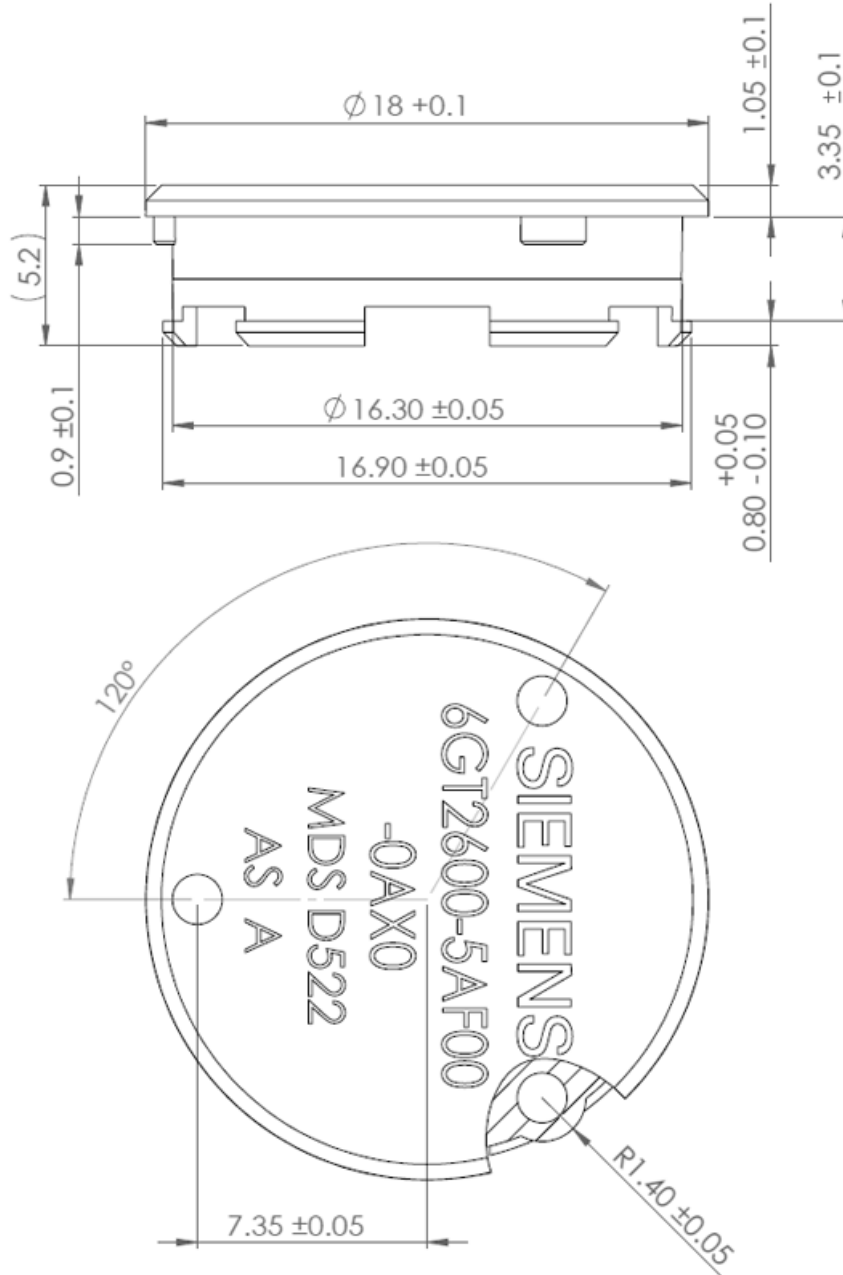



Figure 7-71 Dimension drawing MDS D522 special version

All dimensions in mm

## 7.26 MDS D524

### 7.26.1 Characteristics

MDS D524	Characteristics	
	Area of application	Production and distribution logistics as well as in assembly and production lines, can also be used in a harsh industrial environment without problem
	Memory size	8192 bytes of FRAM user memory
	Write/read range	See section "Field data (Page 39)."
	Mounting on metal	Yes, with spacer
	ISO standard	ISO 15693
	Degree of protection	IP67; IPx9K

### 7.26.2 Ordering data

Table 7- 63 Ordering data for MDS D524

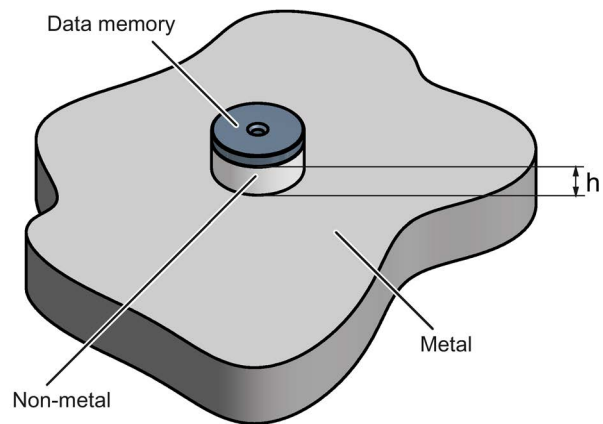
	Article number
MDS D524	6GT2600-5AC00

Table 7- 64 Ordering data of MDS D524 accessories

	Article number
Spacer	6GT2690-0AK00

### 7.26.3 Mounting on metal

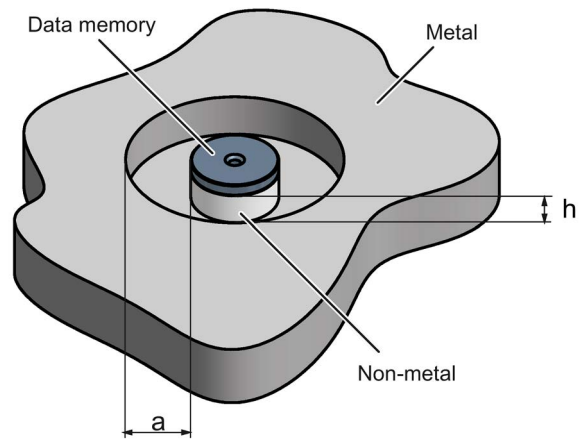
#### Mounting on metal



$$h \geq 15 \text{ mm}$$

Figure 7-72 Mounting the MDS D124/D324/D424/D524/E624 and RF320T on metal with spacer

#### Flush-mounting



$$h \geq 15 \text{ mm}$$

$$a \geq 25 \text{ mm}$$

Figure 7-73 Flush-mounting of the MDS D124/D324/D424/D524/E624 and RF320T in metal with spacer

**Note**

**Going below the distances**

If the distances (a and h) are not observed, a reduction of the field data results. It is possible to mount the MDS with metal screws (M3 countersunk head screws). This has no tangible impact on the range.

**7.26.4 Technical specifications**

Table 7- 65 Technical specifications for MDS D524

<b>6GT2600-5AC00</b>	
Product type designation	SIMATIC MDS D524
<b>Memory</b>	
Memory configuration	
• UID	• 8 bytes
• User memory	• 8192 bytes FRAM
Read cycles (at < 40 °C)	> 10 <sup>12</sup>
Write cycles (at < 40 °C)	> 10 <sup>12</sup>
Data retention time (at < 40 °C)	> 10 years
Write/read distance (S <sub>g</sub> )	Dependent on the reader used, see section "Field data (Page 39)"
MTBF (Mean Time Between Failures)	228 years
<b>Mechanical specifications</b>	
Housing	
• Material	• Epoxy resin
• Color	• Black
Recommended distance to metal	≥ 15 mm
Power supply	Inductive, without battery
<b>Permitted ambient conditions</b>	
Ambient temperature	
• during write/read access	• -25 to +85 °C
• outside the read/write field	• -40 to +100 °C
• during storage	• -40 to +100 °C

<b>6GT2600-5AC00</b>	
Degree of protection to EN 60529	<ul style="list-style-type: none"> <li>• IP67</li> <li>• IPx9K</li> </ul>
Shock according to EN 60721-3-7 Class 7M3 <sup>1)</sup>	1000 m/s <sup>2</sup>
Vibration according to EN 60721-3-7 Class 7M3 <sup>1)</sup>	200 m/s <sup>2</sup>
Torsion and bending load	Not permitted
<b>Design, dimensions and weight</b>	
Dimensions (Ø x H)	27 x 4 mm
Weight	5 g
Type of mounting	<ul style="list-style-type: none"> <li>• Glued <sup>2)</sup></li> <li>• 1x screw M3 <sup>3)</sup> ≤ 1 Nm</li> </ul>

1) The values for shock and vibration are maximum values and must not be applied continuously.

2) The processing instructions of the adhesive manufacturer must be observed.

3) To prevent it loosening during operation, secure the screw with screw-locking varnish.

### 7.26.5 Dimension drawing

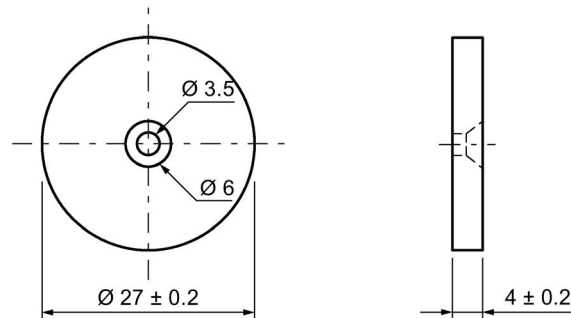



Figure 7-74 Dimensional drawing of MDS D524

All dimensions in mm

## 7.27 MDS D526

### 7.27.1 Characteristics

MDS D526	Characteristics	
 <p>The image shows a circular black transponder disc with a white center hole. The text on the disc reads: 'SIEMENS' at the top, '6GT2600-5AH00' below it, 'MDS D526' in the middle, and 'AS: A' at the bottom.</p>	Area of application	Compact and rugged ISO transponder; suitable for identification of transport units in production-related logistics; can also be deployed in harsh conditions
	Memory size	8192 bytes of FRAM user memory
	Write/read range	See section "Field data (Page 39)."
	Mounting on metal	Yes, with spacer
	ISO standard	ISO 15693
	Degree of protection	IP68

### 7.27.2 Ordering data

Table 7- 66 Ordering data for MDS D526

	Article number
MDS D526	6GT2600-5AH00

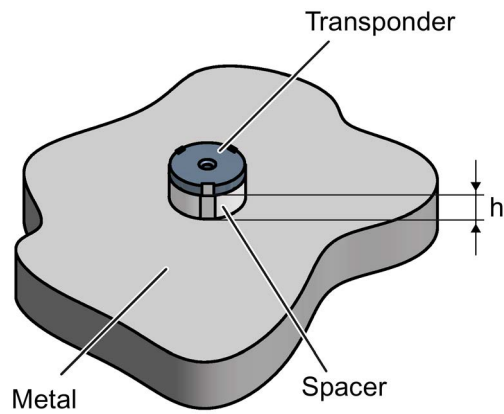
Table 7- 67 Ordering data for MDS D526 accessories

	Article number
Spacer	6GT2690-0AL00



### 7.27.3 Mounting on metal

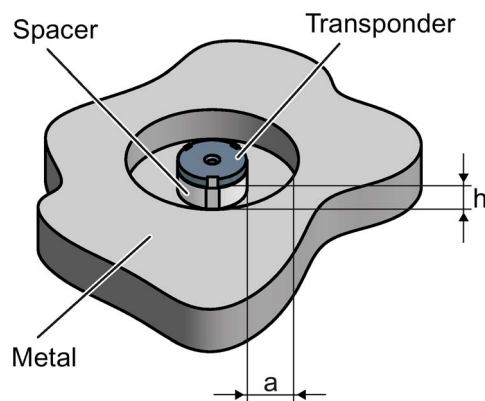
#### Mounting on metal



$h \geq 25 \text{ mm}$

Figure 7-75 Mounting the MDS D126 / D426 / D526 on metal with spacer

#### Flush-mounted in metal



$h \geq 25 \text{ mm}$

$a \geq 50 \text{ mm}$

Figure 7-76 Flush installation of the MDS D126 / D426 / D526 in metal with spacer

## 7.27.4 Technical specifications

Table 7- 68 Technical specifications for MDS D526

<b>6GT2600-5AH00</b>	
Product type designation	SIMATIC MDS D526
<b>Memory</b>	
Memory configuration	
• UID	• 8 bytes
• User memory	• 8192 bytes FRAM
• OTP	• 32 bytes
Read cycles (at < 40 °C)	> 10 <sup>12</sup>
Write cycles (at < 40 °C)	> 10 <sup>12</sup>
Data retention time (at < 40 °C)	> 10 years
Write/read distance (S <sub>9</sub> )	Dependent on the reader used, see section "Field data (Page 39)"
MTBF (Mean Time Between Failures)	228 years
<b>Mechanical specifications</b>	
Housing	
• Material	• Plastic PA 6.6 GF
• Color	• Black
Recommended distance to metal	≥ 25 mm
Power supply	Inductive, without battery
<b>Permitted ambient conditions</b>	
Ambient temperature	
• during write/read access	• -25 to +85 °C
• outside the read/write field	• -40 to +100 °C
• during storage	• -40 to +100 °C
Degree of protection to EN 60529	IP68 2 hours, 2 bar, +20 °C
Shock according to IEC 68-2-27 <sup>1)</sup>	500 m/s <sup>2</sup>
Vibration according to IEC 68-2-6 <sup>1)</sup>	200 m/s <sup>2</sup>
Torsion and bending load	Not permitted
<b>Design, dimensions and weight</b>	
Dimensions (Ø x H)	50 x 3.6 mm

6GT2600-5AH00	
Weight	13 g
Type of mounting	1 x M4 screw <sup>2)</sup> ≤ 1 Nm

- 1) The values for shock and vibration are maximum values and must not be applied continuously.  
2) ) To prevent it loosening during operation, secure the screw with screw locking varnish.

### 7.27.5 Dimension drawing

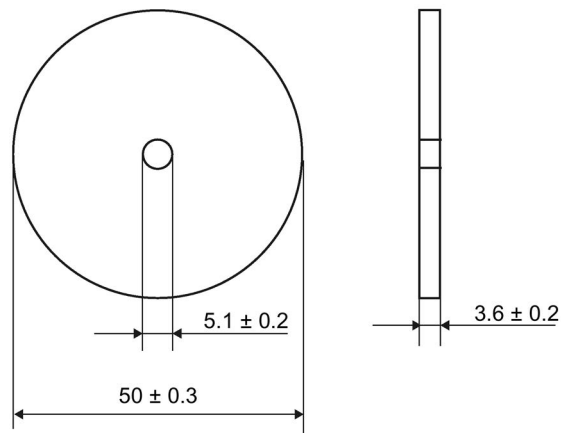



Figure 7-77 Dimensional drawing of MDS D526

All dimensions in mm

## 7.28 MDS D528

### 7.28.1 Characteristics

MDS D528	Characteristics	
	Area of application	Compact and rugged ISO transponder; suitable for screw mounting Use in assembly and production lines in the powertrain sector The rugged housing of the MDS D528 means that it can also be used in extreme environmental conditions without problems.
	Memory size	8192 bytes of FRAM user memory
	Write/read range	See section "Field data (Page 39)"
	Mounting on metal	Yes
	ISO standard	ISO 15693
	Degree of protection	IP68/IPx9K

### 7.28.2 Ordering data

Table 7- 69 Ordering data for MDS D528

	Article number
MDS D528	6GT2600-5AK00

### 7.28.3 Application example

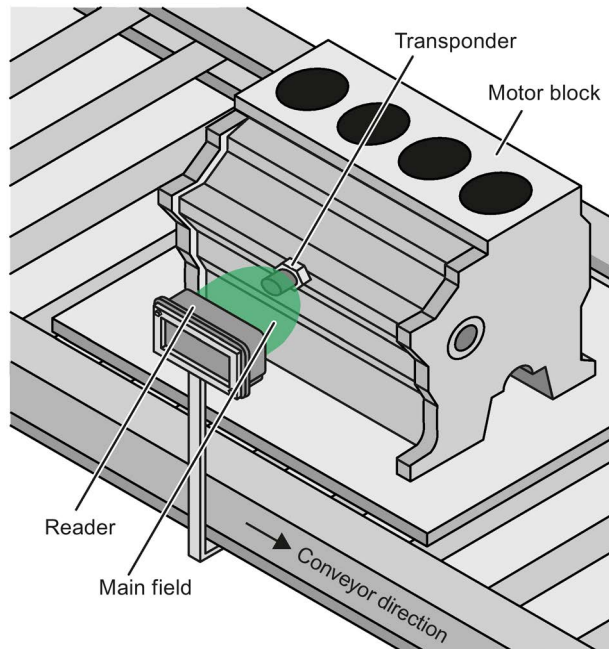


Figure 7-78 Application example

### 7.28.4 Technical specifications

Table 7- 70 Technical specifications for MDS D528

<b>6GT2600-5AK00</b>	
Product type designation	SIMATIC MDS D528
<b>Memory</b>	
Memory configuration	
• UID	• 8 bytes
• User memory	• 8192 bytes FRAM
• OTP	• 32 bytes
Read cycles (at < 40 °C)	> 10 <sup>12</sup>
Write cycles (at < 40 °C)	> 10 <sup>12</sup>
Data retention time (at < 40 °C)	> 10 years
Write/read distance (S <sub>g</sub> )	Dependent on the reader used, see section "Field data (Page 39)"
MTBF (Mean Time Between Failures)	228 years

6GT2600-5AK00

**Mechanical specifications**

Housing

- |            |                     |
|------------|---------------------|
| • Material | • Plastic PA 6.6 GF |
| • Color    | • Black             |

Recommended distance to metal  $\geq 0$  mm

Power supply Inductive, without battery

**Permitted ambient conditions**

Ambient temperature

- |                                |                  |
|--------------------------------|------------------|
| • during write/read access     | • -25 to +85 °C  |
| • outside the read/write field | • -40 to +125 °C |
| • during storage               | • -40 to +125 °C |

Degree of protection to EN 60529

- IP68  
2 hours, 2 bar, +20 °C
- IPx9K  
steam jet: 150 mm; 10 to 15 l/min; 100 bar; 75 °C

Shock according to IEC 68-2-27<sup>1)</sup> 500 m/s<sup>2</sup>

Vibration according to IEC 68-2-6<sup>1)</sup> 200 m/s<sup>2</sup>

Torsion and bending load Not permitted

**Design, dimensions and weight**

Dimensions (Ø x H) 24 x 20 mm (without set screw)

Weight 35 g

Type of mounting 1x transponder set screw M8  
SW 22;  $\leq 8$  Nm

<sup>1)</sup> The values for shock and vibration are maximum values and must not be applied continuously.

### 7.28.5 Dimension drawing

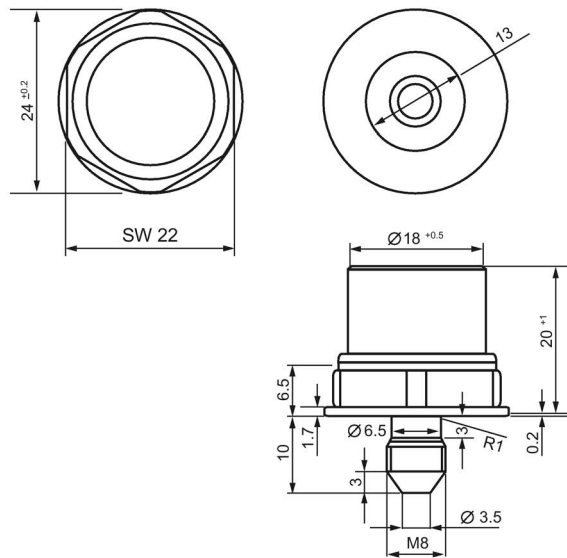


Figure 7-79 Dimensional drawing of MDS D528

All dimensions in mm





# System integration

The communication modules (interface modules) are links between the RFID components (reader and transponder) and the higher-level controllers (e.g. SIMATIC S7), or PCs or computers.

## Interfacing to the controller

The readers are connected to the controller via the following interface or communications modules:

- ASM 456
- ASM 475
- SIMATIC RF120C
- SIMATIC RF160C
- SIMATIC RF170C
- SIMATIC RF180C
- SIMATIC RF182C
- RFID 181EIP

## Function blocks, interface modules/communication modules and readers

Function blocks are used for integration into the SIMATIC. They are used to transfer the input parameters to the reader using the "init\_run"(RESET) command.

You will find information on the following blocks on the Internet in "Industry Online Support - RFID (<https://support.industry.siemens.com/cs/ww/en/ps/15105/man>)".

- FB 45 for MOBY U, MOBY D, RF200, RF300
- FB 55
- Ident profile and Ident blocks, standard function for RFID systems
- RFID standard profile; standard functions for RFID systems
- RF160C communications module with FC 44

### Interface modules/communication modules and function blocks

The following table shows the most important features of the interface modules/communication modules, as well as the compatible function blocks.

When assigning parameters (HW Config) to the communications and interface modules, MOBY U, MOBY D, RF200, RF300 or RF600 must be selected.

Table 8- 1 Overview of interface modules/communication modules

ASM/ communications module	Interfaces to the application (PLC)	Interfaces to the reader	Reader con- nections	Dimensions (W x H x D)	Temperature range	Type of protec- tion
ASM 456	PROFIBUS DP- V1	2 x 8-pin connector socket, M12	2 (parallel)	60 x 210 x 54 or 79 mm	0 °C ... +55 °C	IP67
ASM 475	S7-300 (cen- tral), ET200M (PROFIBUS)	Via screw terminals in front connector	2	40 x 125 x 120 mm	0 °C ... +60 °C	IP20
SIMATIC RF120C	S7-1200 (cen- tral)	9-pin D-sub socket	1	30 x 100 x 75 mm	0 °C ... +55 °C	IP20
SIMATIC RF160C	PROFIBUS DP / DP-V0	2 x 8-pin connector socket, M12	2 (parallel)	60 x 210 x 30 mm	0 °C ... +55 °C	IP67
SIMATIC RF170C	PROFIBUS DP- V1 PROFINET IO	2 x 8-pin connector socket, M12	2 (parallel)	90 x 130 x 60 mm	-25 °C to +55 °C	IP67
SIMATIC RF180C	PROFINET IO	2 x 8-pin connector socket, M12	2 (parallel)	60 x 210 x 54 mm	0 °C to +60° C	IP67
SIMATIC RF182C	TCP/IP	2 x 8-pin connector socket, M12	2 (parallel)	60 x 210 x 30 mm	0 °C to +60 °C	IP67
RFID 181EIP	Ethernet IP	2 x 8-pin connector socket, M12	2 (parallel)	60 x 210 x 54 mm	0 °C to +60° C	IP67

The following table shows the program blocks compatible with the interface modules/communications modules.

Table 8- 2 Compatible program blocks

ASM/ communications mod- ule	Compatible program blocks in conjunction with ...		
	S7-300 / S7-400 and STEP 7 Classic V5.5	S7-300 / S7-400 and STEP 7 Basic/Professional	S7-1200 / S7-1500 and STEP 7 Basic/Professional
ASM 456	FB 45 FB 55 Standard profile V1.19 Ident profile	FB 45 FB 55 Ident profile	Ident profile Ident blocks PIB_1200_UID_001KB PIB_1200_UID_032KB
ASM 475	FB 45 FB 55	FB 45 FB 55	--
SIMATIC RF120C	--	--	Ident profile Ident blocks PIB_1200_UID_001KB PIB_1200_UID_032KB

ASM/ communications mod- ule	Compatible program blocks in conjunction with ...		
	S7-300 / S7-400 and STEP 7 Classic V5.5	S7-300 / S7-400 and STEP 7 Basic/Professional	S7-1200 / S7-1500 and STEP 7 Basic/Professional
<b>SIMATIC RF160C</b>	FC 44 Application blocks for RF160C	FC 44 Application blocks for RF160C	Application blocks for RF160C
<b>SIMATIC RF170C</b>	FB 45 FB 55	FB 45 FB 55	--
<b>SIMATIC RF180C</b>	FB 45 FB 55 Standard profile V1.19 Ident profile	FB 45 FB 55 Ident profile	Ident profile Ident blocks PIB_1200_UID_001KB PIB_1200_UID_032KB



## System diagnostics

### 9.1 Error codes of the RF200 readers

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#### Note

#### Validity of the error codes

The following error codes apply only to RF200 readers with an S-422 interface (CM mode)

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You can determine the error code in two ways:

- directly on the reader/CM by counting the flashing pattern of the red error LED
- via Ident profile with the "Status" output variable

Give consideration to the form of the output variable in the following table ("0xE&FE\$\$00"; "&" = 1 ... 5; "\$\$" = error code).

- Through the FB45 variable "error\_MOBY".

Table 9- 1 Error codes of the RF200 readers

Flashing of red LED on reader	Error code (hexa-decimal)	Description
00	00	no error
02	01	Presence error, possible causes: <ul style="list-style-type: none"> <li>• The active command was not carried out completely</li> <li>• The transponder left the antenna field while the command was being processed - communication disruption between reader and transponder</li> </ul>
05	05	Parameterization error, possible causes: <ul style="list-style-type: none"> <li>• Unknown command</li> <li>• Incorrect parameter</li> <li>• Function not allowed</li> </ul>
06	06	Air interface faulty
12	0C	The transponder memory cannot be written, possible cause: Hardware fault (memory faulty)
13	0D	Error in the specified memory address (access attempted to non-existent or non-accessible memory areas).
19	13	Buffer overflow: Insufficient buffer available in the reader for saving the command
20	14	Major system fault (hardware fault)
21	15	Parameter assignment error: faulty parameter in RESET command

Flashing of red LED on reader	Error code (hexadecimal)	Description
24	18	Only a RESET command is permitted
25	19	Previous command is still active
28	1C	Antenna is already switched off/Antenna is already switched on
30	1E	Incorrect number of characters in frame

---

**Note**

**Error message when memory area is protected**

For transponders with a locked or protected memory area, different error messages can occur following a write command depending on the data carrier type, e.g. MDS D1xx (NXP), D3xx (Infineon), D4xx (Fujitsu): Error 01, 0C

---

## 9.2 Diagnostics functions - STEP 7

Further information on RFID diagnostics options can be found in the following function manuals:

- Function manual Ident profile and Ident blocks  
(<https://support.industry.siemens.com/cs/us/en/view/106368029>)
- Function Manual FB 45 (<https://support.industry.siemens.com/cs/ww/en/view/21738808>)

### 9.2.1 Reader diagnostics with "Reader Status" (SLG Status)

With this command you can query the status and diagnostics data of the reader.

Attribute "0x81" (mode 01), corresponds to UDT 110

Name	Type	Possible Values (hexadecimal)	Comment
hardware	char	4D 4E 31 32 33 34 41	Type of hardware = RF280R with RS232 = RF280R with RS422 = RF260R = RF210/220R = RF240R = RF250R = RF290R
hardware_version	word	01 00 00 10; 00 29; 00 2B; 00 2C	HW version (reserved) = RF200 without RF280R = RF280R
loader_version	word	00 ... FF 00 ... FF	Bootstrap loader version: e.g. 3130 (=version 1.0) = Version (high byte) = Version (low byte)
firmware	char	00 ... FF	FW version : 33 (ASCII : 3 = RF2x0R)
firmware_version	word	00 ... FF 00 ... FF	Firmware version: e.g. 3130 (=version 1.0) = Version (high byte) = Version (low byte)
driver	char	31 32 33	Driver version 3964R = 3964R = ASCII = ASCII/ScanMode
driver_version	word	00 ... FF 00 ... FF	Driver version: e.g. 3132 (=version 1.2) = Version (high byte) = Version (low byte)
interface	byte	01 02	Interface type = RS-422 = RS-232

Name	Type	Possible Values (hexadecimal)	Comment
baud	byte	01 03 05	Transmission speed = 19.2 kBd = 57.6 kBd = 115.2 kBd
multitag_SLG	byte	01	Number of transponders (multitag/bulk) that can be processed in the antenna field = Single tag mode
field_ON_time_SLG	byte	01	ISO transponder (non-specific)
status_ant	byte	01 02	Status of the antenna = Antenna is on = antenna is off
MDS_control	byte	00 01	Presence check = Operation without presence check = Operation with presence check (antenna is activated.)

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**Note**

**Completeness of the table**

Be aware that unassigned fields in the UDT are not listed here.

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## 9.2.2 Transponder diagnostics with "Tag Status" (MDS Status)

The command can be used to scan the status data of the transponder that is located within the antenna field.

### Attribute "0x83" (mode 03), corresponds to UDT 230

Name	Type	Possible Values (hexadecimal)	Comment
UID	array[1...8] byte	00000000 0000000 ... FFFFFFFF FFFFFFFF	Unique identifier =8 byte UID, MSB first
MDS_type	byte	--	Transponder type (chip vendor, designation):
		01	= ISO 15693 general
		03	= ISO 15693 (Infineon, MDS D3xx)
		04	= ISO 15693 (Fujitsu - 2 KB, MDS D4xx); ISO 15693 (Fujitsu - 8 KB, MDS D5xx) <sup>1)</sup>
		05	= ISO 15693 (NXP, MDS D1xx)
		06	= ISO 15693 (TI, MDS D2xx)
		07	= ISO 15693 (STM, MDS D261)
IC_version	byte	0 ... FF	Chip version
size	word	0 ... FF	Memory size in bytes Depending on transponder type, e.g. MDS D3xx: 992 bytes
lock_state	byte	0 ... FF	–not used with RF200
block_size	byte	0 ... FF	Block size of the transponder for each transponder type, e.g. MDS D3xx: 4 bytes
nr_of_blocks	byte	0 ... FF	Number of blocks Depending on transponder type, e.g. MDS D3xx: 248 bytes


<sup>1)</sup> Except for RF280R; possible value (hexadecimal) 08



## Appendix

### A.1 Certificates & approvals

All the latest RFID radio approvals are available on the Internet (<http://www.siemens.com/rfid-approvals>).

Labeling	Description
	Conformity acc. to the RED EU directive

#### Notes on CE marking

The following applies to the system described in this documentation:  
The CE marking on a device indicates the corresponding approval:

#### DIN ISO 9001 certificate

The quality assurance system for the entire product process (development, production, and marketing) at Siemens fulfills the requirements of ISO 9001 (corresponds to EN29001: 1987).





This has been certified by DQS (the German society for the certification of quality management systems).










EQ-Net certificate no.: 1323-01

#### Country-specific approvals:

##### Safety

If the device has one of the following markings the corresponding approval has been obtained:


Labeling	Description
	Underwriters Laboratories (UL) per UL 60950 (I.T.E) or per UL 508 (IND.CONT.EQ)
	Underwriters Laboratories (UL) according to Canadian standard C22.2 No. 60950 (I.T.E) or C22.2 No. 142 (IND.CONT.EQ)
	Underwriters Laboratories (UL) according to standard UL 60950, Report E11 5352 and Canadian standard C22.2 No. 60950 (I.T.E) or UL508 and C22.2 No. 142 (IND.CONT.EQ)
	UL recognition mark

Labeling	Description
	Canadian Standard Association (CSA) acc. to standard C22.2. No. 60950 (LR 81690) or acc. to C22.2 No. 142 (LR 63533)
	Canadian Standard Association (CSA) per American Standard UL 60950 (LR 81690) or per UL 508 (LR 63533)
	This product meets the requirements of the AS/NZS 3548 Norm.
	USA (FCC) This device complies with Part 15 of the FCC Rules. FCC ID: NXW-RF...
Canada (IC)	Canada (IC) This device complies with Industry Canada licence-exempt RSS standard(s). IC: 267X-RF...
	Russia, Belarus and Kazakhstan
	Brazil (ANATEL) ANATEL-ID: XXXX-YY-ZZZZ)
Mexico (COFETEL)	Mexico (COFETEL)
	South Africa (ICASA)
China (CMIIT)	China (CMIIT) CMIIT ID: XXXXYZZZZ
	South Korea (KCC)
	Japan (VCCI)

## A.2 Accessories

### A.2.1 Antenna splitter

#### Area of application

Antenna splitter	Characteristics	
	Area of application	Designed for distributed mounting of antennas in warehouses, logistics and distribution
	Readers that can be connected	RF290R
	Number of connectable antennas	max. 4 (by cascading)
	Connectable antennas	<ul style="list-style-type: none"> <li>• ANT D5</li> <li>• ANT D6</li> <li>• ANT D10</li> </ul>
	Degree of protection	IP65

The antenna splitter is a power distributor with electrical isolation between the input (IN) and the two outputs (OUT1, OUT2). At the operating frequency of 13.56 MHz, the impedance at all inputs and outputs is 50 ohms.

The device is used to connect 2 to 4 antennas to a reader. Gate, C and tunnel arrangements are therefore possible (see section "Configuration options").

#### Ordering data

Table A- 1 Ordering data for the antenna splitter

	Article number
Antenna splitter (incl. one antenna connecting cable 3.3 m)	6GT2690-0AC00

Table A- 2 Ordering data - accessories - antenna splitter

		Article number
Antenna cable	Length 3.3 m	6GT2691-0CH33
	Length 10.5 m	6GT2691-0CN10
Antenna cable extension	Length 7.2 m	6GT2691-0DH72

## Technical specifications


Table A- 3 Technical specifications for antenna splitter

<b>Technical specifications</b>	
max. Input power	10 W
Transmission frequency	13.56 MHz
Power supply	None
Housing dimensions (L x W x H)	160 x 80 x 40 mm (without connector)
Color	Anthracite
Material	Plastic PA 12
Connector (inputs and outputs)	TNC connector
Securing	2 x M5 screws
Ambient temperature	
• During operation	• -25 °C ... +65 °C
• During transportation and storage	• -25 °C ... +75 °C
MTBF	3.0 x 10 <sup>5</sup> hours
Degree of protection according to EN 60529	IP65 (UL: for indoor use only)
Shock resistant according to EN 60721-3-7 Class 7M2	30 g
Total shock response spectrum Type II	
Vibration according to EN 60721-3-7 Class 7M2	1 g (9 ... 200 Hz) / 1.5 g (200 ... 500 Hz)
Weight, approx.	400 g
Approval	CE UL

## A.2.2 Antenna multiplexer SIMATIC RF260X

### A.2.2.1 Characteristics

The SIMATIC RF260X antenna multiplexer can be used to operate up to six antennas on one reader.

SIMATIC RF260X antenna multiplexer	Characteristics	
	Area of application	Designed for distributed mounting of antennas in warehouses, logistics and distribution
	Readers that can be connected	RF290R
	Number of antennas that can be connected	maximum of 6
	Connectable antennas	<ul style="list-style-type: none"> <li>• ANT D5</li> <li>• ANT D6</li> <li>• ANT D10</li> </ul>
	Degree of protection	IP65

### A.2.2.2 Ordering data

Table A- 4 SIMATIC RF260X ordering data

	Article number
SIMATIC RF260X Antenna multiplexer incl. antenna connecting cable 0.4 m	6GT2894-0EA00

Table A- 5 SIMATIC RF260X accessories ordering data

	Article number
24 V connecting cable, 5 m	6GT2491-1HH50
RF290R	6GT2821-0AC12
Wide-range power supply unit for SIMATIC RF-systems (100 - 240 V AC / 24 V DC / 3 A) with 2 m connecting cable with country-specific plug	EU: 6GT2898-0AA00 UK: 6GT2898-0AA10 US: 6GT2898-0AA20
RS-232 connecting cable, with 4-pin M12 connector for 24 V for connection to the wide-range power supply unit, 5 m	6GT2891-4KH50
ANT D5 incl. antenna connecting cable (3.3 m)	6GT2698-5AA10
ANT D6 incl. antenna connecting cable (3.3 m)	6GT2698-5AB00
ANT D10 incl. antenna connecting cable (3.3 m)	6GT2698-5AF00

		Article number
Antenna cable	3.3 m	6GT2691-0CH33
	10.5 m	6GT2691-0CN10
Antenna cable extension	7.2 m	6GT2691-0DH72

### A.2.2.3 Description

	①	24 V DC power supply		
	②	Antenna connections OUT 1 to OUT 6 with LEDs		
		Color	Status LED	
		Yellow	Lit when the corresponding antenna output is active.	
	③	SLG antenna connection "IN"		
	③	LEDs		
		LED	Color	Status LED
COMM / ERR		Red	<ul style="list-style-type: none"> <li>Flashes when the RF260X receives a signal from the SLG. (Only with commands directly to the RF260X)</li> <li>Lit when the multiplexer has detected an error on the output (e.g. non-terminated antenna cable / defective antenna cable / short-circuit)</li> </ul>	
HF - ON		Green	Lit when an HF signal is applied to the "IN" socket ③	
	RUN	Green	Flashes when the RF260X is in the normal operating state.	

### A.2.2.4 Principle of operation


You can operate up to six antennas on one reader by using the multiplexer RF260X. The data is processed sequentially.

Antenna switchover is performed in time-multiplex mode, so by connecting several antennas together, the processing time / activation time per antenna is lengthened accordingly.



### A.2.2.5 Connectors

- Power supply

Pin	Pin, casing side 4-pin M12	Assignment RF260X
 <p>Plan view</p>	1	Ground (0 V)
	2	+ 24 V
	3	+ 24 V
	4	Ground (0 V)

- Reader connector ③



Figure A-1 Reader connector

If a longer antenna cable is required between the RF290R and SIMATIC RF260X multiplexer, a 7.2 m long cable (e.g. 6GT2691-0DH72) must be used to extend it, see Ordering data (Page 339).

The excess length must then be rolled up bifilar and fastened to minimize interference from external sources.

- Antenna outputs ② (OUT 1 to OUT 3 / OUT 4 to OUT 6)

### A.2.2.6 Configuration

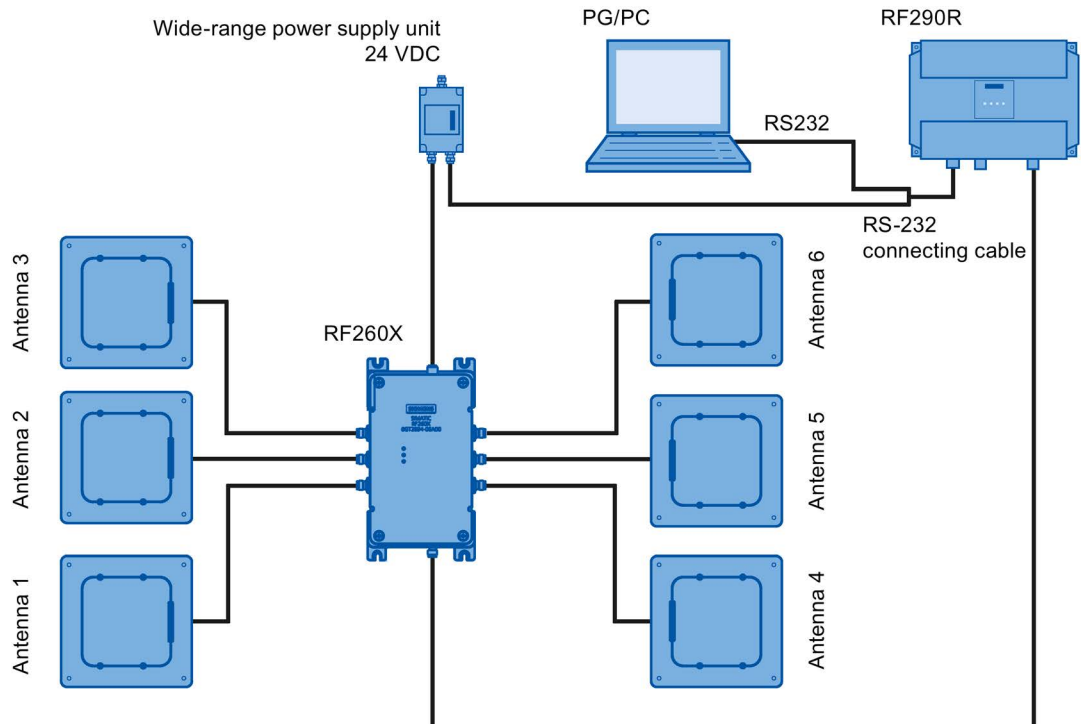


Figure A-2 Configuration example with ANT D5

### A.2.2.7 Parameterization

Parameter settings can be performed using the tool "RF290R-Set" (V9.5.2).

This tool is primarily used for parameterization and commissioning, and is not designed for productive operation.

The relevant parameters of the RF260X can be set in the "Configuration" menu under "SystemParameters > CFG15: Antenna Multiplexing" ①

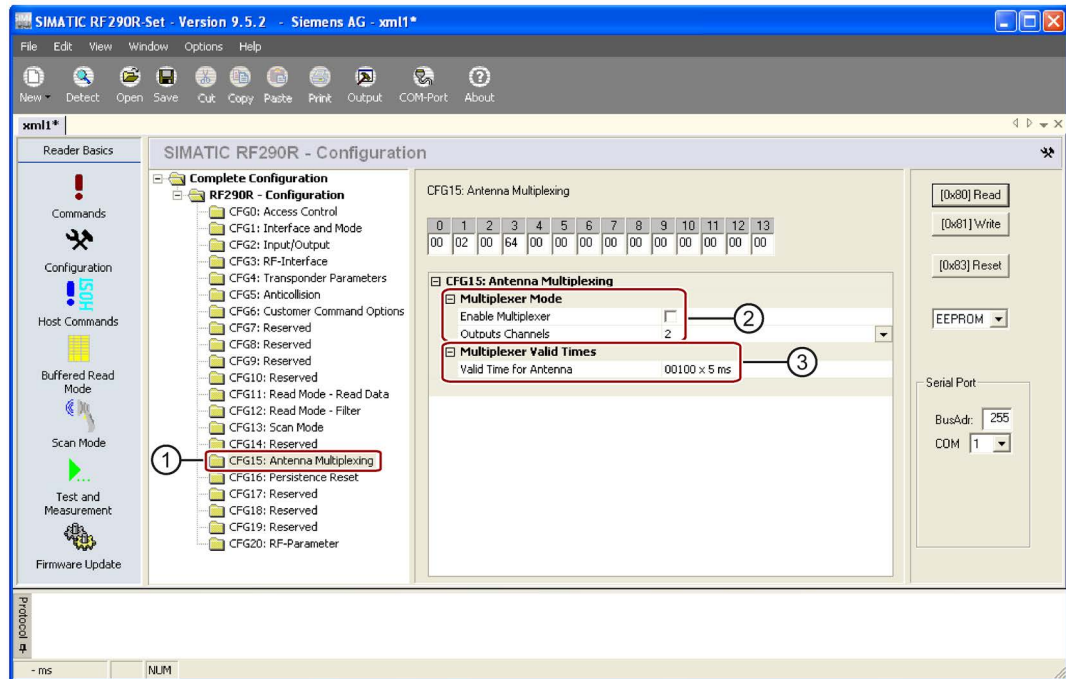


Figure A-3 Menu "Configuration" MOBYDSet"

- For operation with RF260X, you need to activate the "Multiplexing" function ②.
- The number of occupied channels must be specified under "Number of Output Channels" ②.
- In "Multiplexer Valid Times" ③, the maximum time available for the antenna to read a transponder is entered. Following this time, the device switches to the next antenna automatically. If the read was successful, the time may be significantly shorter than specified here.

## Note

### Changing the parameter assignment

- Note that if you change the parameter settings of the reader or the RF260X in scanner mode, this may lead to frame collisions. These collisions result when the frame is sent while a transponder is present.
- The "Transponder response time" (setting: "CFG2: COM interface") during operation of the RF260X must be higher than the total delay time for all the connected antennas (CFG15: MUX-VALD-TIME × Number of Output Channels ≤ Transponder Response Time)

### A.2.2.8 RF260X commands

Using the tool "RF290R-Set" (V9.5.2), certain commands can also be sent to the RF260X. In the "Commands" menu under "RF260X", the following commands can be sent:

- Detect (detection of the RF260X by the reader)
- Channel Select (set to a static channel)
- CPU-Reset (restart the RF260X software)
- Software Version (read out software and hardware versions)

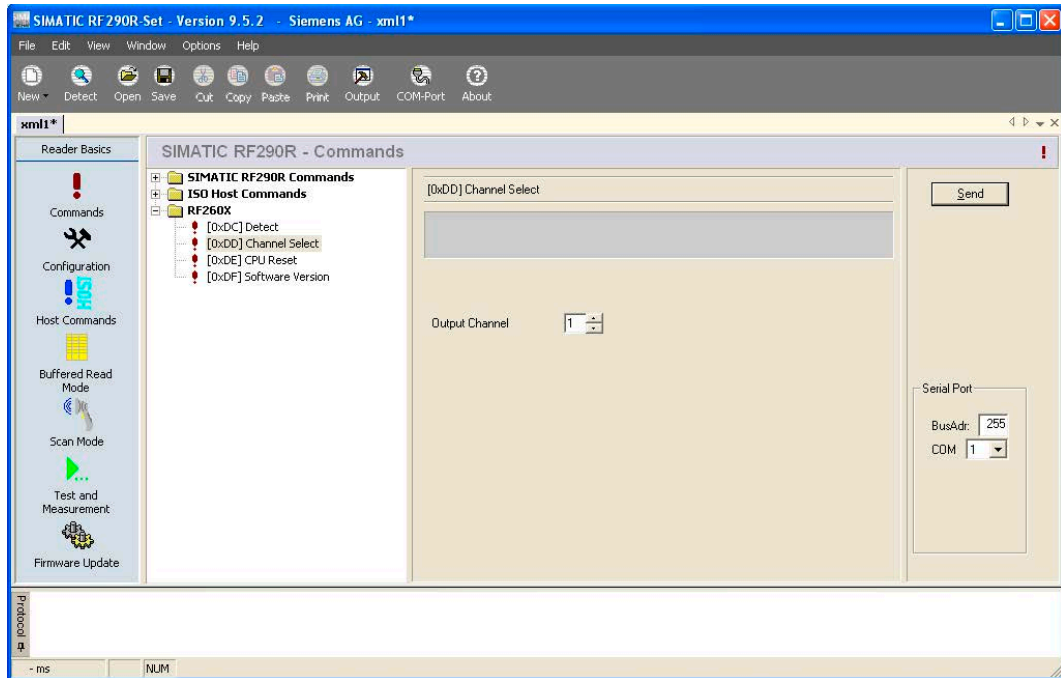


Figure A-4 Sending commands from the "RF290R-Set" tool

### A.2.2.9 Technical specifications

Technical specifications	
Max. write/read distance ANT ↔ Transponder (S <sub>g</sub> )	See manual for the relevant antenna
Number of channels	
<ul style="list-style-type: none"> <li>• Input channels</li> <li>• Output channels</li> </ul>	<ul style="list-style-type: none"> <li>• 1</li> <li>• 6</li> </ul>
Impedance	50 ohm
Power supply	24 V (± 10 %)
Current consumption	max. 200 mA
Dimensions (L x W x H)	240 x 150 x 70 mm
Length of the connecting cable	0.4 m
Color	Anthracite
Material	Aluminum die-casting
Plug-in connections	<ul style="list-style-type: none"> <li>• Power supply: Four-pole M12 / 4 pole round connector</li> <li>• Reader antenna connector: Single-pole TNC socket</li> <li>• Antenna connections: 6 x TNC socket</li> </ul>
Max. power (reader input, or per antenna)	8 W
Shock resistant according to EN 60721-3-7 Class 7M2 Total shock response spectrum Type II	1.5 g
Vibration according to EN 60721-3-7 Class 7M2	1.5 g (5 to 500 Hz)
Securing	4 M5 screws
Tightening torque (at room temperature)	≤ 5 Nm
Ambient temperature	
<ul style="list-style-type: none"> <li>• During operation</li> <li>• During transportation and storage</li> </ul>	<ul style="list-style-type: none"> <li>• -20 °C ... +55 °C</li> <li>• -25 °C ... +70 °C</li> </ul>
MTBF	2.5 x 10 <sup>6</sup> hours
Degree of protection according to EN 60529	IP65
Weight, approx.	1.8 kg
Approvals	CE / FCC / IC

A.2.2.10 Dimensional drawing

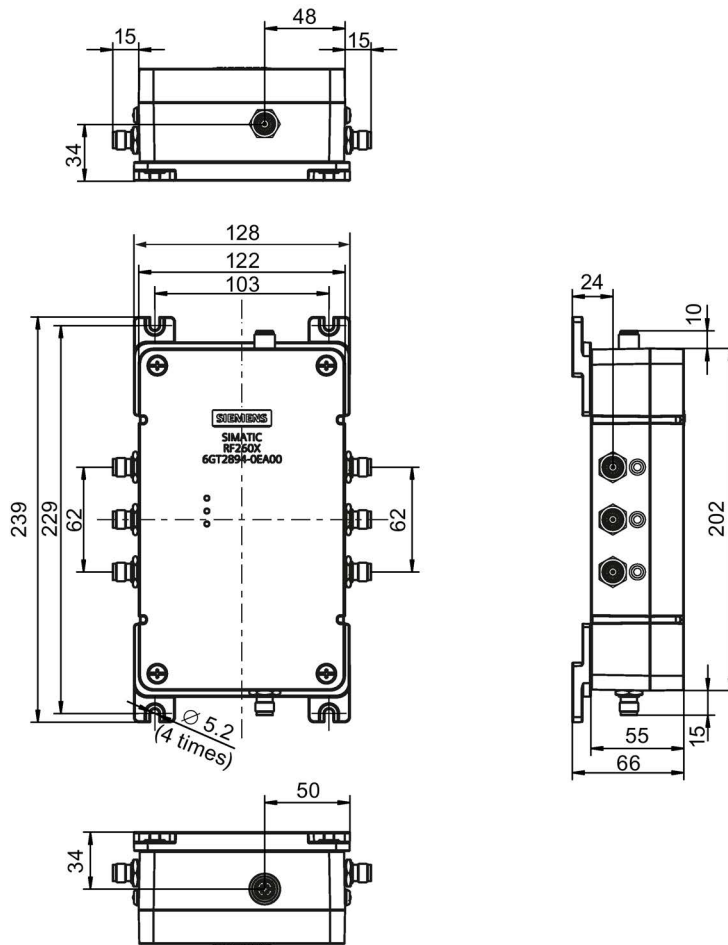



Figure A-5 RF260X dimension drawing

## A.2.3 Wide-range power supply unit for SIMATIC RF systems

### A.2.3.1 Features

<b>Wide-range power supply unit for SIMATIC RF systems</b>	
	<ul style="list-style-type: none"> <li>① DC output 1</li> <li>② DC output 2</li> <li>③ Network connector</li> </ul>
<b>Characteristics</b>	
<ul style="list-style-type: none"> <li>• Wide-range input ③ for use worldwide</li> <li>• Dimensions without mains cable: 175 x 85 x 35 mm</li> <li>• Dimensions including mains cable: 250 x 85 x 35 mm</li> <li>• CE-compliant (EU and UK versions)</li> <li>• UL-certified for US and Canada (US version)</li> <li>• Mechanically and electrically rugged design</li> <li>• Secondary side ①, ②: 24 VDC / 3 A</li> <li>• Short-circuit and no-load stability</li> <li>• Suitable for frame mounting</li> <li>• 3 versions for use in the EU, UK, US</li> </ul>	

### Description

The wide-range power supply unit for SIMATIC RF systems is a universal compact power supply and provides the user with an efficient, cost-saving solution for many different mid-range power supply tasks.

The primary switched power supply is designed for use on single-phase AC systems. The two DC outputs (sockets) are connected in parallel and protected by a built-in current limiting circuit against overload and short-circuits.

The device is vacuum-cast and prepared for Safety Class 2 applications. The EU and UK versions satisfy the low-voltage guideline as well as the current EU standards for CE conformity. Furthermore, the US version has been UL-certified for the US and Canada.

### A.2.3.2 Scope of supply


- Wide-range power supply unit for SIMATIC RF systems
- 2 m mains cable (country-specific)
- Protective cover for flange outlet
- Operating Instructions

### A.2.3.3 Ordering data

Table A- 6 Ordering data for wide-range power supply unit

	Article number
Wide-range power supply unit for SIMATIC RF systems (100 - 240 VAC / 24 VDC / 3 A) with 2 m connecting cable with country-specific plug	EU: 6GT2898-0AA00 UK: 6GT2898-0AA10 US: 6GT2898-0AA20
24 V-connecting cable, length 5 m	6GT2491-1HH50

### A.2.3.4 Safety Information

<p> <b>WARNING</b></p> <p><b>Danger to life</b></p> <p>It is not permitted to open the device or to modify the device.</p> <p>The following must also be taken into account:</p> <ul style="list-style-type: none"> <li>• Failure to observe this requirement shall constitute a revocation of the CE approval, UL certification for the US and Canada as well as the manufacturer's warranty.</li> <li>• For installation of the power supply, compliance with the DIN/VDE requirements or the country-specific regulations is essential.</li> <li>• The field of application of the power supply unit is limited to "Information technology equipment" within the scope of validity of the EN 60950/VDE 0805 standard.</li> <li>• When the equipment is installed, it must be ensured that the mains socket outlet is freely accessible.</li> <li>• The housing can reach a temperature of +25 °C during operation without any adverse consequences. It must, however, be ensured that the power supply is covered in the case of a housing temperature of more than +25°C to protect persons from contact with the hot housing. Adequate ventilation of the power supply must be maintained under these conditions.</li> </ul>
<p><b>NOTICE</b></p> <p><b>Area of application of the wide-range power supply unit</b></p> <p>The wide-range power supply unit may only be used for SIMATIC products in the specifically described area of application and for the documented purpose.</p>



If the wide-range power supply unit for SIMATIC RF systems is used for an end product other than one from the SIMATIC RF family, the following must be taken into account:

- The electric strength test of the end product is to be based upon a maximum working voltage of: Transition from primary to SELV: 353 VDC, 620 Vpk
- The following secondary output circuits are SELV (low voltage; SELV = Safety Extra Low Voltage): all
- The following secondary output circuits are at non-hazardous energy levels: all
- The power supply terminals and/or connectors are suitable for field wiring if terminals are provided.
- The maximum investigated branch circuit rating is: 20 A
- The investigated pollution degree is: 2

<b>⚠ WARNING</b>
<b>Liability</b> If the wide-range power supply unit for SIMATIC RF systems is connected to an end product other than one from the SIMATIC RF family, the end user is responsible and liable for operation of the system or end product that includes the wide-range power supply unit for SIMATIC RF systems.

<b>NOTICE</b>
<b>Restriction to the approval of the wide-range power supply</b> The SIMATIC RF290R reader may only be operated with power supplies that have received KETI approval. There is currently no KETI approval for the wide-range power supply (6GT2898-0AAx0), which is why it may not be operated in South Korea. To be able to operate the SIMATIC RF290 reader in South Korea, use only a power unit that meets the following requirements: 230 VAC, 24 VDC / 3 A; KC safety approved

### A.2.3.5 Connecting

- There are three different (country-specific) mains cables for the EU, UK and US. The appropriate mains cable must be connected to the primary input of the power supply.

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#### Note

It is only permissible to insert or remove the mains cable when the power supply is de-energized.

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- The wide-range power supply unit has total insulation (Safety Class 2), IP65
- It can be mounted using four fixing holes.

## A.2.3.6 Technical specifications

<b>General technical specifications</b>		
Insulation stability (prim./sec.) $U_{ins\ p/s}$		3.3 kV <sub>AC</sub>
Insulation resistance $R_{ins}$		>1 G $\Omega$
Leakage current $I_{leak}$	$U_{in} = 230\ V_{AC}, f = 50\ Hz$	< 200 $\mu A$
Safety class (SELV)	Designed for installation in devices of Safety Class 2	
Mains buffering $t_h$	$U_{in} = 230\ V_{AC}$	$\geq 50\ ms$
Ambient temperature		-25 °C ... +55 °C
Surface temperature	Module top, center	max. 96 °C
Storage temperature		-40 °C ... +85 °C
Self-heating on full-load		max. 45 K
Interference immunity	EN 61000-4-2, 4-3 to 4-6, 4-11	Air discharge: 15 kV 10 V/m symmetrical: 2 symmetrical: 1 10 V <sub>rms</sub>
ESD		
HF fields		
Burst		
Surge		
HF injection		
Mains quality test		
Cooling		Free convection
Dimensions L x W x H		175 mm x 85 mm x 35 mm
Weight		720 g
Housing / casting		UL 94-V0
Power supply class	according to CSA	Level 3
Degree of protection	IP65	
MTBF in years		255
<b>Technical specifications - input</b>		
Rated input voltage $U_{in}$	EN 60950 / UL 60950	100 to 240 V <sub>AC</sub> 120 to 353 V <sub>DC</sub>
Input frequency $f_{in}$		50/60 Hz
Radio interference level		EN 55011/B
Switching frequency $f_{sw}$		approx. 70 kHz typ.
Length of cable		2 m
<b>Technical specifications - output</b>		
Output voltage tolerance $\Delta U_{out}$	$U_{in} = 230\ V_{AC}$	$U_{out\ nom} \leq +2\ \%/ -1\ \%$
Overvoltage protection		$U_{out\ nom} +20\ \%$ typ.
Noise $\Delta U_{LF}$	$U_{in} = \text{min.}, BW: 1\ MHz$	$\leq 1\ \%\ U_{out}$
Noise $\Delta U_{HF}$	$U_{in} = \text{min.}, BW: 20\ MHz$	$\leq 2\ \%\ U_{out}$

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**Technical specifications - output**

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Regulation		
• Line regulation	• $U_{in} = \text{min./max.}$	• $\leq 1,0 \%$
• Load regulation	• $I_{out} = 10...90...10 \%$	• $\leq 1,0 \%$
Short-circuit current $I_{max}$	$I_{nom} = 4 \text{ A (+50 °C)}$	$105 \dots 130 \% I_{nom}$
Settling time $t_R$ load variations	$I_{out} = 10 \dots 90 \dots 10 \%$	$< 5 \text{ ms}$
Temperature coefficient $\epsilon$	$T_A = -25 \text{ °C to } +70 \text{ °C}$	$0.01 \text{ \% / K}$
Overload behavior $P_{over}$	Constant current	
Short-circuit protection/ No-load response	Continuous/no-load stability	
Derating	$T_A > +50 \text{ °C to } +70 \text{ °C}$	max. $2 \text{ \% / K}$
Connector type	M12, 4-pin; two sockets	

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**Technical specifications - initial configurations**

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Input	Outputs $U1 = U2$	$I_{Load} = I1 + I2$	Efficiency (%)	Remarks
110 VAC	24 VDC	0 A		No-load stability
110 VAC	24 VDC	3 A	$\geq 88$	
220 VAC	24 VDC	0 A		No-load stability
220 VAC	24 VDC	3 A	$\geq 90$	

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**Technical specifications - standards complied with**

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Designation	Standard	Values
Electrical safety	EN 60950 / UL 60950 / CAN/CSA 22.2 950, 3 Edition	
Conducted interference	EN 61000-6-3 EN 55011	Class B
Emission	EN 61000-6-3 EN 55011	Class B

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All values are measured at full-load and at an ambient temperature of  $+25 \text{ °C}$  (unless specified otherwise).

## A.2.3.7 Pin assignment of DC outputs and mains connection

Table A- 7 Pin assignment for DC outputs

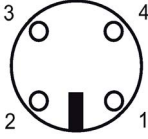
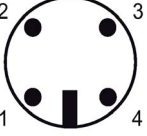
	Assignment
	(1) Ground (0V)
	(2) +24 V DC
	(3) +24 V DC
	(4) Ground (0V)

Table A- 8 Pin assignment mains connector

	Assignment
	(1) 100 to 240 V AC
	(2) n.c.
	(3) 100 to 240 V AC
	(4) n.c.

### A.2.3.8 Dimension drawing

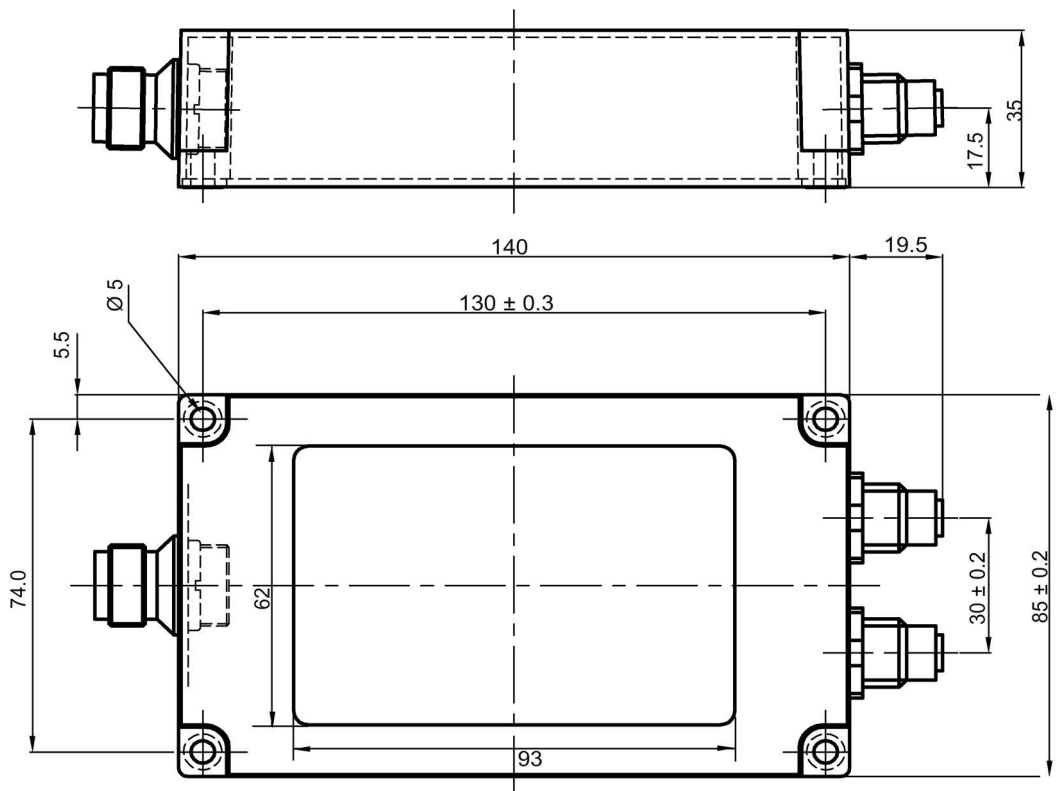


Figure A-6 Dimension drawing wide-range power supply unit for SIMATIC RF systems (all dimensions in mm)

## A.2.3.9 Certificates and approvals

Table A- 9 Wide-range power supply unit for SIMATIC RF systems 6GT2898-0AA00 - Europe, 6GT2898-0AA10 - UK







Certificate	Description
	CE approval to 2004/108/EC EMC 73/23/EEC LVD

Table A- 10 Wide-range power supply unit for SIMATIC RF systems 6GT2898-0AA20 - USA

Standard	
	This product is UL-certified for the US and Canada. It meets the following safety standards: UL 60950-1 - Information Technology Equipment Safety - Part 1: General Requirements CSA C22.2 No. 60950 -1 - Safety of Information Technology Equip- ment UL Report E 205089


## A.2.4 Transponder holders

Table A- 11 Overview of the transponder holders and spacers

Product photo	Usable transponders	Characteristics
 6GT2190-0AA00	<ul style="list-style-type: none"> <li>• MDS D100</li> <li>• MDS D200</li> <li>• MDS D400</li> </ul>	<ul style="list-style-type: none"> <li>• Spacer for mounting on metal, in conjunction with the fixing pocket 6GT2190-0AB00</li> <li>• Distance from transponder to metal: 25 mm</li> <li>• Mounting: 4 x M4 screws</li> <li>• Material: PA6</li> <li>• Weight: 31 g</li> <li>• Dimensions (L x W x H): 110 x 62 x 24 mm</li> </ul>
 6GT2190-0AB00	<ul style="list-style-type: none"> <li>• MDS D100</li> <li>• MDS D200</li> <li>• MDS D400</li> </ul>	<ul style="list-style-type: none"> <li>• Fixing pocket in conjunction with spacer 6GT2190-0AA00</li> <li>• Mounting:               <ul style="list-style-type: none"> <li>– Locks into spacer</li> <li>– 2 x screws/nails</li> <li>– Stapled</li> </ul> </li> <li>• Material: PA6</li> <li>• Weight: 12 g</li> <li>• Dimensions (L x W x H): 121 x 57 x 5 mm</li> </ul>
 6GT2390-0AA00	<ul style="list-style-type: none"> <li>• MDS D100</li> <li>• MDS D200</li> <li>• MDS D400</li> </ul>	<ul style="list-style-type: none"> <li>• Fixing pocket not suitable for mounting directly on metal</li> <li>• Mounting: 2 x M4 countersunk screws</li> <li>• Material: PA6</li> <li>• Weight: 21 g</li> <li>• Dimensions (L x W x H): 110 x 65 x 5 mm</li> </ul>
 6GT2690-0AA00	<ul style="list-style-type: none"> <li>• MDS D139</li> <li>• MDS D339</li> </ul>	<ul style="list-style-type: none"> <li>• Spacer for mounting on metal</li> <li>• Distance from transponder to metal: 30 mm</li> <li>• Mounting: 1 x M5 stainless steel screw</li> <li>• Tightening torque: 1.5 Nm</li> <li>• Material: PPS</li> <li>• Weight: 50 g</li> <li>• Dimensions (Ø x H): 85 x 30 mm</li> </ul>

Product photo	Usable transponders	Characteristics
 <p>6GT2690-0AH00</p>	<ul style="list-style-type: none"> <li>• MDS D139</li> <li>• MDS D339</li> </ul>	<ul style="list-style-type: none"> <li>• Quick change holder for mounting on metal</li> <li>• Distance from transponder to metal: 30 mm</li> <li>• Mounting: Screw-in</li> <li>• Material: Stainless steel VA</li> <li>• Weight: 80 g</li> <li>• Dimensions (Ø x H): 22 x 60 mm</li> </ul>
 <p>6GT2690-0AH10</p>	<ul style="list-style-type: none"> <li>• MDS D139</li> <li>• MDS D339</li> </ul>	<ul style="list-style-type: none"> <li>• Quick change holder for mounting on metal</li> <li>• Distance from transponder to metal: 30 mm</li> <li>• Mounting: Screw-in</li> <li>• Material: Stainless steel VA</li> <li>• Weight: 60 g</li> <li>• Dimensions (Ø x H): 22 x 47 mm</li> </ul>
 <p>6GT2690-0AK00</p>	<ul style="list-style-type: none"> <li>• MDS D124</li> <li>• MDS D324</li> <li>• MDS D424</li> <li>• MDS D524</li> </ul>	<ul style="list-style-type: none"> <li>• Spacer for mounting on metal</li> <li>• Distance from transponder to metal: 15 mm</li> <li>• Mounting: 1 x M4 countersunk screw</li> <li>• Tightening torque: ≤ 1 Nm</li> <li>• Material: PPS</li> <li>• Weight: Approx. 4 g</li> <li>• Remounting cycles: at least 10</li> <li>• Dimensions (Ø x H): 36 x 22 mm</li> </ul>
 <p>6GT2690-0AL00</p>	<ul style="list-style-type: none"> <li>• MDS D126</li> <li>• MDS D426</li> <li>• MDS D526</li> </ul>	<ul style="list-style-type: none"> <li>• Spacer for mounting on metal</li> <li>• Distance from transponder to metal: 25 mm</li> <li>• Mounting: 1 x M4 countersunk screw</li> <li>• Tightening torque: ≤ 1 Nm</li> <li>• Material: PA6</li> <li>• Weight: Approx. 12 g</li> <li>• Remounting cycles: at least 10</li> <li>• Dimensions (Ø x H): 59 x 30 mm</li> </ul>



Product photo	Usable transponders	Characteristics
 <p>6GT2690-0AG00</p>	<ul style="list-style-type: none"> <li>• MDS D160</li> <li>• MDS D460</li> </ul>	<ul style="list-style-type: none"> <li>• Spacer for mounting on metal</li> <li>• Distance from transponder to metal: 10 mm</li> <li>• Mounting: 1 x M3 countersunk screw</li> <li>• Material: PA6</li> <li>• Weight: 2 g</li> <li>• Dimensions (Ø x H): 20 x 14 mm</li> </ul>

**Dimensional drawings**

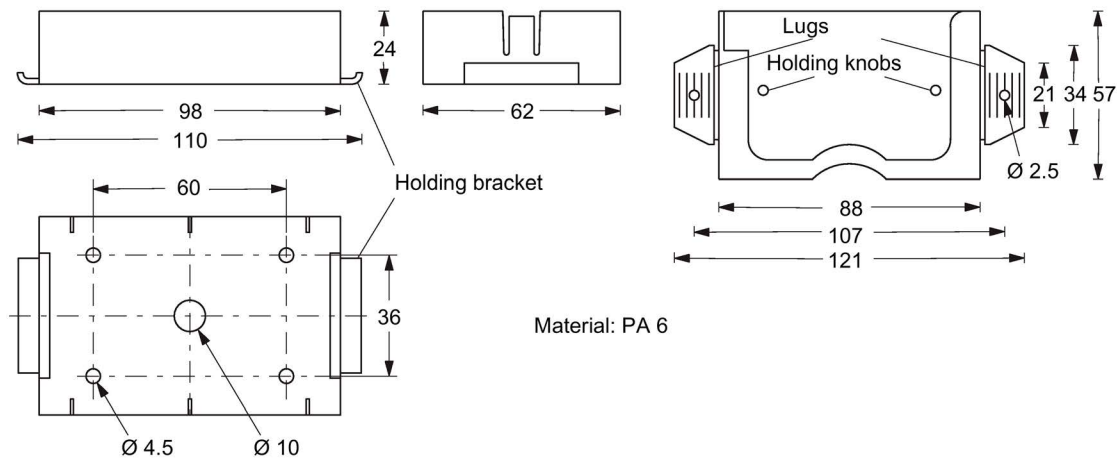


Figure A-7 Dimension drawing of spacer 6GT2190-0AA00 with fixing pocket 6GT2190-0AB00

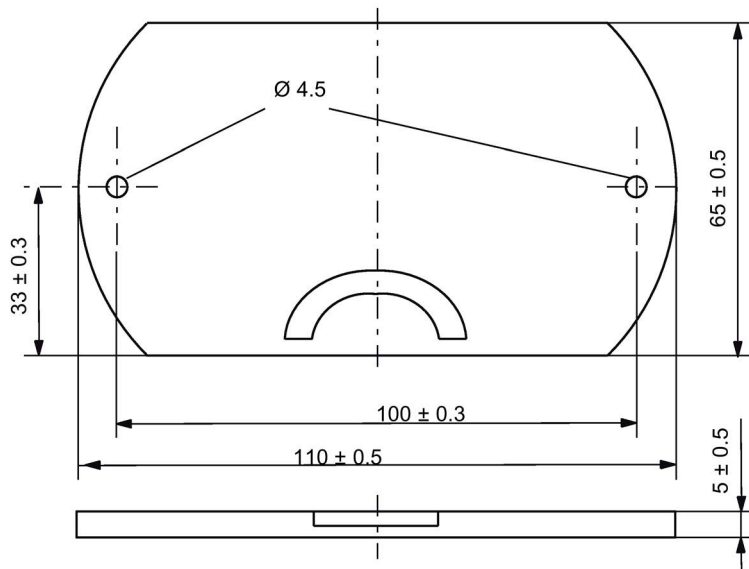


Figure A-8 Dimension drawing of fixing pocket 6GT2390-0AA00

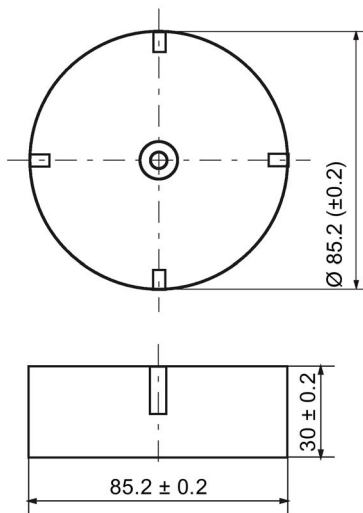


Figure A-9 Dimension drawing of spacer 6GT2690-0AA00

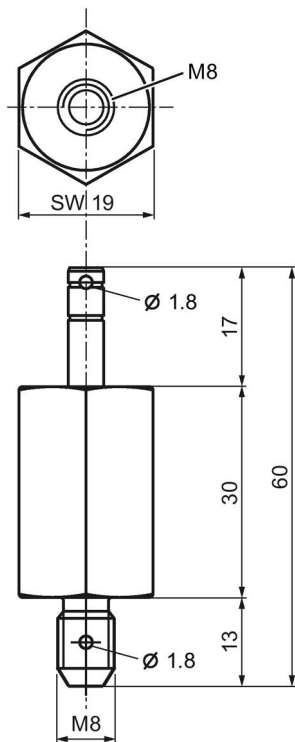


Figure A-10 Dimension drawing of quick change holder 6GT2690-0AH00

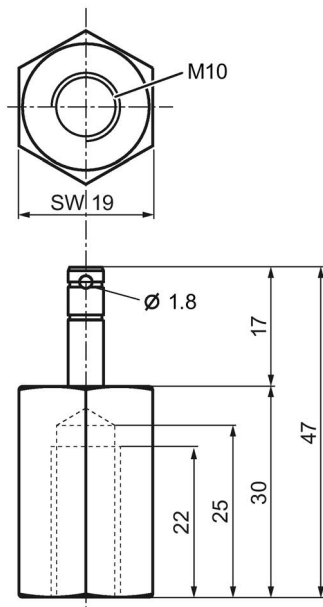


Figure A-11 Dimension drawing of quick change holder 6GT2690-0AH10

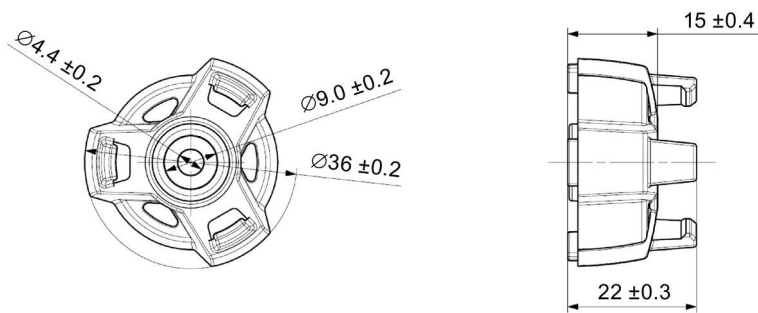


Figure A-12 Dimension drawing of spacer 6GT2690-0AK00

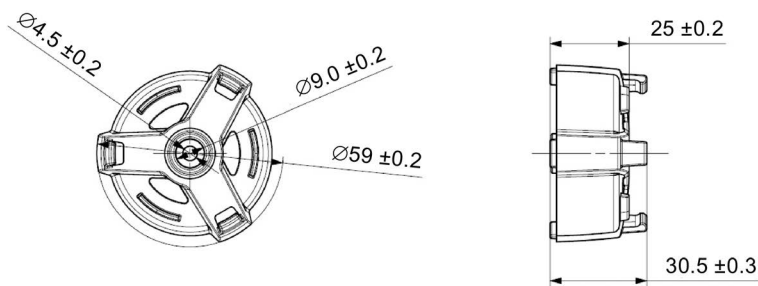


Figure A-13 Dimension drawing of spacer 6GT2690-0AL00

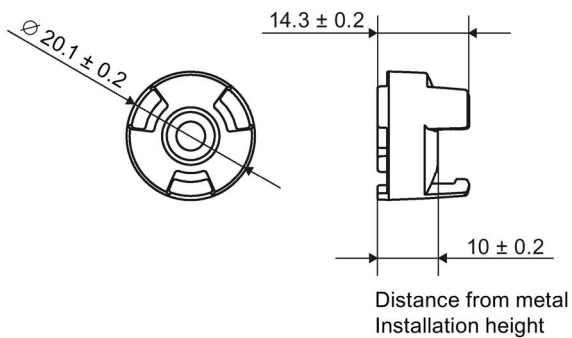


Figure A-14 Dimension drawing of spacer 6GT2690-0AG00

## A.3 Connecting cable

### A.3.1 Reader RF2xxR (RS-422) with ASM 456 / RF160C / RF170C / RF180C / RF182C

#### Connecting cable with straight connector

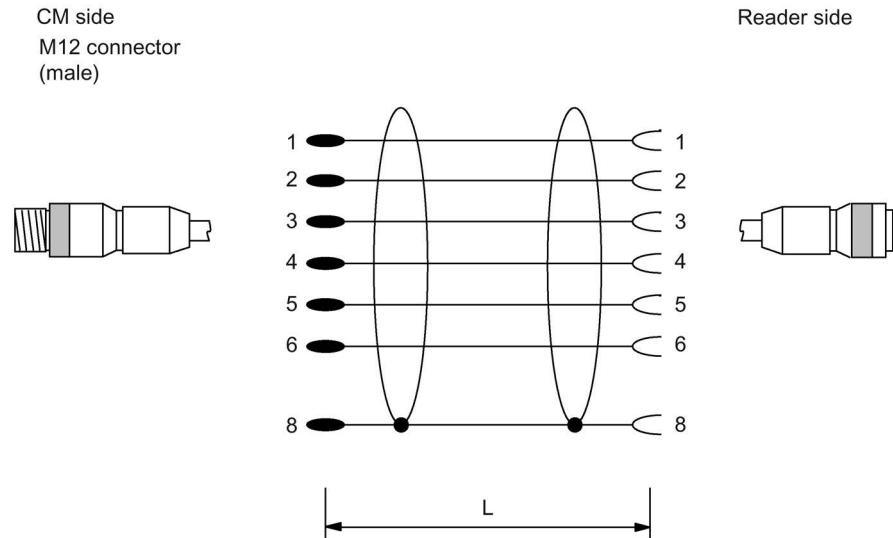


Figure A-15 Connecting cable between ASM 456, RF160C, RF170C, RF180C, RF182C and reader RF2xxR (RS-422)

Table A- 12 Ordering data

Length L	Article number
2 m	6GT2891-4FH20
5 m	6GT2891-4FH50
10 m	6GT2891-4FN10
20 m	6GT2891-4FN20
50 m	6GT2891-4FN50

Connecting cable with angled connector

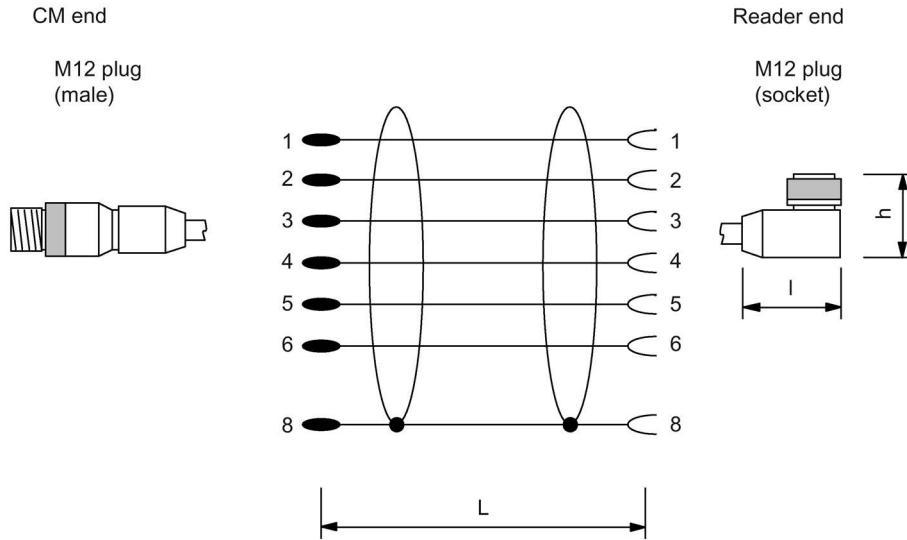


Figure A-16 Connecting cable between ASM 456, RF160C, RF170C, RF180C and RF2xxR reader (RS-422) with angled connector

Table A- 13 Ordering data

Length L	Article number
2 m	6GT2891-4JH20
5 m	6GT2891-4JH50
10 m	6GT2891-4JN10

The angled connector has a height of  $h = 29$  mm and a length of  $l = 38$  mm. Remember that due to the construction, the distance between the edge of the connector and the edge of the reader housing ( $H$ ) is higher.

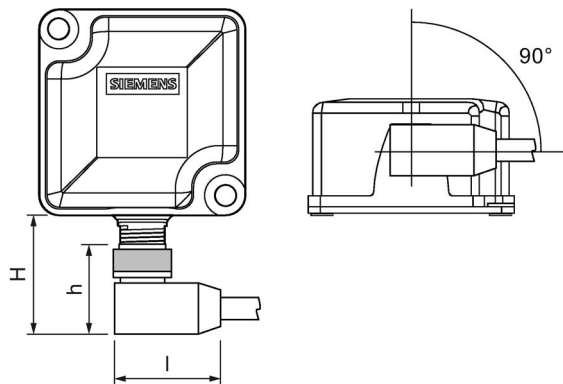


Figure A-17 Distance between connector edge and housing edge

The distance between the edge of the connector and the edge of the reader housing ( $H$ ) is as follows: RF210R/RF220R = 33 mm, RF240R/RF260R = 36 mm and RF290R = 37 mm. If you look at the reader from below, the angled connector points  $90^\circ$  to the right. With the RF290R reader the angle is approximately  $135^\circ$ .

### A.3.2 Reader RF2xxR (RS-422) with ASM 475

#### Reader connection system

The connecting cable has a length of 2 m (standard) and 5 m. Extensions up to 1000 m are possible with the 6GT2891-4F... plug-in cables.

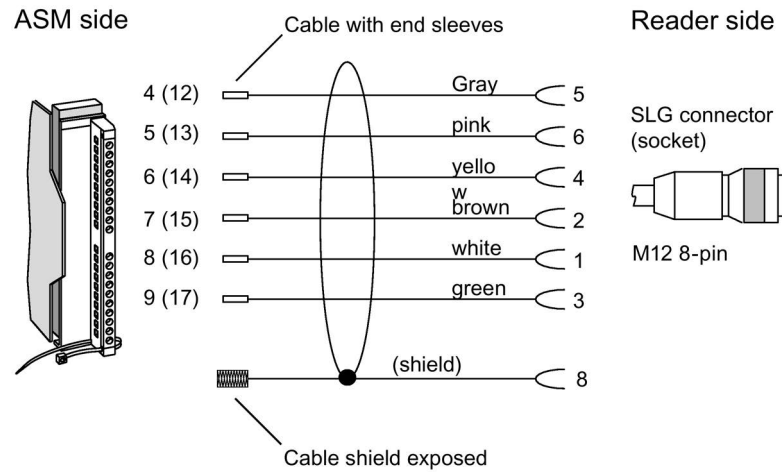


Figure A-18 Connecting cable between the ASM 475 and RF2xx reader (RS-422)

Table A- 14 Ordering data

Length L	Article number
2 m	6GT2891-4EH20
5 m	6GT2891-4EH50

### A.3.3 Reader RF2xxR (RS-422) with RF120C

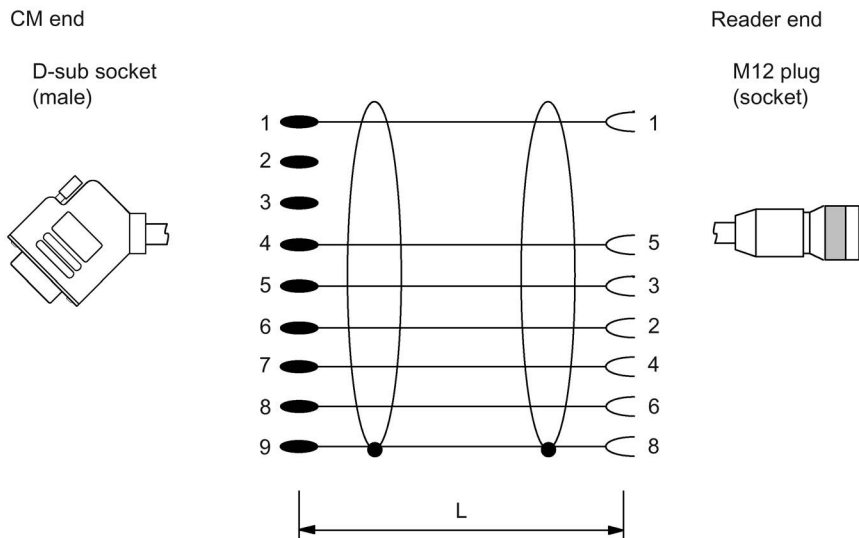


Figure A-19 Connecting cable between RF120C and RF2xxR reader (RS-422)

Table A- 15 Ordering data

Length L	Article number
2 m	6GT2091-4LH20
5 m	6GT2091-4LH50
10 m	6GT2091-4LN10

### A.3.4 Reader RF240R/RF260R/RF290R (RS232) with PC

The connecting cables have a length of 5 m. The outgoing cable for the power supply has a length of 0.5 m.



### With 4-pin power supply connector

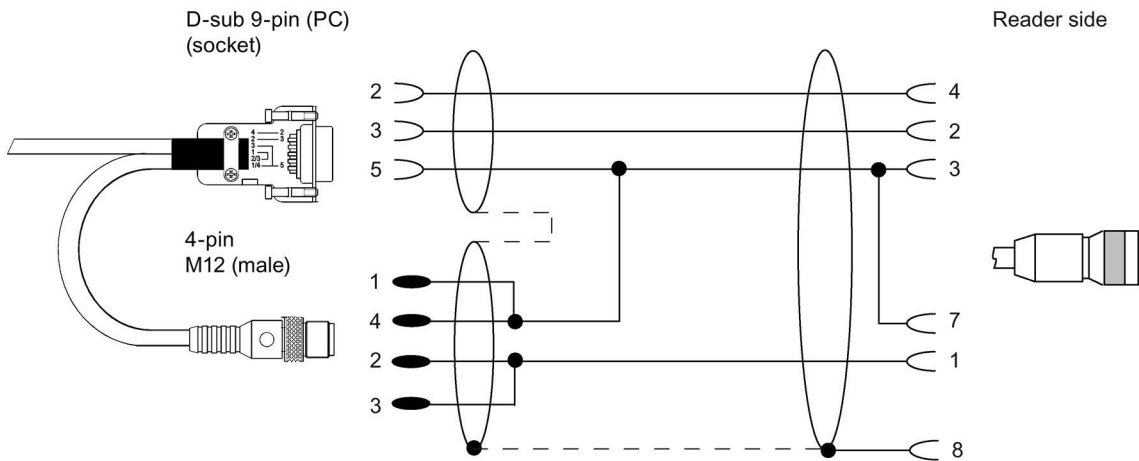


Figure A-20 Connecting cable between PC and RF240R/RF260R/RF290R (RS-232) with 4-pin power supply connector

Suitable power supply unit: e.g. wide-range power supply unit

### With open ends for the power supply

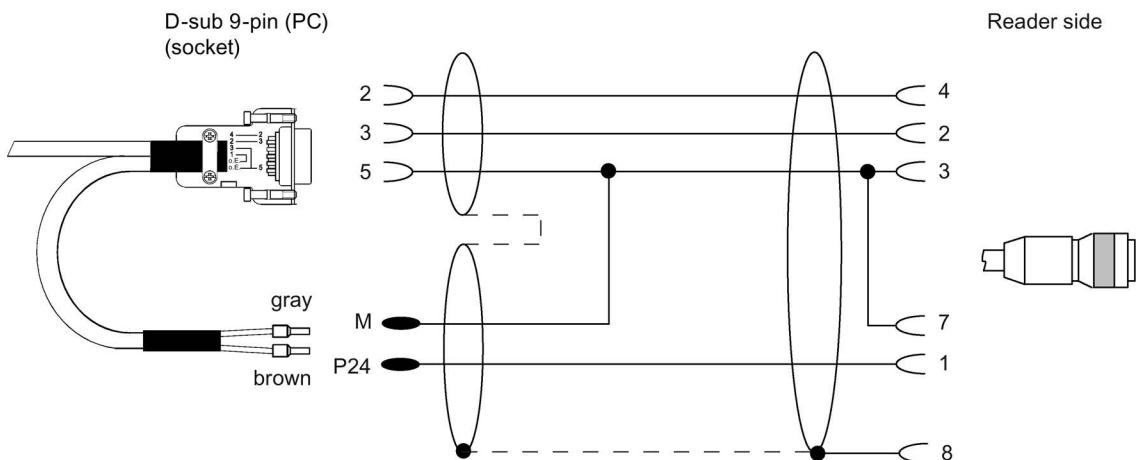


Figure A-21 Connecting cable between PC and RF240R/RF260R/RF290R (RS-232) with open ends for the power supply

Table A- 16 Ordering data connecting cable

	Article number
Connecting cable RS-232 with M12 male connector (4-pin), 5 m	6GT2891-4KH50
Connecting cable RS-232 with open ends (5 m)	6GT2891-4KH50-0AX0

### A.3.5 Reader RF290R

#### Antenna connecting cable

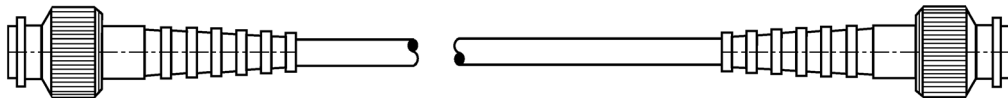


Figure A-22 ANT cable ↔ ANT Dx (3.3 m / 10.5 m)

Table A- 17 Ordering data

Length L	Article number
3.3 m	6GT2691-0CH33
10.5 m	6GT2691-0CN10

#### Antenna extension cable

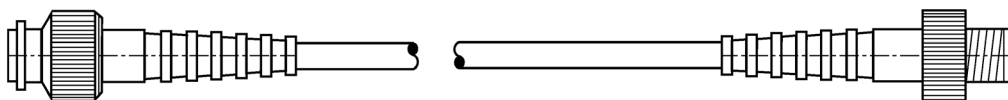


Figure A-23 Antenna extension cable (7.2 m)

Table A- 18 Ordering data

Length L	Article number
7.2 m	6GT2691-0DH72

## A.4 Ordering data

### RF200 components

Table A- 19 RF200 reader

Readers	Description	Article number
<b>RF210R</b>	<ul style="list-style-type: none"> <li>• With RS-422 interface (3964R)</li> <li>• IP67</li> <li>• Operating temperature: -25 °C ... +70 °C</li> <li>• Dimensions (L x Ø): 83 x 18 mm</li> <li>• with integrated antenna</li> </ul>	6GT2821-1AC10
<b>RF210M</b>	<ul style="list-style-type: none"> <li>• With RS-422 interface (3964R)</li> <li>• IP54</li> <li>• Operating temperature: -20 °C ... +50 °C</li> <li>• Dimensions with handle (L x W x H) 195 x 26 x 140 mm</li> <li>• with integrated antenna</li> </ul>	6GT2823-0AA00
<b>RF220R</b>	<ul style="list-style-type: none"> <li>• With RS-422 interface (3964R)</li> <li>• IP67</li> <li>• Operating temperature: -25 °C ... +70 °C</li> <li>• Dimensions (L x Ø): 83 x 30 mm</li> <li>• with integrated antenna</li> </ul>	6GT2821-2AC10
<b>RF240R</b>	<ul style="list-style-type: none"> <li>• With RS-422 interface (3964R)</li> <li>• IP67</li> <li>• Operating temperature: -20 °C ... +70 °C</li> <li>• Dimensions (L x W x H): 50 x 50 x 30 mm</li> <li>• with integrated antenna</li> </ul>	6GT2821-4AC10
<b>RF240R</b>	<ul style="list-style-type: none"> <li>• With RS-232 interface (3964R)</li> <li>• IP67</li> <li>• Operating temperature: -20 °C ... +70 °C</li> <li>• Dimensions (L x W x H): 50 x 50 x 30 mm</li> <li>• with integrated antenna</li> </ul>	6GT2821-4AC11
<b>RF240R</b>	<ul style="list-style-type: none"> <li>• With RS-232 interface (ASCII)</li> <li>• IP67</li> <li>• Operating temperature: -20 °C ... +70 °C</li> <li>• Dimensions (L x W x H): 50 x 50 x 30 mm</li> <li>• with integrated antenna</li> </ul>	6GT2821-4AC40

Readers	Description	Article number
RF250R	<ul style="list-style-type: none"> <li>• With RS-422 interface (3964R)</li> <li>• IP67</li> <li>• Operating temperature: -20 °C ... +70 °C</li> <li>• Dimensions (L x W x H): 50 x 50 x 30 mm</li> <li>• Reader with connections for external antennas ANT 8, ANT 12, ANT 18, ANT 30</li> </ul>	6GT2821-5AC10
RF250R	<ul style="list-style-type: none"> <li>• With RS-232 interface (ASCII)</li> <li>• IP67</li> <li>• Operating temperature: -20 °C ... +70 °C</li> <li>• Dimensions (L x W x H): 50 x 50 x 30 mm</li> <li>• Reader with connections for external antennas ANT 8, ANT 12, ANT 18, ANT 30</li> </ul>	6GT2821-5AC40
RF260R	<ul style="list-style-type: none"> <li>• With RS-422 interface (3964R)</li> <li>• IP67</li> <li>• Operating temperature: -20 °C ... +70 °C</li> <li>• Dimensions (L x W x H): 75 x 75 x 41 mm</li> <li>• with integrated antenna</li> </ul>	6GT2821-6AC10
RF260R	<ul style="list-style-type: none"> <li>• With RS-232 interface (3964R)</li> <li>• IP67</li> <li>• Operating temperature: -20 °C ... +70 °C</li> <li>• Dimensions (L x W x H): 75 x 75 x 41 mm</li> <li>• with integrated antenna</li> </ul>	6GT2821-6AC11
RF260R	<ul style="list-style-type: none"> <li>• With RS-232 interface (ASCII)</li> <li>• IP67</li> <li>• Operating temperature: -20 °C ... +70 °C</li> <li>• Dimensions (L x W x H): 75 x 75 x 41 mm</li> <li>• with integrated antenna</li> </ul>	6GT2821-6AC40
RF280R	<ul style="list-style-type: none"> <li>• With RS-422 interface (3964R)</li> <li>• IP67</li> <li>• Operating temperature: -25 ... +70 °C</li> <li>• Dimensions (L x W x H): 160 x 80 x 41 mm</li> <li>• with integrated antenna</li> </ul>	6GT2821-8AC10
RF280R	<ul style="list-style-type: none"> <li>• With RS-232 interface (ASCII)</li> <li>• IP67</li> <li>• Operating temperature: -25 ... +70 °C</li> <li>• Dimensions (L x W x H): 160 x 80 x 41 mm</li> <li>• with integrated antenna</li> </ul>	6GT2821-8AC40

Readers	Description	Article number
<b>RF290R</b>	<ul style="list-style-type: none"> <li>• With RS-232 interface (Advanced protocol) and RS-422 interface (3964R)</li> <li>• IP65</li> <li>• Operating temperature: -20 °C ... +55 °C</li> <li>• Dimensions (L x W x H): 200 x 140 x 80 mm</li> <li>• Long-range reader with the option of connecting external antennas ANT D5, ANT D6, ANT D10</li> </ul>	6GT2821-0AC12
<b>RF310M</b>	<ul style="list-style-type: none"> <li>• IP65</li> <li>• Operating temperature: -20 °C ... +50 °C</li> <li>• Dimensions (L x W x H): 277 x 100 x 44 mm</li> <li>• Mobile reader with integrated antenna</li> </ul>	6GT2803-1AC00
<b>RF310M</b>	<ul style="list-style-type: none"> <li>• IP65</li> <li>• Operating temperature: -20 °C ... +50 °C</li> <li>• Dimensions (L x W x H): 277 x 100 x 44 mm</li> <li>• Mobile reader with connections for external antennas ANT 8, ANT 12, ANT 18, ANT 30</li> </ul>	6GT2803-1AC10

Table A- 20 ISO transponder

ISO transponder	Description	Article number
<b>MDS D100</b>	<ul style="list-style-type: none"> <li>• IP68</li> <li>• Memory size: 112 bytes of EEPROM user memory</li> <li>• Operating temperature: -25 °C ... +80 °C</li> <li>• Dimensions (L x W x H): 85.6 x 54 x 0.9 mm</li> <li>• Credit card format</li> </ul>	6GT2600-0AD10
<b>MDS D117</b>	<ul style="list-style-type: none"> <li>• IP68</li> <li>• Memory size: 112 bytes of EEPROM user memory</li> <li>• Operating temperature: -25 °C ... +85 °C</li> <li>• Dimensions (Ø x H): 4 x 5 mm</li> </ul>	6GT2600-0AG00
<b>MDS D124</b>	<ul style="list-style-type: none"> <li>• IP68; IPx9K</li> <li>• Memory size: 112 bytes of EEPROM user memory</li> <li>• Operating temperature: -25 °C ... +180 °C</li> <li>• Dimensions (Ø x H): 27 (±0.2) x 4 (±0.2) mm</li> </ul>	6GT2600-0AC10
<b>MDS D126</b>	<ul style="list-style-type: none"> <li>• IP68</li> <li>• Memory size: 112 bytes of EEPROM user memory</li> <li>• Operating temperature: -25 °C ... +85 °C</li> <li>• Dimensions (Ø x H): 50 x 3.6 mm</li> <li>• Round design with mounting hole</li> </ul>	6GT2600-0AE00

ISO transponder	Description	Article number
<b>MDS D127</b>	<ul style="list-style-type: none"> <li>• IP68; IPx9K</li> <li>• Memory size: 112 bytes of EEPROM user memory</li> <li>• Operating temperature: -25 °C ... +125 °C</li> <li>• Dimensions (Ø x H): M6 x 5 (±0.2) mm</li> </ul>	6GT2600-0AF00
<b>MDS D139</b>	<ul style="list-style-type: none"> <li>• IP68; IPx9K</li> <li>• Memory size: 112 bytes of EEPROM user memory</li> <li>• Operating temperature: up to +200 °C / +220 °C</li> <li>• Dimensions (Ø x H): 85 (±0.5) x 15 (-1.0) mm</li> </ul>	6GT2600-0AA10
<b>MDS D160</b>	<ul style="list-style-type: none"> <li>• IP68; IPx9K</li> <li>• Memory size: 112 bytes of EEPROM user memory</li> <li>• Operating temperature: -25 °C...+70 °C</li> <li>• Dimensions (Ø x H): 16 (±0.2) x 3.0 (±0.2) mm</li> <li>• Laundry tag for cyclic applications</li> </ul>	6GT2600-0AB10
<b>MDS D165</b>	<ul style="list-style-type: none"> <li>• IP65</li> <li>• Memory size: 112 bytes of EEPROM user memory</li> <li>• Operating temperature: -25 °C ... +85 °C</li> <li>• Dimensions (L x W): 86 x 54 mm</li> <li>• Smartlabel (PET) in credit card format</li> </ul>	6GT2600-1AB00-0AX0
<b>MDS D200</b>	<ul style="list-style-type: none"> <li>• IP67</li> <li>• Memory size: 256 bytes of EEPROM user memory</li> <li>• Operating temperature: -20 °C ... +60 °C</li> <li>• Dimensions (L x W x H): 86 x 54 x 0.8 mm</li> <li>• Credit card format</li> </ul>	6GT2600-1AD00-0AX0
<b>MDS D261</b>	<ul style="list-style-type: none"> <li>• IP65</li> <li>• Memory size: 256 bytes of EEPROM user memory</li> <li>• Operating temperature: -25 °C ... +85 °C</li> <li>• Dimensions (L x W): 55 x 55 mm</li> <li>• Smartlabel (PET), small design</li> </ul>	6GT2600-1AA00-0AX0
<b>MDS D324</b>	<ul style="list-style-type: none"> <li>• IP67; IPx9K</li> <li>• Memory size: 992 bytes of EEPROM user memory</li> <li>• Operating temperature: -25 °C ... +125 °C</li> <li>• Dimensions (Ø x H): 27 (±0.2) x 4 (±0.2) mm</li> </ul>	6GT2600-3AC00
<b>MDS D339</b>	<ul style="list-style-type: none"> <li>• IP68; IPx9K</li> <li>• Memory size: 992 bytes of EEPROM user memory</li> <li>• Operating temperature: -25 °C ... +220 °C</li> <li>• Dimensions (Ø x H): 85 (±0.5) x 15 (-1.0) mm</li> </ul>	6GT2600-3AA10

ISO transponder	Description	Article number
<b>MDS D400</b>	<ul style="list-style-type: none"> <li>• IP67</li> <li>• Memory size: 2000 bytes of FRAM user memory</li> <li>• Operating temperature: -25 °C ... +60 °C</li> <li>• Dimensions (L x W x H) 85.6 (±0.3) × 54 (±0.2) × 0.8 (±0.05) mm</li> </ul>	6GT2600-4AD00
<b>MDS D421</b>	<ul style="list-style-type: none"> <li>• IP67; IPx9K</li> <li>• Memory size: 2000 bytes of FRAM user memory</li> <li>• Operating temperature -25 °C ... +85 °C</li> <li>• Dimensions (Ø x H): 10 x 4.5 mm</li> </ul>	6GT2600-4AE00
<b>MDS D422</b>	<ul style="list-style-type: none"> <li>• IP68</li> <li>• Memory size: 2000 bytes of FRAM user memory</li> <li>• Operating temperature: -25 °C ... +85 °C</li> <li>• Dimensions (Ø x H): M20 x 6 (±0.2) mm</li> <li>• Can be screwed into metal (flush-mounted)</li> </ul>	6GT2600-4AF00
<b>MDS D423</b>	<ul style="list-style-type: none"> <li>• IP68; IPx9K</li> <li>• Memory size: 2000 bytes of FRAM user memory</li> <li>• Operating temperature: -25 °C ... +85 °C</li> <li>• Dimensions (Ø x H): 30 (+0.2/-0.5) x 8 (-0.5) mm</li> </ul>	6GT2600-4AA00
<b>MDS D424</b>	<ul style="list-style-type: none"> <li>• IP67; IPx9K</li> <li>• Memory size: 2000 bytes of FRAM user memory</li> <li>• Operating temperature: -25 °C ... +125 °C</li> <li>• Dimensions (Ø x H): 27 (±0.2) x 4 (±0.2) mm</li> </ul>	6GT2600-4AC00
<b>MDS D425</b>	<ul style="list-style-type: none"> <li>• IP68; IPx9K</li> <li>• Memory size: 2000 bytes of FRAM user memory</li> <li>• Operating temperature: -25 °C ... +85 °C</li> <li>• Dimensions (Ø x H): 24 X 10 mm; M6 thread</li> <li>• Screw transponder</li> </ul>	6GT2600-4AG00
<b>MDS D426</b>	<ul style="list-style-type: none"> <li>• IP68</li> <li>• Memory size: 2000 bytes of FRAM user memory</li> <li>• Operating temperature: -25 °C ... +85 °C</li> <li>• Dimensions (Ø x H): 50 x 3.6 mm</li> <li>• Round design with mounting hole</li> </ul>	6GT2600-4AH00
<b>MDS D428</b>	<ul style="list-style-type: none"> <li>• IP68; IPx9K</li> <li>• Memory size: 2000 bytes of FRAM user memory</li> <li>• Operating temperature: -25 °C ... +85 °C</li> <li>• Dimensions (Ø x H): 18(±1) x 20(±1) mm (without thread); thread M8</li> </ul>	6GT2600-4AK00-0AX0

ISO transponder	Description	Article number
<b>MDS D460</b>	<ul style="list-style-type: none"> <li>• IP67; IPx9K</li> <li>• Memory size: 2000 bytes of FRAM user memory</li> <li>• Operating temperature: -25 °C ... +85 °C</li> <li>• Dimensions (Ø x H): 16 (±0.2) x 3.0 (±0.2) mm</li> </ul>	6GT2600-4AB00
<b>MDS D521</b>	<ul style="list-style-type: none"> <li>• IP67; IPx9K</li> <li>• Memory size: 8192 bytes of FRAM user memory</li> <li>• Operating temperature -25 °C ... +85 °C</li> <li>• Dimensions (Ø x H): 10 x 4.5 mm</li> </ul>	6GT2600-5AE00
<b>MDS D522</b>	<ul style="list-style-type: none"> <li>• IP68</li> <li>• Memory size: 8192 bytes of FRAM user memory</li> <li>• Operating temperature: -25 °C ... +85 °C</li> <li>• Dimensions (Ø x H): M20 x 6 (±0.2) mm</li> <li>• Can be screwed into metal (flush-mounted)</li> </ul>	6GT2600-5AF00
<b>MDS D522 Special variants</b>	<ul style="list-style-type: none"> <li>• IP68</li> <li>• Memory size: 8192 bytes of FRAM user memory</li> <li>• Operating temperature: -25 °C ... +85 °C</li> <li>• Dimensions (Ø x H): 18 (+0.1) x 5.2 mm</li> <li>• Can be clipped into metal (flush-mounted)</li> </ul>	6GT2600-5AF00-0AX0
<b>MDS D524</b>	<ul style="list-style-type: none"> <li>• IP67</li> <li>• Memory size: 8192 bytes of FRAM user memory</li> <li>• Operating temperature: -25 °C ... +85 °C</li> <li>• Dimensions (Ø x H): 27 (±0.2) x 4 (±0.2) mm</li> </ul>	6GT2600-5AC00
<b>MDS D526</b>	<ul style="list-style-type: none"> <li>• IP67; IPx9K</li> <li>• Memory size: 8192 bytes of FRAM user memory</li> <li>• Operating temperature: -25 °C ... +85 °C</li> <li>• Dimensions (Ø x H): 50 x 3.6 mm</li> <li>• Round design with mounting hole</li> </ul>	6GT2600-4AH00
<b>MDS D528</b>	<ul style="list-style-type: none"> <li>• IP68; IPx9K</li> <li>• Memory size: 8192 bytes of FRAM user memory</li> <li>• Operating temperature: -25 °C ... +85 °C</li> <li>• Dimensions (Ø x H): 18(±1) x 20(±1) mm (without thread); thread M8</li> </ul>	6GT2600-5AK00



Table A- 21 Communication modules/interface modules

ASM/ communications module	Description	Article number
<b>ASM 456</b>	ASM 456 for PROFIBUS DP-V1 max. 2 readers connectable	6GT2002-0ED00
<b>ASM 475</b>	ASM 475 for SIMATIC S7 max. 2 RF2xxR readers with RS-422 can be connected in parallel without a front connector	6GT2002-0GA10
<b>RF120C</b>	Communications module RF120C for SIMATIC S7-1200	6GT2002-0LA00
<b>RF160C</b>	Communications module RF160C for PROFIBUS DP V0 max. 2 readers connectable	6GT2002-0EF00
<b>RF170C</b>	RF170C communications module	6GT2002-0HD00
	RF170C connecting block	6GT2002-1HD00
<b>RF180C</b>	RF180C communications module max. 2 SLGs or readers can be connected	6GT2002-0JD00
	Connecting block M12, 7/8" (5-pin)	6GT2002-1JD00
	Connecting block M12, 7/8" (4-pin)	6GT2002-4JD00
	Push-pull connecting block, RJ-45	6GT2002-2JD00
<b>RF182C</b>	RF182C communication module Max. 2 SLGs or readers can be connected	6GT2002-0JD10
	Connecting block M12, 7/8" (5-pin)	6GT2002-1JD00
	Connecting block M12, 7/8" (4-pin)	6GT2002-4JD00
	Push-pull connecting block, RJ-45	6GT2002-2JD00
<b>RFID 181EIP</b>	RF182C communications module max. 2 SLGs or readers can be connected	6GT2002-0JD20
	Connecting block M12, 7/8" (5-pin)	6GT2002-1JD00
	Connecting block M12, 7/8" (4-pin)	6GT2002-4JD00
	Push-pull connecting block, RJ-45	6GT2002-2JD00

Table A- 22 Antennas

Antennas	Description	Article number
<b>ANT 3</b>	<ul style="list-style-type: none"> <li>• IP67</li> <li>• Operating temperature: -25 °C ... +70 °C</li> <li>• Dimensions (L x W x H): 50 x 28 x 10 mm</li> <li>• without antenna connecting cable</li> </ul>	6GT2398-1CD30-0AX0
	<ul style="list-style-type: none"> <li>• incl. one plug-in antenna connecting cable 3 m</li> </ul>	6GT2398-1CD40-0AX0
<b>ANT 8</b>	<ul style="list-style-type: none"> <li>• IP67</li> <li>• Operating temperature: -25 °C ... +70 °C</li> <li>• Dimensions (Ø x L): M8 x 40 mm</li> <li>• without antenna connecting cable</li> </ul>	6GT2398-1CF00
	<ul style="list-style-type: none"> <li>• incl. one plug-in antenna connecting cable 3 m</li> </ul>	6GT2398-1CF10

Antennas	Description	Article number
ANT 12	<ul style="list-style-type: none"> <li>IP67</li> <li>Operating temperature: -25 °C ... +70 °C</li> <li>Dimensions (Ø x L): M12 x 40 mm</li> <li>incl. one integrated antenna connecting cable 0.6 m</li> </ul>	6GT2398-1CC10
	<ul style="list-style-type: none"> <li>incl. one plug-in antenna connecting cable 3 m</li> </ul>	6GT2398-1CC00
ANT 18	<ul style="list-style-type: none"> <li>IP67 (front)</li> <li>Operating temperature: -25 °C ... +70 °C</li> <li>Dimensions (Ø x L): M18 x 55 mm</li> <li>incl. one integrated antenna connecting cable 0.6 m</li> </ul>	6GT2398-1CA10
	<ul style="list-style-type: none"> <li>incl. one plug-in antenna connecting cable 3 m</li> </ul>	6GT2398-1CA00
ANT 30	<ul style="list-style-type: none"> <li>IP67</li> <li>Operating temperature: -25 °C ... +70 °C</li> <li>Dimensions (Ø x L): M30 x 58 mm</li> <li>incl. one plug-in antenna connecting cable 3 m</li> </ul>	6GT2398-1CD00
ANT D5	<ul style="list-style-type: none"> <li>IP65</li> <li>Operating temperature: -20 °C ... +55 °C</li> <li>Dimensions (L x W x H): 380 x 380 x 110 mm</li> <li>incl. one antenna connecting cable 3.3 m</li> </ul>	6GT2698-5AA10
ANT D6	<ul style="list-style-type: none"> <li>IP65</li> <li>Operating temperature: -20 °C ... +55 °C</li> <li>Dimensions (L x W x H): 580 x 480 x 110 mm</li> <li>incl. one antenna connecting cable 3.3 m</li> </ul>	6GT2698-5AB00
ANT D10	<ul style="list-style-type: none"> <li>IP65</li> <li>Operating temperature: -20 °C ... +55 °C</li> <li>Dimensions (L x W x H): 1150 x 365 x 115 mm</li> <li>incl. one antenna connecting cable 3.3 m</li> </ul>	6GT2698-5AF00

## Accessories

Table A- 23 Reader accessories

Readers	Accessories	Article number
RF290R	Adapter for mounting on a DIN rail (pack of 3)	6GK5798-8ML00-0AB3

Table A- 24 ISO transponder accessories

Transponder	Accessories	Article number
MDS D100 / D200 / D400	Spacer	6GT2190-0AA00
	Fixing pocket	6GT2190-0AB00
	Securing pocket (cannot be mounted directly on metal)	6GT2390-0AA00
MDS D139 / D339	Spacer (Ø x H): 85 x 30 mm	6GT2690-0AA00
	Quick change holder (Ø x H): 22 x 48 mm	6GT2690-0AH00
MDS D124 / D324 / D424 / D524	Spacer (Ø x H): 35 x 15 mm	6GT2690-0AK00
MDS D126 / D426 / D526	Spacer (Ø x H): 60 x 30 mm	6GT2690-0AL00
MDS D160 / D460	Spacer (Ø x H): 20 x 15 mm	6GT2690-0AG00

Table A- 25 Antenna accessories

Antennas	Accessories	Article number	
ANT 3 / ANT 8	Antenna connecting cable with M8 plug (with angled plug)	6GT2391-0AH30	
ANT D5 / ANT D6 / ANT D10	Antenna splitter (incl. one antenna connecting cable 3.3 m)	6GT2690-0AC00	
	Antenna multiplexer SIMATIC RF260X (incl. one antenna connecting cable 0.4 m)	6GT2894-0EA00	
	Antenna cable	3.3 m	6GT2691-0CH33
		10.5 m	6GT2691-0CN10
	Antenna cable extension	7.2 m	6GT2691-0DH72
ANT D6	Cover	6GT2690-0AD00	

Table A- 26 Accessories - connecting cable RF200 reader ↔ PC

Connecting cable	Accessories	Article number
RF240R / RF260R / RF290R (RS-232) and PC	Connecting cable RS-232 with M12 male connector (4-pin), 5 m	6GT2891-4KH50
	Connecting cable RS-232 with open ends, 5 m	6GT2891-4KH50-0AX0
RF290R	Antenna cable 3.3 m	6GT2691-0CH33
	Antenna cable 10.5 m	6GT2691-0CN10
RF290R	Antenna extension cable 7.2 m	6GT2691-0DH72

Table A- 27 Accessories - connecting cable communications module/ASM ↔ reader

Connecting cables	Description Length	Article number
ASM 456 / RF160C / RF170C / RF180C and RF2xxR reader (RS-422)	2 m	6GT2891-4FH20
	5 m	6GT2891-4FH50
	10 m	6GT2891-4FN10
	20 m	6GT2891-4FN20
	50 m	6GT2891-4FN50
ASM 456 / RF160C / RF170C / RF180C and RF2xxR reader (RS-422) with angled connector	2 m	6GT2891-4JH20
	5 m	6GT2891-4JH50
	10 m	6GT2891-4JN10
ASM 475 and RF2xxR reader (RS-422)	2 m	6GT2891-4EH20
	5 m	6GT2891-4EH50
RF120C and reader RF3xxR (RS-422)	2 m	6GT2091-4LH20
	5 m	6GT2091-4LH50
	10 m	6GT2091-4LN10

Table A- 28 RFID accessories, general

RFID general	Article number
DVD "Ident Systems Software & Documentation"	6GT2080-2AA20
Wide-range power supply unit for SIMATIC RF systems (100 - 240 VAC / 24 VDC / 3 A) with country-specific power cable/plug, 2 m	EU: 6GT2898-0AA00
	UK: 6GT2898-0AA10
	US: 6GT2898-0AA20
24 V connecting cable, 5 m	6GT2491-1HH50
M12 connector, 4-pin for wide range power supply unit, pack of 3	6GK1907-0DB10-6AA3

## A.5 Service & Support

### Industry Online Support

In addition to the product documentation, the comprehensive online information platform of Siemens Industry Online Support at the following Internet address:

Link 1: (<https://support.industry.siemens.com/cs/de/en/>)

Apart from news, there you will also find:

- Project information: Manuals, FAQs, downloads, application examples etc.
- Contacts, Technical Forum
- The option submitting a support query:  
link 2: (<https://support.industry.siemens.com/My/ww/en/requests>)

- Our service offer:

Right across our products and systems, we provide numerous services that support you in every phase of the life of your machine or system - from planning and implementation to commissioning, through to maintenance and modernization.

You will find contact data on the Internet at the following address:

Link 3: ([http://w3.siemens.com/aspa\\_app](http://w3.siemens.com/aspa_app))

### RFID homepage

For general information about our identification systems, visit RFID homepage (<http://w3.siemens.com/mcms/identification-systems/>).

### Online catalog and ordering system

The online catalog and the online ordering system can also be found on the Industry Mall Homepage (<https://mall.industry.siemens.com>).

### SITRAIN - Training for Industry

The training offer includes more than 300 courses on basic topics, extended knowledge and special knowledge as well as advanced training for individual sectors - available at more than 130 locations. Courses can also be organized individually and held locally at your location.

You will find detailed information on the training curriculum and how to contact our customer consultants at the following Internet address:

Link: (<http://sitrain.automation.siemens.com/sitrainworld/>)



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