SIEMENS

SIMATIC Ident

RFID systems SIMATIC RF300

System Manual

10/2016

C79000-G8976-C345-06

Legal information

Warning notice system

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

⚠ DANGER

indicates that death or severe personal injury **will** result if proper precautions are not taken.

⚠ WARNING

indicates that death or severe personal injury **may** result if proper precautions are not taken.

⚠ CAUTION

indicates that minor personal injury can result if proper precautions are not taken.

NOTICE

indicates that property damage can result if proper precautions are not taken.

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

Qualified Personnel

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

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Note the following:

⚠ WARNING

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

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Disclaimer of Liability

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

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C79000-G8976-C345-06
℗ 10/2016 Subject to change

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Introduction 1

1.1 Navigating in the system manual

Structure of the content	Content
Contents	Detailed organization of the documentation, including the index of pages and chapters
Introduction	Purpose, structure and description of the important topics.
Safety Information	Refers to all the valid technical safety aspects which have to be adhered to while installing, commissioning and operating from the product/system view and with reference to statutory regulations.
System overview	Overview of all RF identification systems, system overview of SIMATIC RF300
Planning the RF300 system	Information about possible applications of SIMATIC RF300, support for application planning, tools for finding suitable SIMATIC RF300 components.
Reader	Description of readers which can be used for SIMATIC RF300
Antennas	Description of antennas which can be used for SIMATIC RF300
RF300 transponder	Description of RF300 transponders which can be used for SIMATIC RF300
ISO transponder	Description of ISO transponders which can be used for SIMATIC RF300
System integration	Overview of the communications modules and function blocks that can be used for SIMATIC RF300
System diagnostics	Description of system diagnostics available for SIMATIC RF300
Appendix	• Certificates and approvals • Accessories • Connecting cables • Ordering data • Service & Support

1.2 Preface

Purpose of this document

This system manual contains all the information needed to plan and configure the system.

It is intended both for programming and testing/debugging personnel who commission the system themselves and connect it with other units (automation systems, further programming devices), as well as for service and maintenance personnel who install expansions or carry out fault/error analyses.

Scope of validity of this document

This documentation is valid for all variants of the SIMATIC RF300 system and describes the devices shipped as of July 2016.

Additional information

You will find further information about the readers RF350M, RF310R Scanmode and RF382R Scanmode in the relevant manuals.

Additional information (https://support.industry.siemens.com/cs/ww/en/ps/15033)

Registered trademarks

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History

Currently released versions of the SIMATIC RF300 system manual:

Edition	Remark
05/2005	First Edition
11/2005	Revised edition, components added: RF310R with RS-422 interface, RF350T and RF360T; ASM 452, ASM 456, ASM 473 and ASM 475
04/2006	Revised edition, components added: RF340R as well as RF350R with the antenna types ANT 1, ANT 18 and ANT 30
12/2006	Revised edition, components added: RF370T, RF380T and RF170C
07/2007	Revised edition, degrees of protection changed for the RF300 readers
09/2007	Revised edition, components added: RF380R and RF180C
06/2008	Revised edition
01/2009	Revised edition, expanded by the reader functionalities "RF300 transponder" and "ISO transponder" for the SIMATIC RF310R and SIMATIC RF380R readers

Edition	Remark
03/2014	Revised edition, expanded by the reader functionalities "RF300 transponder" and "ISO transponder" for the SIMATIC RF340R and SIMATIC RF350R readers Expanded by the following components: • Reader RF310R with Scanmode, RF382R with Scanmode • Communications module RF120C • Antennas ANT 12 (in conjunction with RF350R) and ANT 8 (in conjunction with RF310M) • RF300 transponder RF330T • ISO transponder MDS D117, D126, D127, D165, D200, D261, D339, D400, D422, D423, D425, D426
10/2016	Revised and expanded edition Expanded by the following components: • Readers of the second generation RF310R, RF340R, RF350R • Reader RF380R Scanmode • Antenna ANT 3, ANT 3S • ISO transponder MDS D5xx • MOBY I migration in SIMATIC RF300

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 information

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

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3.1 RFID systems

RFID systems from Siemens control and optimize material flow. They identify reliably, quickly and economically, are insensitive to contamination and store data directly on the product or workpiece carrier.

Table 3- 1 Overview of SIMATIC RFID systems

Frequency range	HF			UHF
RFID system	SIMATIC RF200	SIMATIC RF300	MOBY D	SIMATIC RF600
Transmission frequency	13.56 MHz	13.56 MHz	13.56 MHz	865 ... 928 MHz [1)]
Range, max.	650 mm	240 mm	380 mm	8 m
Protocols (air interface)	• ISO 15693 • ISO 18000-3	• ISO 15693 • ISO 14443 (MOBY E) • RF300 (proprietary)	• ISO 15693 • ISO 18000-3	• EPCglobal Class 1 Gen 2 • ISO 18000-6B • ISO 18000-6C
Standards, specifications, approvals	• EN 300330, EN 301489, CE • FCC Part 15 • UL/CSA	• EN 300330, EN 301489, CE • FCC Part 15 • UL/CSA • ATEX	• EN 300330, EN 301489, CE • FCC Part 15 • UL/CSA	• ETSI EN 3002208, CE • FCC • UL
Memory capacity, max.	992 bytes (EEPROM) 8192 bytes (FRAM)	64 kB (EEPROM) 8192 bytes (FRAM)	922 bytes (EEPROM) 2000 bytes (FRAM)	496 bits (EPC), 3424 bytes
Maximum data transfer rate for wireless transmission	25.5 kbps	106 kbps	26.5 kbps	300 kbps

Frequency range	HF			UHF
RFID system	SIMATIC RF200	SIMATIC RF300	MOBY D	SIMATIC RF600
Multitag capability	With RF290R reader only	Yes/No [2]	Yes	Yes
Special characteristics	• Particularly compact designs • For particularly low-cost RFID solutions • IO-Link for simple identification tasks	• High data transmission speed • Extended diagnostics options • High memory capacity • Simple migration from old systems MOBY I/E	• SIMATIC or PC/IT integration • External antennas for industrial applications	• SIMATIC or PC/IT integration • Data preprocessing in the readers • Special antennas for industrial applications

1) Depends on the country of deployment and the frequency range permitted there

2) Multitag capability only with the readers of the second generation and in conjunction with ISO transponders.

3.2 SIMATIC RF300

3.2.1 System overview of SIMATIC RF300

SIMATIC RF300 is an inductive identification system specially designed for use in industrial production for the control and optimization of material flow.

Thanks to its compact dimensions, RF300 is the obvious choice where installation conditions are restricted, especially for assembly lines, handling systems and workpiece carrier systems. RF300 is suitable for both simple and demanding RFID applications and it stands out for its persuasive price/performance ratio.

Scanmode applications

In applications without command control, the transponders are read automatically. The type of data acquisition and transfer is preset in the reader using parameters.

Medium-performance applications

RF300 in conjunction with ISO transponders provides a cost-effective solution for medium-performance applications.

High-performance applications

The high-performance components of RF300 in conjunction with the RF300 transponders provide advantages in terms of high data transmission speeds and storage capacities.

SIMATIC RF300 - second generation

As of the delivery stage in the first quarter of 2017 an innovative second generation of the readers RF310R, RF340R und RF350R is available. These readers apart from additional performance characteristics are 100% compatible with the RF300s of the first generation. The second generation of the RF380R comes later.

Additional performance features:

- Additional transponder protocol ISO 14443 (air interface) for MDS E transponders
- Automatic detection of different transponder types (RF300, ISO 15693, ISO 14443)
- Emulation of MOBY I write/read devices (SLG 4x) in conjunction with RF300 transponders for simplified migration
- Setup help integrated in the reader

  The setup help serves the simple optimization of the reader-transponder positioning during installation/commissioning. Further installation or software are not necessary. The setup help becomes active directly after turning the device on.
- Improved 5-color LED display
- User-friendly parameter assignment and configuration with TIA Portal technological object (as of STEP 7 Basic / Professional V14 SP 1)
- Expanded functions for trained users:
  - Address information for the "INIT" command no longer necessary
  - Expanded "RESET" parameter
  - The MDS-STATUS "Mode 3" functions with all transponder types
  - Automatic antenna recognition with the reader RF350R (depending on the antenna)

Table 3- 2 Differences in the features

Feature	SIMATIC RF300 first generation	SIMATIC RF300 second generation
Transponder protocol RF300	✓	✓
Transponder protocol ISO 15693	✓	✓
Transponder protocol ISO 14443	--	✓
Multi-transponder mode	--	✓
MOBY I emulation to the controller	--	✓
Integrated setup help	--	✓
LED display	Single (3 colors)	Double (5 colors)
RFID technological object	--	✓ [1)]
Fast Command (MDS D1xx, D4xx, D5xx)	--	✓

[1)] With the TIA Portal as of STEP 7 Basic / Professional V14 SP 1

3.2.2 RFID components and their function

System components overview

Table 3- 3 RF300 system components

Component	Description
Communications module	A communications module is used to integrate the RF identification system in controllers/automation systems.
Reader	The reader ensures inductive communication and power supply to the transponder, and handles the connection to the various controllers (e.g. SIMATIC S7) through the communications module (e.g. ASM 456).
Transponder	The transponder stores all data relevant for production and is used, for example, instead of barcode.

RF300 system components for high-performance applications

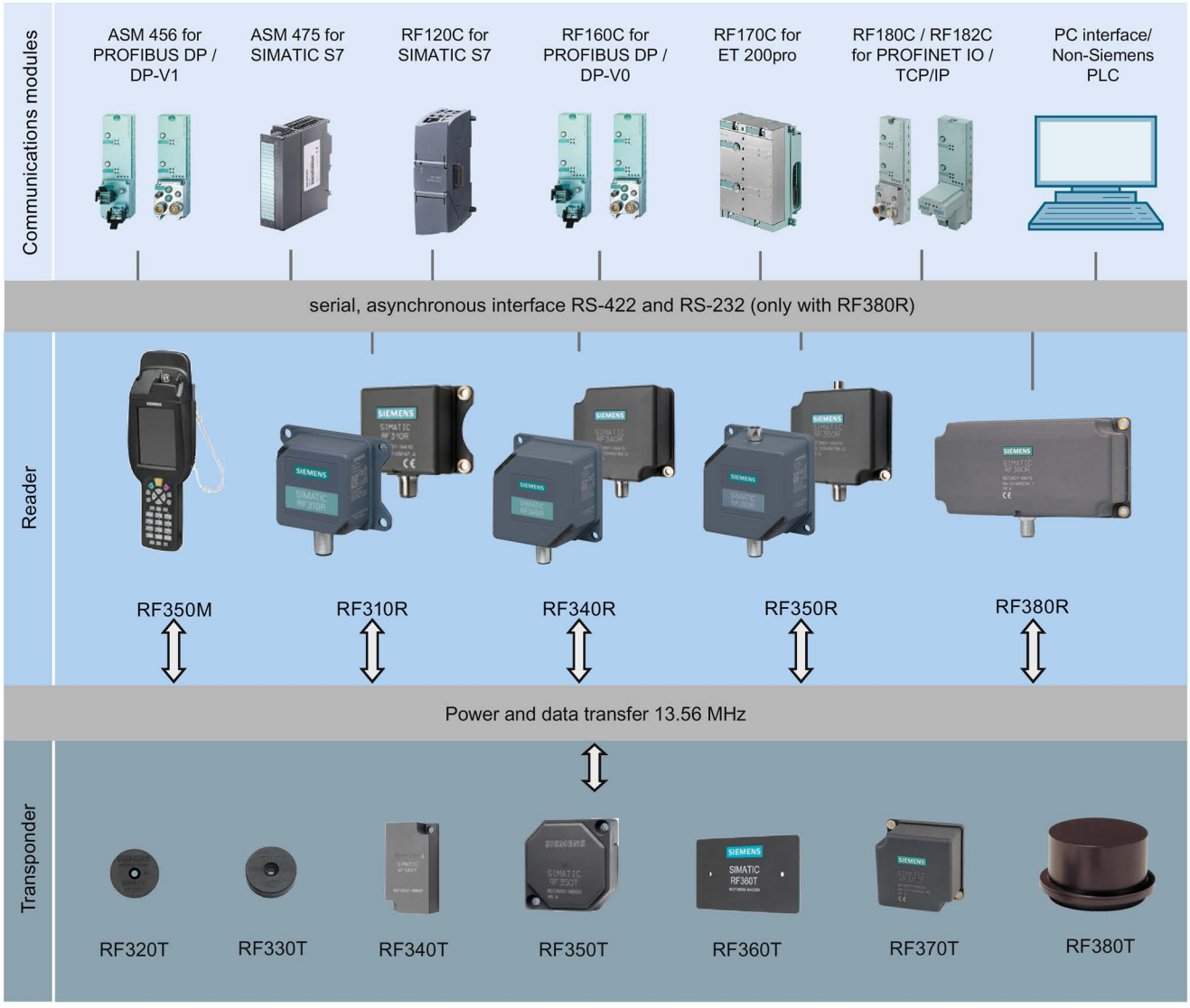


Figure 3-1 High performance system overview

Table 3- 4 Reader-transponder combination options for high-performance applications

Transponder	RF310R	RF340R	RF350R with ANT 1	RF350R with ANT 3	RF350R with ANT 18	RF350R with ANT 30	RF380R
RF320T	✓	✓	✓	✓	✓	✓	✓
RF330T	✓	✓	✓	✓	✓	✓	✓
RF340T	✓	✓	✓	✓	✓	✓	✓
RF350T	✓	✓	✓	--	--	✓	✓
RF360T	✓	✓	✓	--	--	✓	✓

Transponder	RF310R	RF340R	RF350R with ANT 1	RF350R with ANT 3	RF350R with ANT 18	RF350R with ANT 30	RF380R
RF370T	✓ [1]	✓	✓	--	--	--	✓
RF380T	--	✓	✓	--	--	--	✓

[1] as of reader version "AS ≥ D"

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

RF300 system components for medium-performance applications

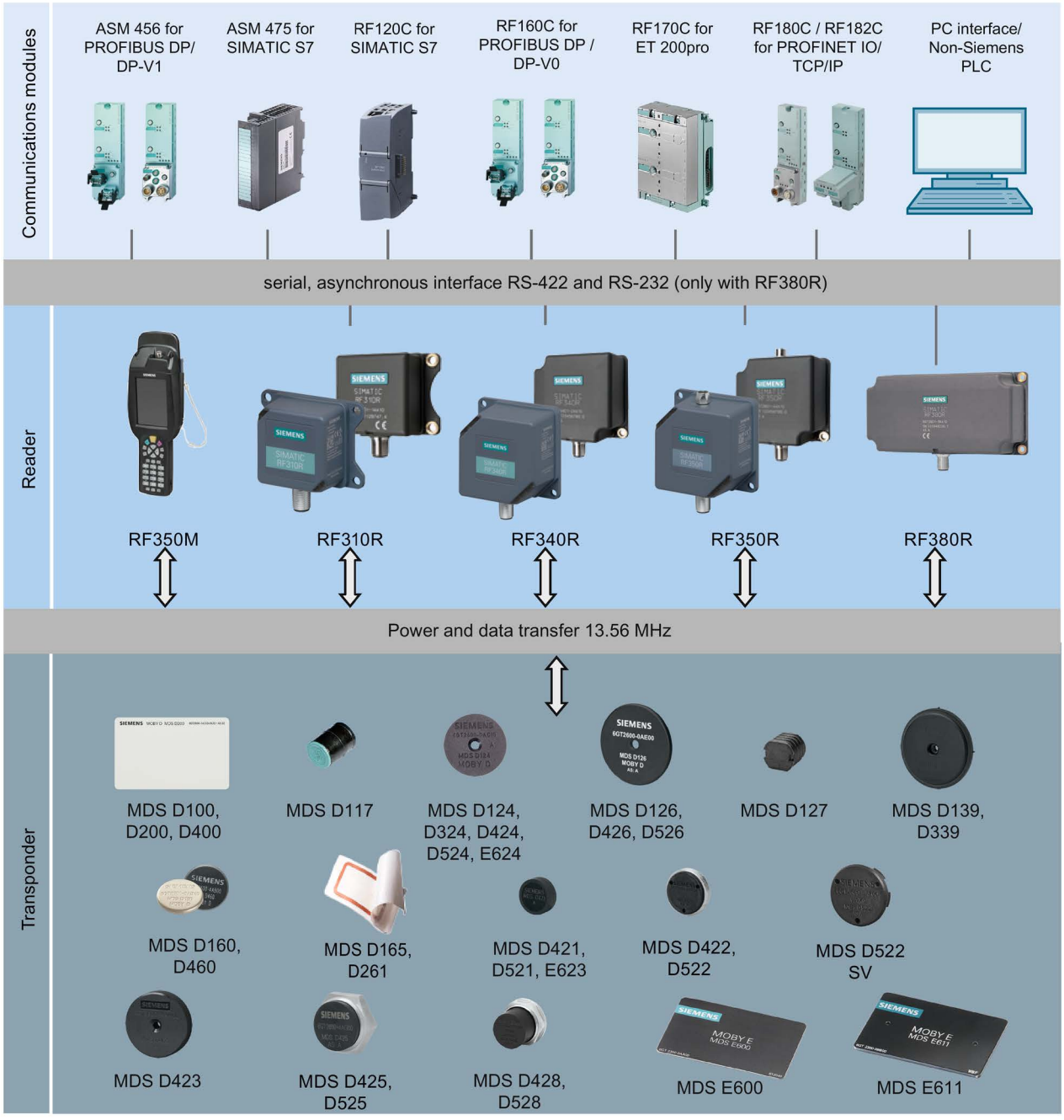


Figure 3-2 System overview medium-performance

Table 3- 5 Reader-transponder combination options for medium-performance applications

Transponder / MDS	RF310R (RS-422)	RF340R	RF350R with ANT 1	RF350R with ANT 3	RF350R with ANT 12	RF350R with ANT 18	RF350R with ANT 30	RF380R
MDS D100	✓	✓	✓	--	--	--	○	✓
MDS D117	--	--	--	--	✓	✓	--	--
MDS D124	✓	✓	✓	✓	○	✓	✓	✓
MDS D126	✓	✓	✓	--	--	--	✓	✓
MDS D127	--	--	--	--	✓	✓	--	--
MDS D139	✓	✓	✓	--	--	--	○	✓
MDS D160	✓	✓	✓	✓	✓	✓	✓	✓
MDS D165	✓	✓	✓	--	--	--	○	✓
MDS D200	✓	✓	✓	--	--	--	○	✓
MDS D261	✓	✓	✓	--	--	--	○	✓
MDS D324	✓	✓	✓	✓	--	✓	✓	✓
MDS D339 [1]	✓	✓	✓	--	--	--	--	✓
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	✓	✓	✓	--	✓	✓	✓	✓
MDS E600 [2]	✓	✓	✓	--	--	--	○	--
MDS E611 [2]	✓	✓	✓	--	--	--	○	--
MDS E623 [2]	--	--	--	--	✓	✓	--	--
MDS E624 [2]	✓	✓	✓	--	○	✓	✓	--

[1] as of reader version "AS ≥ D"

[2] Product to be discontinued; only relevant for migration projects.

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

Note

Note on operation of the transponders MDS D5xx and MDS E6xx

Note that the transponders MDS D5xx and MDS E6xx can only be operated in conjunction with the readers of the second generation (article number "6GT2801-xBAxx").

RF300 system components for Scanmode applications

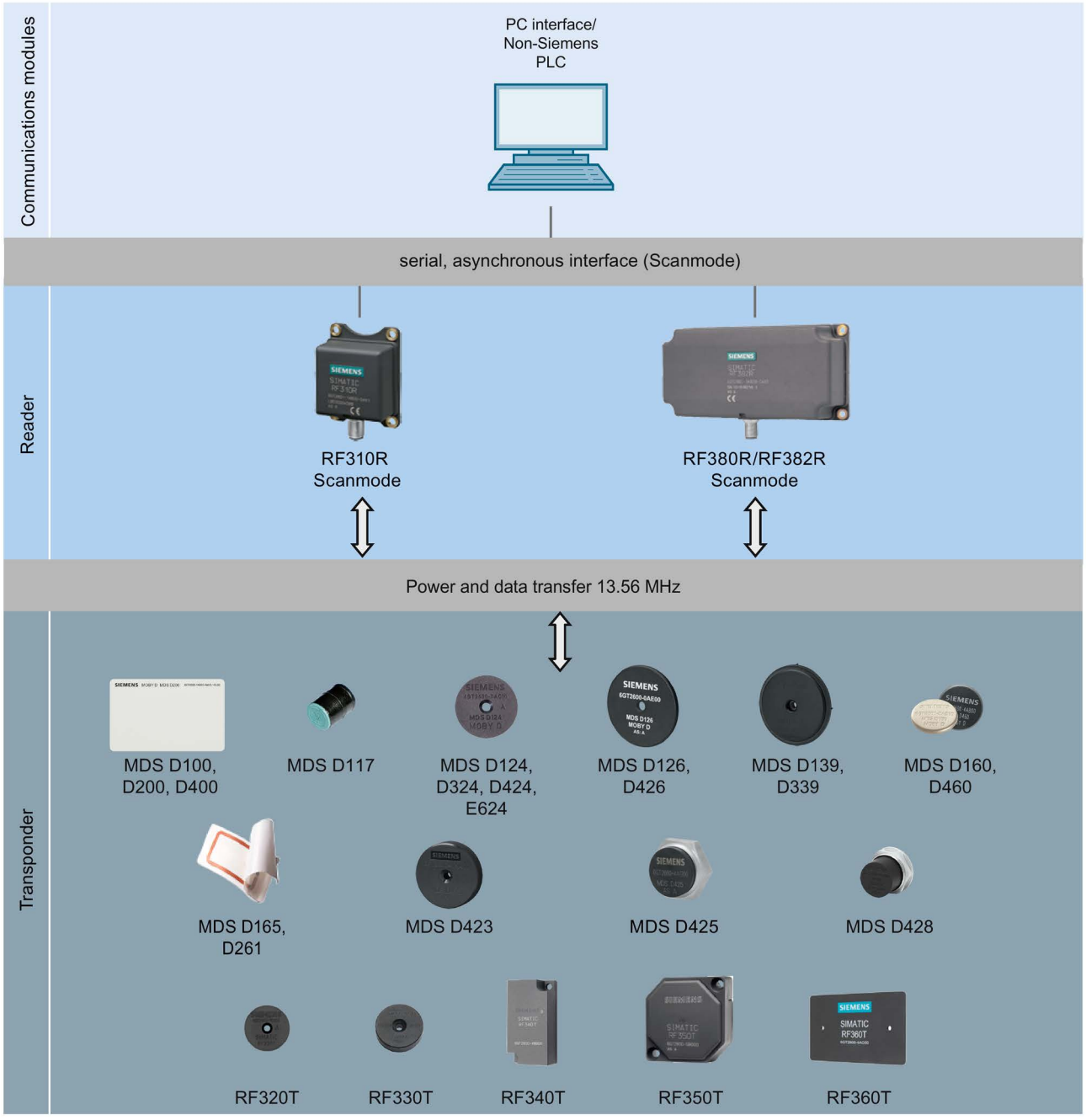


Figure 3-3 Scanmode system overview

Table 3- 6 Reader-transponder combination options for Scanmode applications

Transponder / MDS	RF310R	RF380R	RF382R
MDS D100	✓	✓	--
MDS D124	✓	✓	✓
MDS D126	✓	✓	--
MDS D139	✓	✓	--
MDS D160	✓	✓	✓
MDS D165	✓	✓	--
MDS D200	✓	✓	--
MDS D261	✓	✓	--
MDS D324	✓	✓	✓
MDS D339	✓	✓	--
MDS D400	✓	✓	--
MDS D423	✓	✓	--
MDS D424	✓	✓	✓
MDS D425	✓	✓	--
MDS D426	✓	✓	--
MDS D428	✓	✓	--
MDS D460	✓	✓	✓
RF320T	✓	✓	--
RF330T	✓	✓	--
RF340T	✓	✓	--
RF350T	✓	✓	--
RF360T	✓	✓	--
RF370T	--	✓	--
RF380T	--	✓	--

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

Note

Note on operation of the transponders MDS D5xx and MDS E6xx

Note that the transponders MDS D5xx and MDS E6xx can only be operated in conjunction with the readers of the second generation (article number "6GT2801-xBAxx").

3.2.3 Application areas of RF300

SIMATIC RF300 is primarily used for non-contact identification of containers, palettes and workpiece holders in a closed production circuit. The data carriers (transponders) remain in the production chain and are not supplied with the products. SIMATIC RF300, with its compact transponder and reader enclosure dimensions, is particularly suitable in confined spaces.

Main applications

- Mechanical engineering, automation systems, conveyor systems
- Ancillary assembly lines in the automotive industry, component suppliers
- Small assembly lines

Application examples

- Production lines for engines, gearboxes, axles, etc.
- Assembly lines for ABS systems, airbags, brake systems, doors, cockpits, etc.
- Assembly lines for household electrical appliances, consumer electronics and electronic communication equipment
- Assembly lines for PCs, small-power motors, contactors, switches

Advantages

- Reading and writing of large data volumes within a short time results in shorter production cycle times and helps to boost productivity
- Can be used in harsh environments thanks to rugged components with high degree of protection
- Simple system integration into TCP/IP networks, SIMATIC S7, PROFINET and PROFIBUS (TIA) with little effort
- Shorter commissioning times and fewer plant failures and downtimes thanks to integral diagnostic functionalities
- Cost savings thanks to maintenance-free components

3.3 System configuration

3.3.1 Overview

The SIMATIC RF300 system is characterized by a high level of standardization of its components. This means that the system follows the TIA principle throughout: Totally Integrated Automation. It provides maximum transparency at all levels with its reduced interface overhead. This ensures optimum interaction between all system components.

The RF300 system with its flexible components offers many possibilities for system configuration. This chapter shows you how you can use the RF300 components on the basis of various example scenarios.

3.3.2 Assembly line example: Use of RF300 transponders

In assembly lines, such as in engine manufacturing, many work steps are completed in succession. Automated or manual assembly work is carried out at the individual workstations in relatively short periods of time. The special features of the RF300 transponders, which stand out for their large data memory and high transmission speeds, bring about many advantages in regard to the production unit numbers of such plants.

The possibility of saving large volumes of data means savings in terms of data management on the HOST system and considerably contributes to data security (redundant data management e.g. HOST database or controller and data carrier)

Advantages at a glance:

- redundant data storage on the basis of large memory, availability of decentralized data
- high data rate
- data management savings on the host system

Features of the scenario

In this example scenario, engine blocks that are placed on metal pallets are conveyed on an assembly line. The engines are assembled piece-by-piece at the individual workstations. The RFID transponder of the type SIMATIC RF340T is mounted permanently on the underside of the pallet. The transport speed is approx. 0.5 m/s.

In this scenario, it is an advantage that the transponder can be directly secured to metal on the metal pallets. The small-dimensioned SIMATIC RF310R reader is integrated in the conveyor elements in such a manner that it can communicate with the transponders from below. Thus, it is not necessary to align the pallets or to attach several transponders.

The data of the entire production order (5000 bytes) is stored on the transponder. This data is read at each workstation and changed or supplemented depending on the workstation, and then written back again. Thus, the status of the engine block assembly can be determined at any point in time, even if there is a failure at the HOST level.

Thanks to the extremely high data rate, a very short cycle time for the work steps can be planned, which results in high end product unit numbers "engines".

The entire production order that is saved on the transponder can also be read manually via the WIN-LC terminal located at each workstation. This means that virtually no additional data management is required on the control computer.

The production order data can also be read for servicing purposes via the mobile SIMATIC RF350M reader.

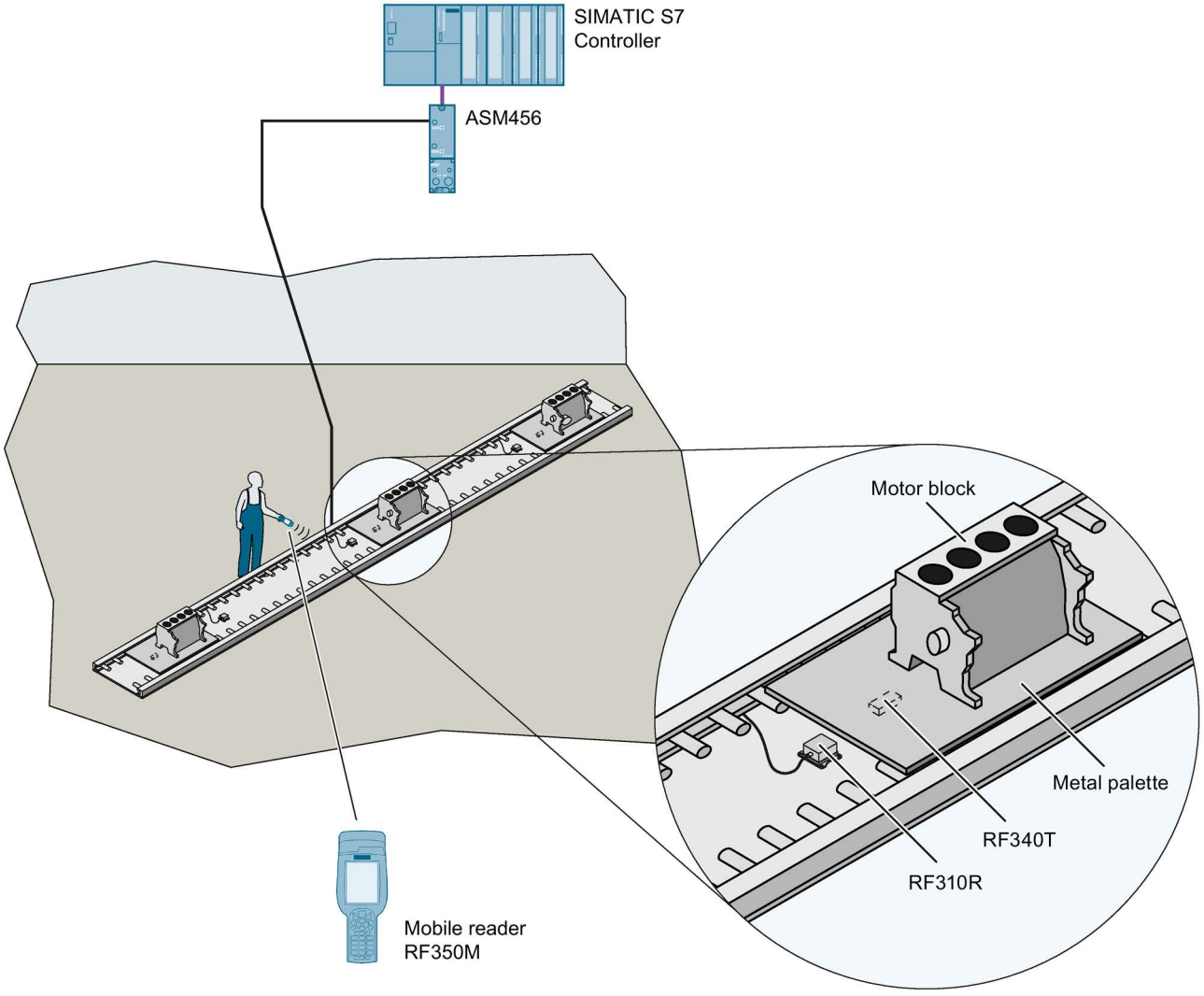


Figure 3-4 Example of engine block production

3.3.3 Example of container and cardboard container handling: Use of ISO transponders

Containers of varying sizes are conveyed to picking workstations in a delivery center. There, the individual goods are removed and packed in cartons according to the delivery note. These cartons are marked with low-cost transponder labels and sorted to small or large packaging workstations (according to the delivery note) by being guided or transported via the corresponding conveyor system. The containers are marked using the MDS D100 ISO transponder.

Advantages at a glance:

- Decision points in the conveyor system can be installed in a more favorable way (mechanically)
- Different sizes of containers with different depths can be identified due to the range
- In contrast to bar codes, the transponders can also be written to
- Different types of transponders can be processed using one and the same reader

Features of the scenario

In this example scenario, containers of varying sizes are conveyed on a conveyor system. Only the unique identification number (8 bytes) is read. The containers to be picked are sorted to the corresponding workstations. The maximum transport speed is 1.0 m/s.

In this scenario, it is an advantage that the RF380R reader can read and write the transponders at different distances on the containers without a great deal of mechanical or control system effort due to the reading range.

During the picking process, the goods are immediately placed in different containers or packed in cartons depending on the destination (small packaging or large packaging station). The containers are equipped with the MDS D100 ISO transponder. The low-cost "one-way tag" (label) is used on the cartons: it is simply glued onto the carton. Thus the goods can be identified at any time. Again, one and the same reader hardware is used for this. The maximum transport speed is 0.8 m/s.

In addition, flexible identification is possible at each location and at any time using the mobile SIMATIC RF350M reader.

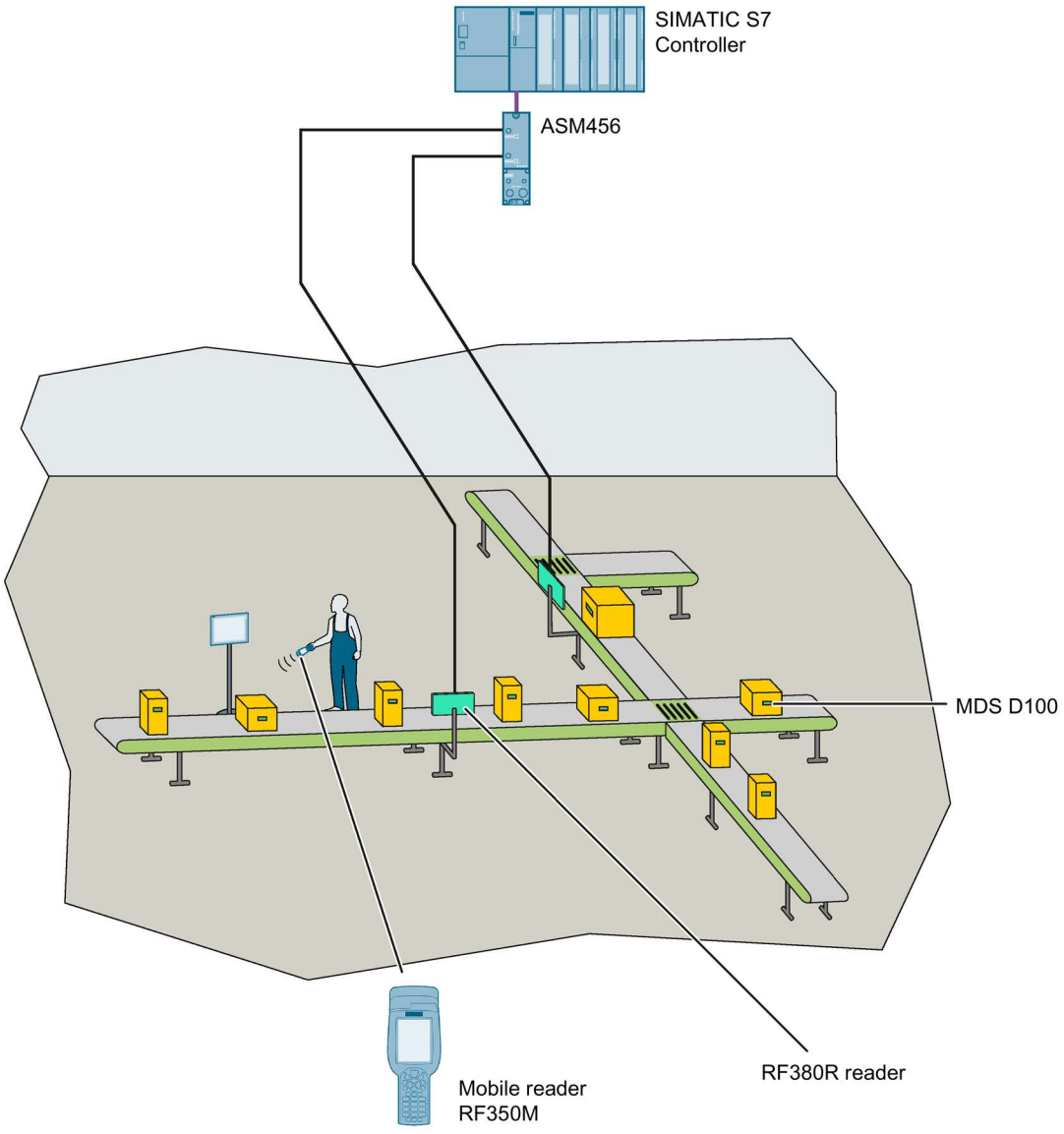


Figure 3-5 Example of container and cardboard container handling

Planning the RF300 system

4

4.1 Fundamentals of application planning

4.1.1 Selection criteria for SIMATIC RF300 components

Assess your application according to the following criteria, in order to choose the right SIMATIC RF300 components:

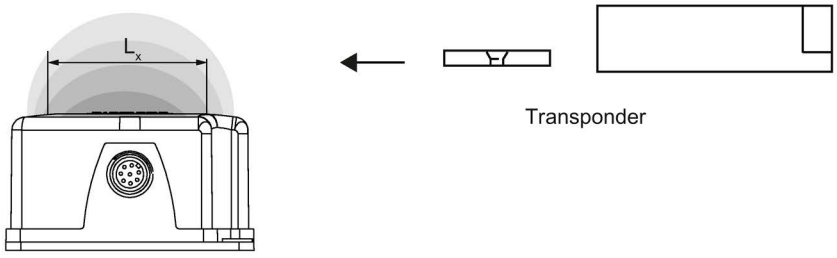
- Transmission distance (read/write distance)
- Tracking tolerances
- Static or dynamic data transfer
- Data volume to be transferred
- Speed in case of dynamic transfer
- Metal-free rooms for transponders and readers
- Ambient conditions such as relative humidity, temperature, chemical impacts, etc.

4.1.2 Transmission window and read/write distance

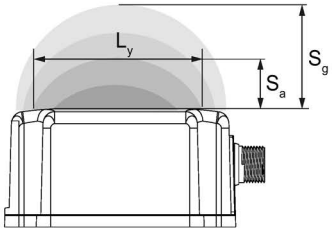
The reader generates an inductive alternating field. The antenna field is largest near to the reader. The size of the field decreases strongly the further away from the reader. The distribution of the antenna field depends on the structure and geometry of the antennas in the reader and transponder.

For the transponder to function correctly, a minimum field strength at the transponder must be achieved at a distance S_g from the reader or the antenna. The figures below show the transmission window between transponder and reader or between transponder and antenna:

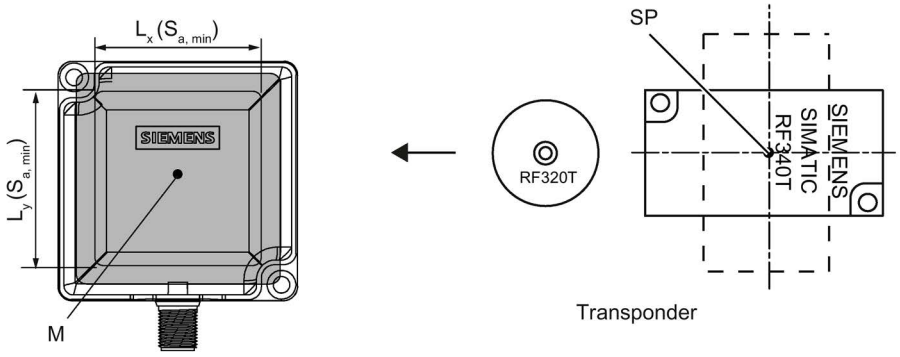
Front view



Side view



View from above



Transmission window

S_a Operating distance between transponder and reader

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

L_x Length of a transmission window in the x direction while maintaining the working distance ($L_x \neq L_y$ with RF380R and RF382R)

L_y Length of a transmission window in the y direction while maintaining the working distance ($L_x \neq L_y$ with RF380R and RF382R)

M Field centerpoint

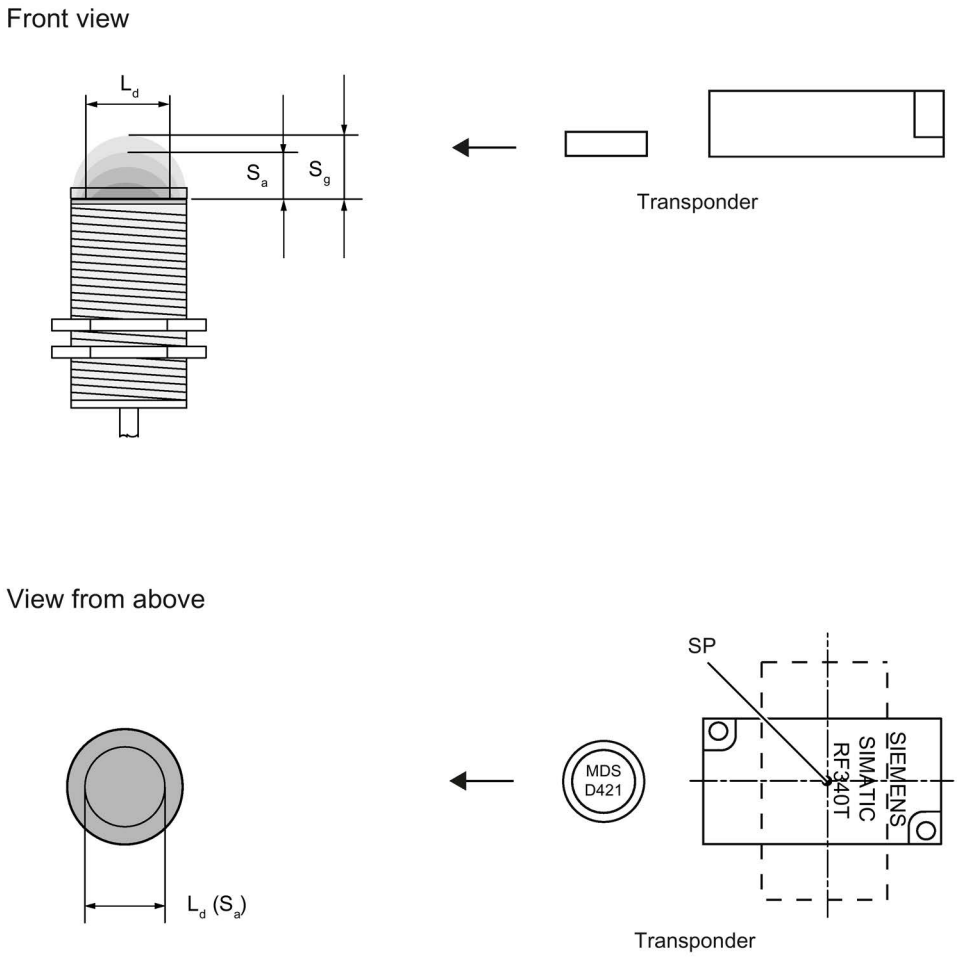
SP Intersection of the axes of symmetry of the transponder

Figure 4-1 Transmission window and read/write distance reader

Note

Transmission window with RF380R and RF382R

Note that the transmission window of the reader RF380R is not square ($L_x \neq L_y$). To obtain as large a transmission window as possible, make sure that the transponder only crosses the reader in the x direction.



S_a Operating distance between transponder and reader

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

L_d Diameter of a transmission window

SP Intersection of the axes of symmetry of the transponder

Figure 4-2 Transmission window and read/write distance round antenna

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_a and S_g. The active operating area reduces as the distance increases, and shrinks to a single point at distance S_g. Only static mode should thus be used in the area between S_a and S_g.

Aids for calculating the field data

Note

Determining the operating distance, limit distance and transmission window

Remember that you can obtain the values S_a, S_g and L simply and quickly using the tool for field data acquisition. You will find this on the DVD "Ident Systems, Software & Documentation".

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:

$$B = 0.4 \cdot L$$

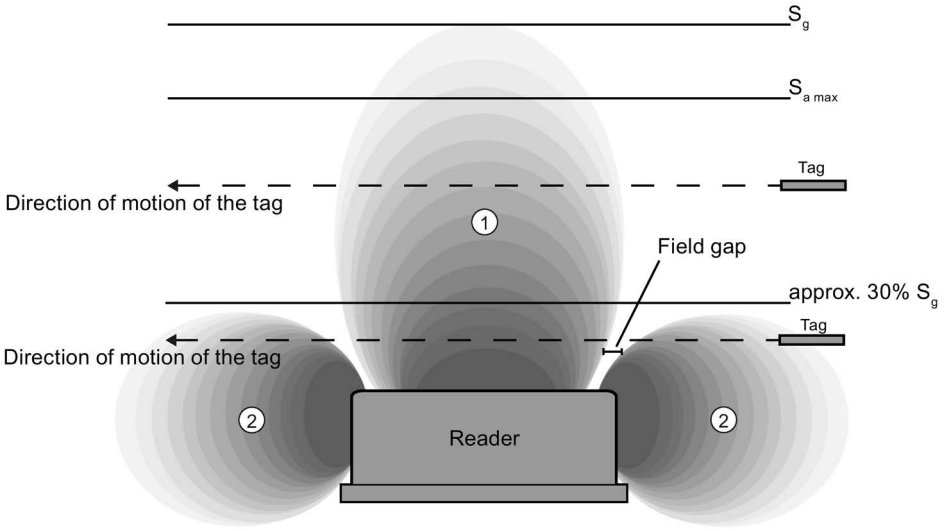
B: Width of the transmission window
L: Length of the transmission window

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.

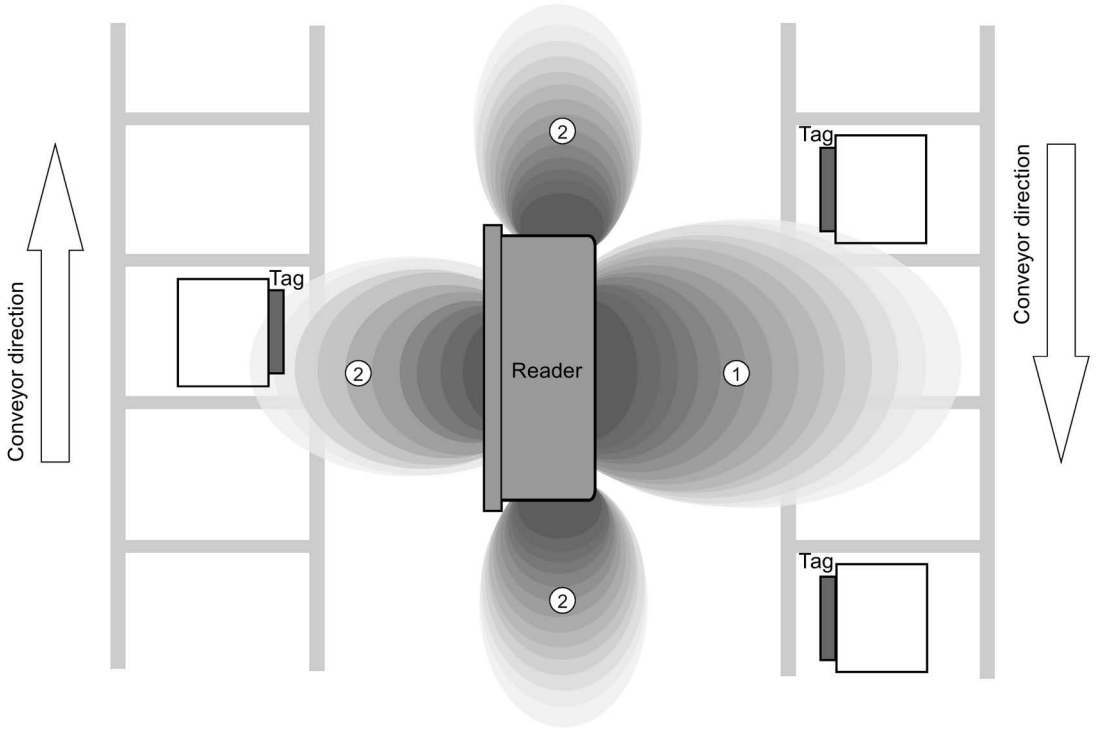


① Main field
② Secondary field

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

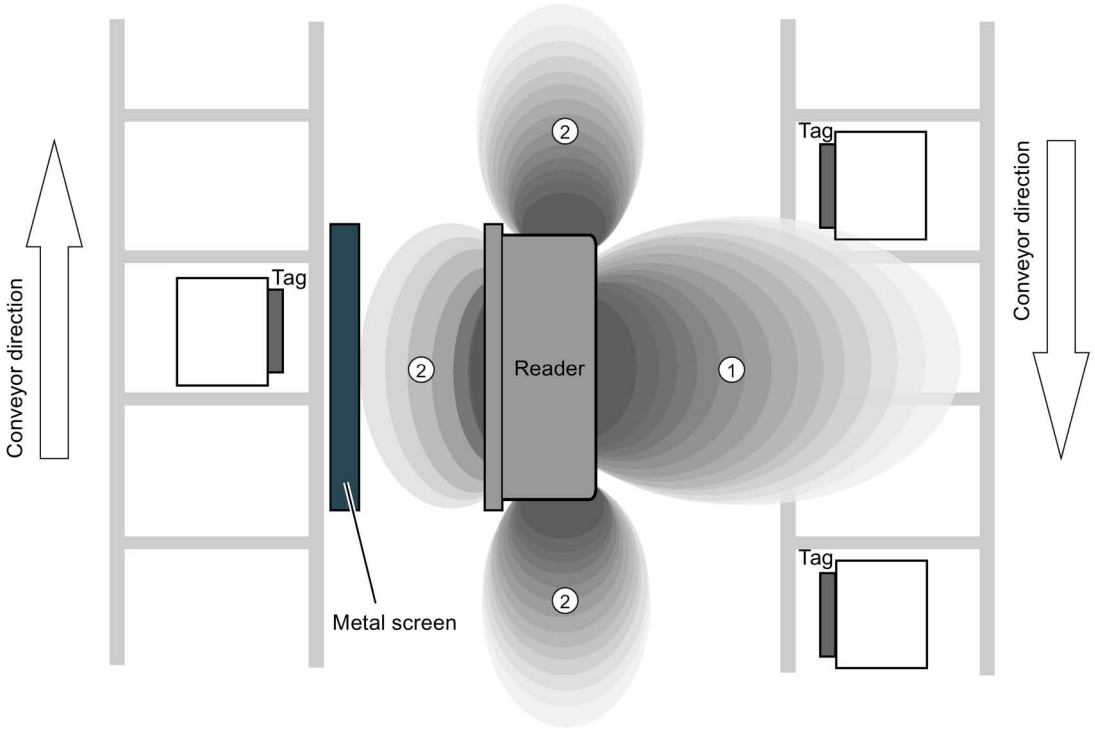
Figure 4-4 Secondary field without shielding

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 Setup help of the readers of the second generation

After turning on the reader (connection to the power supply) and the following startup phase, the reader automatically changes to the "Setup" mode. During this the antenna (reader-internal or external) is turned on, in contrast to generation 1 in which the antenna is turned on by a RESET.

In this status "search for transponders" the reader scans the antenna field for transponders with all HF protocols (RF300, ISO 15693, ISO 14443). If a transponder is recognized in the antenna field of the reader only the HF protocol of the recognized transponder type is used and there is a change in the status to "Show quality". In this status you obtain direct feedback of the communication with the transponder via the LED. If no transponder is recognized for a longer period of time, the reader changes back to the "Search for transponders" status.

When a "RESET" command is received, the reader changes back to the normal operation as known from the RF300.

Meaning of the LED operating display in the "Setup" mode

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

Table 4- 1 Display elements

LED	Meaning
	The reader is turned off.
	The reader is turned on and is searching for transponders. The reader is in the "Setup" mode, in the "Search for transponders" status and has not yet received a "RESET" command and is not ready.
/	There is transponder in the antenna field. The reader is in the "Setup" mode, in the status "Show quality", has not yet received a "RESET" command and is not ready. Depending on the receive strength, the LED flickers or is lit permanently.

4.1.6 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:

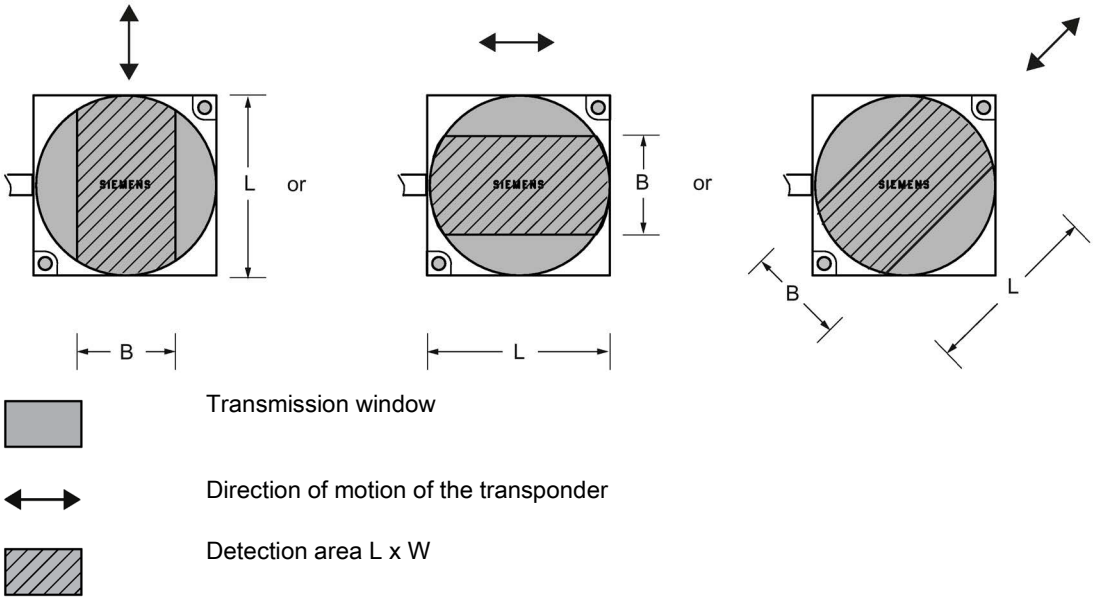


Figure 4-6 Detection areas of the reader for different directions of transponder motion

4.1.7 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:

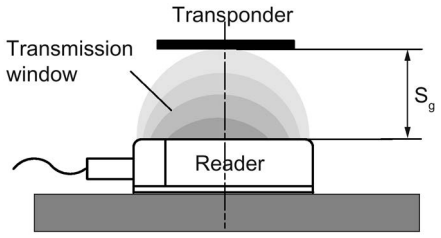


Figure 4-7 Operation in static mode

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 for transponders, readers and antennas (Page 48)]

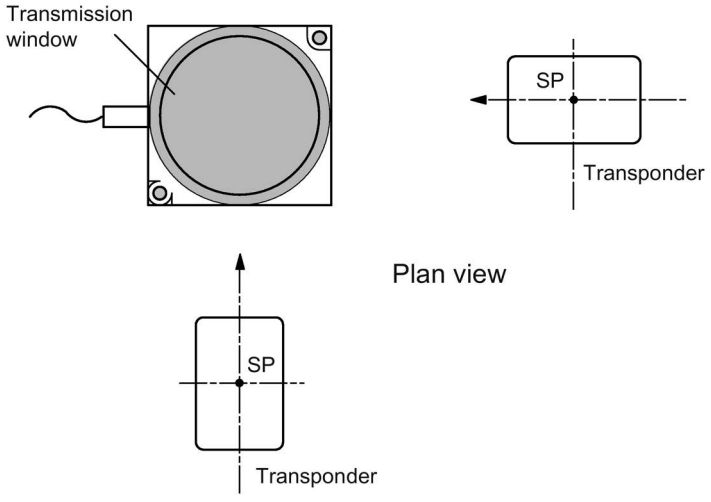


Figure 4-8 Operation in dynamic mode

4.1.8 Dwell time of the transponder

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

The dwell time is calculated thus:

$$t_v = \frac{L \cdot 0,8\,[m]}{v_{Tag}\,[m/\,s]}$$

t_V: Dwell time of the transponder

L: Length of the transmission window

v_{Tag}: Speed of the transponder (tag) in dynamic mode

0,8: Constant factor used to compensate for temperature impacts 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. In general:

$$t_v \geq t_K$$

$t_{V:}$: Dwell time of the data memory within the field of the reader

t_K: Communication time between transponder and communication module

4.1.9 Communication between communications 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.

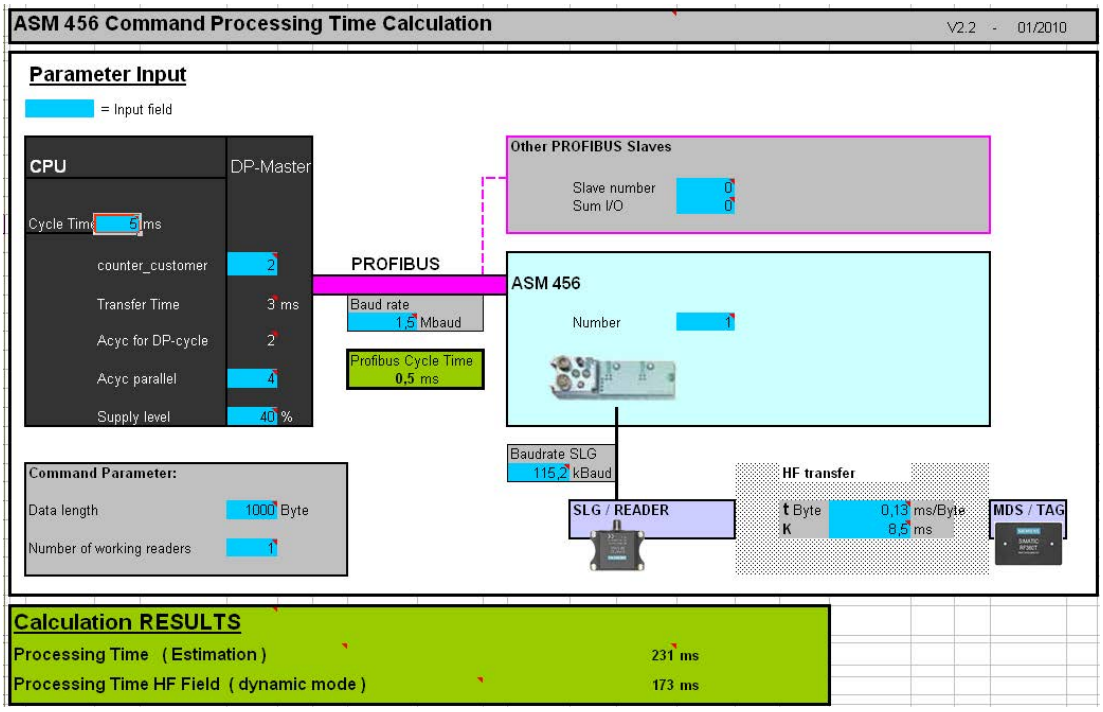


Figure 4-9 User interface of the calculation tool for command processing time

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).

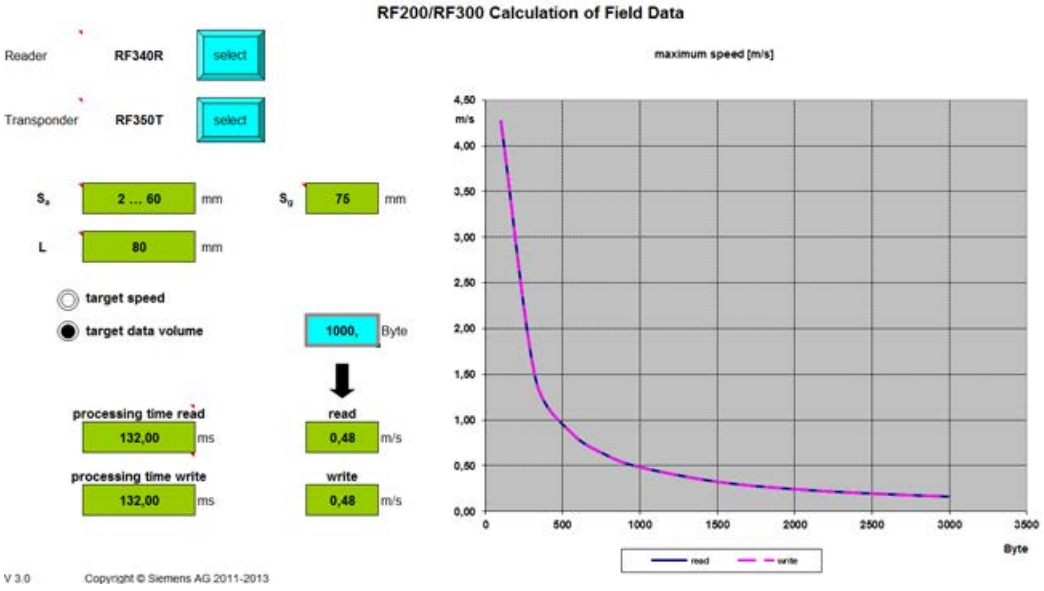


Figure 4-10 User interface of the calculation tool for field data acquisition

4.2 Field data for transponders, readers and antennas

The following tables show the field data for all SIMATIC RF300 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, see section "Impact of secondary fields (Page 41)".

Note

Possible reader-transponder combinations

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

4.2.1 Field data of RF300 transponders

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.

In dynamic mode, make sure that rectangular transponders cross the antenna field in the longitudinal direction.

Table 4- 2 Field data RF310R reader

	Length of the transmission window (L)	Operating distance (S_a)	Limit distance (S_g)
RF320T	30	1...23	26
RF330T	30	2...18	21
RF340T	40	2...36	41
RF350T	45	2...47	53
RF360T	45	2...60	68
RF370T	70	2...45	60

All values are in mm

The values relate to the RF310R reader as of version "D".

Table 4- 3 Field data RF340R reader

	Length of the transmission window (L)	Operating distance (S_a)	Limit distance (S_g)
RF320T	45	1...20	25
RF330T	40	2...18	23
RF340T	80	2...50	58
RF350T	80	2...60	75
RF360T	90	2...65	85
RF370T	85	5...60	80
RF380T	90	5...80	100

All values are in mm

Table 4- 4 Field data RF350R reader / ANT 1

	Length of the transmission window (L)	Operating distance (S_a)	Limit distance (S_g)
RF320T	45	1...30	37
RF330T	40	1...25	30
RF340T	80	2...55	70
RF350T	80	2...65	85
RF360T	90	2...75	100
RF370T	85	5...65	85
RF380T	90	5...90	110

All values are in mm

Table 4- 5 Field data RF350R reader / ANT 3

	Length of the transmission window (L)	Operating distance (S_a)	Limit distance (S_g)
RF320T	25	1...15	18
RF330T	25	1...10	15
RF340T	40	2...25	30

All values are in mm

Table 4- 6 Field data RF350R reader / ANT 18

	Diameter of the transmission window (L_d)	Operating distance (S_a)	Limit distance (S_g)
RF320T	10	0...10	13
RF330T	10	0...11	13
RF340T	20	0...18	22

All values are in mm

Table 4- 7 Field data RF350R reader / ANT 30

	Diameter of the transmission window (L_d)	Operating distance (S_a)	Limit distance (S_g)
RF320T	15	0...15	20
RF330T	22	0...15	18
RF340T	35	0...25	30
RF350T	35	0...35	40
RF360T	80	2...32	38

All values are in mm

Table 4- 8 Field data RF380R reader

	Length of the transmission window		Operating distance (S_a)	Limit distance (S_g)
	in the x direction (L_x)	in the y direction (L_y)		
RF320T	100	40	2...45	60
RF330T	120	30	5...45	52
RF340T	120	50	2...80	105
RF350T	140	60	2...100	125
RF360T	160	70	2...120	150
RF370T	160	65	5...100	135
RF380T	180	75	5...125	160

All values are in mm

The RF380R with MLFB 6GT2801-3AB10 allows the transmission output power to be set with the aid of the "distance_limiting" input parameter (you will find more detailed information in "Function manual FB 45 (https://support.industry.siemens.com/cs/ww/en/view/21738808)"). For this, values from approx. 0.5 W to approx. 2.0 W can be set in 0.25 W increments. Depending on the setting, the change to the transmission output power increases the performance in the lower operating distance (low performance) or in the upper limit distance (high performance).

The "distance_limiting" range of values is from:

- 02 (= 0.5 W) through
- 05 (= 1.25 W; default value) to
- 08 (= 2 W).

Note

A 'distance_limiting' value setting outside of the range of "02 to 08" leads to the default setting 5 and does not generate an error message.

You will find more information on this subject in the chapter "Minimum clearances (Page 60)" section "Minimum distance from reader to reader".

You will find precise information about the parameters in "Product Information "FB 45 and FC 45 input parameters for RF300 and ISO transponders" (https://support.industry.siemens.com/cs/ww/en/view/33315697)".

4.2.2 Field data of ISO transponders (MDS D)

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.

Observe the following information for field data of ISO transponders:

- A maximum median deviation of ±2 mm is permitted in static mode (without affecting the field data).
- In dynamic mode, make sure that rectangular transponders cross the antenna field in the longitudinal direction.

Table 4- 9 Field data RF310R reader

	Length of the transmission window (L)	Operating distance (S_a)	Limit distance (S_g)
MDS D100	40	2...93	105
MDS D124	30	2...64	72
MDS D126	90	2...65	73
MDS D139	105	5...96	109
MDS D160	30	2...39	44
MDS D165	130	2...90	102
MDS D200	120	2...80	90
MDS D261	80	2...74	83
MDS D324	30	2...47	63
MDS D339	85	5...74	84
MDS D400	90	2...104	115
MDS D423	55	2...35	40
MDS D424	35	1...68	75
MDS D425	30	1...22	25
MDS D426	90	5...75	90
MDS D428	30	1...40	45
MDS D460	30	1...32	38
MDS D524	35	1...70	78
MDS D525	30	1...22	25
MDS D526	90	5...80	90
MDS D528	30	1...43	48

All values are in mm

Table 4- 10 Field data RF340R reader

	Length of the transmission window (L)	Operating distance (S_a)	Limit distance (S_g)
MDS D100	90	5...110	140
MDS D124	60	2...60	75
MDS D126	80	2...85	110
MDS D139	90	5...80	110
MDS D160	50	2...35	60
MDS D165	130	15...120	140
MDS D200	125	10...100 [1]	115
MDS D261	95	15...60 [2]	70
MDS D324	50	2...55	70
MDS D339	100	5...75	85
MDS D400	140	2...100	130
MDS D423	65	5...40	48
MDS D424	50	2...55	70
MDS D425	45	2...20	30
MDS D426	110	0...80	100
MDS D428	45	2...40	50
MDS D460	45	2...25	40
MDS D524	50	2...55	70
MDS D525	45	2...20	30
MDS D526	110	0...80	100
MDS D528	45	2...40	50

[1] When operating the reader of the second generation and an ambient temperature > 50 °C, the operating distance (S_a) is 15 ... 80 mm.

[2] When operating the reader of the second generation the operating distance (S_a) is 40 ... 100 mm and the limit distance .(S_g) is 150 mm.

All values are in mm

Table 4- 11 Field data RF350R reader / ANT 1

	Length of the transmission window (L)	Operating distance (S_a)	Limit distance (S_g)
MDS D100	80	5...110	140
MDS D124	55	2...65	85
MDS D126	150	2...90	120
MDS D139	75	5...85	115
MDS D160	50	2...35	60
MDS D165	140	5...100	120
MDS D200	130	5...95	115
MDS D261	100	5...80	95
MDS D324	50	2...66	78
MDS D339	110	5...90	105
MDS D400	140	2...110	135
MDS D423	85	10...40	50
MDS D424	50	2...75	88
MDS D425	40	2...25	35
MDS D426	110	0...85	95
MDS D428	40	2...40	50
MDS D460	40	2...32	38
MDS D524	50	2...65	85
MDS D525	40	2...25	35
MDS D526	110	0...85	105
MDS D528	40	2...35	50

All values are in mm

Table 4- 12 Field data RF350R reader / ANT 3

	Diameter of the transmission window (L_d)	Operating distance (S_a)	Limit distance (S_g)
MDS D124	40	1...35	42
MDS D160	40	1...28	35
MDS D324	40	1...22	32
MDS D422	20	1...11	18
MDS D423	30	5...20	30
MDS D424	40	1...40	48
MDS D425	25	2...18	22
MDS D428	30	2...28	30
MDS D460	30	1...20	28

All values are in mm

Table 4- 13 Field data RF350R reader / ANT 12

	Diameter of the transmission window (L_d)	Operating distance (S_a)	Limit distance (S_g)
MDS D117	2	0...2	3
MDS D127	2	0...3	4
MDS D160	15	0...8	12
MDS D421	6	0...3	5
MDS D428	15	1...10	17
MDS D460	8	1...8	10
MDS D521	6	0...3	5
MDS D528	15	1...10	17

All values are in mm

Table 4- 14 Field data RF350R reader / ANT 18

	Diameter of the transmission window (L_d)	Operating distance (S_a)	Limit distance (S_g)
MDS D117	3	0...5	6
MDS D124	27	2...24	28
MDS D127	3	0...5	6
MDS D160	20	1...18	20
MDS D324	25	1...22	28
MDS D421	10	0...6	8
MDS D422	20	1...10	13
MDS D424	25	1...27	35
MDS D425	17	1...10	14
MDS D428	17	1...15	20
MDS D460	15	1...12	16
MDS D521	10	0...6	8
MDS D522	20	1...10	13
MDS D524	25	1...27	35
MDS D525	17	1...10	14
MDS D528	17	1...15	20

All values are in mm

Table 4- 15 Field data RF350R reader / ANT 30

	Diameter of the transmission window (L_d)	Operating distance (S_a)	Limit distance (S_g)
MDS D124	30	1...35	40
MDS D126	70	0...42	50
MDS D160	25	1...24	28
MDS D324	30	1...35	40
MDS D422	30	0...14	16
MDS D423	45	5...22	28
MDS D424	28	0...45	50
MDS D425	25	1...15	20
MDS D426	65	0...45	48
MDS D428	25	1...25	28
MDS D460	22	1...18	20
MDS D522	30	0...15	19
MDS D524	28	0...45	50
MDS D525	25	1...15	20
MDS D526	65	0...45	48
MDS D528	25	1...25	28

All values are in mm

Table 4- 16 Field data RF380R reader

	Length of the transmission window		Operating distance (S_a)	Limit distance (S_g)
	in the x direction (L_x)	in the y direction (L_y)		
MDS D100	140	100	5...170	210
MDS D124	80	80	1...120	140
MDS D126	180	140	2...145	190
MDS D139	140	90	5...160	200
MDS D160	80	40	2...64	80
MDS D165	200	140	5...170	200
MDS D200	200	160	5...150	195
MDS D261	190	120	5..120	160
MDS D324	100	60	2...96	120
MDS D339	290	140	5...160	180
MDS D400	240	120	2...200	240
MDS D423	110	60	5...75	90
MDS D424	100	70	2...120	140
MDS D425	80	45	2...35	50
MDS D426	220	160	0...155	195
MDS D428	80	50	2…70	95

	Length of the transmission window		Operating distance (S_a)	Limit distance (S_g)
	in the x direction (L_x)	in the y direction (L_y)		
MDS D460	80	70	2…65	90
MDS D524	100	70	2...120	140
MDS D525	80	45	2...35	50
MDS D526	220	160	0...155	195
MDS D528	80	50	2…70	95

All values are in mm

Table 4- 17 Field data RF382R reader

	Length of the transmission window		Operating distance (S_a)	Limit distance (S_g)
	in the x direction (L_x)	in the y direction (Ly)		
MDS D124	70	130	40...65	75
MDS D160	50	100	35...50	65
MDS D324	60	120	40...65	75
MDS D424	65	120	40...65	75
MDS D460	40	80	30...50	60

All values are in mm

4.2.3 Field data of ISO transponders (MDS E)

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.

Observe the following information for field data of ISO transponders:

- A maximum median deviation of ±2 mm is possible in static mode (without affecting the field data).
- In dynamic mode, make sure that rectangular transponders cross the antenna field in the longitudinal direction.

Note

Relenace of the MDS E transponders

The MDS E transponders are products that will be discontinued. These are relevant for migration projects in which existing RFID systems are replaced by SIMATIC RF300, generation 2.

Note that the MDS E transponders can only be operated in conjunction with the readers of the second generation!

Table 4- 18 Field data RF310R reader

	Length of the transmission window (L)	Operating distance (S_a)	Limit distance (S_g)
MDS E600	80	2...30	43
MDS E611	80	2...40	60
MDS E624	45	2...25	36

All values are in mm

Table 4- 19 Field data RF340R reader

	Length of the transmission window (L)	Operating distance (S_a)	Limit distance (S_g)
MDS E600	90	5...50	65
MDS E611	90	10...50	65
MDS E624	60	2...35	45

All values are in mm

Table 4- 20 Field data RF350R reader / ANT 1

	Length of the transmission window (L)	Operating distance (S_a)	Limit distance (S_g)
MDS E600	70	10...50	60
MDS E611	100	10...50	65
MDS E624	55	2...35	45

All values are in mm

Table 4- 21 Field data RF350R reader / ANT 12

	Diameter of the transmission window (L_d)	Operating distance (S_a)	Limit distance (S_g)
MDS E623	6	0...3	5

All values are in mm

Table 4- 22 Field data RF350R reader / ANT 18

	Diameter of the transmission window (L_d)	Operating distance (S_a)	Limit distance (S_g)
MDS E623	10	0...6	8
MDS E624	25	2...15	20

All values are in mm

Table 4- 23 Field data RF350R reader / ANT 30

	Diameter of the transmission window (L_d)	Operating distance (S_a)	Limit distance (S_g)
MDS E624	28	1...20	24

All values are in mm

4.2.4 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- 24 Minimum distances RF300 transponder

	RF310R	RF340R	RF350R / ANT 1	RF350R / ANT 3	RF350R / ANT 18	RF350R / ANT 30	RF380R
RF320T	≥ 50	≥ 70	≥ 70	40	≥ 20	≥ 40	≥ 120
RF330T	≥ 40	≥ 50	≥ 50	60	≥ 20	≥ 30	≥ 120
RF340T	≥ 60	≥ 80	≥ 80	60	≥ 40	≥ 40	≥ 140
RF350T	≥ 60	≥ 80	≥ 80	70	--	≥ 50	≥ 150
RF360T	≥ 60	≥ 80	≥ 80	--	--	50	≥ 120
RF370T	--	≥ 80	≥ 80	--	--	--	≥ 130
RF380T	--	≥ 80	≥ 80	--	--	--	≥ 150

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- 25 Minimum distances ISO transponder

	RF310R	RF340R	RF350R / ANT 1	RF350R / ANT 3	RF350R / ANT 12	RF350R / ANT 18	RF350R / ANT 30	RF380R	RF382R [1]
MDS D100	≥ 120	≥ 240	≥ 240	--	--	--	--	≥ 420	--
MDS D117	--	--	--	--	≥ 20	≥ 30	--	--	--
MDS D124	≥ 100	≥ 180	≥ 180	90	--	≥ 50	≥ 80	≥ 360	≥ 100, 150
MDS D126	≥ 120	≥ 140	≥ 140	--	--	--	≥ 100	≥ 400	--
MDS D127	--	--	--	--	≥ 25	≥ 30	--	--	--
MDS D139	≥ 200	≥ 200	≥ 200	--	--	--	≥ 80	≥ 450	--
MDS D160	≥ 120	≥ 150	≥ 150	≥ 60	≥ 30	≥ 50	≥ 60	≥ 300	≥ 100, 120
MDS D165	≥ 120	≥ 140	≥ 140	--	--	--	--	≥ 500	--
MDS D200	≥ 120	≥ 150	≥ 150	--	--	--	--	≥ 500	--
MDS D261	≥ 160	≥ 200	≥ 200	--	--	--	--	≥ 400	--
MDS D324	≥ 120	≥ 180	≥ 180	≥ 85	--	≥ 50	≥ 80	≥ 360	≥ 100, 150
MDS D339	≥ 200	≥ 140	≥ 140	--	--	--	--	≥ 450	--
MDS D400	≥ 220	≥ 240	≥ 240	--	--	--	--	≥ 500	--
MDS D421	--	--	--	--	≥ 15	≥ 15	--	--	--
MDS D422	--	--	--	≥ 60	--	≥ 30	≥ 40	--	--
MDS D423	≥ 100	≥ 120	≥ 120	≥ 60	--	≥ 40	≥ 60	≥ 250	--
MDS D424	≥ 100	180	≥ 180	≥ 80	--	≥ 50	≥ 80	≥ 360	≥ 100, 180
MDS D425	≥ 70	≥ 100	≥ 100	≥ 60	--	--	≥ 60	≥ 250	--
MDS D426	≥ 120	≥ 120	≥ 140	--	--	≥ 30	≥ 60	≥ 400	--
MDS D428	≥ 100	≥ 150	≥ 150	≥ 60	≥ 30	≥ 50	≥ 60	≥ 300	--
MDS D460	≥ 100	≥ 150	≥ 150	≥ 60	≥ 30	≥ 50	≥ 60	≥ 300	≥ 100, 120
MDS D521	--	--	--	--	≥ 15	≥ 15	--	--	--
MDS D522	--	--	--	--	--	≥ 30	≥ 40	--	--
MDS D524	≥ 100	180	≥ 180	--	--	≥ 50	≥ 80	≥ 360	≥ 100, 180
MDS D525	≥ 70	≥ 100	≥ 100	≥ 60	--	--	≥ 60	≥ 250	--
MDS D526	≥ 120	≥ 120	≥ 140	--	--	≥ 30	≥ 60	≥ 400	--
MDS D528	≥ 100	≥ 150	≥ 150	--	≥ 30	≥ 50	≥ 60	≥ 300	--
MDS E600 [2]	≥ 120	≥ 240	≥ 240	--	--	--	--	--	--
MDS E611 [2]	≥ 120	≥ 240	≥ 240	--	--	--	--	--	--

	RF310R	RF340R	RF350R / ANT 1	RF350R / ANT 3	RF350R / ANT 12	RF350R / ANT 18	RF350R / ANT 30	RF380R	RF382R [1]
MDS E623 [2]	--	--	--	--	≥ 15	≥ 15	--	--	--
MDS E624 [2]	≥ 100	180	≥ 180	≥ 80	--	≥ 50	≥ 80	--	--

1) The first value is the minimum distance of the transponders in the horizontal field, the second value is the minimum distance of the transponders in the vertical field.

2) Product being discontinued; only relevant for migration projects with the readers of the second generation.

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- 26 Minimum distances reader

	RF310R to RF310R	RF340R to RF340R	RF380R to RF380R[1]	RF382R to RF382R
with 2 readers	≥ 150	≥ 200 / 350	≥ 400	≥ 200
with several readers	≥ 200	≥ 250 / 500	≥ 500	≥ 200

All values are in mm

1) The permissible minimum distance between two RF380Rs depends on the transmit power that is set. The specified minimum distance must be multiplied by the following factor, depending on the output:

Table 4- 27 Effect on the minimum distance of the transmit power with RF380R

'distance_limiting' byte	Factor
02; 03	0.8
04; 05; 06	1.0
07; 08	1.2

Minimum distance from antenna to antenna

Table 4- 28 Minimum distances antennas

ANT 1	ANT 3	ANT 3S	ANT 8	ANT 12	ANT 18	ANT 30
≥ 300	≥ 150	≥ 20	≥ 50	≥ 70	≥ 100	≥ 100

All values are in mm

You will find detailed information on the minimum distances between antennas the section "Minimum distance between antennas (Page 210)".

Note

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

If the values fall below the values specified in the "Minimum distance readers" and "Minimum distances antennas" tables , 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" and "Minimum distances antennas" tables 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 RF 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.

Note

Please also observe the graphic representations of the minimum distances in the respective chapters on readers.

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 48)" 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- 29 Interference due to metal rack

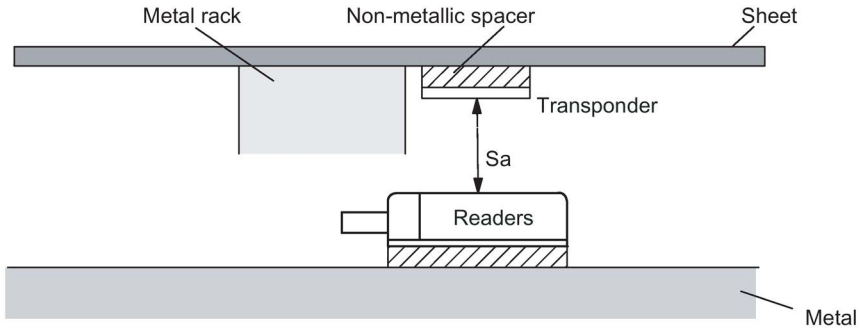
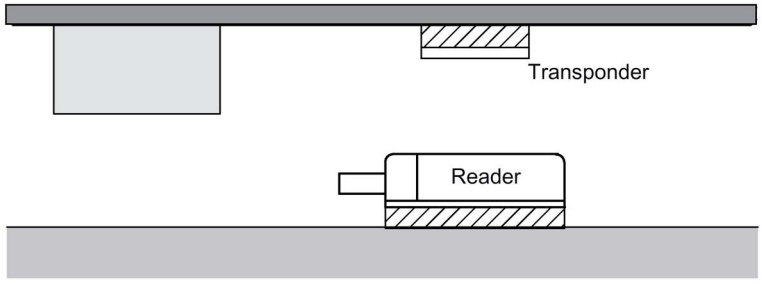
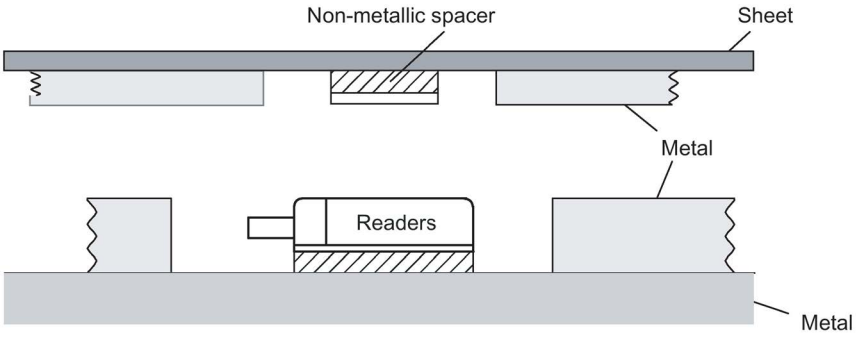
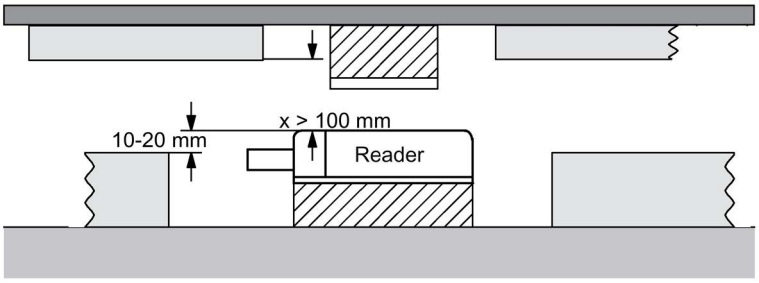
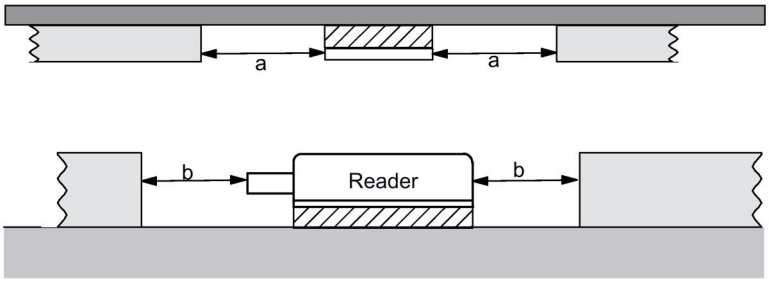
Representation	Description
	**Problem:** A metal rack is located above the transmission window of the reader. This affects the entire field. In particular, the transmission window between reader and transponder is reduced.
	**Remedy:** The transmission window is no longer affected if the transponder is mounted differently.

Table 4- 30 Flush-mounting of transponders and readers

Representation	Description
	**Problem:** 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:
	**Remedy:** Enlargement of the non-metallic spacer below the transponder and/or reader. The transponder and/or reader are 10 to 20 mm higher than the metal surround. (The value x ≥ 100 mm is valid, e.g. for RF310R. It indicates that, for a distance x ≥ 100 mm, the reader can no longer be significantly affected by metal.)
	**Remedy:** Increase the distances a, b to metal. The following rule of thumb can be used: • Increase a, b by a factor of 2 to 3 over the values specified for metal-free areas • 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.

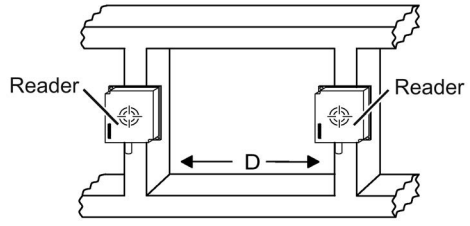
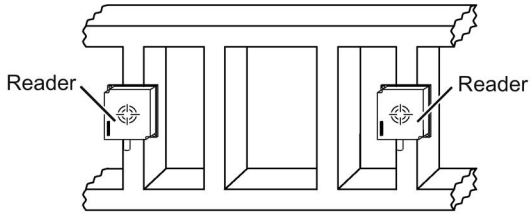
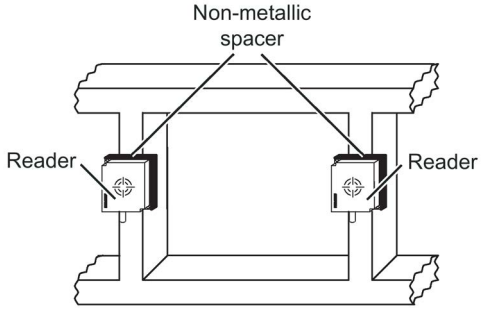
Mounting of several readers on metal frames or racks

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.

Note that antenna cables should not be coiled (cable coil = antenna) and should not be mounted directly on metal when coiled to avoid coupling. Antenna cables should be laid separately in a cable channel and not together with the signal/power supply cable of devices (including those of the reader) or other power cables.

NOTICE
Installation of the readers on a metal construction and mixed mode Note that if the readers are installed on a metal construction and in mixed mode [1] the minimum spacing needs to be doubled. This also applies if you are working with external antennas. Moreover the non-metal base on which the reader is mounted should be at least 40 mm thick. [1] RF300 operation along with ISO 15693 operation or ISO 15693 operation with MOBY E operation etc.

Table 4- 31 Mounting several readers on metal frames or racks

Representation	Description
	Problem: Interaction between readers
	**Remedy:** Increase the distance D between the two readers.
	**Remedy:** Introduce one or more iron struts in order to short-circuit the stray fields.
	**Remedy:** 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:

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 on the transmission window by metal

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. RF260R) 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 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.

Note

Possible reader-transponder combinations

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

4.3.4.1 Impact on the transmission window by metal

With RF300 transponders

Table 4- 32 Reduction of field data due to metal, range as %: Transponder and RF310R

Transponder		RF310R reader		
		Without metal	On metal	Flush-mounted in metal (20 mm all-round)
RF320T[1)]	Without metal	100	95	80
	On metal; distance 20 mm	100	80	70
	Flush-mounted in metal; distance all round 20 mm	80	70	60
RF330T	Without metal	100	95	80
	On metal; distance 0 mm	100	85	75
	Flush-mounted in metal; distance all round 10 mm	85	80	70
	Flush-mounted in metal; without surrounding clearance	30	30	25
RF340T	Without metal	100	95	80
	On metal; distance 0 mm	80	80	80
	Flush-mounted in metal; distance all round 20 mm	70	70	70
RF350T	Without metal	100	95	85
	On metal; distance 0 mm	70	65	65
	Flush-mounted in metal; distance all round 20 mm	60	60	60
RF360T	Without metal	100	95	85
	On metal; distance 20 mm	100	95	75
	Flush-mounted in metal; distance all round 20 mm	60	60	60
RF370T	without metal	100	95	80
	on metal; distance 0 mm	95	90	75
	flush-mounted in metal; distance all round 20 mm	70	65	65

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

With ISO transponders (MDS D)

Table 4- 33 Reduction of field data due to metal, range as %: Transponder and RF310R

Transponder		RF310R reader		
		Without metal	On metal	Flush-mounted in metal (20 mm all-round)
MDS D100[1)]	Without metal	100	95	80
	On metal; distance 20 mm	75	70	65
	Flush-mounted in metal; distance all round 20 mm	55	55	50
MDS D124[1)]	Without metal	100	95	80
	On metal; distance 15 mm	90	95	85
	Flush-mounted in metal; distance all round 20 mm	80	75	60
MDS D126[1)]	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
MDS D139[1)]	Without metal	100	90	80
	On metal; distance 30 mm	100	90	80
	Flush-mounted in metal; distance all round 100 mm	100	90	80
MDS D160[1)]	Without metal	100	90	80
	On metal; distance 10 mm	75	75	75
MDS D165	Without metal	100	90	85
	On metal; distance 25 mm	90	80	75
MDS D200[1)]	Without metal	100	90	80
	On metal; distance 20 mm	80	70	65
	Flush-mounted in metal; distance all round 20 mm	60	60	60
MDS D261	Without metal	100	80	85
	On metal; distance 25 mm	90	75	80
MDS D324[1)]	Without metal	100	95	75
	On metal; distance 15 mm	80	80	75
	Flush-mounted in metal; distance all round 25 mm	80	75	70
MDS D339	without metal	100	90	80
	on metal; distance 30 mm	100	90	80
	flush-mounted in metal; distance all round 100 mm	100	90	80
MDS D400[1)]	Without metal	100	80	75
	On metal; distance 20 mm	65	60	55

Transponder		RF310R reader		
		Without metal	On metal	Flush-mounted in metal (20 mm all-round)
	Flush-mounted in metal; distance all round 20 mm	55	50	45
MDS D423	Without metal	100	95	90
	On metal; distance 0 mm	150[2)]	140[2)]	140[2)]
	Flush-mounted in metal; distance all round 0 mm	70	60	60
MDS D424[1)]	Without metal	100	90	80
	On metal; distance 15 mm	80	80	70
	Flush-mounted in metal; distance all round 25 mm	60	60	50
MDS D425	Without metal	100	100	95
	On metal; distance 0 mm	90	85	80
MDS D426[1)]	Without metal	100	90	80
	On metal; distance 25 mm	85	80	70
	Flush-mounted in metal; distance all round 50 mm	80	75	65
MDS D428	Without metal	100	100	75
	On metal; distance 0 mm	100	100	75
MDS D460[1)]	Without metal	100	100	80
	On metal; distance 10 mm	80	80	60
MDS D524[1)]	without metal	100	90	80
	on metal; distance 15 mm	80	80	70
	flush-mounted in metal; distance all round 25 mm	60	60	50
MDS D525	without metal	100	100	95
	on metal; distance 0 mm	90	85	80
MDS D526[1)]	without metal	100	90	80
	on metal; distance 25 mm	85	80	70
	flush-mounted in metal; distance all round 50 mm	80	75	65
MDS D528	without metal	100	100	75
	on metal; distance 0 mm	100	100	75

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.

With ISO transponders (MDS E)

Table 4- 34 Reduction of field data due to metal, range as %: Transponder and RF310R

Transponder		RF310R reader		
		without metal	on metal	flush-mounted in metal (20 mm all-round)
MDS E600[1)]	without metal	100	95	80
	on metal; distance 20 mm	75	70	65
	flush-mounted in metal; distance all round 20 mm	55	55	50
MDS E611[1)]	without metal	100	95	80
	on metal; distance 20 mm	75	70	65
	flush-mounted in metal; distance all round 20 mm	55	55	50
MDS E624[1)]	without metal	100	95	80
	on metal; distance 15 mm	90	95	85
	flush-mounted in metal; distance all round 20 mm	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.

4.3.4.2 RF340R

With RF300 transponders

Table 4- 35 Reduction of field data due to metal, range as %: Transponder and RF340R

Transponder		RF340R reader		
		Without metal	On metal	Flush-mounted in metal (20 mm all-round)
RF320T	Without metal	100	95	90
	On metal; distance 20 mm	85	85	80
	Flush-mounted in metal; distance all round 20 mm	75	75	65
RF330T[1)]	Without metal	100	95	90
	On metal; distance 0 mm	90	90	80
	Flush-mounted in metal; distance all round 10 mm	65	65	60
RF340T	Without metal	100	95	80
	On metal; distance 0 mm	65	65	55

Transponder		RF340R reader		
		Without metal	On metal	Flush-mounted in metal (20 mm all-round)
	Flush-mounted in metal; distance all round 20 mm	60	60	55
RF350T	Without metal	100	90	85
	On metal; distance 0 mm	75	70	70
	Flush-mounted in metal; distance all round 20 mm	55	55	45
RF360T	Without metal	100	95	80
	On metal; distance 20 mm	75	70	65
	Flush-mounted in metal; distance all round 20 mm	70	60	50
RF370T	Without metal	100	95	80
	On metal; distance 0 mm	95	90	75
	Flush-mounted in metal; distance all round 20 mm	70	65	65
RF380T	Without metal	100	95	75
	On metal; distance 0 mm	100	95	70
	Flush-mounted in metal; distance all-round 40 mm	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.

With ISO transponders (MDS D)

Table 4- 36 Reduction of field data due to metal, range as %: Transponder and RF340R

Transponder		RF340R reader		
		Without metal	On metal	Flush-mounted in metal (20 mm all-round)
MDS D100[1)]	Without metal	100	90	75
	On metal; distance 20 mm	70	65	60
	Flush-mounted in metal; distance all round 20 mm	60	45	45
MDS D124[1)]	Without metal	100	95	80
	On metal; distance 15 mm	85	85	75
	Flush-mounted in metal; distance all round 20 mm	80	80	45
MDS D126[1)]	Without metal	100	90	85
	On metal; distance 25 mm	80	80	70

Transponder		RF340R reader		
		Without metal	On metal	Flush-mounted in metal (20 mm all-round)
	Flush-mounted in metal; distance all round 50 mm	75	75	65
MDS D139[1)]	Without metal	100	95	80
	On metal; distance 30 mm	100	90	75
	Flush-mounted in metal; distance all round 100 mm	100	90	75
MDS D160[1)]	Without metal	100	95	80
	On metal; distance 10 mm	85	85	75
MDS D165	Without metal	100	95	85
	On metal; distance 25 mm	90	80	75
MDS D200[1)]	Without metal	100	95	90
	On metal; distance 20 mm	90	85	80
	Flush-mounted in metal; distance all round 20 mm	75	50	65
MDS D261	Without metal	100	100	100
	On metal; distance 25 mm	70	95	90
MDS D324[1)]	Without metal	100	95	80
	On metal; distance 15 mm	90	85	75
	Flush-mounted in metal; distance all round 25 mm	80	80	60
MDS D339	Without metal	100	95	80
	On metal; distance 30 mm	100	90	75
	Flush-mounted in metal; distance all round 100 mm	100	90	75
MDS D400[1)]	Without metal	100	90	80
	On metal; distance 20 mm	70	65	80
	Flush-mounted in metal; distance all round 20 mm	55	50	50
MDS D423	Without metal	100	95	85
	On metal; distance 0 mm	120[2)]	120[2)]	115[2)]
	Flush-mounted in metal; distance all round 0 mm	65	60	60
MDS D424[1)]	Without metal	100	95	80
	On metal; distance 15 mm	85	85	75
	Flush-mounted in metal; distance all round 25 mm	75	75	70
MDS D425	Without metal	100	95	95
	On metal; distance 0 mm	100	90	90
MDS D426[1)]	Without metal	100	90	80
	On metal; distance 25 mm	80	75	70

Transponder		RF340R reader		
		Without metal	On metal	Flush-mounted in metal (20 mm all-round)
	Flush-mounted in metal; distance all round 50 mm	75	70	65
MDS D428	Without metal	100	95	80
	On metal; distance 0 mm	95	80	75
MDS D460[1)]	Without metal	100	95	95
	On metal; distance 10 mm	85	85	85
MDS D524[1)]	without metal	100	95	80
	on metal; distance 15 mm	85	85	75
	flush-mounted in metal; distance all round 25 mm	75	75	70
MDS D525	without metal	100	95	95
	on metal; distance 0 mm	100	90	90
MDS D526[1)]	without metal	100	90	80
	on metal; distance 25 mm	80	75	70
	flush-mounted in metal; distance all round 50 mm	75	70	65
MDS D528	without metal	100	95	80
	on metal; distance 0 mm	95	80	75

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.

With ISO transponders (MDS E)

Table 4- 37 Reduction of field data due to metal, range as %: Transponder and RF340R

Transponder		RF340R reader		
		without metal	on metal	flush-mounted in metal (20 mm all-round)
MDS E600[1)]	without metal	100	90	75
	on metal; distance 20 mm	70	65	60
	flush-mounted in metal; distance all round 20 mm	60	45	45
MDS E611[1)]	without metal	100	90	75
	on metal; distance 20 mm	70	65	60
	flush-mounted in metal; distance all round 20 mm	60	45	45
MDS E624[1)]	without metal	100	95	80
	on metal; distance 15 mm	85	85	75
	flush-mounted in metal; distance all round 20 mm	80	80	45

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

4.3.4.3 RF350R

Reader RF350R with ANT 1 and with RF300 transponders

Table 4- 38 Reduction of field data due to metal, range as %: Transponder and RF350R with ANT 1

Transponder		ANT 1 without metal	ANT 1 on metal	ANT 1 flush-mounted in metal (40 mm all-round)
RF320T[1)]	Without metal	100	90	90
	On metal; distance 20 mm	85	85	75
	Flush-mounted in metal; distance all round 20 mm	75	75	65
RF330T	Without metal	100	90	90
	On metal; distance 0 mm	95	85	75
	Flush-mounted in metal; distance all round 10 mm	65	60	60
RF340T	Without metal	100	90	90

Transponder		ANT 1 without metal	ANT 1 on metal	ANT 1 flush-mounted in metal (40 mm all-round)
	On metal; distance 0 mm	65	65	60
	Flush-mounted in metal; distance all round 20 mm	60	60	55
RF350T	Without metal	100	90	85
	On metal; distance 0 mm	75	70	65
	Flush-mounted in metal; distance all round 20 mm	55	55	45
RF360T	Without metal	100	90	85
	On metal; distance 20 mm	75	75	65
	Flush-mounted in metal; distance all round 20 mm	65	60	50
RF370T	Without metal	100	90	85
	On metal; distance 0 mm	95	88	75
	Flush-mounted in metal; distance all round 20 mm	70	65	65
RF380T	Without metal	100	90	80
	On metal; distance 0 mm	100	90	70
	Flush-mounted in metal; distance all round 40 mm	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.

Reader RF350R with ANT 1 and with ISO transponders (MDS D)

Table 4- 39 Reduction of field data due to metal, range as %: Transponder and RF350R with ANT 1

Transponder		ANT 1 without metal	ANT 1 on metal	ANT 1 mounted in metal (40 mm all-round)
MDS D100[1)]	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[1)]	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[1)]	Without metal	100	85	85
	On metal; distance 25 mm	85	75	75

Transponder		ANT 1 without metal	ANT 1 on metal	ANT 1 mounted in metal (40 mm all-round)
	Flush-mounted in metal; distance all round 50 mm	80	70	70
MDS D139[1)]	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[1)]	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[1)]	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
MDS D261	Without metal	100	90	85
	On metal; distance 25 mm	85	80	80
MDS D324[1)]	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
MDS D339[1)]	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 D400[1)]	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
MDS D423	Without metal	100	90	90
	On metal; distance 0 mm	115[2)]	115[2)]	115[2)]
	Flush-mounted in metal; distance all round 0 mm	80	65	65
MDS D424[1)]	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
MDS D425	Without metal	100	95	95
	On metal; distance 0 mm	90	85	85
MDS D426[1)]	Without metal	100	90	85
	On metal; distance 25 mm	85	80	75
	Flush-mounted in metal; distance all round 50 mm	80	75	x

Transponder		ANT 1 without metal	ANT 1 on metal	ANT 1 mounted in metal (40 mm all-round)
MDS D428	Without metal	100	90	85
	On metal; distance 0 mm	85	80	80
MDS D460[1)]	Without metal	100	90	80
	On metal; distance 10 mm	85	80	75
MDS D524[1)]	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
MDS D525	without metal	100	95	95
	on metal; distance 0 mm	90	85	85
MDS D526[1)]	without metal	100	90	85
	on metal; distance 25 mm	85	80	75
	flush-mounted in metal; distance all round 50 mm	80	75	x
MDS D528	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.

Reader RF350R with ANT 1 and with ISO transponders (MDS E)

Table 4- 40 Reduction of field data due to metal, range as %: Transponder and RF350R with ANT 1

Transponder		ANT 1 without metal	ANT 1 on metal	ANT 1 mounted in metal (40 mm all-round)
MDS E600[1)]	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 E611[1)]	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 E624[1)]	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

Transponder	ANT 1 without metal	ANT 1 on metal	ANT 1 mounted in metal (40 mm all-round)

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

Reader RF350R with ANT 3 and with RF300 transponders

Table 4- 41 Reduction of field data due to metal, range as %: Transponder and RF350R with ANT 3

Transponder		ANT 3 without metal	ANT 3 on metal	ANT 3 flush-mounted in metal (40 mm all-round)
RF320T[1)]	without metal	100	90	90
	on metal; distance 20 mm	35	35	35
	flush-mounted in metal; distance all round 20 mm	35	25	15
RF330T	without metal	100	100	100
	on metal; distance 0 mm	117	106	106
	flush-mounted in metal; distance all round 10 mm	128	128	128
RF340T	without metal	100	75	70
	on metal; distance 0 mm	70	75	63
	flush-mounted in metal; distance all round 20 mm	63	63	58
RF350T	without metal	100	75	75
	on metal; distance 0 mm	70	75	75
	flush-mounted in metal; distance all round 20 mm	63	63	58

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

Reader RF350R with ANT 3 and with ISO transponders (MDS D)

Table 4- 42 Reduction of field data due to metal, range as %: Transponder and RF350R with ANT 3

Transponder		ANT 3 without metal	ANT 3 on metal	ANT 3 flush-mounted in metal (40 mm all-round)
MDS D124[1)]	without metal	100	100	90
	On metal; distance 20 mm	33	24	21

Transponder		ANT 3 without metal	ANT 3 on metal	ANT 3 flush-mounted in metal (40 mm all-round)
	flush-mounted in metal; distance all round 20 mm	24	24	17
MDS D160[1)]	without metal	100	100	95
	on metal; distance 0 mm	16	16	21
	flush-mounted in metal; distance all round 10 mm	24	18	13
MDS D324[1)]	without metal	100	100	92
	on metal; distance 0 mm	47	34	29
	flush-mounted in metal; distance all round 20 mm	29	24	18
MDS D421 MDS D521	without metal	100	100	100
	on metal; distance 0 mm	110	110	110
	flush-mounted in metal; distance all round 0 mm	90	50	50
MDS D422 MDS D522	without metal	100	100	83
	on metal, distance 0 mm	111	111	111
	flush-mounted in metal; distance all round 20 mm	83	56	39
MDS D423	without metal	100	100	93
	on metal; distance 0 mm	125	125	121
	flush-mounted in metal; distance all round 20 mm	125	143	136
MDS D424[1)] MDS D524	without metal	100	100	94
	on metal; distance 0 mm	23	23	21
	flush-mounted in metal; distance all round 20 mm	17	13	10
MDS D425 MDS D525	without metal	100	100	100
	on metal; distance 0 mm	89	100	71
	flush-mounted in metal; distance all round 20 mm	71	54	36
MDS D428 MDS D528	without metal	100	93	83
	on metal; distance 0 mm	93	93	83
	flush-mounted in metal; distance all round 20 mm	93	93	83
MDS D460[1)]	without metal	100	93	90
	on metal; distance 0 mm	33	33	20
	flush-mounted in metal; distance all round 20 mm	33	33	17

Transponder	ANT 3 without metal	ANT 3 on metal	ANT 3 flush-mounted in metal (40 mm all-round)

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.

Reader RF350R with ANT 3 and with ISO transponders (MDS E)

Table 4- 43 Reduction of field data due to metal, range as %: Transponder and RF350R with ANT 3

Transponder		ANT 3 without metal	ANT 3 on metal	ANT 3 flush-mounted in metal (40 mm all-round)
MDS E624[1)]	without metal	100	100	94
	on metal; distance 0 mm	23	23	21
	flush-mounted in metal; distance all round 20 mm	17	13	10

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

Reader RF350R with ANT 12 and with ISO transponders (MDS D)

Table 4- 44 Reduction of field data due to metal, range as %: Transponder and RF350R with ANT 12

Transponder		ANT 12 without metal	ANT 12 mounted in metal (0 mm all-round)
MDS D117	Without metal	100	85
	On metal; distance 0 mm	90	85
	Flush-mounted in metal; distance all round 0 mm	65	65
MDS D127	Without metal	100	85
	On metal; distance 0 mm	95	85
	Flush-mounted in metal; distance all round 0 mm	65	65
MDS D160[1)]	Without metal	100	80
	On metal; distance 10 mm	100	80
MDS D421	Without metal	100	80
	On metal; distance 0 mm	90	75

Transponder		ANT 12 without metal	ANT 12 mounted in metal (0 mm all-round)
	Flush-mounted in metal; distance all round 0 mm	70	60
MDS D428	Without metal	100	75
	On metal; distance 0 mm	95	75
MDS D460[1)]	Without metal	100	80
	On metal; distance 10 mm	100	80
MDS D521	without metal	100	80
	on metal; distance 0 mm	90	75
	flush-mounted in metal; distance all round 0 mm	70	60
MDS D528	without metal	100	75
	on metal; distance 0 mm	95	75

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

Reader RF350R with ANT 12 and with ISO transponders (MDS E)

Table 4- 45 Reduction of field data due to metal, range as %: Transponder and RF350R with ANT 12

Transponder		ANT 12 without metal	ANT 12 mounted in metal (0 mm all-round)
MDS E623	without metal	100	80
	on metal; distance 0 mm	90	75
	flush-mounted in metal; distance all round 0 mm	70	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.

Reader RF350R with ANT 18 and with RF300 transponders

Table 4- 46 Reduction of field data due to metal, range as %: Transponder and RF350R with ANT 18

Transponder		ANT 18 without metal	ANT 18 mounted in metal (10 mm all-round)
RF320T[1)]	Without metal	100	65
	On metal; distance 20 mm	85	55
	Flush-mounted in metal; distance all round 20 mm	75	45
RF330T	Without metal	100	85
	On metal; distance 0 mm	120[2)]	100

Transponder		ANT 18 without metal	ANT 18 mounted in metal (10 mm all-round)
	Flush-mounted in metal; distance all round 10 mm	115[2)]	95
	Flush-mounted in metal; without surrounding clearance	95	90
RF340T	Without metal	100	85
	On metal; distance 0 mm	65	60
	Flush-mounted in metal; distance all round 20 mm	60	55

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.

Reader RF350R with ANT 18 and with ISO transponders (MDS D)

Table 4- 47 Reduction of field data due to metal, range as %: Transponder and RF350R with ANT 18

Transponder		ANT 18 without metal	ANT 18 mounted in metal (10 mm all-round)
MDS D124[1)]	Without metal	100	85
	On metal, distance 15 mm	85	75
	Flush-mounted in metal; distance all round 15 mm	85	45
MDS D127	Without metal	100	90
	On metal, distance 0 mm	95	85
	Flush-mounted in metal; distance all round 0 mm	60	60
MDS D160[1)]	Without metal	100	80
	On metal, distance 10 mm	85	75
MDS D324[1)]	Without metal	100	80
	On metal; distance 15 mm	90	75
	Flush-mounted in metal; distance all round 25 mm	80	65
MDS D421	Without metal	100	85
	On metal, distance 0 mm	90	65
	Flush-mounted in metal; distance all round 0 mm	40	20
MDS D422	Without metal	100	85
	On metal, distance 0 mm	95	85
	Flush-mounted in metal; distance all round 0 mm	90	80

Transponder		ANT 18 without metal	ANT 18 mounted in metal (10 mm all-round)
MDS D424[1)]	Without metal	100	85
	On metal 15 mm	85	80
	Flush-mounted in metal; distance all round 25 mm	75	75
MDS D425	Without metal	100	85
	On metal, distance 0 mm	100	85
MDS D428	Without metal	100	95
	On metal, distance 0 mm	95	95
MDS D460[1)]	Without metal	100	95
	On metal, distance 15 mm	95	95
MDS D521	without metal	100	85
	on metal, distance 0 mm	90	65
	flush-mounted in metal; distance all round 0 mm	40	20
MDS D522	without metal	100	85
	on metal, distance 0 mm	95	85
	flush-mounted in metal; distance all round 0 mm	90	80
MDS D524[1)]	without metal	100	85
	on metal 15 mm	85	80
	flush-mounted in metal; distance all round 25 mm	75	75
MDS D525	without metal	100	85
	on metal, distance 0 mm	100	85
MDS D528	without metal	100	95
	on metal, distance 0 mm	95	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.

Reader RF350R with ANT 18 and with ISO transponders (MDS E)

Table 4- 48 Reduction of field data due to metal, range as %: Transponder and RF350R with ANT 18

Transponder		ANT 18 without metal	ANT 18 mounted in metal (10 mm all-round)
MDS E623	without metal	100	85
	on metal, distance 0 mm	90	65
	flush-mounted in metal; distance all round 0 mm	40	20
MDS E624[1)]	without metal	100	85
	on metal, distance 15 mm	85	75

Transponder		ANT 18 without metal	ANT 18 mounted in metal (10 mm all-round)
	flush-mounted in metal; distance all round 15 mm	85	45

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

Reader RF350R with ANT 30 and with RF300 transponders

Table 4- 49 Reduction of field data due to metal, range as %: Transponder and RF350R with ANT 30

Transponder		Mounting the antenna	
		ANT 30 without metal	ANT 30 mounted in metal (20 mm all-round)
RF320T[1)]	Without metal	100	90
	On metal; distance 30 mm	85	75
	Flush-mounted in metal; distance all round 20 mm	75	65
RF330T	Without metal	100	90
	On metal;	110[2)]	100
	Flush-mounted in metal; distance all round 10 mm	105[2)]	95
	Flush-mounted in metal; without surrounding clearance	90	80
RF340T	Without metal	100	85
	On metal; distance 30 mm	65	55
	Flush-mounted in metal; distance all round 20 mm	60	55
RF350T	Without metal	100	85
	Directly on metal	75	65
	Flush-mounted in metal; distance all round 20 mm	55	45
RF360T	without metal	100	75
	on metal; distance 20 mm	75	55
	flush-mounted in metal; distance all round 20 mm	50	35

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.

Reader RF350R with ANT 30 and with ISO transponders (MDS D)

Table 4- 50 Reduction of field data due to metal, range as %: Transponder and RF350R with ANT 30

Transponder		ANT 30 without metal	ANT 30 mounted in metal (20 mm all-round)
MDS D124[1)]	Without metal	100	85
	On metal; distance 15 mm	85	75
	Flush-mounted in metal; distance all round 15 mm	80	45
MDS D126[1)]	Without metal	100	85
	On metal; distance 25 mm	90	75
	Flush-mounted in metal; distance all round 50 mm	85	70
MDS D160[1)]	Without metal	100	80
	On metal, distance 10 mm	85	75
MDS D324[1)]	Without metal	100	80
	On metal; distance 15 mm	90	70
	Flush-mounted in metal; distance all round 25 mm	80	65
MDS D422	Without metal	100	85
	On metal, distance 0 mm	95	85
	Flush-mounted in metal; distance all round 0 mm	90	80
MDS D423	Without metal	100	80
	On metal, distance 0 mm	125[2)]	115[2)]
	Flush-mounted in metal; distance all round 0 mm	80	70
MDS D424[1)]	Without metal	100	85
	On metal 15 mm	95	85
	Flush-mounted in metal; distance all round 25 mm	85	75
MDS D425	Without metal	100	80
	On metal, distance 0 mm	95	80
MDS D426[1)]	Without metal	100	85
	On metal; distance 25 mm	90	75
	Flush-mounted in metal; distance all round 50 mm	80	70
MDS D428	Without metal	100	90
	On metal, distance 0 mm	95	90
MDS D460[1)]	Without metal	100	90
	On metal, distance 10 mm	95	85

Transponder		ANT 30 without metal	ANT 30 mounted in metal (20 mm all-round)
MDS D522	without metal	100	85
	on metal, distance 0 mm	95	85
	flush-mounted in metal; distance all round 0 mm	90	80
MDS D524[1)]	without metal	100	85
	on metal 15 mm	95	85
	flush-mounted in metal; distance all round 25 mm	85	75
MDS D525	without metal	100	80
	on metal, distance 0 mm	95	80
MDS D526[1)]	without metal	100	85
	on metal; distance 25 mm	90	75
	flush-mounted in metal; distance all round 50 mm	80	70
MDS D528	without metal	100	90
	on metal, distance 0 mm	95	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 % can occur if transponders were developed specifically for mounting in/on metallic surroundings.

Reader RF350R with ANT 30 and with ISO transponders (MDS E)

Table 4- 51 Reduction of field data due to metal, range as %: Transponder and RF350R with ANT 30

Transponder		ANT 30 without metal	ANT 30 mounted in metal (20 mm all-round)
MDS E624[1)]	without metal	100	85
	on metal; distance 15 mm	85	75
	flush-mounted in metal; distance all round 15 mm	80	45

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

4.3.4.4 RF380R

With RF300 transponders

Table 4- 52 Reduction of field data due to metal, range as %: Transponder and RF380R

Transponder		Reader RF380R (RF300 mode)		
		Without metal	On metal	Flush-mounted in metal (20 mm all-round)
RF320T[1)]	Without metal	100	95	90
	On metal; distance 20 mm	85	75	70
	Flush-mounted in metal; distance all round 20 mm	60	55	50
RF330T	Without metal	100	90	80
	On metal; distance 0 mm	70	65	60
RF340T	Without metal	100	90	80
	On metal; distance 0 mm	70	65	60
	Flush-mounted in metal; distance all round 20 mm	60	60	55
RF350T	Without metal	100	85	80
	On metal; distance 0 mm	70	65	60
	Flush-mounted in metal; distance all round 20 mm	55	50	45
RF360T[1)]	Without metal	100	95	85
	On metal; distance 20 mm	75	70	65
	Flush-mounted in metal; distance all round 20 mm	60	55	50
RF370T	Without metal	100	95	85
	On metal; distance 0 mm	90	85	80
	Flush-mounted in metal; distance all round 20 mm	65	60	60
RF380T	Without metal	100	95	85
	On metal; distance 0 mm	95	90	80
	Flush-mounted in metal; distance all-round 40 mm	65	60	55

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

With ISO transponders (MDS D)

Table 4- 53 Reduction of field data due to metal, range as %: Transponder and RF380R

Transponder		Reader RF380R (ISO mode)		
		Without metal	On metal	Flush-mounted in metal (20 mm all-round)
MDS D100[1)]	Without metal	100	95	80
	On metal; distance 20 mm	65	60	55
	Flush-mounted in metal; distance all round 20 mm	55	50	45
MDS D124[1)]	Without metal	100	95	90
	On metal; distance 15 mm	95	90	85
	Flush-mounted in metal; distance all round 20 mm	70	65	50
MDS D126[1)]	Without metal	100	90	80
	On metal; distance 25 mm	80	75	70
	Flush-mounted in metal; distance all round 50 mm	75	65	65
MDS D139[1)]	Without metal	100	90	75
	On metal; distance 30 mm	95	85	70
	Flush-mounted in metal; distance all round 100 mm	90	80	70
MDS D160[1)]	Without metal	100	95	90
	On metal; distance 10 mm	85	85	80
MDS D165	Without metal	100	90	80
	On metal; distance 25 mm	80	75	70
MDS D200[1)]	Without metal	100	90	80
	On metal; distance 20 mm	80	75	70
	Flush-mounted in metal; distance all round 20 mm	65	60	55
MDS D261	Without metal	100	95	85
	On metal; distance 25 mm	85	80	75
MDS D324[1)]	Without metal	100	95	85
	On metal; distance 15 mm	85	85	80
	Flush-mounted in metal; distance all round 25 mm	70	65	60
MDS D339[1)]	Without metal	100	90	80
	On metal; distance 30 mm	85	80	75
	Flush-mounted in metal; distance all round 100 mm	80	75	70
MDS D400[1)]	Without metal	100	90	80
	On metal; distance 20 mm	75	70	60

Transponder		Reader RF380R (ISO mode)		
		Without metal	On metal	Flush-mounted in metal (20 mm all-round)
	Flush-mounted in metal; distance all round 20 mm	60	60	55
MDS D423	Without metal	100	95	85
	On metal; distance 0 mm	100	100	90
	flush-mounted in metal; distance all round 10 mm	75	65	60
MDS D424[1)]	Without metal	100	90	75
	On metal; distance 15 mm	75	75	60
	Flush-mounted in metal; distance all round 25 mm	60	55	40
MDS D425	Without metal	100	70	90
	On metal; distance 0 mm	75	70	60
MDS D426[1)]	Without metal	100	90	80
	On metal; distance 25 mm	80	75	70
	Flush-mounted in metal; distance all round 50 mm	75	65	65
MDS D428	Without metal	100	90	80
	On metal; distance 0 mm	85	80	65
MDS D460[1)]	Without metal	100	95	80
	On metal; distance 10 mm	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.

4.3.4.5 RF382R

Note

RF382R not suitable for metallic surroundings

The RF382R was not developed for reading transponders in a metallic environment.

With ISO transponders (MDS D)

Table 4- 54 Reduction of field data by metal (in %): Transponder and RF382R

Transponder		Reader RF382R (ISO mode)	
		Without metal	On metal
MDS D124	Without metal	100	110[1)]
MDS D160	Without metal	100	100
MDS D324	Without metal	100	110[1)]
MDS D424	Without metal	100	105[1)]
MDS D460	Without metal	100	115[1)]

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

4.4 Chemical resistance of the transponders

4.4.1 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 materials used to manufacture the transponders.

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

Table 4- 55 Overview of the housing materials of the transponders

Housing material	Transponder
Polyamide 12	RF340T RF350T RF370T
Polyphenylene sulfide (PPS)	RF380T 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

Housing material	Transponder
Epoxy resin	RF320T RF360T MDS D124 (6GT2600-0AC00) MDS D324 MDS D421 MDS D424 MDS D460 MDS D521 MDS D524 MDS E610 MDS E611 MDS E623 MDS E624
PA6	MDS D127
PA6.6 GF30	MDS D126 MDS D422 MDS D425 MDS D426 MDS D428 MDS D522 MDS D525 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.

4.4.2 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- 56 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	○○○

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
-	Not resistant
w.	Water solution
c. s.	Cold saturated

4.4.3 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- 57 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	○○○○
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

4.4.4 Polycarbonate (PC)

Table 4- 58 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

4.4.5 Polyvinyl chloride (PVC)

Table 4- 59 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
-	Not resistant

4.4.6 Epoxy resin

Table 4- 60 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	-
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	○○○○

Substance	Test conditions		Rating
	Concentration [%]	Temperature [°C]	
Benzoic acid		20 °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	-
Butadiene (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	○○○○

Substance	Test conditions		Rating
	Concentration [%]	Temperature [°C]	
Formamide	100%	20 °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

4.4.7 PA6.6 GF30

Table 4- 61 Chemical resistance - 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

4.5 Guidelines for electromagnetic compatibility (EMC)

4.5.1 Overview

These EMC Guidelines answer the following questions:

- Why are EMC guidelines necessary?
- What types of external interference have an impact on the system?
- How can interference be prevented?
- How can interference be eliminated?
- Which standards relate to EMC?
- Examples of interference-free plant design

The description is intended for "qualified personnel":

- Project engineers and planners who plan system configurations with RFID modules and have to observe the necessary guidelines.
- Fitters and service engineers who install the connecting cables in accordance with this description or who rectify defects in this area in the event of interference.

Note

Failure to observe notices drawn to the reader's attention can result in dangerous conditions in the plant or the destruction of individual components or the entire plant.

4.5.2 What does EMC mean?

The increasing use of electrical and electronic devices is accompanied by:

- Higher component density
- More switched power electronics
- Increasing switching rates
- Lower power consumption of components due to steeper switching edges

The higher the degree of automation, the greater the risk of interaction between devices.

Electromagnetic compatibility (EMC) is the ability of an electrical or electronic device to operate satisfactorily in an electromagnetic environment without affecting or interfering with the environment over and above certain limits.

EMC can be broken down into three different areas:

- Internal immunity to interference:

  Immunity to internal (own) electrical disturbance
- External immunity to interference:

  Immunity to external electromagnetic disturbances
- Degree of interference emission:

  Emission of interference and its effect on the electrical environment

All three areas are considered when testing an electrical device.

The RFID modules are tested for conformity with the limit values required by the CE and R&TTE directives. Since the RFID modules are merely components of an overall system, and sources of interference can arise as a result of combining different components, certain directives have to be followed when setting up a plant.

EMC measures usually consist of a complete package of measures, all of which need to be implemented in order to ensure that the plant is immune to interference.

Note

The plant manufacturer is responsible for the observance of the EMC directives; the plant operator is responsible for radio interference suppression in the overall plant.

All measures taken when setting up the plant prevent expensive retrospective modifications and interference suppression measures.

The plant operator must comply with the locally applicable laws and regulations. They are not covered in this document.

4.5.3 Basic rules

It is often sufficient to follow a few elementary rules in order to ensure electromagnetic compatiblity (EMC).

The following rules must be observed:

Shielding by enclosure

- Protect the device against external interference by installing it in a cabinet or housing. The housing or enclosure must be connected to the chassis ground.
- Use metal plates to shield against electromagnetic fields generated by inductances.
- Use metal connector housings to shield data conductors.

Wide-area ground connection

- Plan a meshed grounding concept.
- Bond all passive metal parts to chassis ground, ensuring large-area and low-HF-impedance contact.
- Establish a large-area connection between the passive metal parts and the central grounding point.
- Don't forget to include the shielding bus in the chassis ground system. That means the actual shielding busbars must be connected to ground by large-area contact.
- Aluminium parts are not suitable for ground connections.

Plan the cable installation

- Break the cabling down into cable groups and install these separately.
- Always route power cables, signal cables and HF cables through separated ducts or in separate bundles.
- Feed the cabling into the cabinet from one side only and, if possible, on one level only.
- Route the signal cables as close as possible to chassis surfaces.
- Twist the feed and return conductors of separately installed cables.
- Routing HF cables:
  avoid parallel routing of HF cables.
- Do not route cables through the antenna field.

Shielding for the cables

- Shield the data cables and connect the shield at both ends.
- Shield the analog cables and connect the shield at one end, e.g. on the drive unit.
- Always apply large-area connections between the cable shields and the shielding bus at the cabinet inlet and make the contact with clamps.

- Feed the connected shield through to the module without interruption.
- Use braided shields, not foil shields.

Line and signal filter

- Use only line filters with metal housings
- Connect the filter housing to the cabinet chassis using a large-area low-HF-impedance connection.
- Never fix the filter housing to a painted surface.
- Fix the filter at the control cabinet inlet or in the direction of the source.

4.5.4 Propagation of electromagnetic interference

Three components have to be present for interference to occur in a system:

- Interference source
- Coupling path
- Interference sink

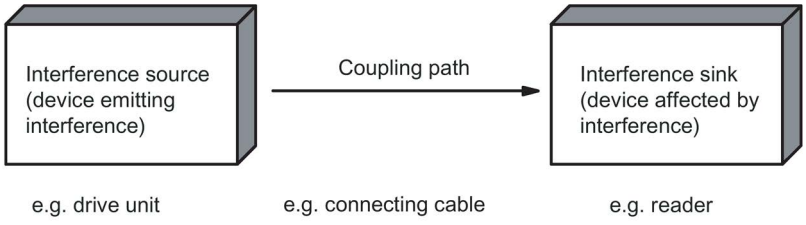


Figure 4-11 Propagation of interference

If one of the components is missing, e.g. the coupling path between the interference source and the interference sink, the interference sink is unaffected, even if the interference source is transmitting a high level of noise.

The EMC measures are applied to all three components, in order to prevent malfunctions due to interference. When setting up a plant, the manufacturer must take all possible measures in order to prevent the occurrence of interference sources:

- Only devices fulfilling limit class A of VDE 0871 may be used in a plant.
- Interference suppression measures must be introduced on all interference-emitting devices. This includes all coils and windings.
- The design of the system must be such that mutual interference between individual components is precluded or kept as small as possible.

Information and tips for plant design are given in the following sections.

Interference sources

In order to achieve a high level of electromagnetic compatibility and thus a very low level of disturbance in a plant, it is necessary to recognize the most frequent interference sources. These must then be eliminated by appropriate measures.

Table 4- 62 Interference sources: origin and effect

Interference source	Interference results from	Effect on the interference sink
Contactors, electronic valves	Contacts	System disturbances
	Coils	Magnetic field
Electrical motor	Collector	Electrical field
	Winding	Magnetic field
Electric welding device	Contacts	Electrical field
	Transformer	Magnetic field, system disturbance, transient currents
Power supply unit, switched-mode	Circuit	Electrical and magnetic field, system disturbance
High-frequency appliances	Circuit	Electromagnetic field
Transmitter (e.g. service radio)	Antenna	Electromagnetic field
Ground or reference potential difference	Voltage difference	Transient currents
Operator	Static charge	Electrical discharge currents, electrical field
Power cable	Current flow	Electrical and magnetic field, system disturbance
High-voltage cable	Voltage difference	Electrical field

What interference can affect RFID?

Interference source	Cause	Remedy
Switched-mode power supply	Interference emitted from the current infeed	Replace the power supply
Interference injected through the cables connected in series	Cable is inadequately shielded	Better cable shielding
	The reader is not connected to ground.	Ground the reader
HF interference over the antennas	caused by another reader	• Position the antennas further apart. • Erect suitable damping materials between the antennas. • Reduce the power of the readers. Please follow the instructions in the section *Installation guidelines/reducing the effects of metal*

Coupling paths

A coupling path has to be present before the disturbance emitted by the interference source can affect the system. There are four ways in which interference can be coupled in:

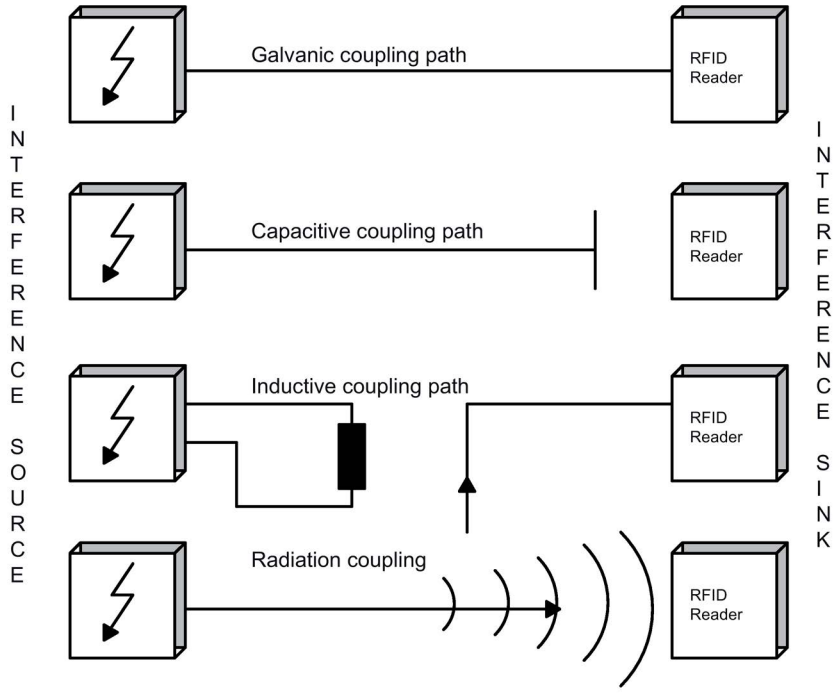


Figure 4-12 Ways in which interference can be coupled in

When RFID modules are used, different components in the overall system can act as a coupling path:

Table 4- 63 Causes of coupling paths

Coupling path	Invoked by
Conductors and cables	• Incorrect or inappropriate installation • Missing or incorrectly connected shield • Inappropriate physical arrangement of cables
Control cabinet or housing	• Missing or incorrectly wired equalizing conductor • Missing or incorrect earthing • Inappropriate physical arrangement • Components not mounted securely • Unfavorable cabinet configuration

4.5.5 Cabinet configuration

The influence of the user in the configuration of an electromagnetically compatible plant encompasses cabinet configuration, cable installation, ground connections and correct shielding of cables.

Note

For information about electromagnetically compatible cabinet configuration, please consult the installation guidelines for SIMATIC PLCs.

Shielding by enclosure

Magnetic and electrical fields and electromagnetic waves can be kept away from the interference sink by using a metal enclosure. The easier the induced interference current can flow, the greater the intrinsic weakening of the interference field. All enclosures and metal panels in the cabinet should therefore be connected in a manner allowing good conductance.

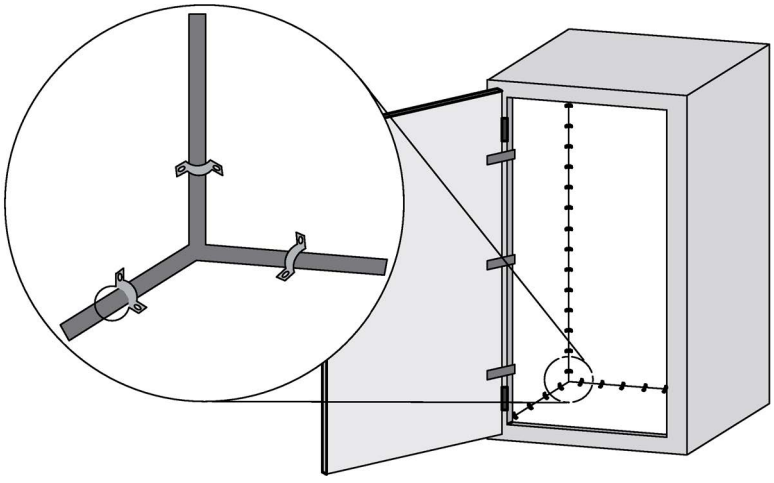


Figure 4-13 Shielding by enclosure

If the control cabinet panels are insulated from each other, a high-frequency-conducting connection can be established using ribbon cables and high-frequency terminals or HF conducting paste. The larger the area of the connection, the greater the high-frequency conductivity. This is not possible using single-wire connections.

Prevention of interference by optimum configuration

Good interference suppression can be achieved by installing SIMATIC PLCs on conducting mounting plates (unpainted). When setting up the control cabinet, interference can be prevented easily by observing certain guidelines. Power components (transformers, drive units, load power supply units) should be arranged separately from the control components (relay control unit, SIMATIC S7).

As a rule:

- The effect of the interference decreases as the distance between the interference source and interference sink increases.
- The interference can be further decreased by installing grounded shielding plates.
- The load connections and power cables should be installed separately from the signal cables with a minimum clearance of 10 cm.

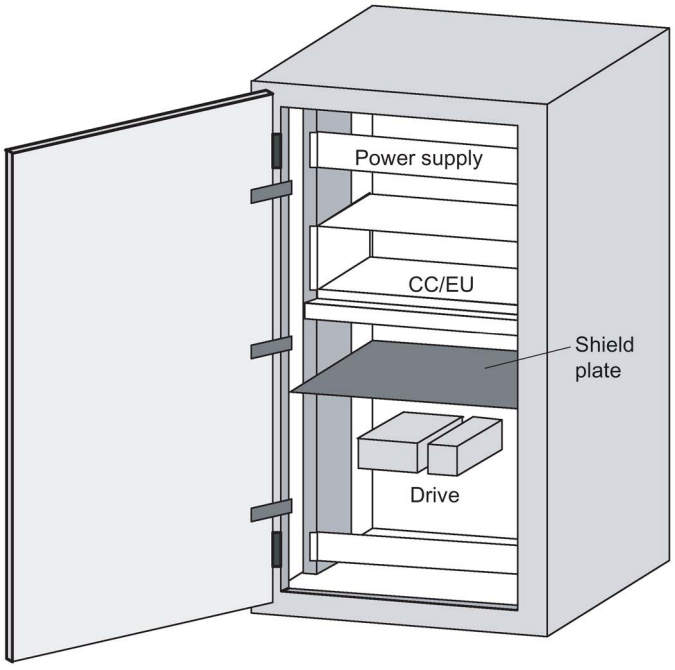


Figure 4-14 Prevention of interference by optimum configuration

Filtering of the supply voltage

External interference from the mains can be prevented by installing line filters. Correct installation is extremely important, in addition to appropriate dimensioning. It is essential that the line filter is mounted directly at the cabinet inlet. As a result, interference is filtered promptly at the inlet, and is not conducted through the cabinet.

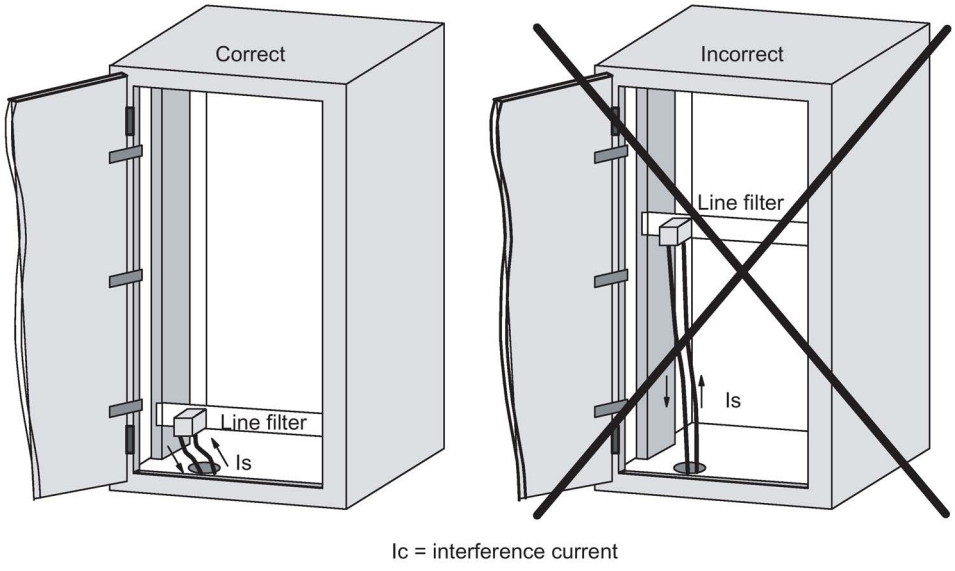


Figure 4-15 Filtering of the supply voltage

4.5.6 Prevention of interference sources

A high level of immunity to interference can be achieved by avoiding interference sources. All switched inductances are frequent sources of interference in plants.

Suppression of inductance

Relays, contactors, etc. generate interference voltages and must therefore be suppressed using one of the circuits below.

Even with small relays, interference voltages of up to 800 V occur on 24 V coils, and interference voltages of several kV occur on 230 V coils when the coil is switched. The use of freewheeling diodes or RC circuits prevents interference voltages and thus stray interference on conductors installed parallel to the coil conductor.

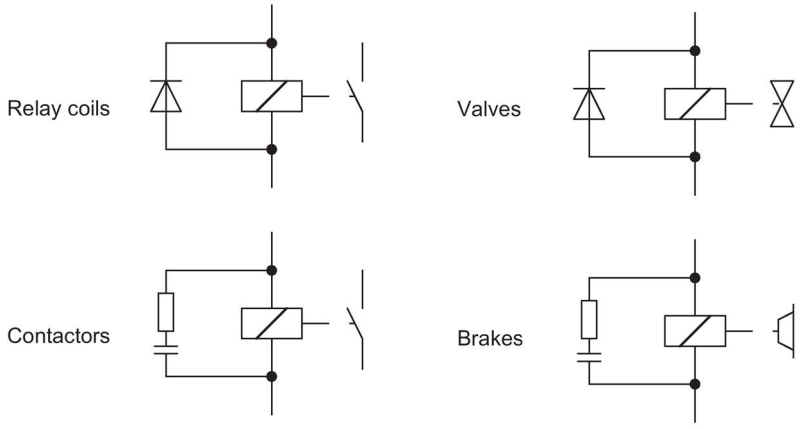


Figure 4-16 Suppression of inductance

Note

All coils in the cabinet should be suppressed. The valves and motor brakes are frequently forgotten. Fluorescent lamps in the control cabinet should be tested in particular.

4.5.7 Equipotential bonding

Potential differences between different parts of a plant can arise due to the different design of the plant components and different voltage levels. If the plant components are connected across signal cables, transient currents flow across the signal cables. These transient currents can corrupt the signals.

Proper equipotential bonding is thus essential.

- The equipotential bonding conductor must have a sufficiently large cross section (at least 10 mm^2).
- The distance between the signal cable and the associated equipotential bonding conductor must be as small as possible (antenna effect).
- A fine-strand conductor must be used (better high-frequency conductivity).
- When connecting the equipotential bonding conductors to the centralized equipotential bonding strip (EBS), the power components and non-power components must be combined.
- The equipotential bonding conductors of the separate modules must lead directly to the equipotential bonding strip.

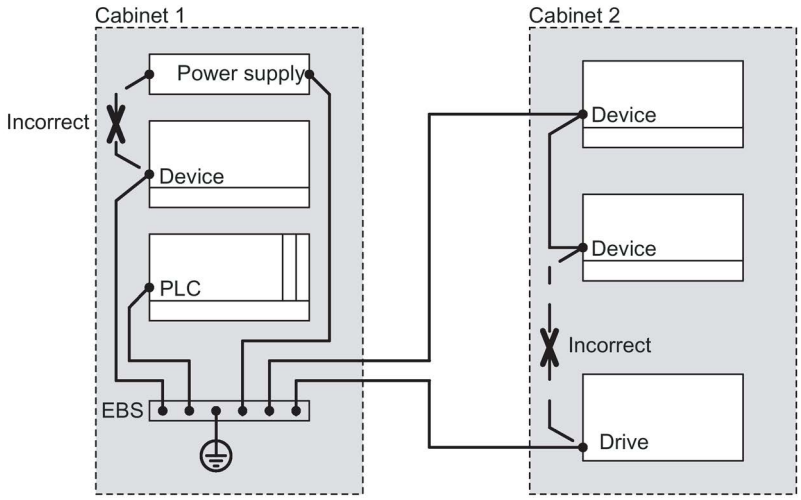


Figure 4-17 Equipotential bonding (EBS = Equipotential bonding strip)

The better the equipotential bonding in a plant, the smaller the chance of interference due to fluctuations in potential.

Equipotential bonding should not be confused with protective earthing of a plant. Protective earthing prevents the occurrence of excessive contact voltages in the event of equipment faults whereas equipotential bonding prevents the occurrence of differences in potential.

4.5.8 Cable shielding

Signal cables must be shielded in order to prevent coupling of interference.

The best shielding is achieved by installing the cables in steel tubes. However, this is only necessary if the signal cable is routed through an environment prone to particular interference. It is usually adequate to use cables with braided shields. In either case, however, correct connection is vital for effective shielding.

Note

An unconnected or incorrectly connected shield has no shielding effect.

As a rule:

- For analog signal cables, the shield should be connected at one end on the receiver side
- For digital signals, the shield should be connected to the enclosure at both ends
- Since interference signals are frequently within the HF range (> 10 kHz), a large-area HF-proof shield contact is necessary

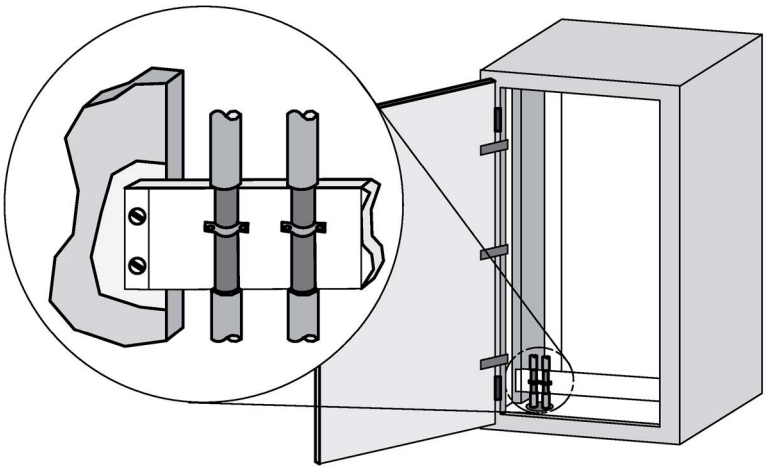


Figure 4-18 Cable shielding

The shielding bus should be connected to the control cabinet enclosure in a manner allowing good conductance (large-area contact) and must be situated as close as possible to the cable inlet. The cable insulation must be removed and the cable clamped to the shielding bus (high-frequency clamp) or secured using cable ties. Care should be taken to ensure that the connection allows good conductance.

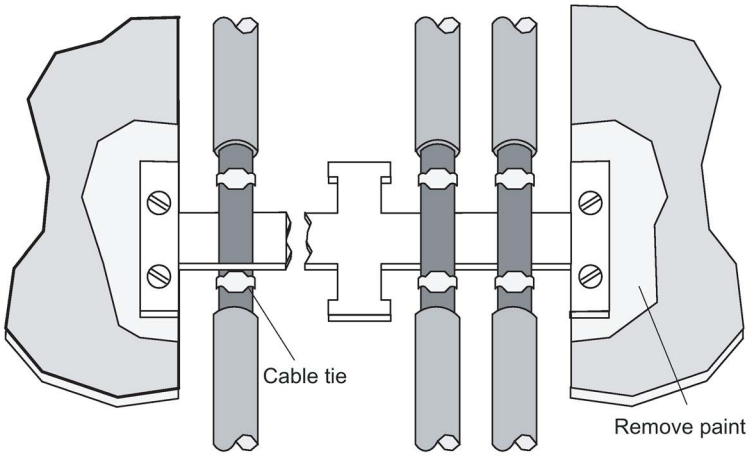


Figure 4-19 Connection of shielding bus

The shielding bus must be connected to the PE busbar.

If shielded cables have to be interrupted, the shield must be continued via the corresponding connector housing. Only suitable connectors may be used for this purpose.

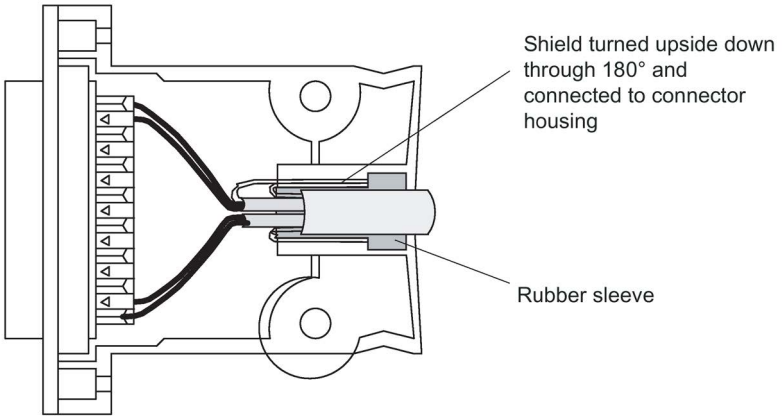


Figure 4-20 Interruption of shielded cables

If intermediate connectors, which do not have a suitable shield connection, are used, the shield must be continued by fixing cable clamps at the point of interruption. This ensures a large-area, HF-conducting contact.

Readers

5

Features of the RF300 reader

The reader provides inductive communication with the transponders and serial connection to the communications modules.

Communication between the transponder and reader takes place over inductive alternating fields.

The transmittable data volume between reader and transponder depends on

- the speed at which the transponder moves through the transmission window of the reader.
- the length of the transmission window,
- the transponder type used (RF300- / ISO 15693- (MDS D)/ ISO 14443 transponder (MDS E)),
- the memory type (FRAM, EEPROM; with RF300 transponders).

ISO 15693 functionality

With all readers of the RF300 family, you can use ISO 15693 transponders. Note that the readers for RF300, ISO 15963 or ISO 14443 operation must have parameters assigned. The parameter assignment done with the aid of the RESET frame (INIT-Run).

For more detailed information on software parameter assignment refer to the manuals.

- Function manual "Ident profile and Ident blocks (https://support.industry.siemens.com/cs/ww/en/view/106368029)",
- Product Information "FB 45 and FC 45 input parameters for RF300 and ISO transponders (https://support.industry.siemens.com/cs/ww/en/view/33315697)",
- Function manual "FB 45 (https://support.industry.siemens.com/cs/ww/en/view/21738808)" as of version "AS ≥ A3".

ISO 14443 functionality

With all readers of the second generation of the RF300 family, you can use ISO 14443 transponders. The RF300 readers of the second generation therefore replace the MOBY E readers SLG 72 and SLG 75. Note that the readers for RF300, ISO 15963 or ISO 14443 operation must have parameters assigned. The parameter assignment done with the aid of the RESET frame (INIT-Run).

The following commands are supported in ISO 14443 operation of the readers:

- READ
- WRITE
- MDS-STATUS (mode 3)
- INIT
- REPEAT

Special ISO 14443 commands such as "INCREMENT", "DECREMENT" or "SET-VALUE" are not supported.

5.1 SIMATIC RF310R

5.1.1 Features

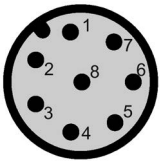
SIMATIC RF310R	Characteristics	
	Design	① RS-422 interface ② Status display
	Area of application	Identification tasks on small assembly lines in harsh industrial environments

5.1.2 RF310R ordering data

Table 5- 1 RF310R ordering data

	Article number
RF310R with RS-422 interface (3964R) horizontal base plate	6GT2801-1AB10
RF310R with RS-422 interface (3964R) base plate turned through 90°	6GT2801-1AB10-0AX1

5.1.3 Pin assignment RF310R 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	Earth (shield)

5.1.4 LED operating display

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

Table 5- 2 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
	• Operating mode "with presence": Transponder present • Operating mode "without presence": Transponder present and command currently being executed
	There is an error. The number of flashes provides information about the current error. You will find more information on error messages in the section "System diagnostics (Page 399)".

5.1.5 Ensuring reliable data exchange

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

5.1.6 Metal-free area

The RF310R can be flush-mounted in metal. Please allow for a possible reduction in the field data values.

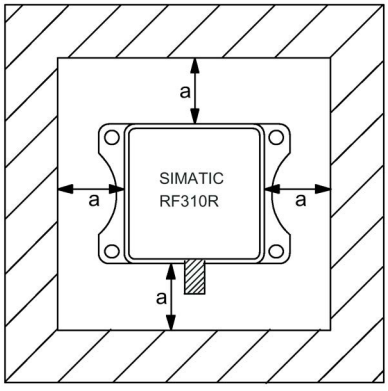
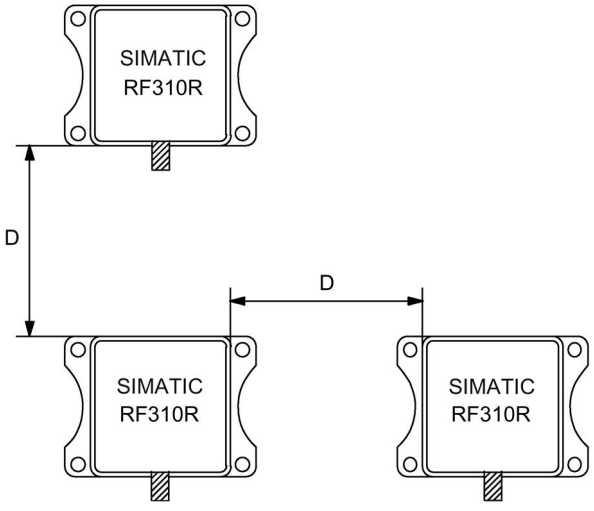


Figure 5-1 Metal-free area for RF310R

To avoid any impact on the field data, the distance a should be ≥ 20 mm.

5.1.7 Minimum distance between RF310R readers

RF310R side by side

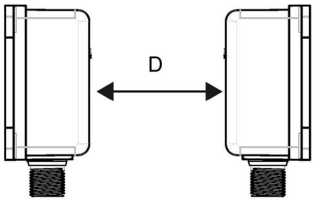


D ≥ 150 mm (with 2 readers)

D ≥ 200 mm (with more than 2 readers)

Figure 5-2 Minimum distance between RF310R readers

RF310R face-of-face



D ≥ 300 mm

Figure 5-3 Face-of-face distance between two RF310Rs

5.1.8 Technical specifications

Table 5- 3 Technical specifications of the RF310R reader with RS-422 interface

		6GT2801-1AB10
Product type designation	SIMATIC RF310R	
Radio frequencies		
Operating frequency, rated value	13.56 MHz	
Electrical data		
Maximum range	60 mm	
Maximum data transmission speed reader ↔ transponder	RF300 transponder	ISO transponder
• Read	• approx. 8000 bytes/s	• approx. 1500 bytes/s
• Write	• approx. 8000 bytes/s	• approx. 1500 bytes/s
Transmission speed	19.2, 57.6, 115.2 kBd	
Read/write distances of the reader	See section "Field data for transponders, readers and antennas (Page 48)."	
MTBF (Mean Time Between Failures)	170 years	
Interfaces		
Electrical connector design	M12, 8-pin	
Standard for interfaces for communication	RS-422	
Antenna	integrated	

	6GT2801-1AB10
Mechanical specifications	
Housing	
• Material	• Plastic PA 12
• Color	• Anthracite
Recommended distance to metal	0 mm
Supply voltage, current consumption, power loss	
Supply voltage	24 VDC
Typical current consumption	50 mA
Permitted ambient conditions	
Ambient temperature	
• During operation	• -25 to +70 °C
• During transportation and storage	• -40 to +85 °C
Degree of protection to EN 60529	IP67
Shock-resistant to EN 60721-3-7, Class 7 M3	50 g
Vibration-resistant to EN 60721-3-7, Class 7 M3	20 g
Torsion and bending load	Not permitted
Design, dimensions and weight	
Dimensions (L x W x H)	75 x 55 x 30 mm
Weight	200 g
Type of mounting	4 x M5 screw; 1.5 Nm
Cable length for RS-422 interface, maximum	1000 m
LED display design	3-color LED
Standards, specifications, approvals	
Proof of suitability	Radio to R&TTE directives EN 300330, EN 301489, CE, FCC, UL/CSA

5.1.9 Approvals

FCC information

Siemens SIMATIC RF310R (MLFB 6GT2801-1AB10); FCC ID NXW-RF310R

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.

5.1.10 Dimension drawing

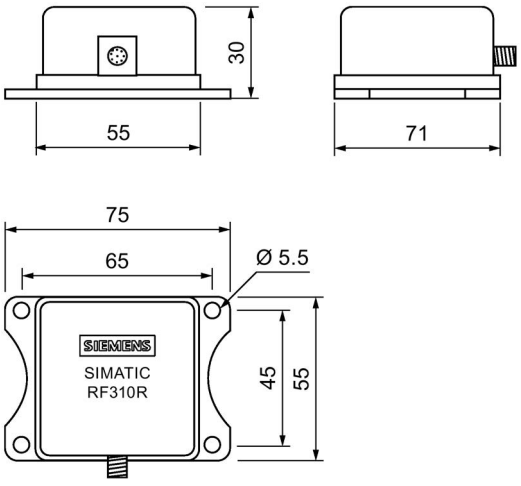


Figure 5-4 Dimension drawing for RF310R

Dimensions in mm

5.2 SIMATIC RF310R with Scanmode

You will find detailed information on the SIMATIC RF310R with Scanmode on the Internet (https://support.industry.siemens.com/cs/ww/en/ps/15034).

5.2.1 Features

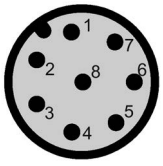
SIMATIC RF310R special version Scanmode	Characteristics	
	Design	① RS-422 interface ② Status display
	Area of application	Identification tasks on small assembly lines in harsh industrial environments

5.2.2 Ordering data for RF310R with Scanmode

Table 5- 4 Ordering data RF310R Scanmode

	Article number
RF310R special version Scanmode with RS-422 interface	6GT2801-1AB20-0AX1

5.2.3 Pin assignment RF310R special version Scanmode 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	Earth (shield)

5.2.4 LED operating display

The operational statuses of the reader are displayed by two LEDs. The LEDs can adopt the colors white green, red, yellow or blue 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 ready for operation
■	• Operating mode "with presence": Transponder present • Operating mode "without presence": Transponder present and command currently being executed
■	There is an error. The number of flashes provides information about the current error. You will find more information on error messages in the section "System diagnostics (Page 399)".

5.2.5 Ensuring reliable data exchange

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

5.2.6 Metal-free area

The RF310R special version can be flush-mounted in metal. Please allow for a possible reduction in the field data values.

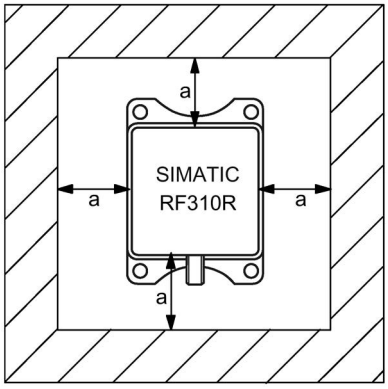
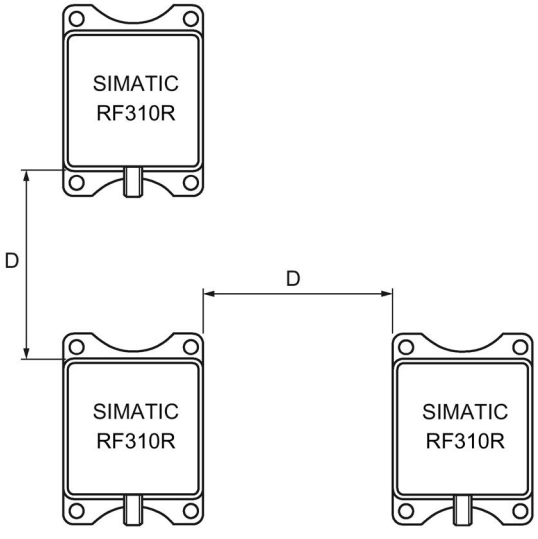


Figure 5-5 Metal-free area for RF310R special version

To avoid any impact on the field data, the distance a should be ≥ 20 mm.

5.2.7 Minimum distance between several readers

RF310R special version side by side

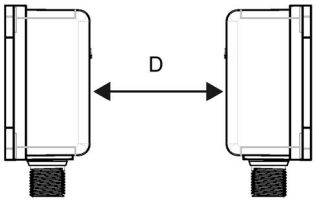


D ≥ 150 mm (with 2 readers)

D ≥ 200 mm (with more than 2 readers)

Figure 5-6 Minimum distance between RF310R readers

RF310R special version face-to-face



D ≥ 300 mm

Figure 5-7 Face-to-face distance between two RF310R special version

5.2.8 Technical specifications

Table 5- 6 Technical specifications of the RF310R reader with Scanmode

		6GT2801-1AB20-0AX1
Product type designation	SIMATIC RF310R Scanmode	
Radio frequencies		
Operating frequency, rated value	13.56 MHz	
Electrical data		
Maximum range	60 mm	
Maximum data transmission speed reader ↔ transponder	RF300 transponder	ISO transponder
• Read	• approx. 8000 bytes/s	• approx. 1500 bytes/s
Transmission speed	9.6, 19.2, 38.4, 57.6, 115.2 kBd	
Read/write distances of the reader	See section "Field data for transponders, readers and antennas (Page 48)."	
MTBF (Mean Time Between Failures)	170 years	
Interfaces		
Electrical connector design	M12, 8-pin	
Standard for interfaces for communication	RS-422 (Scanmode)	
Antenna	integrated	
Mechanical specifications		
Housing		
• Material	• Plastic PA 12	
• Color	• Anthracite	
Recommended distance to metal	0 mm	

	6GT2801-1AB20-0AX1
Supply voltage, current consumption, power loss	
Supply voltage	24 VDC
Typical current consumption	50 mA
Permitted ambient conditions	
Ambient temperature	
• During operation	• -25 to +70 °C
• During transportation and storage	• -40 to +85 °C
Degree of protection to EN 60529	IP67
Shock-resistant to EN 60721-3-7, Class 7 M3	50 g
Vibration-resistant to EN 60721-3-7, Class 7 M3	20 g
Torsion and bending load	Not permitted
Design, dimensions and weight	
Dimensions (L x W x H)	75 x 55 x 30 mm
Weight	170 g
Type of mounting	4 x M5 screws; 1.5 Nm
Cable length for RS-422 interface, maximum	1000 m
LED display design	3-color LED
Standards, specifications, approvals	
Proof of suitability	Radio to R&TTE directives EN 300330, EN 301489, CE, FCC, UL/CSA

5.2.9 Approvals

FCC information

Siemens SIMATIC RF310R (MLFB 6GT2801-1AB20-0AX1); FCC ID NXW-RF310R

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.

5.2.10 Dimension drawing

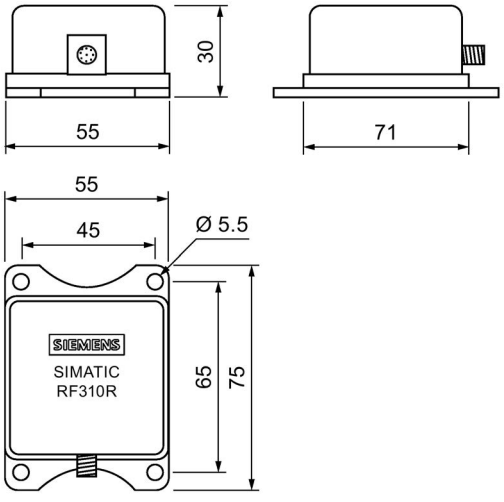


Figure 5-8 Dimension drawing RF310R special version Scanmode

Dimensions in mm

5.3 SIMATIC RF310R - second generation

5.3.1 Features

SIMATIC RF310R	Characteristics	
	Design	① RS-422 interface ② LED operating display
	Area of application	Identification tasks on small assembly lines in harsh industrial environments

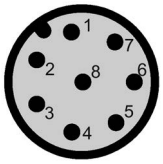
5.3.2 Ordering data

Table 5- 7 RF310R ordering data

	Article number
RF310R with RS-422 interface (3964R)	6GT2801-1BA10

5.3.3 Pin assignment of the RS-422 interface

Table 5- 8 Pin assignment

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	Earth (shield)

5.3.4 LED operating display

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

Table 5- 9 Display elements

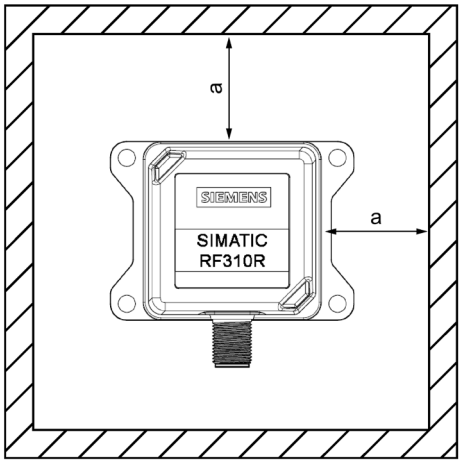
LED	Meaning
□	The reader is turned off.
■	The reader is turned on and is searching for transponders. The reader is in the "Setup" mode, in the "Search for transponders" status and has not yet received a "RESET" command and is not ready.
■ / □	There is transponder in the antenna field. The reader is in the "Setup" mode, in the status "Show quality", has not yet received a "RESET" command and is not ready. Depending on the signal strength, the LED flickers or is lit permanently.
■	The reader has received a "RESET" command.
■	The reader is turned on, the antenna is turned off.
■	• Operating mode "with presence": Transponder present • Operating mode "without presence": Transponder present and command currently being executed
■	There is an error. The number of flashes provides information about the current error. You will find more information on error messages in the section "System diagnostics (Page 399)".

5.3.5 Ensuring reliable data exchange

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

5.3.6 Metal-free area

The RF310R can be flush-mounted in metal. Allow for a possible reduction in the field data. To avoid any influence on the field data, the distance "a" should be kept to.

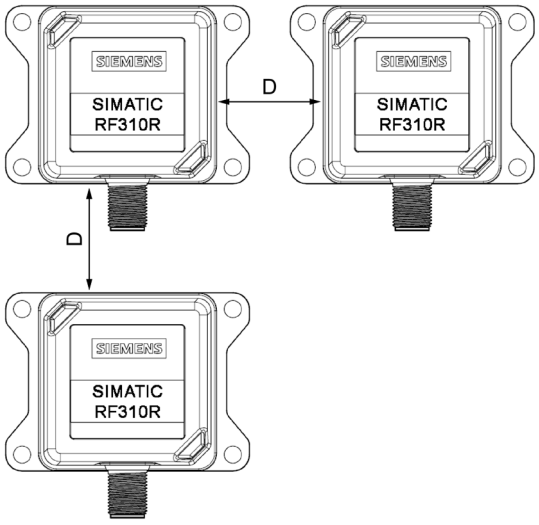


a ≥ 20 mm

Figure 5-9 Metal-free area for RF310R

5.3.7 Minimum distance between RF310R readers

RF310R side by side

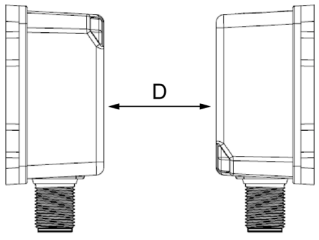


D ≥ 150 mm (with 2 readers)

D ≥ 200 mm (with more than 2 readers)

Figure 5-10 Minimum distance between RF310R readers

RF310R face-of-face



D ≥ 300 mm

Figure 5-11 Face-of-face distance between two RF310Rs

5.3.8 Technical specifications

Table 5- 10 Technical specifications of the RF310R reader with RS-422 interface

	6GT2801-1BA10		
Product type designation	SIMATIC RF310R		
Radio frequencies			
Operating frequency, rated value	13.56 MHz		
Electrical data			
Maximum range	60 mm		
Maximum data transmission speed reader ↔ transponder	RF300 transponder	ISO transponder (MDS D)	ISO transponder (MDS E)
• Read	• ≤ 8000 bytes/s	• ≤ 3300 bytes/s	• ≤ 3400 bytes/s
• Write	• ≤ 8000 bytes/s	• ≤ 1700 bytes/s	• ≤ 800 bytes/s
Transmission speed	19.2, 57.6, 115.2 kBd		
Read/write distances of the reader	See section "Field data for transponders, readers and antennas (Page 48)."		
MTBF (Mean Time Between Failures)	273 years		
Interfaces			
Electrical connector design	M12, 8-pin		
Standard for interfaces for communication	RS-422		
Antenna	integrated		
Mechanical specifications			
Housing			
• Material	• Plastic PA 12		
• Color	• TI-Grey		
Recommended distance to metal	0 mm		
Supply voltage, current consumption, power loss			
Supply voltage	24 VDC		
Typical current consumption	60 mA		

	6GT2801-1BA10
Permitted ambient conditions	
Ambient temperature	
• During operation	• -25 to +70 °C
• During transportation and storage	• -40 to +85 °C
Degree of protection to EN 60529	IP67
Shock-resistant to EN 60721-3-7, Class 7 M3	50 g
Vibration-resistant to EN 60721-3-7, Class 7 M3	20 g
Torsion and bending load	Not permitted
Design, dimensions and weight	
Dimensions (L x W x H)	75 x 55 x 30 mm
Weight	100 g
Type of mounting	4 x M5 screws; 1.5 Nm
Cable length for RS-422 interface, maximum	1000 m
LED display design	2 LEDs, 5 colors
Standards, specifications, approvals	
Proof of suitability	Radio to R&TTE directives EN 300330, EN 301489, CE, FCC, UL/CSA (IEC 61010), Ex approval

5.3.9 Approvals

FCC information

Siemens SIMATIC RF310R (MLFB 6GT2801-1BA10); FCC ID NXW-RF310R02

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

(1) This device may not cause harmful interference, and

(2) this device must accept any interference received, including interference that may cause undesired operation.

Caution

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

Note

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

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

IC information

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

(1) This device may not cause interference, and

(2) this device must accept any interference, including interference that may cause undesired operation of the device.

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

(1) L`appareil ne doit pas produire de brouillage, et

(2) l'utilisateur de l`appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d`en compromettre le fonctionnement.

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

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

- a) indoor use;
- b) altitude up to 2 000 m;
- c) temperature -25 °C to 70 °C;
- d) maximum relative humidity 80 % for temperature up to 31 °C decreasing linearly to 50 % relative humidity at 40 °C;
- e) TRANSIENT OVERVALTAGES up to the levels of OVERVALTAGE CATEGORY II, NOTE 1: These levels of transient overvoltage are typical for equipment supplied from the building wiring.
- f) using a "NEC Class 2" power supply is required
- g) the device is categorized as pollution degree 3/4

5.3.10 Dimension drawing

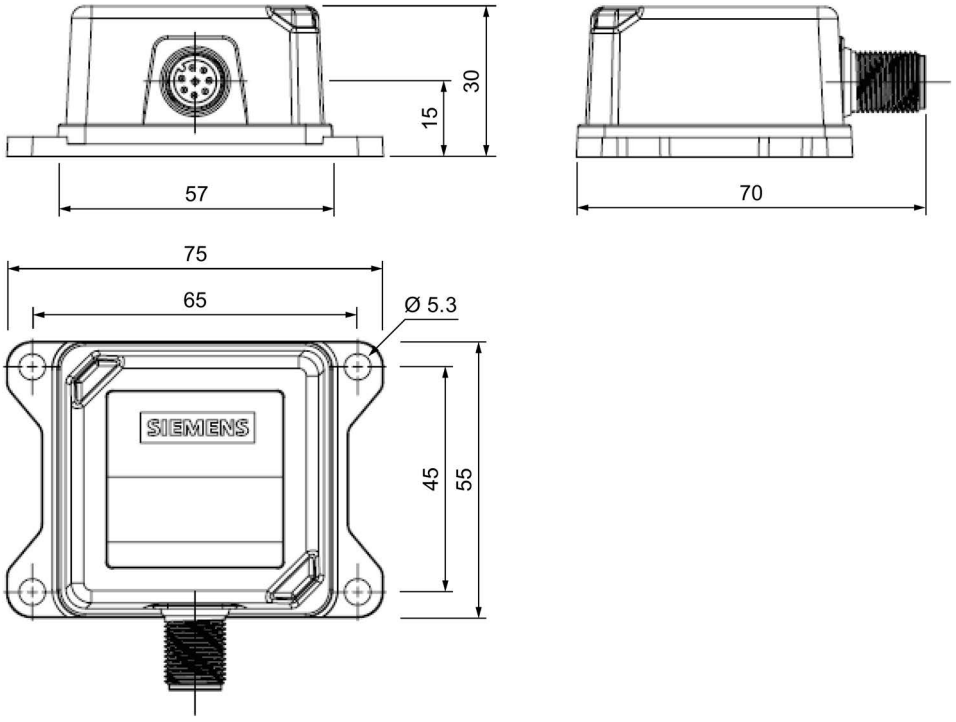


Figure 5-12 Dimension drawing for RF310R

Dimensions in mm

5.3.11 Using the reader in hazardous area

⚠ WARNING

Explosion hazard

In a flammable or combustible environment, no cables may be connected to or disconnected from the device.

ATEX

The SIMATIC Ident products meet the requirements of explosion protection acc. to ATEX. The products meet the requirements of the standards:

Document	Title
EN 60079-0	Hazardous areas Part 0: Equipment - General requirements
EN 60079-7	Hazardous areas Part 7: Equipment protection by increased safety "e"
EN 60079-31	Potentially explosive atmosphere Part 31: Equipment dust ignition protection by enclosure "t"

You will find the current versions of the standards in the currently valid ATEX certificates.

ATEX mark

NOTICE
Validity only when the devices are marked
There is a corresponding approval only with devices to which the Ex mark is applied.

The identification of the electrical equipment as an enclosed unit is:

II 3 G Ex ec IIB T5 Gc
II 3 D Ex tc IIIC T80°C Dc

-25 °C ... +70 °C
U_n = 24 VDC

The equipment also has the following additional information:

XXXYYYZZZ [= serial number, is assigned during production]
DEMKO 16 ATEX 1767 X [= certificate number]

IECEx

The SIMATIC Ident products meet the requirements of explosion protection acc. to IECEx. The products meet the requirements of the standards:

Document	Title
IEC 60079-0	Hazardous areas Part 0: Equipment - General requirements
IEC 60079-7	Hazardous areas Part 7: Equipment protection by increased safety "e"
IEC 60079-31	Potentially explosive atmosphere Part 31: Equipment dust ignition protection by enclosure "t"

You will find the current versions of the standards in the currently valid IECEx certificates.

IECEx mark

NOTICE
Validity only when the devices are marked
There is a corresponding approval only with devices to which the IECEx mark is applied.

The identification of the electrical equipment as an enclosed unit is:

II 3 G Ex ec IIB T5 Gc
II 3 D Ex tc IIIC T80°C Dc
-25 °C ... +70 °C
U_n= 24 VDC

The equipment also has the following additional information:

XXXYYYZZZ [= serial number, is assigned during production]
IECEx ULD 16.0031 X [= certificate number]

UL HAZ. LOC.

The SIMATIC Ident products meet the requirements of explosion protection acc. to UL HAZ. LOC. The products meet the requirements of the standards:

Document	Title
UL 60079-0	Hazardous areas Part 0: Equipment - General requirements
CSA C22.2 NO. 60079-0	
UL 60079-7	Hazardous areas Part 7: Equipment protection by increased safety "e"
CSA C22.2 NO. 60079-7	
UL 60079-31	Potentially explosive atmosphere Part 31: Equipment dust ignition protection by enclosure "t"
CSA C22.2 NO. 60079-31	

You will find the current versions of the standards in the currently valid UL HAZ. LOC. certificates

UL HAZ. LOC. mark

NOTICE
Validity only when the devices are marked There is a corresponding approval only with devices to which the UL HAZ. LOC. mark is applied.

The identification of the electrical equipment as an enclosed unit is:

E223122
IND.CONT.EQ FOR HAZ.LOC.
CL.I, DIV.2, GP.C,D T4
CL.II, DIV.2, GP.F,G T80°C
AEx ec IIB T4, Ex ec IIB T4
AEx tc IIIC T80°C, Ex tc IIIC T80°C

-25 °C ... +70 °C

U_n= 24 VDC

The equipment also has the following additional information:

XXXYYYZZZ [= serial number, is assigned during production]

5.3.11.1 Using the reader in hazardous area for gases

The temperature class of the reader for hazardous areas depends on the ambient temperature range:

Ambient temperature range	Temperature class
-25 ℃ to +70 ℃	T5

⚠ WARNING
Ignitions of gas-air mixtures When using the reader, check to make sure that the temperature class is adhered to in keeping with the requirements of the area of application Non-compliance with the permitted temperature ranges while using the reader can lead to ignitions of gas-air mixtures.

5.3.11.2 Using the reader in hazardous area for dust

The equipment is suitable for dusts whose ignition temperatures for a dust layer of 5 mm are higher than 80 °C (smoldering temperature).

Ambient temperature range	Temperature value
-25 °C < Ta < +70 °C	T80 °C

⚠ WARNING

Ignitions of dust-air mixtures

When using the reader, check to make sure that the temperature values are adhered to in keeping with the requirements of the area of application. Non-compliance with the permitted temperature range while using the reader can lead to ignitions of dust-air mixtures.

5.3.11.3 Installation and operating conditions for hazardous areas:

NOTICE

Risk of explosion

Risk of explosion of dust-air mixtures or gas-air mixtures and the device can be damaged. Note the following conditions when installing and operating the device in a hazardous area:

- Making and breaking of circuits is permitted only in a de-energized state.
- The maximum surface temperature, corresponding to the marking, applies only for operation without a cover of dust.
- The device may only be operated in such a way that adequate protection against UV light is ensured.
- The device may not be operated in areas influenced by processes that generate high electrostatic charges.
- The device must be installed so that it is mechanically protected.
- The grounding of the plug (8-pin) on the reader must be via its supply cable.
- The device may only be operated with accessories specified or supplied by the manufacturer. All the points above also apply to the accessories (cables and connectors) and to the antennas (exception: the housing of ANT 1 does not need to be installed with impact protection).
- The device sockets incl. the metal parts of the connecting cable must have a shrink-on sleeve pulled over them, in other words, all metal parts apart from the securing sockets of the housing must be fully covered and be inaccessible.
- After disconnecting the connections (antenna cable, signal/supply cable), before the plugs are inserted again, they must be checked for contamination and if necessary cleaned.

5.4 SIMATIC RF340R/RF350R

5.4.1 SIMATIC RF340R

5.4.1.1 Features

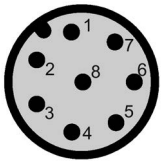
SIMATIC RF340R	Characteristics	
	Design	① RS-422 interface ② Status display
	Area of application	Identification tasks on assembly lines in harsh industrial environments

5.4.1.2 Ordering data for RF340R

Table 5- 11 Ordering data for RF340R

	Article number
RF340R with RS-422 interface (3964R)	6GT2801-2AB10

5.4.1.3 Pin assignment of RF340R 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	Earth (shield)

5.4.1.4 LED operating display

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

Table 5- 12 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
■	• Operating mode "with presence": Transponder present • Operating mode "without presence": Transponder present and command currently being executed
■	There is an error. The number of flashes provides information about the current error. You will find more information on error messages in the section "System diagnostics (Page 399)".

5.4.1.5 Ensuring reliable data exchange

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

5.4.1.6 Metal-free area

The RF340R can be flush-mounted in metal. Please allow for a possible reduction in the field data values.

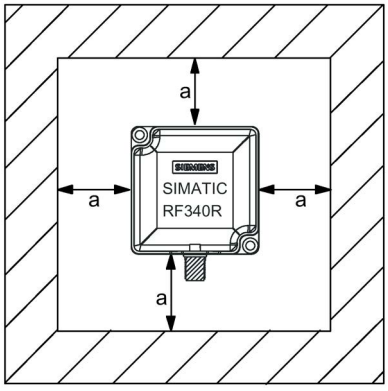
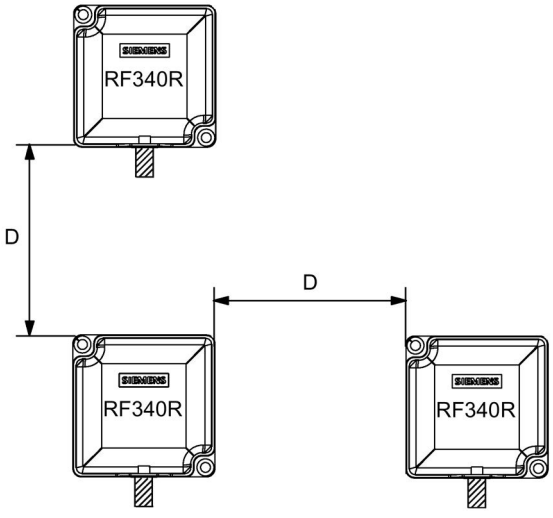


Figure 5-13 Metal-free area for RF340R

To avoid any impact on the field data, the distance a should be ≥ 20 mm.

5.4.1.7 Minimum distance between RF340R readers

RF340R side by side

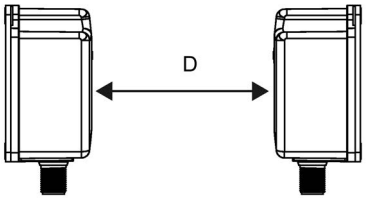


D ≥ 200 mm (with 2 readers)

D ≥ 250 mm (with more than 2 readers)

Figure 5-14 Minimum distance between RF340R readers

RF340R face-of-face



D ≥ 500 mm

Figure 5-15 Face-of-face distance between two RF340Rs

5.4.1.8 Technical specifications

Table 5- 13 Technical specifications of the RF340R reader

		6GT2801-2AB10
Product type designation	SIMATIC RF340R	
Radio frequencies		
Operating frequency, rated value	13.56 MHz	
Electrical data		
Maximum range	140 mm	
Maximum data transmission speed reader ↔ transponder	RF300 transponder	ISO transponder
• Read	• approx. 8000 bytes/s	• approx. 1500 bytes/s
• Write	• approx. 8000 bytes/s	• approx. 1500 bytes/s
Transmission speed	19.2, 57.6, 115.2 kBd	
Read/write distances of the reader	See section "Field data for transponders, readers and antennas (Page 48)."	
MTBF (Mean Time Between Failures)	140 years	
Interfaces		
Electrical connector design	M12, 8-pin	
Standard for interfaces for communication	RS-422 (3964R protocol)	
Antenna	integrated	

	6GT2801-2AB10
Mechanical specifications	
Housing	
• Material	• Plastic PA 12
• Color	• Anthracite
Recommended distance to metal	0 mm
Supply voltage, current consumption, power loss	
Supply voltage	24 VDC
Typical current consumption	100 mA
Permitted ambient conditions	
Ambient temperature	
• During operation	• -25 to +70 ℃
• During transportation and storage	• -40 to +85 ℃
Degree of protection to EN 60529	IP67
Shock-resistant to EN 60721-3-7, Class 7 M3	50 g
Vibration-resistant to EN 60721-3-7, Class 7 M3	20 g
Torsion and bending load	Not permitted
Design, dimensions and weight	
Dimensions (L x W x H)	75 x 75 x 41 mm
Weight	250 g
Type of mounting	2 x M5 screws; 1.5 Nm
Cable length for RS-422 interface, maximum	1000 m
LED display design	3-color LED
Standards, specifications, approvals	
Proof of suitability	Radio to R&TTE directives EN 300330, EN 301489, CE, FCC, UL/CSA, Ex approval

5.4.1.9 Approvals

FCC information

Siemens SIMATIC RF340R (MLFB 6GT2801-2AA10); FCC ID NXW-RF340R

Siemens SIMATIC RF340R (MLFB 6GT2801-2AB10); FCC ID NXW-RF340R01

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.

5.4.1.10 Dimension drawing

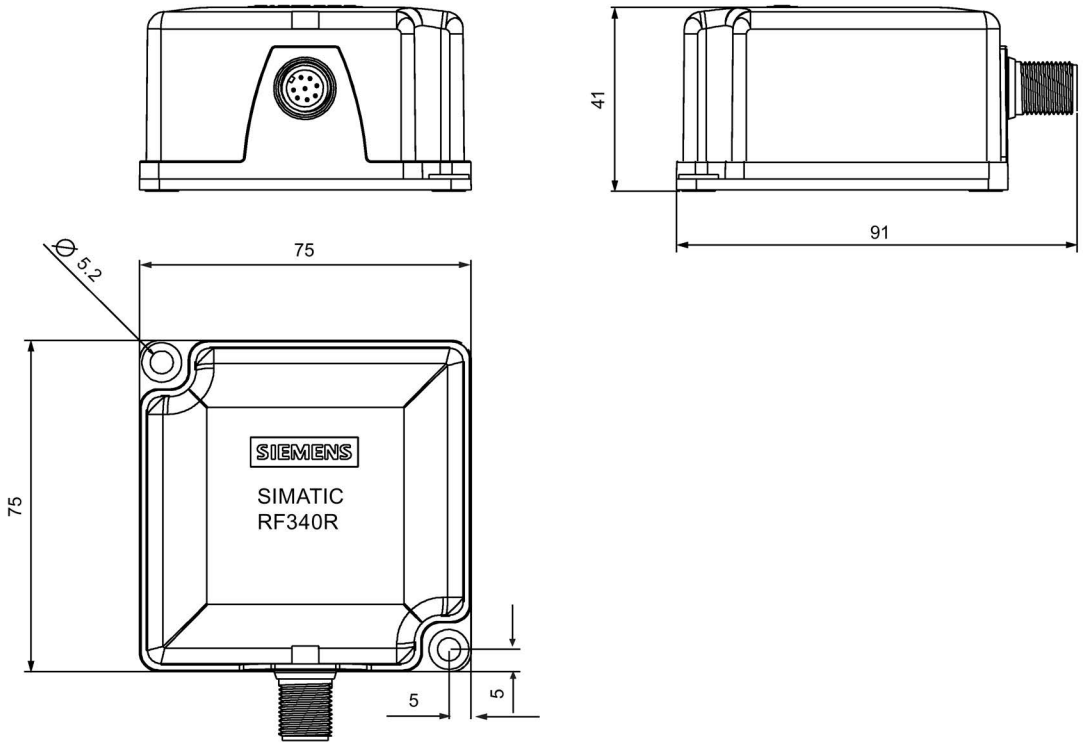


Figure 5-16 Dimension drawing for RF340R

Dimensions in mm

5.4.2 SIMATIC RF350R

5.4.2.1 Features

SIMATIC RF350R	Characteristics	
	Design	① Antenna connection ② RS-422 interface ③ Status display
	Area of application	Identification tasks in assembly lines in harsh industrial environments; for external antennas (ANT 1, ANT 3, ANT 12, ANT 18, ANT 30)

Note

Reader requires external antennas

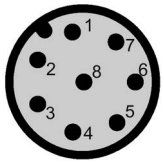
Note that the RF350R reader is designed only for operation with external antennas and only works in conjunction with the antennas ANT 1, ANT 3, ANT 12, ANT 18 or ANT 30.

5.4.2.2 Ordering data for RF350R

Table 5- 14 Ordering data for RF350R

	Article number
RF350R with RS-422 interface (3964R)	6GT2801-4AB10

5.4.2.3 Pin assignment of RF350R 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	Earth (shield)

5.4.2.4 LED operating display

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

Table 5- 15 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
	• Operating mode "with presence": Transponder present • Operating mode "without presence": Transponder present and command currently being executed
	There is an error. The number of flashes provides information about the current error. You will find more information on error messages in the section "System diagnostics (Page 399)".

5.4.2.5 Ensuring reliable data exchange

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

5.4.2.6 Metal-free area

The RF350R reader does not have an internal antenna. Operation is not affected by mounting on metal or flush-mounting in metal. For information about the metal-free area required by the external antennas, refer to the corresponding section of the chapter Auto-Hotspot.

5.4.2.7 Technical specifications

Table 5- 16 Technical specifications of the RF350R reader

		6GT2801-4AB10
Product type designation	SIMATIC RF350R	
Radio frequencies		
Operating frequency, rated value	13.56 MHz	
Electrical data		
Maximum range		
• ANT 1	• 140 mm	
• ANT 3 / ANT 3 S	• 50 mm / 20 mm	
• ANT 12	• 16 mm	
• ANT 18	• 35 mm	
• ANT 30	• 55 mm	
Maximum data transmission speed reader ↔ transponder	RF300 transponder	ISO transponder
• Read	• approx. 8000 bytes/s	• approx. 1500 bytes/s
• Write	• approx. 8000 bytes/s	• approx. 1500 bytes/s
Transmission speed	19.2, 57.6, 115.2 kBd	
Read/write distances of the reader	See section "Field data for transponders, readers and antennas (Page 48)."	
MTBF (Mean Time Between Failures)	140 years	
Interfaces		
Electrical connector design	M12, 8-pin	
Antenna connector design	M8, 4-pin	
Standard for interfaces for communication	RS-422 (3964R protocol)	
Antenna	External, antennas ANT 1, ANT 3, ANT 12, ANT 18 or ANT 30	
Mechanical specifications		
Housing		
• Material	• Plastic PA 12	
• Color	• Anthracite	
Recommended distance to metal	0 mm	

	6GT2801-4AB10
Supply voltage, current consumption, power loss	
Supply voltage	24 VDC
Typical current consumption	100 mA
Permitted ambient conditions	
Ambient temperature	
• During operation	• -25 to +70 °C
• During transportation and storage	• -40 to +85 °C
Degree of protection to EN 60529	IP65
Shock-resistant to EN 60721-3-7, Class 7 M3	50 g
Vibration-resistant to EN 60721-3-7, Class 7 M3	20 g
Torsion and bending load	Not permitted
Design, dimensions and weight	
Dimensions (L x W x H)	75 x 75 x 41 mm
Weight	250 g
Type of mounting	2 x M5 screws; 1.5 Nm
Cable length for RS-422 interface, maximum	1000 m
LED display design	3-color LED
Standards, specifications, approvals	
Proof of suitability	Radio to R&TTE directives EN 300330, EN 301489, CE, FCC, UL/CSA, Ex approval

5.4.2.8 Approvals

FCC information

Siemens SIMATIC RF350R (MLFB 6GT2801-4AA10); FCC ID NXW-RF350R

Siemens SIMATIC RF350R (MLFB 6GT2801-4AB10); FCC ID NXW-RF350R01

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.

5.4.2.9 Dimension drawing

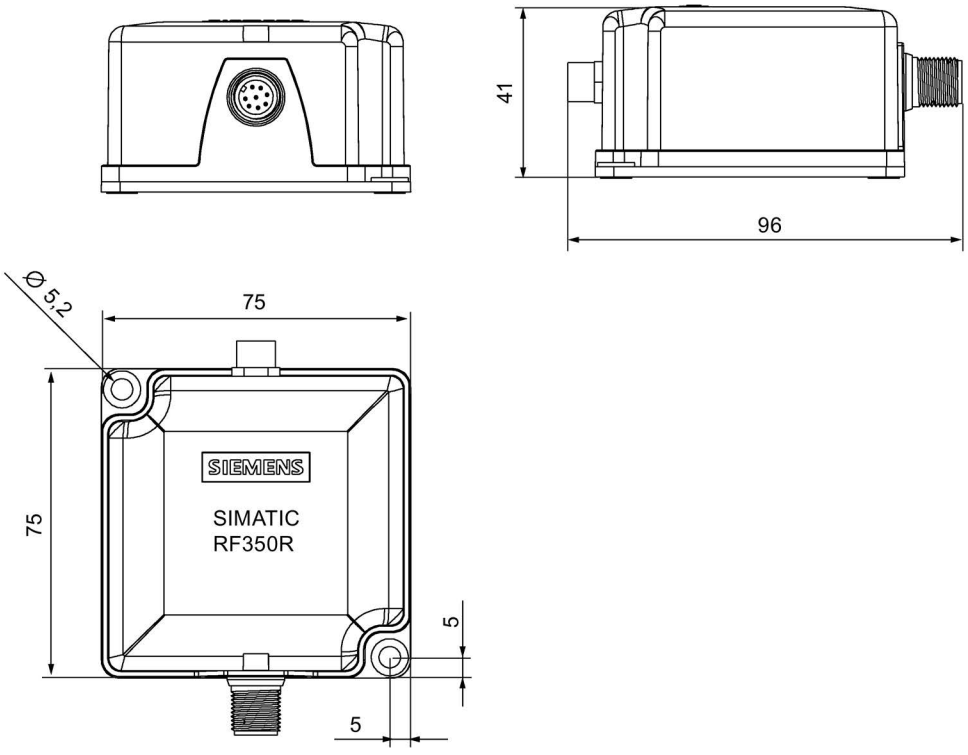


Figure 5-17 RF350R dimension drawing

Dimensions in mm

5.4.3 Use of the reader in hazardous areas

TÜV NORD CERT GmbH as accredited test center and certification body, no. 0044 as per Article 9 of the Directive 94/9/EC of the European Council of 23 March 1994, has confirmed the compliance with the essential health and safety requirements relating to the design and construction of equipment and protective systems intended for use in hazardous areas as per Annex II of the Directive. The essential health and safety requirements are satisfied in accordance with the following standards:

Document	Title
EN 60079-0: 2006	Electrical equipment for hazardous gas atmospheres - Part 0: General requirements
EN 60079-15: 2005	Electrical equipment for hazardous gas atmospheres - Part 15: Design, testing and identification of electrical equipment with type of protection "n"
IEC 61241 -0: 2006	Electrical apparatus for use in the presence of combustible dust - Part 0: General requirements
IEC 61241 -1: 2004	Electrical apparatus for use in the presence of combustible dust - Part 1: Protection through enclosure

⚠ WARNING

EXPLOSION HAZARD

DO NOT CONNECT OR DISCONNECT EQUIPMENT WHEN A FLAMMABLE OR COMBUSTIBLE ATMOSPHERE IS PRESENT.

Identification

The identification of the electrical equipment as an enclosed unit is:

II 3 G Ex nA nC IIB T5
II 3 D Ex tD A22 IP6x T80 °C

-25 °C to +70 °C

U_n = 20 to 30 VDC

The equipment also has the following additional markings:

XXXYYYZZZ	[= serial number, is assigned during production]
TÜV 10 ATEX 556039	[= certificate number]

5.4.3.1 Use of the readers in hazardous areas for gases

Temperature class delineation for gases

The temperature class of the reader for hazardous areas depends on the ambient temperature range:

Ambient temperature range	Temperature class
-25 °C to +70 °C	T5

⚠ WARNING

Ignitions of gas-air mixtures

When using the RF340R/RF350R readers, check to ensure that the temperature class is observed in respect of the requirements of the area of application.

Non-compliance with the permitted temperature ranges while using the reader can lead to ignitions of gas-air mixtures.

5.4.3.2 Use of the readers in hazardous areas for dusts

The equipment is suitable for dusts whose ignition temperatures for a dust layer of 5 mm are higher than 80 °C (smoldering temperature). With the ignition temperature according to type of protection iD specified here in compliance with IEC 61241-0 and IEC 61241-11, the smoldering temperature of the dust layer is referenced in this case.

Temperature class delineation for dusts

Ambient temperature range	Temperature value
-25 °C < Ta < +70 °C	T80 °C

⚠ WARNING

Ignitions of dust-air mixtures

When using the RF340R/RF350R readers, check to ensure that the temperature values are observed in respect of the requirements of the area of application.

Non-compliance with the permitted temperature ranges while using the reader can lead to ignitions of dust-air mixtures.

5.4.3.3 Installation and operating conditions for the hazardous area

NOTICE

Device may be damaged

Note the following conditions when installing and operating the device in a hazardous zone to avoid damage:

- Making and breaking of circuits is permitted only in a de-energized state.
- The maximum surface temperature, corresponding to the marking, applies only for operation without a cover of dust.
- The device may only be operated in such a way that adequate protection against UV light is ensured.
- The device may not be operated in areas influenced by processes that generate high electrostatic charges.
- The equipment must be installed so that it is mechanically protected.
- The device sockets must be protected with a shrink-on tube.
- The 8 pin connector must be grounded via its supply line.
- The device may only be operated with accessories specified or supplied by the manufacturer. All the points above also apply to the accessories (cables and connectors) and to the antennas (exception: the housing of antenna 1 does not need to be installed with impact protection).

5.5 SIMATIC RF340R/RF350R - second generation

5.5.1 SIMATIC RF340R - second generation

5.5.1.1 Features

SIMATIC RF340R	Characteristics	
	Design	① RS-422 interface ② LED operating display
	Area of application	Identification tasks on assembly lines in harsh industrial environments

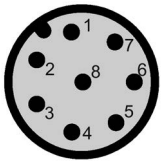
5.5.1.2 Ordering data

Table 5- 17 Ordering data for RF340R

	Article number
RF340R with RS-422 interface (3964R)	6GT2801-2BA10

5.5.1.3 Pin assignment of the RS-422 interface

Table 5- 18 Pin assignment

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	Earth (shield)

5.5.1.4 LED operating display

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

Table 5- 19 Display elements

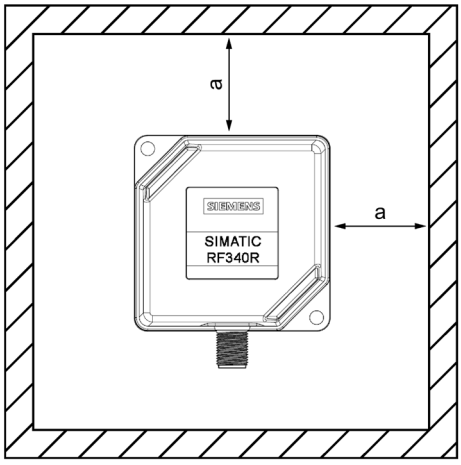
LED	Meaning
	The reader is turned off.
	The reader is turned on and is searching for transponders. The reader is in the "Setup" mode, in the "Search for transponders" status and has not yet received a "RESET" command and is not ready.
/	There is transponder in the antenna field. The reader is in the "Setup" mode, in the status "Show quality", has not yet received a "RESET" command and is not ready. Depending on the signal strength, the LED flickers or is lit permanently.
	The reader has received a "RESET" command.
	The reader is turned on, the antenna is turned off.
	• Operating mode "with presence": Transponder present • Operating mode "without presence": Transponder present and command currently being executed
	There is an error. The number of flashes provides information about the current error. You will find more information on error messages in the section "System diagnostics (Page 399)".

5.5.1.5 Ensuring reliable data exchange

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

5.5.1.6 Metal-free area

The RF340R can be flush-mounted in metal. Allow for a possible reduction in the field data. To avoid any influence on the field data, the distance "a" should be kept to.

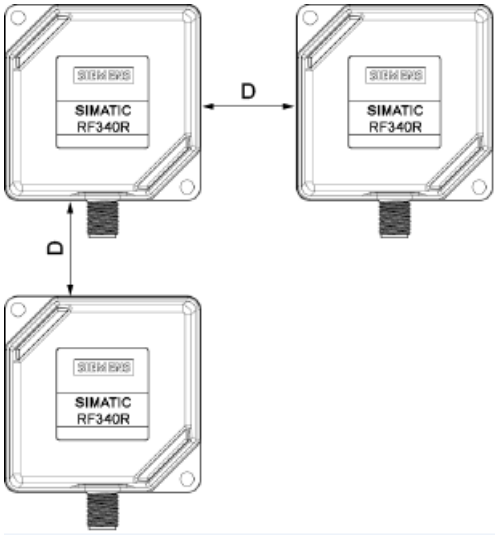


a ≥ 20 mm

Figure 5-18 Metal-free area for RF340R

5.5.1.7 Minimum distance between RF340R readers

RF340R side by side

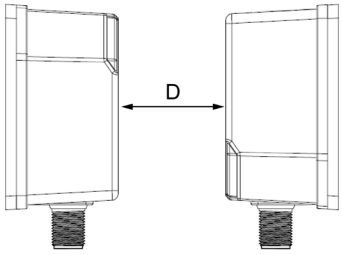


D ≥ 350 mm (with 2 readers)

D ≥ 500 mm (with more than 2 readers)

Figure 5-19 Minimum distance between RF340R readers

RF340R face-of-face



D ≥ 500 mm

Figure 5-20 Face-of-face distance between two RF340Rs

5.5.1.8 Technical specifications

Table 5- 20 Technical specifications of the RF340R reader

	6GT2801-2BA10		
Product type designation	SIMATIC RF340R		
Radio frequencies			
Operating frequency, rated value	13.56 MHz		
Electrical data			
Maximum range	140 mm		
Maximum data transmission speed reader ↔ transponder	RF300 transponder	ISO transponder (MDS D)	ISO transponder (MDS E)
• Read	• ≤ 8000 bytes/s	• ≤ 3300 bytes/s	• ≤ 3400 bytes/s
• Write	• ≤ 8000 bytes/s	• ≤ 1700 bytes/s	• ≤ 800 bytes/s
Transmission speed	19.2, 57.6, 115.2 kBd		
Read/write distances of the reader	See section "Field data for transponders, readers and antennas (Page 48)."		
MTBF (Mean Time Between Failures)	260 years		
Interfaces			
Electrical connector design	M12, 8-pin		
Standard for interfaces for communication	RS-422 (3964R protocol)		
Antenna	integrated		

	6GT2801-2BA10
Mechanical specifications	
Housing	
• Material	• Plastic PA 12
• Color	• TI-Grey
Recommended distance to metal	0 mm
Supply voltage, current consumption, power loss	
Supply voltage	24 VDC
Typical current consumption	60 mA
Permitted ambient conditions	
Ambient temperature	
• During operation	• -25 to +70 °C
• During transportation and storage	• -40 to +85 °C
Degree of protection to EN 60529	IP67
Shock-resistant to EN 60721-3-7, Class 7 M3	50 g
Vibration-resistant to EN 60721-3-7, Class 7 M3	20 g
Torsion and bending load	Not permitted
Design, dimensions and weight	
Dimensions (L x W x H)	75 x 75 x 41 mm
Weight	210 g
Type of mounting	2 x M5 screws; 1.5 Nm
Cable length for RS-422 interface, maximum	1000 m
LED display design	2 LEDs, 5 colors
Standards, specifications, approvals	
Proof of suitability	Radio to R&TTE directives EN 300330, EN 301489, CE, FCC, UL/CSA (IEC 61010), Ex approval

5.5.1.9 Approvals

FCC information

Siemens SIMATIC RF340R (MLFB 6GT2801-2BA10); FCC ID NXW-RF340R02

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

(1) This device may not cause harmful interference, and

(2) this device must accept any interference received, including interference that may cause undesired operation.

Caution

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

Note

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

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

IC information

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

(1) This device may not cause interference, and

(2) this device must accept any interference, including interference that may cause undesired operation of the device.

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

(1) L`appareil ne doit pas produire de brouillage, et

(2) l'utilisateur de l`appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d`en compromettre le fonctionnement.

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

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

- a) indoor use;
- b) altitude up to 2 000 m;
- c) temperature -25 °C to 70 °C;
- d) maximum relative humidity 80 % for temperature up to 31 °C decreasing linearly to 50 % relative humidity at 40 °C;
- e) TRANSIENT OVERVALTAGES up to the levels of OVERVALTAGE CATEGORY II, NOTE 1: These levels of transient overvoltage are typical for equipment supplied from the building wiring.
- f) using a "NEC Class 2" power supply is required
- g) the device is categorized as pollution degree 3/4

5.5.1.10 Dimension drawing

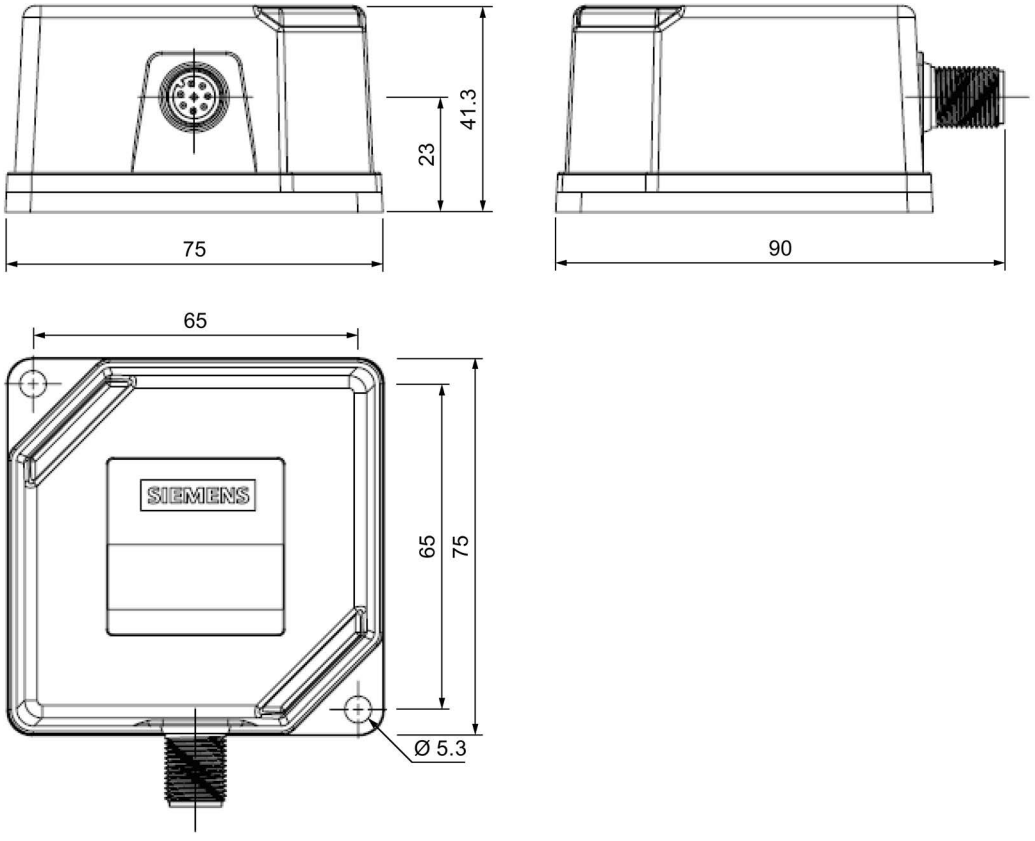


Figure 5-21 Dimension drawing for RF340R

Dimensions in mm

5.5.2 SIMATIC RF350R - second generation

5.5.2.1 Features

SIMATIC RF350R	Characteristics	
	Design	① Antenna connection ② RS-422 interface ③ LED operating display
	Area of application	Identification tasks in assembly lines in harsh industrial environments; for external antennas (ANT 1, ANT 3, ANT 12, ANT 18, ANT 30)

Note

Reader requires external antennas

Note that the RF350R reader is designed only for operation with external antennas and only works in conjunction with the antennas ANT 1, ANT 3, ANT 12, ANT 18 or ANT 30.

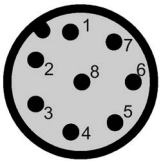
5.5.2.2 Ordering data

Table 5- 21 Ordering data for RF350R

	Article number
RF350R with RS-422 interface (3964R)	6GT2801-4BA10

5.5.2.3 Pin assignment of the RS-422 interface

Table 5- 22 Pin assignment

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	Earth (shield)

5.5.2.4 LED operating display

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

Table 5- 23 Display elements

LED	Meaning
	The reader is turned off.
	The reader is turned on and is searching for transponders. The reader is in the "Setup" mode, in the "Search for transponders" status and has not yet received a "RESET" command and is not ready.
/	There is transponder in the antenna field. The reader is in the "Setup" mode, in the status "Show quality", has not yet received a "RESET" command and is not ready. Depending on the signal strength, the LED flickers or is lit permanently.
	The reader has received a "RESET" command.
	The reader is turned on, the antenna is turned off.
	• Operating mode "with presence": Transponder present • Operating mode "without presence": Transponder present and command currently being executed
	There is an error. The number of flashes provides information about the current error. You will find more information on error messages in the section "System diagnostics (Page 399)".

5.5.2.5 Ensuring reliable data exchange

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

5.5.2.6 Metal-free area

The RF350R reader does not have an internal antenna. Operation is not affected by mounting on metal or flush-mounting in metal. For information about the metal-free area required by the external antennas, refer to the corresponding section of the chapter "Antennas (Page 203)".

5.5.2.7 Technical specifications

Table 5- 24 Technical specifications of the RF350R reader

	6GT2801-4BA10		
Product type designation	SIMATIC RF350R		
Radio frequencies			
Operating frequency, rated value	13.56 MHz		
Electrical data			
Maximum range			
• ANT 1	• 140 mm		
• ANT 3	• 50 mm		
• ANT 12	• 16 mm		
• ANT 18	• 35 mm		
• ANT 30	• 55 mm		
Maximum data transmission speed reader ↔ transponder	RF300 transponder	ISO transponder (MDS D)	ISO transponder (MDS E)
• Read	• ≤ 8000 bytes/s	• ≤ 3300 bytes/s	• ≤ 3400 bytes/s
• Write	• ≤ 8000 bytes/s	• ≤ 1700 bytes/s	• ≤ 800 bytes/s
Transmission speed	19.2, 57.6, 115.2 kBd		
Read/write distances of the reader	See section "Field data for transponders, readers and antennas (Page 48)."		
MTBF (Mean Time Between Failures)	260 years		
Interfaces			
Electrical connector design	M12, 8-pin		
Antenna connector design	M8, 4-pin		
Standard for interfaces for communication	RS-422 (3964R protocol)		
Antenna	External, antennas ANT 1, ANT 3, ANT 12, ANT 18 or ANT 30		

	6GT2801-4BA10
Mechanical specifications	
Housing	
• Material	• Plastic PA 12
• Color	• TI-Grey
Recommended distance to metal	0 mm
Supply voltage, current consumption, power loss	
Supply voltage	24 VDC
Typical current consumption	60 mA
Permitted ambient conditions	
Ambient temperature	
• During operation	• -25 to +70 °C
• During transportation and storage	• -40 to +85 °C
Degree of protection to EN 60529	IP65
Shock-resistant to EN 60721-3-7, Class 7 M3	50 g
Vibration-resistant to EN 60721-3-7, Class 7 M3	20 g
Torsion and bending load	Not permitted
Design, dimensions and weight	
Dimensions (L x W x H)	75 x 75 x 41 mm
Weight	250 g
Type of mounting	2 x M5 screws; 1.5 Nm
Cable length for RS-422 interface, maximum	1000 m
LED display design	2 LEDs, 5 colors
Standards, specifications, approvals	
Proof of suitability	Radio to R&TTE directives EN 300330, EN 301489, CE, FCC, UL/CSA (IEC 61010), Ex approval

5.5.2.8 Approvals

FCC information

Siemens SIMATIC RF350R (MLFB 6GT2801-4BA10); FCC ID NXW-RF350R02

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

(1) This device may not cause harmful interference, and

(2) this device must accept any interference received, including interference that may cause undesired operation.

Caution

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

Note

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

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

IC information

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

(1) This device may not cause interference, and

(2) this device must accept any interference, including interference that may cause undesired operation of the device.

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

(1) L`appareil ne doit pas produire de brouillage, et

(2) l'utilisateur de l`appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d`en compromettre le fonctionnement.

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

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

- a) indoor use;
- b) altitude up to 2 000 m;

- c) temperature -25 °C to 70 °C;
- d) maximum relative humidity 80 % for temperature up to 31 °C decreasing linearly to 50 % relative humidity at 40 °C;
- e) TRANSIENT OVERVALTAGES up to the levels of OVERVALTAGE CATEGORY II, NOTE 1: These levels of transient overvoltage are typical for equipment supplied from the building wiring.
- f) using a "NEC Class 2" power supply is required
- g) the device is categorized as pollution degree 3/4

5.5.2.9 Dimension drawing

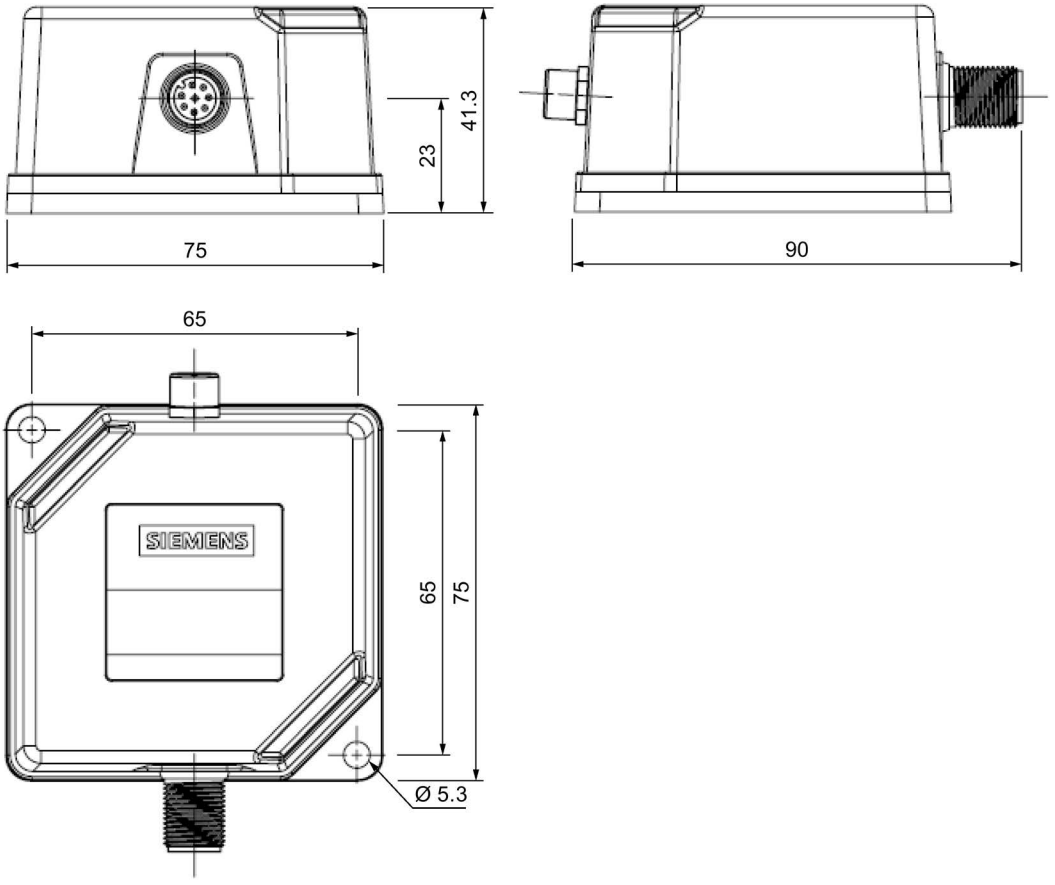


Figure 5-22 RF350R dimension drawing

Dimensions in mm

5.5.3 Using the readers in a hazardous area

WARNING
Explosion hazard In a flammable or combustible environment, no cables may be connected to or disconnected from the device.

ATEX

The SIMATIC Ident products meet the requirements of explosion protection acc. to ATEX. The products meet the requirements of the standards:

Document	Title
EN 60079-0	Hazardous areas Part 0: Equipment - General requirements
EN 60079-7	Hazardous areas Part 7: Equipment protection by increased safety "e"
EN 60079-31	Potentially explosive atmosphere Part 31: Equipment dust ignition protection by enclosure "t"

You will find the current versions of the standards in the currently valid ATEX certificates.

ATEX mark

NOTICE
Validity only when the devices are marked There is a corresponding approval only with devices to which the Ex mark is applied.

The identification of the electrical equipment as an enclosed unit is:

II 3 G Ex ec IIB T5 Gc
II 3 D Ex tc IIIC T80°C Dc

-25 °C ... +70 °C
U_n = 24 VDC

The equipment also has the following additional information:

XXXYYYZZZ [= serial number, is assigned during production]
DEMKO 16 ATEX 1767 X [= certificate number]

IECEx

The SIMATIC Ident products meet the requirements of explosion protection acc. to IECEx. The products meet the requirements of the standards:

Document	Title
IEC 60079-0	Hazardous areas Part 0: Equipment - General requirements
IEC 60079-7	Hazardous areas Part 7: Equipment protection by increased safety "e"
IEC 60079-31	Potentially explosive atmosphere Part 31: Equipment dust ignition protection by enclosure "t"

You will find the current versions of the standards in the currently valid IECEx certificates.

IECEx mark

NOTICE
Validity only when the devices are marked
There is a corresponding approval only with devices to which the IECEx mark is applied.

The identification of the electrical equipment as an enclosed unit is:

II 3 G Ex ec IIB T5 Gc
II 3 D Ex tc IIIC T80°C Dc
-25 °C ... +70 °C
U_n= 24 VDC

The equipment also has the following additional information:

XXXYYYZZZ	[= serial number, is assigned during production]
IECEx ULD 16.0031 X	[= certificate number]

UL HAZ. LOC.

The SIMATIC Ident products meet the requirements of explosion protection acc. to UL HAZ. LOC. The products meet the requirements of the standards:

Document	Title
UL 60079-0	Hazardous areas Part 0: Equipment - General requirements
CSA C22.2 NO. 60079-0	
UL 60079-7	Hazardous areas Part 7: Equipment protection by increased safety "e"
CSA C22.2 NO. 60079-7	
UL 60079-31	Potentially explosive atmosphere Part 31: Equipment dust ignition protection by enclosure "t"
CSA C22.2 NO. 60079-31	

You will find the current versions of the standards in the currently valid UL HAZ. LOC. certificates

UL HAZ. LOC. mark

NOTICE
Validity only when the devices are marked There is a corresponding approval only with devices to which the UL HAZ. LOC. mark is applied.

The identification of the electrical equipment as an enclosed unit is:

E223122
IND.CONT.EQ FOR HAZ.LOC.
CL.I, DIV.2, GP.C,D T4
CL.II, DIV.2, GP.F,G T80°C
AEx ec IIB T4, Ex ec IIB T4
AEx tc IIIC T80°C, Ex tc IIIC T80°C
-25 °C ... +70 °C
U_n= 24 VDC

The equipment also has the following additional information:

XXXYYYZZZ [= serial number, is assigned during production]

5.5.3.1 Using the reader in hazardous area for gases

The temperature class of the reader for hazardous areas depends on the ambient temperature range:

Ambient temperature range	Temperature class
-25 ℃ to +70 ℃	T5

⚠ WARNING
Ignitions of gas-air mixtures When using the reader, check to make sure that the temperature class is adhered to in keeping with the requirements of the area of application Non-compliance with the permitted temperature ranges while using the reader can lead to ignitions of gas-air mixtures.

5.5.3.2 Using the reader in hazardous area for dust

The equipment is suitable for dusts whose ignition temperatures for a dust layer of 5 mm are higher than 80 °C (smoldering temperature).

Ambient temperature range	Temperature value
-25 °C < Ta < +70 °C	T80 °C

⚠ WARNING

Ignitions of dust-air mixtures

When using the reader, check to make sure that the temperature values are adhered to in keeping with the requirements of the area of application. Non-compliance with the permitted temperature range while using the reader can lead to ignitions of dust-air mixtures.

5.5.3.3 Installation and operating conditions for hazardous areas:

NOTICE

Risk of explosion

Risk of explosion of dust-air mixtures or gas-air mixtures and the device can be damaged. Note the following conditions when installing and operating the device in a hazardous area:

- Making and breaking of circuits is permitted only in a de-energized state.
- The maximum surface temperature, corresponding to the marking, applies only for operation without a cover of dust.
- The device may only be operated in such a way that adequate protection against UV light is ensured.
- The device may not be operated in areas influenced by processes that generate high electrostatic charges.
- The device must be installed so that it is mechanically protected.
- The grounding of the plug (8-pin) on the reader must be via its supply cable.
- The device may only be operated with accessories specified or supplied by the manufacturer. All the points above also apply to the accessories (cables and connectors) and to the antennas (exception: the housing of ANT 1 does not need to be installed with impact protection).
- The device sockets incl. the metal parts of the connecting cable must have a shrink-on sleeve pulled over them, in other words, all metal parts apart from the securing sockets of the housing must be fully covered and be inaccessible.
- After disconnecting the connections (antenna cable, signal/supply cable), before the plugs are inserted again, they must be checked for contamination and if necessary cleaned.

5.6 SIMATIC RF380R

5.6.1 Features

SIMATIC RF380R	Characteristics	
	Design	① RS-232 or RS-422 interface ② Status display
	Area of application	Identification tasks on assembly lines in harsh industrial environments

5.6.2 RF380R ordering data

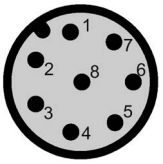
Table 5- 25 RF380R ordering data

	Article number
RF380R with RS-232/RS-422 interface (3964R)	6GT2801-3AB10

5.6.3 Pin assignment of RF380R RS-232/RS-422 interface

You can connect the RF380R reader to a higher-level system via the internal RS-422 interface or via the RS-232 interface. After connection, the interface module automatically detects which interface has been used.

Note correct assignment of the pins here:

Pin	Pin	Assignment	
	Device end 8-pin M12	RS-232	RS-422
	1	+ 24 V	+ 24 V
	2	RXD	- Transmit
	3	0 V	0 V
	4	TXD	+ Transmit
	5	not used	+ Receive
	6	not used	- Receive
	7	not used	not used
	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- 26 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
▣	• Operating mode "with presence": Transponder present • Operating mode "without presence": Transponder present and command currently being executed
▣	There is an error. The number of flashes provides information about the current error. You will find more information on error messages in the section "System diagnostics (Page 399)".

5.6.5 Ensuring reliable data exchange

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

5.6.6 Metal-free area

The RF380R can be flush-mounted in metal. Please allow for a possible reduction in the field data values.

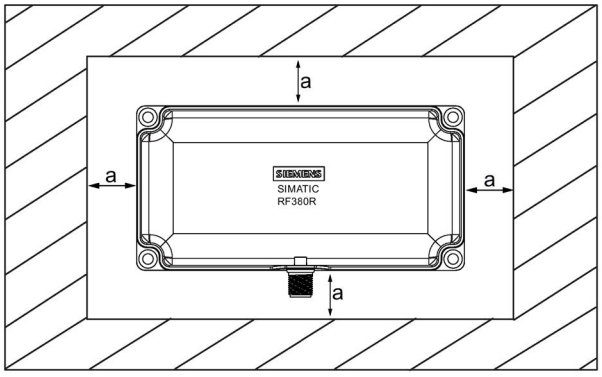
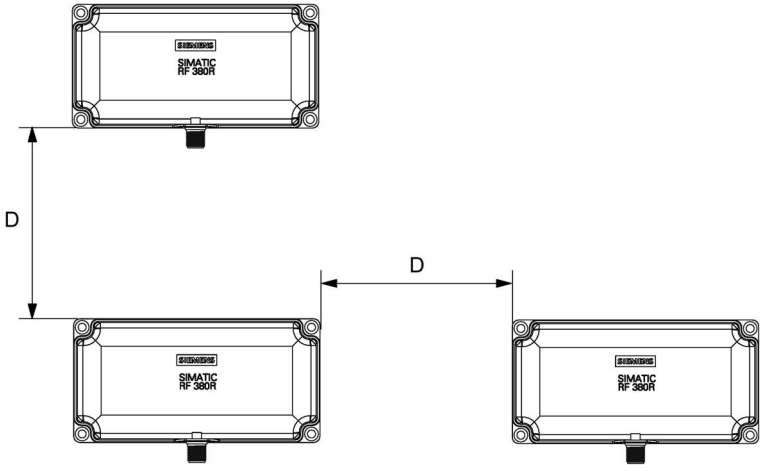


Figure 5-23 Metal-free area for RF380R

To avoid any impact on the field data, the distance a should be ≥ 20 mm.

5.6.7 Minimum distance between RF380R readers

RF380R side by side

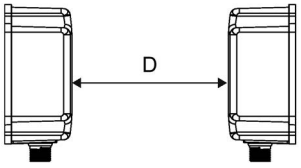


D ≥ 400 mm (with 2 readers)

D ≥ 500 mm (with more than 2 readers)

Figure 5-24 Minimum distance between RF380R readers

RF380R face-to-face



D ≥ 800 mm

Figure 5-25 Face-to-face distance between two RF380R

5.6.8 Technical specifications

Table 5- 27 Technical specifications of the RF380R reader

		6GT2801-3AB10
Product type designation	SIMATIC RF380R	
Radio frequencies		
Operating frequency, rated value	13.56 MHz	
Electrical data		
Maximum range	200 mm	
Maximum data transmission speed reader ↔ transponder	RF300 transponder	ISO transponder
• Read	• approx. 8000 bytes/s	• approx. 1500 bytes/s
• Write	• approx. 8000 bytes/s	• approx. 1500 bytes/s
Transmission speed	19.2, 57.6, 115.2 kBd	
Read/write distances of the reader	See section "Field data for transponders, readers and antennas (Page 48)."	
MTBF (Mean Time Between Failures)	109 years	
Interfaces		
Electrical connector design	M12, 8-pin	
Standard for interfaces for communication	RS-232/RS-422 (3964R protocol)	
Antenna	Integrated	

	6GT2801-3AB10	
Mechanical specifications		
Housing		
• Material	• Plastic PA 12	
• Color	• Anthracite	
Recommended distance to metal	0 mm	
Supply voltage, current consumption, power loss		
Supply voltage	24 VDC	
Typical current consumption	160 mA	
Permitted ambient conditions		
Ambient temperature		
• During operation	• -25 to +70 °C	
• During transportation and storage	• -40 to +85 °C	
Degree of protection to EN 60529	IP67	
Shock-resistant to EN 60721-3-7, Class 7 M3	50 g	
Vibration-resistant to EN 60721-3-7, Class 7 M3	20 g	
Torsion and bending load	Not permitted	
Design, dimensions and weight		
Dimensions (L x W x H)	160 x 80 x 41 mm	
Weight	600 g	
Type of mounting	4 x M5 screws; 1.5 Nm	
Cable length for RS-422 interface, maximum	RS-422	RS-232
	1000 m	30 m
LED display design	3-color LED	
Standards, specifications, approvals		
Proof of suitability	Radio in accordance with R&TTE directives EN 300330, EN 301489, CE, FCC, UL/CSA, Ex: II 3G Ex nC IIB T5	

5.6.9 Approvals

FCC information

Siemens SIMATIC RF380R (MLFB 6GT2801-3AA10); FCC ID NXW-RF380R

Siemens SIMATIC RF380R (MLFB 6GT2801-3AB10); FCC ID NXW-RF380R01

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.

5.6.10 Dimension drawing

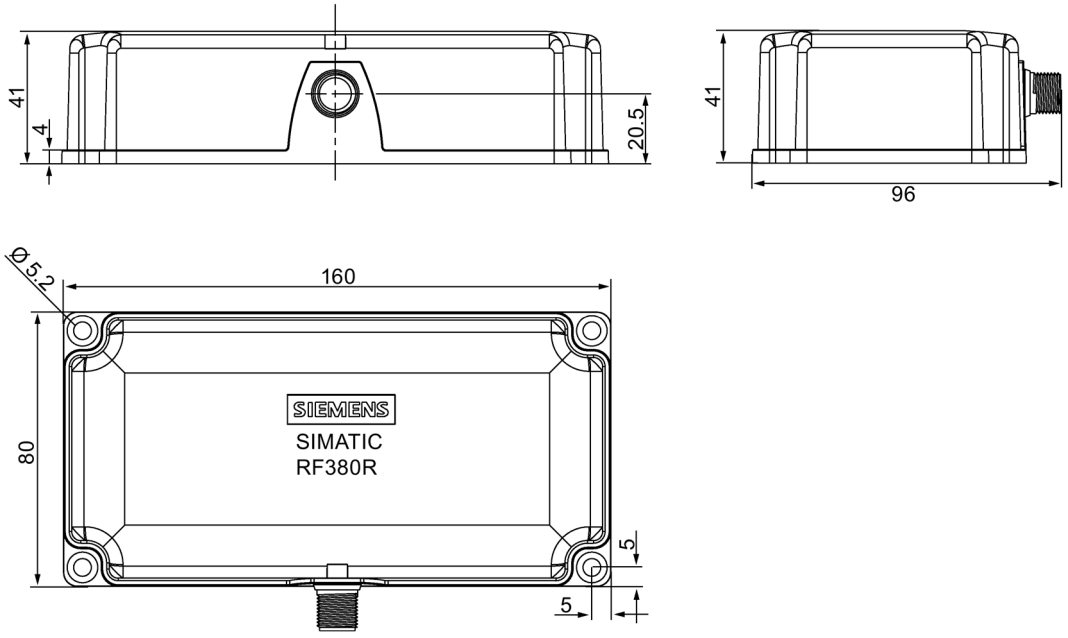


Figure 5-26 Dimension drawing RF380R

Dimensions in mm

5.6.11 Use of the reader in a hazardous

⚠ WARNING

Explosion hazard

In a flammable or combustible environment, no cables may be connected to or disconnected from the device.

ATEX

The SIMATIC Ident products meet the requirements of explosion protection acc. to ATEX. The products meet the requirements of the standards:

Document	Title
EN 60079-0	Hazardous areas Part 0: Equipment - General requirements
EN 60079-7	Hazardous areas Part 7: Equipment protection by increased safety "e"
EN 60079-31	Potentially explosive atmosphere Part 31: Equipment dust ignition protection by enclosure "t"

You will find the current versions of the standards in the currently valid ATEX certificates.

ATEX mark

NOTICE
Validity only when the devices are marked
There is a corresponding approval only with devices to which the Ex mark is applied.

The identification of the electrical equipment as an enclosed unit is:

II 3 G Ex ec IIB T5 Gc
II 3 D Ex tc IIIC T80°C Dc

-25 °C ... +70 °C
U_n = 24 VDC

The equipment also has the following additional information:

XXXYYYZZZ [= serial number, is assigned during production]
DEMKO 16 ATEX 1767 X [= certificate number]

IECEx

The SIMATIC Ident products meet the requirements of explosion protection acc. to IECEx. The products meet the requirements of the standards:

Document	Title
IEC 60079-0	Hazardous areas Part 0: Equipment - General requirements
IEC 60079-7	Hazardous areas Part 7: Equipment protection by increased safety "e"
IEC 60079-31	Potentially explosive atmosphere Part 31: Equipment dust ignition protection by enclosure "t"

You will find the current versions of the standards in the currently valid IECEx certificates.

IECEx mark

NOTICE
Validity only when the devices are marked
There is a corresponding approval only with devices to which the IECEx mark is applied.

The identification of the electrical equipment as an enclosed unit is:

II 3 G Ex ec IIB T5 Gc
II 3 D Ex tc IIIC T80°C Dc
-25 °C ... +70 °C
U_n= 24 VDC

The equipment also has the following additional information:

XXXYYYZZZ [= serial number, is assigned during production]
IECEx ULD 16.0031 X [= certificate number]

UL HAZ. LOC.

The SIMATIC Ident products meet the requirements of explosion protection acc. to UL HAZ. LOC. The products meet the requirements of the standards:

Document	Title
UL 60079-0	Hazardous areas Part 0: Equipment - General requirements
CSA C22.2 NO. 60079-0	
UL 60079-7	Hazardous areas Part 7: Equipment protection by increased safety "e"
CSA C22.2 NO. 60079-7	
UL 60079-31	Potentially explosive atmosphere Part 31: Equipment dust ignition protection by enclosure "t"
CSA C22.2 NO. 60079-31	

You will find the current versions of the standards in the currently valid UL HAZ. LOC. certificates

UL HAZ. LOC. mark

NOTICE
Validity only when the devices are marked There is a corresponding approval only with devices to which the UL HAZ. LOC. mark is applied.

The identification of the electrical equipment as an enclosed unit is:

E223122
IND.CONT.EQ FOR HAZ.LOC.
CL.I, DIV.2, GP.C,D T4
CL.II, DIV.2, GP.F,G T80°C
AEx ec IIB T4, Ex ec IIB T4
AEx tc IIIC T80°C, Ex tc IIIC T80°C

-25 °C ... +70 °C

U_n= 24 VDC

The equipment also has the following additional information:

XXXYYYZZZ [= serial number, is assigned during production]

5.6.11.1 Using the reader in hazardous area for gases

The temperature class of the reader for hazardous areas depends on the ambient temperature range:

Ambient temperature range	Temperature class
-25 ℃ to +70 ℃	T5

⚠ WARNING
Ignitions of gas-air mixtures When using the reader, check to make sure that the temperature class is adhered to in keeping with the requirements of the area of application Non-compliance with the permitted temperature ranges while using the reader can lead to ignitions of gas-air mixtures.

5.6.11.2 Using the reader in hazardous area for dust

The equipment is suitable for dusts whose ignition temperatures for a dust layer of 5 mm are higher than 80 °C (smoldering temperature).

Ambient temperature range	Temperature value
-25 °C < Ta < +70 °C	T80 °C

⚠ WARNING

Ignitions of dust-air mixtures

When using the reader, check to make sure that the temperature values are adhered to in keeping with the requirements of the area of application. Non-compliance with the permitted temperature range while using the reader can lead to ignitions of dust-air mixtures.

5.6.11.3 Installation and operating conditions for hazardous areas:

NOTICE

Risk of explosion

Risk of explosion of dust-air mixtures or gas-air mixtures and the device can be damaged. Note the following conditions when installing and operating the device in a hazardous area:

- Making and breaking of circuits is permitted only in a de-energized state.
- The maximum surface temperature, corresponding to the marking, applies only for operation without a cover of dust.
- The device may only be operated in such a way that adequate protection against UV light is ensured.
- The device may not be operated in areas influenced by processes that generate high electrostatic charges.
- The device must be installed so that it is mechanically protected.
- The grounding of the plug (8-pin) on the reader must be via its supply cable.
- The device may only be operated with accessories specified or supplied by the manufacturer. All the points above also apply to the accessories (cables and connectors) and to the antennas (exception: the housing of ANT 1 does not need to be installed with impact protection).
- The device sockets incl. the metal parts of the connecting cable must have a shrink-on sleeve pulled over them, in other words, all metal parts apart from the securing sockets of the housing must be fully covered and be inaccessible.
- After disconnecting the connections (antenna cable, signal/supply cable), before the plugs are inserted again, they must be checked for contamination and if necessary cleaned.

5.7 SIMATIC RF380R with Scanmode

You will find detailed information on the SIMATIC RF382R with Scanmode on the Industry Online Support - SIMATIC RF380R with Scanmode (https://support.industry.siemens.com/cs/ww/en/ps/15037).

5.7.1 Features

RF380R Scanmode	Characteristics	
	Design	① RS232 or RS422 interface ② Status display
	Field of application	Identification tasks on assembly lines in harsh industrial environments

5.7.2 Ordering data for RF380R with Scanmode

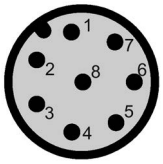
Table 5- 28 Ordering data RF380R Scanmode

Product	Article number
RF380R Scanmode	6GT2801-3AB20-0AX1

5.7.3 Pin assignment RF380R Scanmode RS-232 interface

You can connect the RF380R Scanmode reader via the internal RS-232/RS-422 interface to a higher-level system. (See section "Basic rules (Page 103)") Make sure that the pin assignment is correct. In the factory settings, the reader is set to RS-232. Siemens can change the interface to RS-422.

Table 5- 29 Connector and reader pin assignment

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

5.7.4 LED operating display

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

Table 5- 30 LED operating display on the reader

LED	Meaning
□	The reader is turned off.
■	Operating voltage present, reader ready for operation
■	• Operating mode "with presence": Transponder present • Operating mode "without presence": Transponder present and command currently being executed
■	There is an error. The number of flashes provides information about the current error. You will find more information on error messages in the section "System diagnostics (Page 399)".

5.7.5 Ensuring reliable data exchange

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

5.7.6 Metal-free area

The RF380R can be flush-mounted in metal. Please allow for a possible reduction in the field data values.

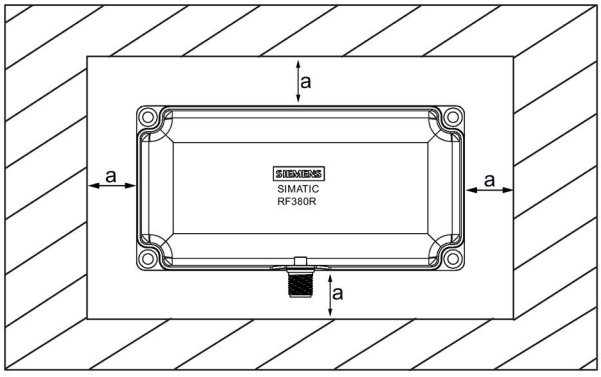
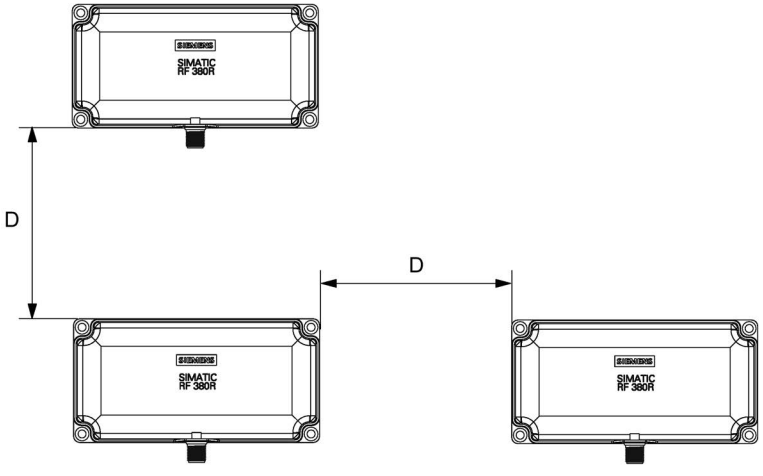


Figure 5-27 Metal-free area for RF380R

To avoid any impact on the field data, the distance a should be ≥ 20 mm.

5.7.7 Minimum distance between several RF380R Scanmode readers

RF380R side by side

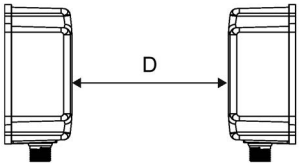


D ≥ 400 mm (with 2 readers)

D ≥ 500 mm (with more than 2 readers)

Figure 5-28 Minimum distance between RF380R readers

RF380R face-to-face



D ≥ 800 mm

Figure 5-29 Face-to-face distance between two RF380R

5.7.8 Technical specifications

Table 5- 31 Technical specifications of the RF380R Scanmode reader

		6GT2801-3AB20-0AX1
Product type designation	SIMATIC RF380R Scanmode	
Radio frequencies		
Operating frequency, rated value	13.56 MHz	
Electrical data		
Maximum range	200 mm	
Maximum data transmission speed reader ↔ transponder	RF300 transponder	ISO transponder
• Read	approx. 8000 bytes/s	approx. 1500 bytes/s
Transmission speed	9.6, 19.2, 38.4, 57, 115.2 kBd	
Read distances of the reader	see section "Field data for transponders, readers and antennas (Page 48)"	
MTBF (Mean Time Between Failures)	109 years	
Interfaces		
Electrical connector design	M12, 8-pin	
Standard for interfaces for communication	RS-232 / RS-422	
Antenna	integrated	
Mechanical specifications		
Enclosure		
• Material	• Plastic PA 12	
• Color	• Anthracite	
Recommended distance to metal	0 mm	

	6GT2801-3AB20-0AX1	
Supply voltage, current consumption, power loss		
Supply voltage	24 VDC	
Typical current consumption	160 mA	
Permitted environmental conditions		
Ambient temperature		
• During operation	-25 to +70 °C	
• Transport and storage	-40 to +85 °C	
Degree of protection to EN 60529	IP67	
Shock-resistant to EN 60721-3-7, Class 7 M3	50 g	
Vibration-resistant to EN 60721-3-7, Class 7 M3	20 g	
Torsion and bending load	Not permitted	
Design, dimensions and weights		
Dimensions (L x W x H)	160 x 80 x 41 (without M12 device connector)	
Weight	Approx. 600 g	
Type of mounting	4 x M5 screws; 1.5 Nm	
Cable length for RS-422 interface, maximum	RS-422	RS-232
	1000 m	30 m
LED display design	3-color LED	
Standards, specifications, approvals		
Proof of suitability	Radio to R&TTE directives EN 300330, EN 301489, CE, FCC, UL/CSA	

5.7.9 Approvals

FCC information

Siemens SIMATIC RF380R (MLFB 6GT2801-3AB20-0AX1); FCC ID NXW-RF380R01

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.

5.7.10 Certificates and Approvals

Certificates for USA and Canada

C UL US	Underwriters Laboratories (UL) acc. to standard UL 60950, Report E11 5352 and Canadian standard C22.2 No. 60950 (I.T.E) or acc. to UL508 and C22.2 No. 142 (IND.CONT.EQ)

5.7.11 Dimension drawing

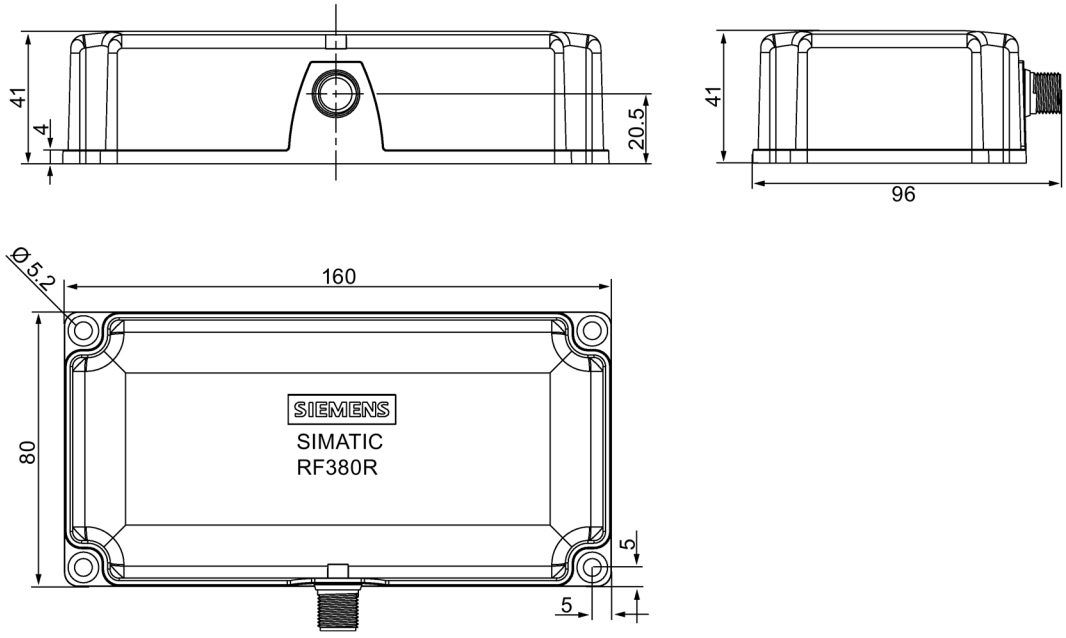


Figure 5-30 Dimension drawing RF380R

Dimensions in mm

5.8 SIMATIC RF382R with Scanmode

You will find detailed information on the SIMATIC RF382R with Scanmode on the Internet (https://support.industry.siemens.com/cs/ww/en/ps/15038).

5.8.1 Characteristics

RF382R Scanmode	Characteristics	
	Design	① RS-232 or RS-422 interface ② Status display
	Operating range	Suitable for high speeds, e.g. in • Suspension conveyor systems • Assembly lines • Production • Order picking

5.8.2 RF382R with Scanmode ordering data

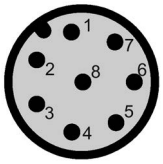
Table 5- 32 RF382R Scanmode ordering data

	Article number
RF382R Scanmode	6GT2801-3AB20-0AX0

5.8.3 Pin assignment RF382R Scanmode RS232 interface

You can connect the RF382R Scanmode reader via the internal RS-232/RS-422 interface or via a higher-level system. (See section "Basic rules (Page 103)") Make sure that the pin assignment is correct. In the factory settings, the reader is set to RS-232. Siemens can change the interface to RS-422.

Table 5- 33 Connector and reader pin assignment

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

5.8.4 LED operating display

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

Table 5- 34 LED operating display on the reader

LED	Meaning
□	The reader is turned off.
■	Operating voltage present, reader ready for operation
■	• Operating mode "with presence": Transponder present • Operating mode "without presence": Transponder present and command currently being executed
■	There is an error. The number of flashes provides information about the current error. You will find more information on error messages in the section "System diagnostics (Page 399)".

5.8.5 Ensuring reliable data exchange

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

5.8.6 Mounting on metal

The RF382R can be mounted directly on metal. Flush mounting on metal is not permitted.

5.8.7 Minimum distance between several RF382R Scanmode readers

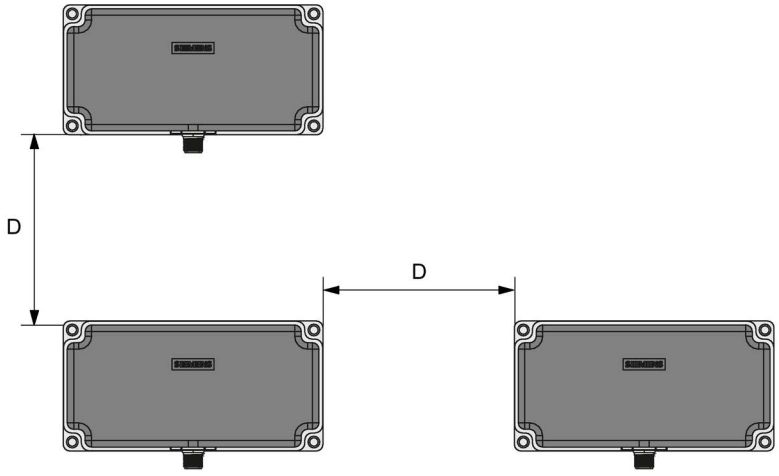


Figure 5-31 Minimum distance between several RF382R Scanmode readers

Minimum distance D from RF382R to RF382R	D ≥ 200 mm

5.8.8 Transmission window

Orientation of fields of the SIMATIC RF382R Scanmode

For many applications it may be best to operate the reader so that the tags move from left to right (or from right to left) at a certain distance in front of the narrow edge of the reader. With this direction of movement, the horizontal reader field is used, see figure below.

You also have the option of moving the tags up and down (or down and up) past the narrow edge of the reader. With this direction of movement, uses the vertical reader field is used.

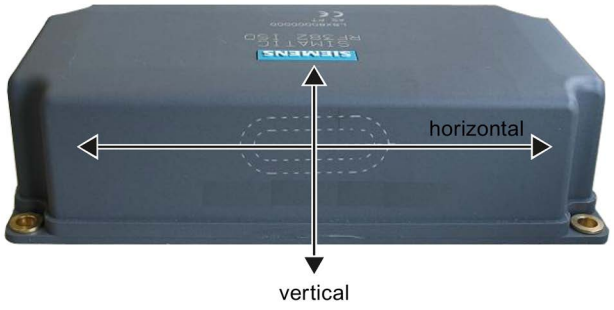


Figure 5-32 Definition of horizontal and vertical reader field

Maximum field strength

The reader creates the maximum field approximately 13 mm below the upper reader edge. For the largest possible reading range the tags you want to read should move in this range. This applies regardless of whether the horizontal or the vertical field is used.

Figure 5-33 Line of maximum magnetic field strength

The area of the maximum field strength and, therefore, the maximum range is identified by a laser icon:

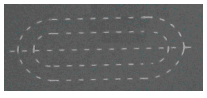


Figure 5-34 Laser labeling

Transmission window horizontal field

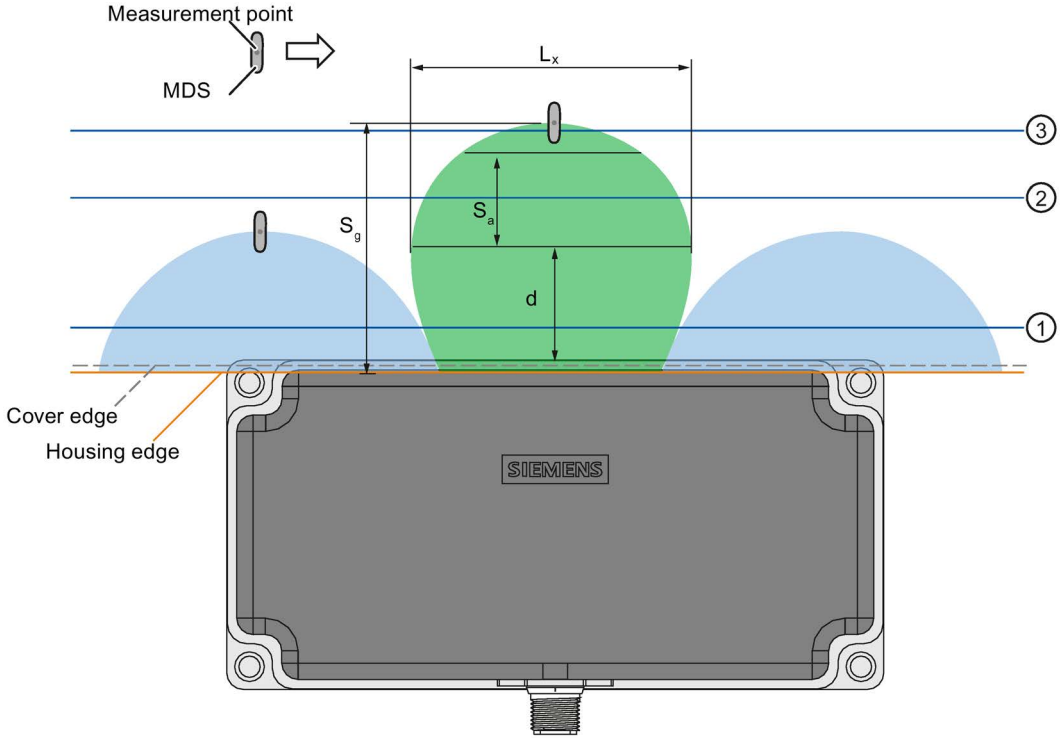


Figure 5-35 Distance definition horizontal field

Green	Main field (processing field)
Blue	Secondary fields, horizontal field
L_x	Maximum length of the main field, horizontal field
d	Distance from the reader edge at which maximum horizontal main field length L exists
S_a	Operating range in the main field
S_g	Limit distance
①	Level 1
②	Level 2
③	Level 3
⇒	Direction of motion of the transponder

Operating range (S_a)

The operating range lies between Level ① and Level ③.

The operating range between Levels ① and ② includes secondary fields.

The recommended operating range therefore lies in the green main field between Level 2 and Level 3.

Limit distance (S_g)

The limit distance lies on Level ③.

Transmission window vertical field

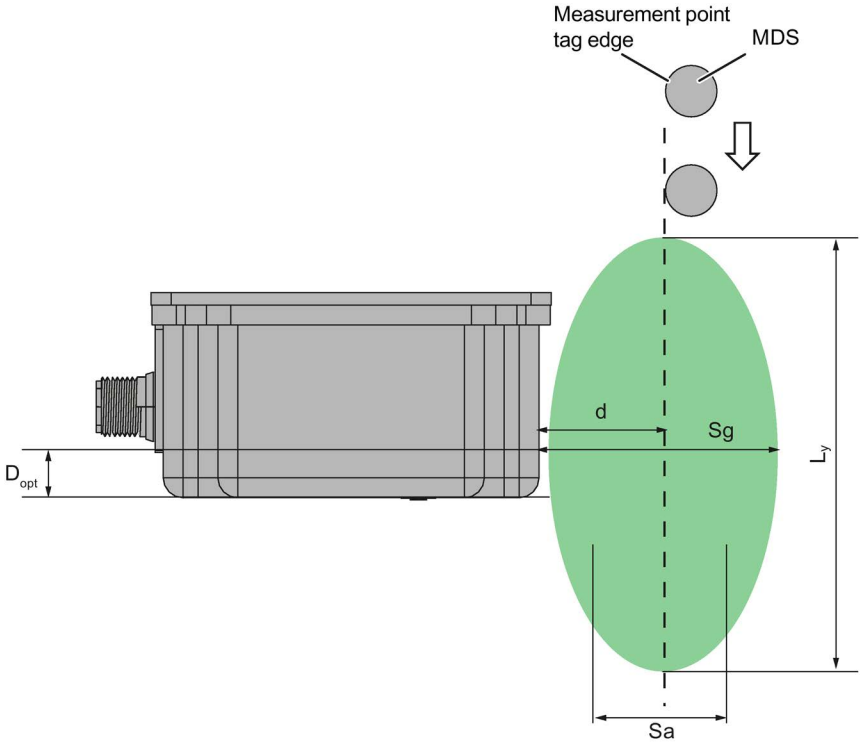


Figure 5-36 Distance definition vertical field

Green	Main field (processing field)
L_y	Maximum length of the main field, vertical field
d	Distance from the reader edge at which maximum vertical main field length L_y exists
S_a	Operating range in the main field
S_g	Limit distance
D_{opt}	= 13 mm
⇓	Direction of motion of the transponder

5.8.9 Technical specifications

Table 5- 35 Technical specifications of the RF382R reader with Scanmode

	6GT2801-3AB20-0AX0
Product type designation	SIMATIC RF382R Scanmode
Radio frequencies	
Operating frequency, rated value	13.56 MHz
Electrical data	
Maximum range	75 mm
Maximum data transmission speed reader ↔ transponder	ISO transponder
• Read	• approx. 1500 bytes/s
Transmission speed	19.2, 57.6, 115.2 kBd
Read/write distances of the reader	See section "Field data for transponders, readers and antennas (Page 48)."
MTBF (Mean Time Between Failures)	115 years
Interfaces	
Electrical connector design	M12, 8-pin
Standard for interfaces for communication	RS-232 (factory setting, can be changed to RS-422)
Antenna	integrated
Mechanical specifications	
Housing	
• Material	• Plastic PA 12
• Color	• Anthracite
Recommended distance to metal	0 mm
Supply voltage, current consumption, power loss	
Supply voltage	24 VDC
Typical current consumption	140 mA

	6GT2801-3AB20-0AX0	
Permitted ambient conditions		
Ambient temperature		
• During operation	• -25 to +70 °C	
• During transportation and storage	• -40 to +85 °C	
Degree of protection to EN 60529	IP67	
Shock-resistant to EN 60721-3-7, Class 7 M3	50 g	
Vibration-resistant to EN 60721-3-7, Class 7 M3	20 g	
Torsion and bending load	Not permitted	
Design, dimensions and weight		
Dimensions (L x W x H)	160 x 80 x 41 mm	
Weight	550 g	
Type of mounting	4 x M5 screws; 1.5 Nm	
Cable length for RS-422 interface, maximum	RS-422	RS-232
	1000 m	30 m
LED display design	3-color LED	
Standards, specifications, approvals		
Proof of suitability	Radio to R&TTE directives EN 300330, EN 301489, CE, FCC, UL/CSA	

5.8.10 Approvals

FCC information

Siemens SIMATIC RF382R (MLFB 6GT2801-3AB20-0AX0); FCC ID NXW-RF382R

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.

Certificates for USA and Canada

c UL us	Underwriters Laboratories (UL) acc. to standard UL 60950, Report E11 5352 and Canadian standard C22.2 No. 60950 (I.T.E) or acc. to UL508 and C22.2 No. 142 (IND.CONT.EQ)

5.8.11 Dimensional diagram

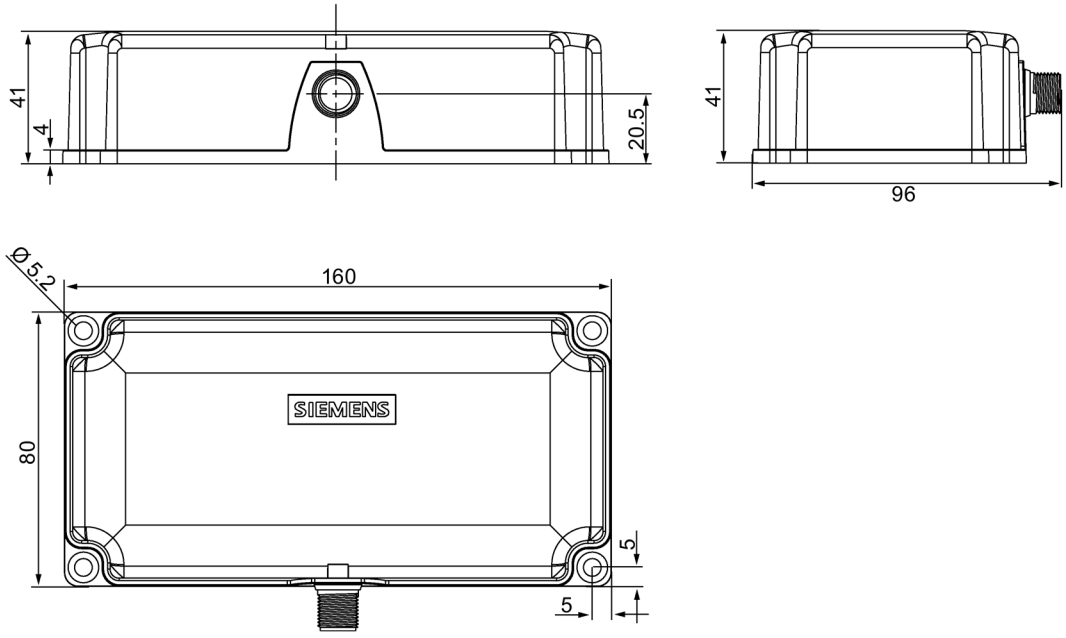


Figure 5-37 Dimension drawing

Antennas

6

6.1 Features

For the RF350R and RF350M readers, you can use the following plug-in antennas:

Antenna	Product photo	Limit distance S_g [1]	Dimensions
ANT 1		Up to 140 mm	75 x 75 x 20 mm (L x W x H)
ANT 3		Up to 50 mm	50 x 75 x 10 mm (L x W x H)

Antenna	Product photo	Limit distance S_g [1]	Dimensions
ANT 3S		Up to 5 mm	50 × 28 × 10 mm (L x W x H)
ANT 8 [2]		Up to 4 mm	M8 x 1.0 x 39 mm (∅ x thread x L)
ANT 12		Up to 16 mm	M12 x 1.0 x 40 mm (∅ x thread x L)
ANT 18		Up to 35 mm	M18 x 1.0 x 55 mm (Ø x thread x L)
ANT 30		Up to 55 mm	M30 x 1.5 x 61 mm (Ø x thread x L)

[1] Depending on the transponder used

[2] only released with RF350M und RF350R - second generation

Note

Use of the antennas in hazardous areas

The antennas ANT 1, ANT 12, ANT 18 and ANT 30 are approved for use in hazardous locations. For more information, refer to the section "Use of the reader in hazardous areas (Page 155)".

ANT 1

The ANT 1 is an antenna in the mid performance range and can be used to the customer's advantage in production and assembly lines due to its manageable housing shape. The antenna dimensions make it possible to read/write large quantities of data dynamically from/to the transponder during operation. The antenna cable can be connected at the reader end.

ANT 3

The ANT 3 is designed for use in small assembly lines. The extremely compact design of the antenna allows extremely accurate positioning. The antenna cable can be connected at the reader end.

ANT 3S

The ANT 3S is designed for use in small assembly lines. The extremely compact design of the antenna allows extremely accurate positioning even with small transponders. The antenna cable can be connected at the reader end.

ANT 8

The ANT 8 is primarily envisaged for tool identification applications. The extremely small design of the antenna allows extremely accurate positioning. The antenna cable can be connected at the reader end and screwed to the antenna.

The antenna ANT 8 has currently only been tested and released for use in conjunction with the mobile reader RF350M and the reader RF350R - second generation.

ANT 12

The ANT 12 is primarily envisaged for tool identification applications. The very small size of the antenna means that highly exact positioning is possible using the plastic nuts included in the scope of delivery. The antenna cable can be connected at the reader end.

ANT 18

The ANT 18 is designed for use in small assembly lines. Due to its small, compact construction, the antenna can be easily positioned for any application using two plastic nuts (included in the package). The antenna cable can be connected at the reader end.

ANT 30

The ANT 30 is designed for use in small assembly lines. In comparison to ANT 18, the maximum write/read distance is approximately 60 % larger. Due to its compact construction, the antenna can be easily positioned for any application using two plastic nuts (included in the package). The antenna cable can be connected at the reader end.

6.2 Ordering data

Table 6- 1 Ordering data for antennas

		Article number
ANT 1	incl. integrated antenna cable 3 m	6GT2398-1CB00
ANT 3	without antenna connecting cable	6GT2398-1CD30-0AX0
	incl. plug-in antenna cable 3 m	6GT2398-1CD40-0AX0
ANT 3S	without antenna connecting cable	6GT2398-1CD50-0AX0
	incl. plug-in antenna cable 3 m	6GT2398-1CD60-0AX0
ANT 8	without antenna connecting cable	6GT2398-1CF00
	incl. plug-in antenna cable 3 m	6GT2398-1CF10
ANT 12	incl. plug-in antenna cable 3 m	6GT2398-1CC00
ANT 18	incl. plug-in antenna cable 3 m	6GT2398-1CA00
ANT 30	incl. plug-in antenna cable 3 m	6GT2398-1CD00

Table 6- 2 Antenna accessories ordering data

		Article number
Antenna connecting cable	3 m	6GT2398-0AH30

6.3 Ensuring reliable data exchange

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

6.4 Metal-free area

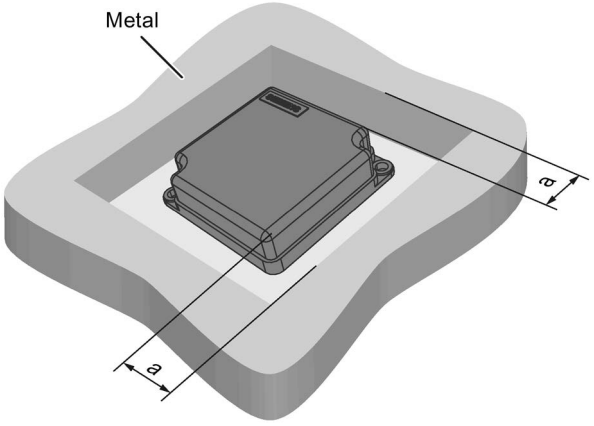
The antennas ANT 1, ANT 8, ANT 12, ANT 18 and ANT 30 can be flush-mounted in metal. Please allow for a possible reduction in the field data values. During installation, maintain the minimum distances (a and b) on/flush with the metal.

Note

Reduction of range if the metal-free space is not maintained

At values lower than a and b, the field data changes significantly, resulting in a reduction in the limit distance and operating distance. Therefore, during installation, maintain the minimum distances (a and b) on/flush with the metal.

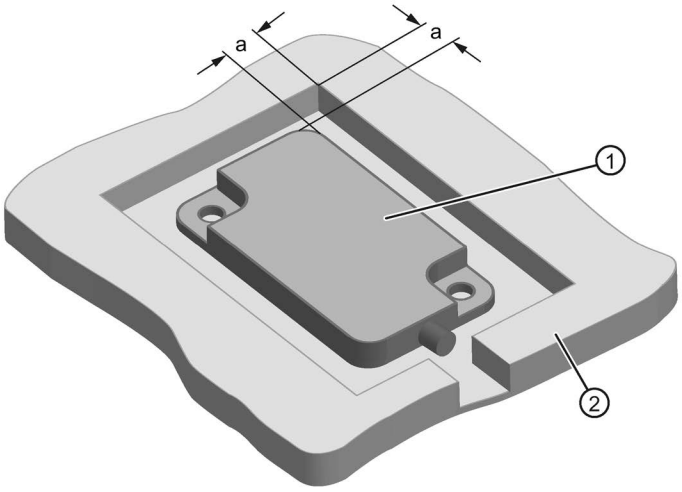
Metal-free space for flush-mounted installation of ANT 1



a = 40 mm

Figure 6-1 ANT 1 flush-mounted in metal

Metal-free space for flush-mounted installation of ANT 3 and ANT 3S



① ANT 3
② Metal
a = 10 mm

Figure 6-2 ANT 3 and ANT 3S flush-mounted in metal

Flush-mounting of ANT 8

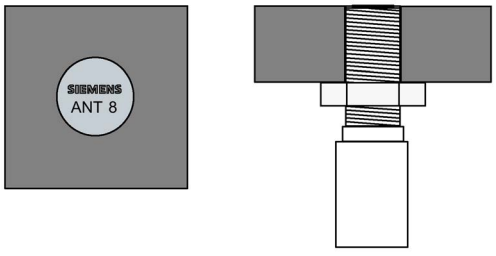


Figure 6-3 ANT 8 flush-mounted in metal

The ANT 8 can be flush-mounted in metal.

Flush-mounting of ANT 12

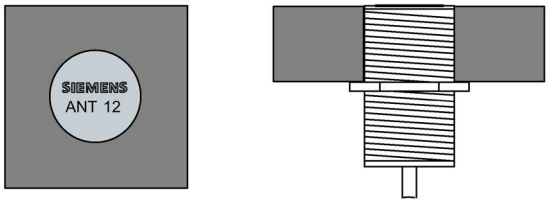
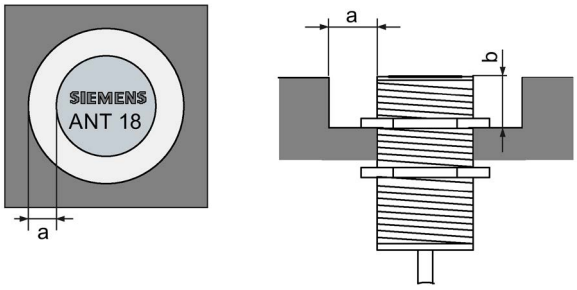


Figure 6-4 ANT 12 flush-mounted in metal

The ANT 12 can be flush-mounted in metal.

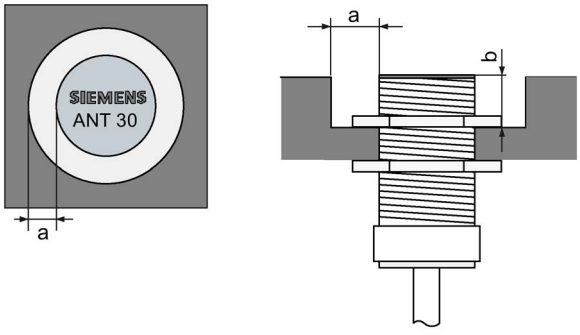
Metal-free space for flush-mounted installation of ANT 18



a = 10 mm
b = 10 mm

Figure 6-5 ANT 18 flush-mounted in metal

Metal-free space for flush-mounted installation of ANT 30

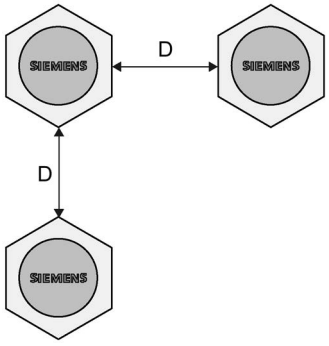
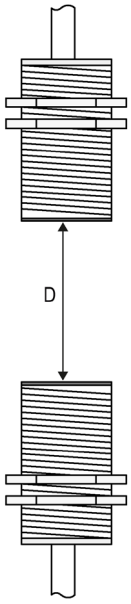


a = 20 mm
b = 20 mm

Figure 6-6 ANT 30 flush-mounted in metal

6.5 Minimum distance between antennas

Table 6- 3 Minimum distance between antennas

Diagram (example)	Minimum distance [mm]	
	**Antennas next to each other**	
	ANT 1	D ≥ 300 mm
	ANT 3	D ≥ 150 mm
	ANT 3S	D ≥ 20 mm
	ANT 8	D ≥ 50 mm
	ANT 12	D ≥ 70 mm
	ANT 18	D ≥ 100 mm
	ANT 30	D ≥ 100 mm
	**Antennas face to face**	
	ANT 1	D ≥ 500 mm
	ANT 3	D ≥ 200 mm
	ANT 3S	D ≥ 50 mm
	ANT 8	D ≥ 50 mm
	ANT 12	D ≥ 100 mm
	ANT 18	D ≥ 100 mm
	ANT 30	D ≥ 200 mm

The reader electronics can be mounted directly alongside each other.

6.6 Technical specifications

Table 6- 4 Technical specifications of the antennas ANT 1, ANT 3 , ANT 3S and ANT 8

	ANT 1	ANT 3	ANT 3S	ANT 8
Max. write/read distance antenna ↔ transponder (S_g)	140 mm	50 mm	5 mm	4 mm
Housing dimensions	75 x 75 x 20 mm (L x W x H)	50 x 28 x 10 mm (L x W x H)	50 x 28 x 10 mm (L x W x H)	M8 x 1.0 x 39 mm (Ø x thread x L)
Color	Anthracite	Black	Black	silver-metallic
Material	Plastic PA 12	Plastic PA6-V0	Plastic PA6-V0	Stainless steel
Plug connection	M8, 4-pin; (pins on antenna side)	M8, 4-pin; socket on antenna side	M8, 4-pin; socket on antenna side	M8, 4-pin; (pins on antenna side)
Degree of protection to EN 60529	IP67			IP67 (front)
Shock-resistant acc. to EN 60721-3-7, Class 7M2 Vibration-resistant to EN 60721-3-7, Class 7M2	50 g [1)] 20 g (3 to 50 Hz) [1)]			
Attachment of the antenna	2 x M5 screws	2 x M4 screws	2 x M4 screws	2x stainless steel nuts M8 x 1.0 mm
Ambient temperature • During operation • During transportation and storage	 • -25 ℃ ... +70 ℃ • -40 °C ... +85 °C			
Weight, approx. • without antenna cable • with antenna cable (3.0 m)	 • -- • 225 g	 • 35 g • 160 g	 • 35 g • 160 g	 • 10 g • 140 g

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

Table 6- 5 Technical specifications of the antennas ANT 12, ANT 18 and ANT 30

	ANT 12	ANT 18	ANT 30
Max. write/read distance antenna ↔ transponder (S_g)	16 mm	35 mm	55 mm
Housing dimensions	M12 x 1.0 x 40 mm (Ø x thread x L)	M18 x 1.0 x 55 mm (Ø x thread x L)	M30 x 1.5 x 61 mm (Ø x thread x L)
Color	Pale turquoise		
Material	Plastic Crastin		
Plug connection	M8, 4-pin; (pins on antenna side)		
Degree of protection to EN 60529	IP67 (front)		
Shock-resistant acc. to EN 60721-3-7, Class 7M2 Vibration-resistant to EN 60721-3-7, Class 7M2	50 g [1)] 20 g (3 to 50 Hz) [1)]		
Attachment of the antenna	2 plastic nuts M12 x 1.0 mm	2 plastic nuts M18 x 1.0 mm	2 plastic nuts M30 x 1.5 mm
Ambient temperature • During operation • During transportation and storage	 • -25 ℃ to +70 ℃ • -40 ℃ to +85 ℃		
Approx. weight • without antenna cable • with antenna cable (3.0 m)	 • -- • 145 g	 • -- • 130 g	 • -- • 180 g

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

6.7 Dimensional drawings

The cable length is 3 m. All dimensions are in mm.

ANT 1

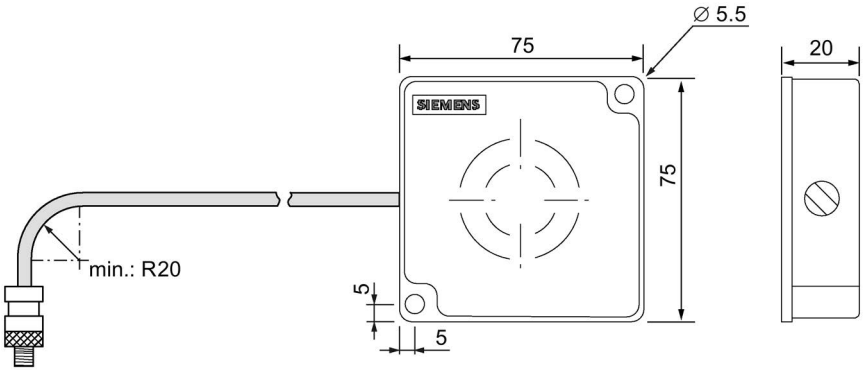


Figure 6-7 Dimension drawing for ANT 1

ANT 3 / ANT 3S

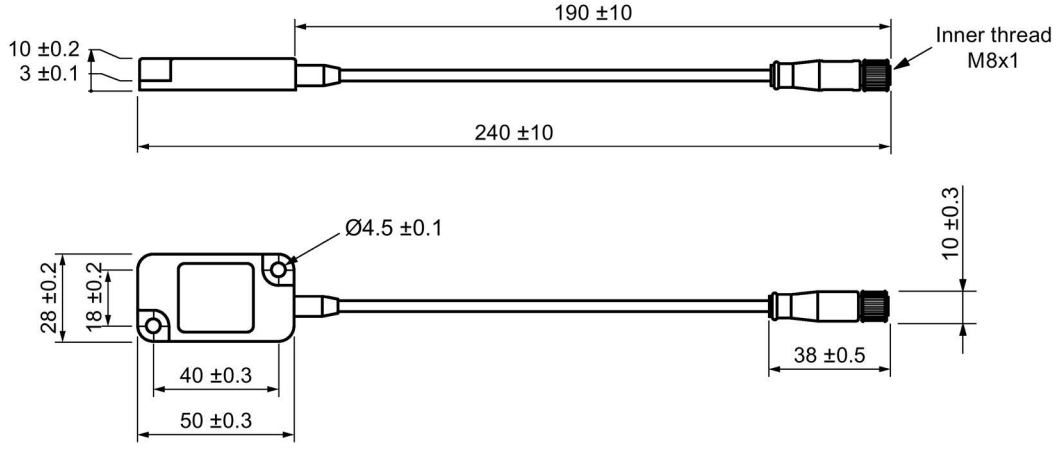


Figure 6-8 Dimension drawing ANT 3 7 ANT 3S

ANT 8

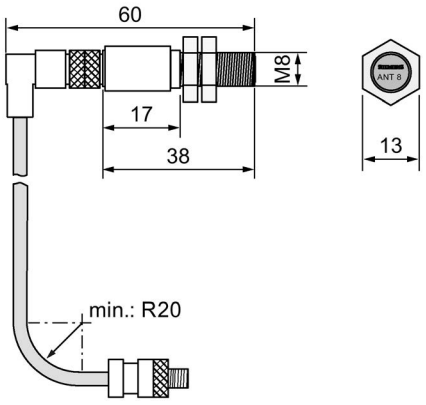


Figure 6-9 Dimension drawing for ANT 8

ANT 12

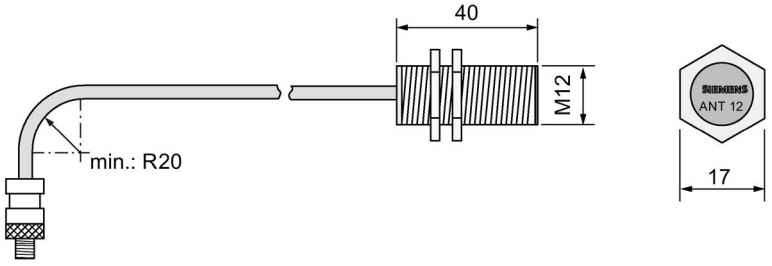


Figure 6-10 Dimension drawing for ANT 12

ANT 18

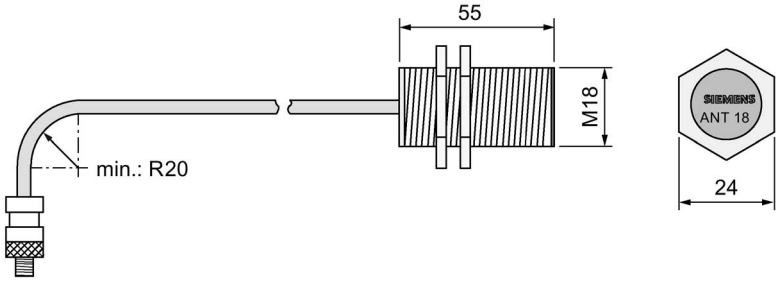


Figure 6-11 Dimension drawing for ANT 18

ANT 30

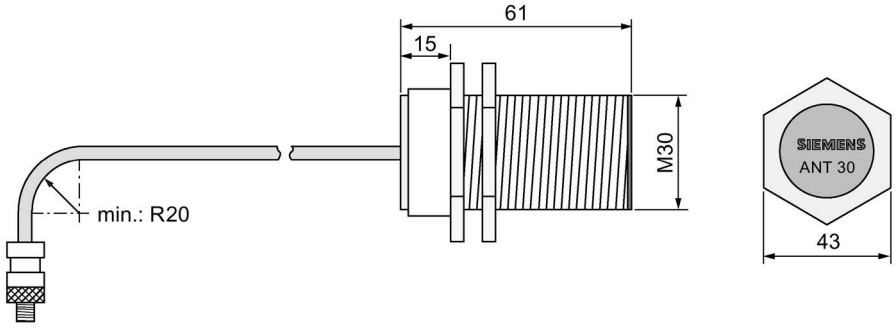


Figure 6-12 Dimension drawing for ANT 30

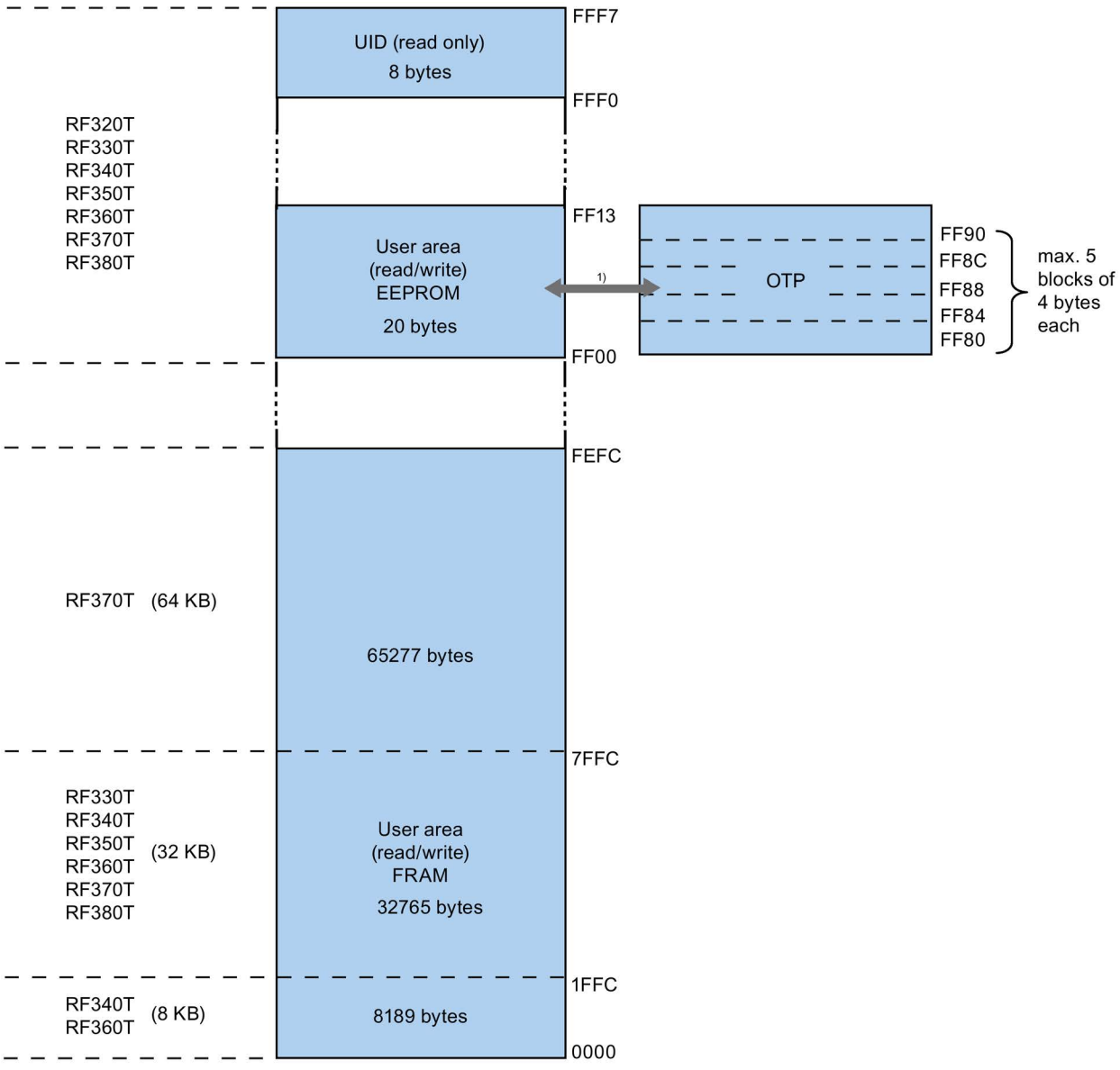
RF300 transponder

7

Features of the RF300 transponders

The RF300 transponders (RF3xxT) stand out particularly for their extremely fast data exchange with the RF300 readers (RF3xxR). With the exception of the RF320T transponder, all of the RF300 transponders have 8 to 64 KB of FRAM memory, which has an almost unlimited capacity for reading and writing.

7.1 Memory configuration of the RF300 transponders



1) Physically identical memory When the OTP area is used, the corresponding user area (FF00-FF13) can no longer be modified (read only).

Figure 7-1 Memory configuration of the RF300 transponders

EEPROM area

The memory configuration of an RF300 transponder always comprises an EEPROM that has 20 bytes for user data (read/write) and a 4-byte unique serial number (UID, read only). For reasons of standardization, the UID is transferred as an 8 byte value through a read command to address FFF0 with a length of 8. The unused 4 high bytes are filled with zeros.

Note

Write speed

The EEPROM user memory (address FF00-FF13, or FF80-FF90) requires significantly more time for writing (approx. 11 ms/byte) than the high-speed FRAM memory. For time-critical applications with write functions, it is advisable to use FRAM transponders (e.g. RF330T, RF340T, RF350T, RF360T, RF370T, RF380T).

FRAM area

Depending on the tag type, high-speed FRAM memory is available. (8 KB, 32 KB, 64 KB). This area does not exist for the RF320T.

In the case of RF3xxT transponders with FRAM memory, the data carrier initialization command (INIT) is only effective on this memory area but not on the EEPROM area (FF00-FF13).

OTP area

The EEPROM memory area (address FF00-FF13) can also be used as a so-called "OTP" memory (One Time Programmable). The 5 block addresses FF80, FF84, FF88, FF8C and FF90 are used for this purpose. A write command to this block address with a valid length (4, 8, 12, 16, 20 depending on the block address) protects the written data from subsequent overwriting.

Note

Seamless use of the OTP area

When the OTP area is used, it must be ensured that the blocks are used starting from Block 0 consecutively.

Examples:

- 3 blocks (with write command), Block 0, 1, 2 (FF80, length = 12): valid
- 2 blocks (consecutive), Block 0 (FF80, length =4), Block 1 (FF84, length = 4): valid
- 2 blocks (consecutive), Block 0 (FF80, length =4), Block 2 (FF88, length = 4): Invalid
- 1 Block, Block 4 (FF90, length = 4): Invalid

Note

Use of the OTP area is not reversible

If you use the OPT area, you cannot undo it, because the OPT area can only be written to once.

7.2 SIMATIC RF320T

7.2.1 Features

RF320T	Characteristics	
	Area of application	Identification tasks on small assembly lines in harsh industrial environments
	Memory size	20 bytes of EEPROM user memory
	Write/read range	See section Field data of RF300 transponders (Page 49)
	Mounting on metal	Yes, with spacer
	Degree of protection	IP67/IPx9K

7.2.2 Ordering data

Table 7- 1 Ordering data RF320T

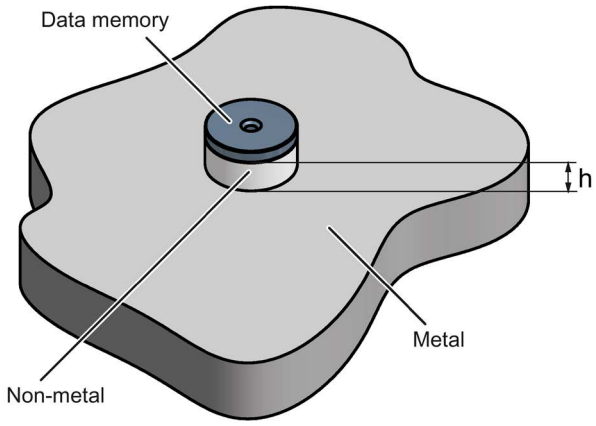
	Article number
RF320T	6GT2800-1CA00

Table 7- 2 Ordering data for RF320T accessories

	Article number
Spacer	6GT2690-0AK00

7.2.3 Mounting on metal

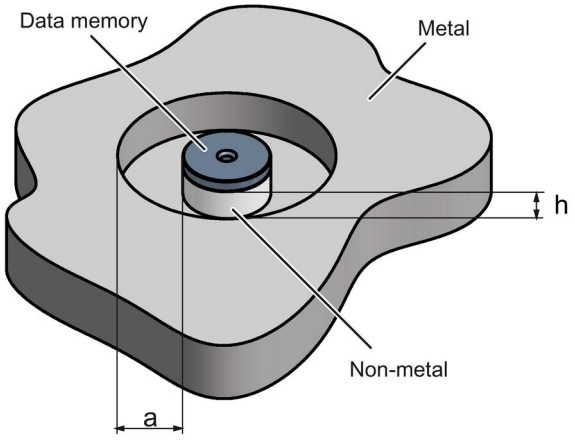
Mounting on metal



h ≥ 15 mm

Figure 7-2 Mounting the MDS D124/D324/D424/D524/E624 and RF320T on metal with spacer

Flush-mounting



h ≥ 15 mm

a ≥ 25 mm

Figure 7-3 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.

7.2.4 Technical data

Table 7- 3 Technical specifications for RF320T

	6GT2800-1CA00
Product type designation	SIMATIC RF320T
Memory	
Memory organization	Byte-oriented, write protection possible in 4-byte blocks
Memory configuration	
• UID	• 4 bytes EEPROM
• User memory	• 20 bytes EEPROM
• OPT memory	• 20 bytes EEPROM
Read cycles (at < 40 °C)	> 10^{14}
Write cycles (at < 40 °C)	> 10^{5}
Data retention time (at < 40 °C)	> 10 years
Write/read distance (S_g)	Dependent on the reader used, see section "Field data of RF300 transponders (Page 49)"
MTBF (Mean Time Between Failures)	1800 years
Mechanical specifications	
Housing	
• Material	• Epoxy resin
• Color	• Black
Recommended distance to metal	≥ 20 mm
Power supply	Inductive, without battery
Permitted ambient conditions	
Ambient temperature	
• during write/read access	• -25 to +125 °C
• outside the read/write field	• -40 ... +140 °C

	6GT2800-1CA00
• during storage	• -40 to +140 °C
Degree of protection to EN 60529	• IP67 • IPx9K
Shock-resistant to EN 60721-3-7, Class 7 M3	100 g [1]
Vibration-resistant to EN 60721-3-7, Class 7 M3	20 g [1]
Torsion and bending load	Not permitted

Design, dimensions and weight	
Dimensions (Ø x H)	27 x 4 mm
Weight	5 g
Type of mounting	• 1 x M3 screw [2] ≤ 1.0 Nm • Glued

[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.

7.2.5 Dimension drawing

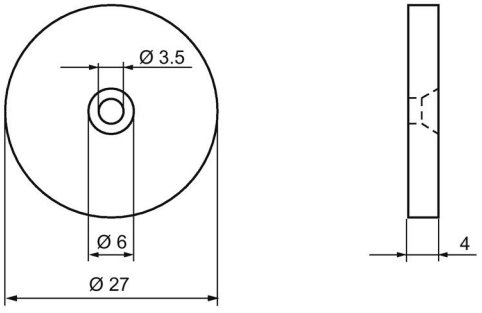


Figure 7-4 RF320T dimension drawing

Dimensions in mm

7.3 SIMATIC RF330T

7.3.1 Features

Table 7- 4

RF330T	Characteristics	
	Area of application	In production automation for identification of metallic workpiece holders, workpieces or containers.
	Memory size	32 KB EEPROM user memory
	Write/read range	See section "Field data of RF300 transponders (Page 49)"
	Mounting on metal	Yes flush mounted on/in metal
	Degree of protection	IP68/IPx9K

7.3.2 Ordering data

Table 7- 5 Ordering data RF330T

	Article number
RF330T	6GT2800-5BA00

Table 7- 6 Ordering data for RF330T accessories

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

7.3.3 Mounting on/in metal

Direct mounting of the RF330T on metal is permitted.

Mounting of the RF330T on metal

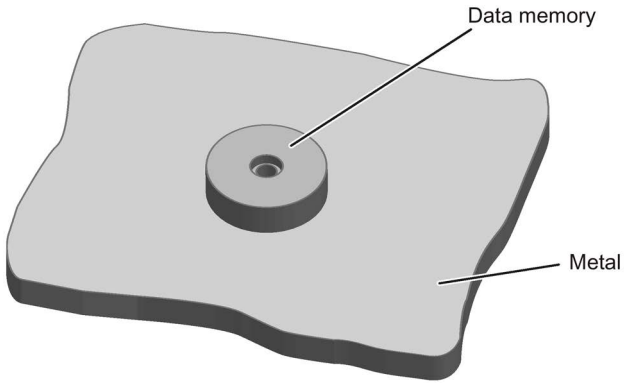
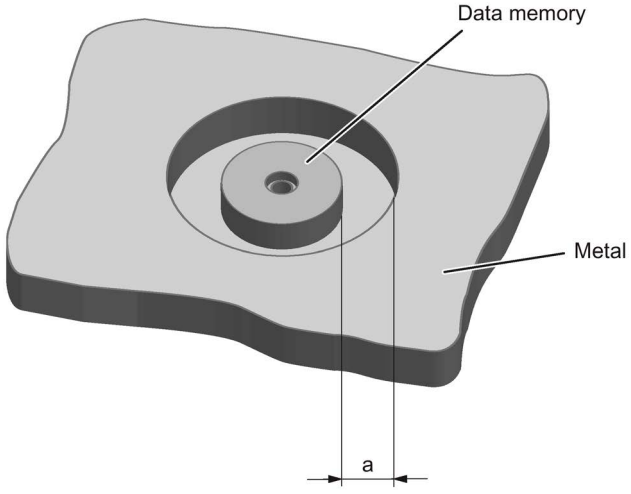


Figure 7-5 Mounting of the RF330T on metal

Flush-mounting of RF330T in metal



a ≥ 10 mm

Figure 7-6 Mounting of the RF330T in metal with 10 mm clearance

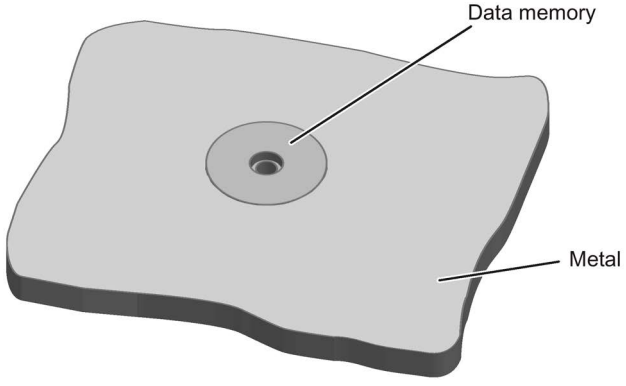


Figure 7-7 Mounting of the RF330T in metal without clearance

Note

Reduction of the write/read range

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

7.3.4 Technical specifications

Table 7- 7 RF330T technical specifications

	6GT2800-5BA00
Product type designation	SIMATIC RF330T
Memory	
Memory organization	in bytes
Memory configuration	
• UID	• 4 bytes EEPROM
• User memory	• 8 KB FRAM
• OPT memory	• 20 bytes EEPROM
Read cycles (at < 40 °C)	> 10^{14}
Write cycles (at < 40 °C)	> 10^{14}
Data retention time (at < 40 °C)	> 10 years
Write/read distance (S_g)	Dependent on the reader used, see section "Field data of RF300 transponders (Page 49)"
MTBF (Mean Time Between Failures)	1200 years
Mechanical specifications	
Housing	
• Material	• Plastic PPS
• 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 ... +100 °C
• during storage	• -40 to +100 °C

	6GT2800-5BA00
Degree of protection to EN 60529	• IP68 2 hours, 2 m, 20 ℃ • IPx9K steam jet: 150 mm; 10 to 15 l/min; 100 bar; 75 °C
Pressure resistance	• Low pressure resistant vacuum dryer: up to 20 mbar • high pressure resistant (see degree of protection IPx9K)
Shock-resistant to EN 60721-3-7, Class 7 M3	50 g [1]
Vibration-resistant to EN 60721-3-7, Class 7 M3	20 g [1]
Torsion and bending load	Not permitted
Design, dimensions and weight	
Dimensions (Ø x H)	30 x 8 mm
Weight	10 g
Type of mounting	1 x M4 screw [2] ≤ 1.5 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.

7.3.5 Dimension drawing

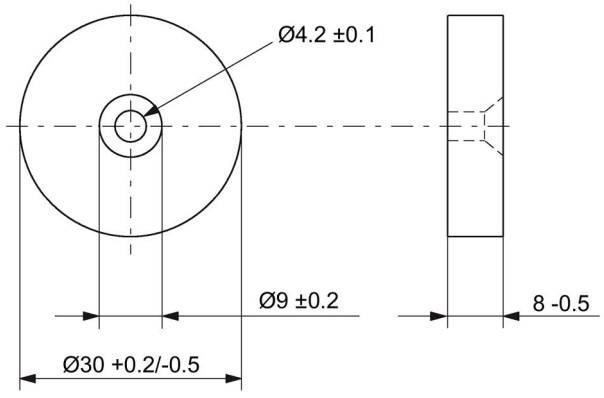


Figure 7-8 RF330T dimension drawing

Dimensions in mm

7.4 SIMATIC RF340T

7.4.1 Features

Table 7- 8

RF340T	Characteristics	
	Area of application	Identification tasks on small assembly lines in harsh industrial environments
	Memory size	• 8 KB FRAM user memory • 32 KB FRAM user memory
	Write/read range	See section Field data of RF300 transponders (Page 49)
	Mounting on metal	Yes
	Degree of protection	IP68/IPx9K

7.4.2 Ordering data

Table 7- 9 Ordering data RF340T

	Article number
RF340T 8 KB FRAM user memory	6GT2800-4BB00
RF340T 32 KB FRAM user memory	6GT2800-5BB00

7.4.3 Mounting on metal

Direct mounting of the RF340T on metal is permitted.

Mounting of RF340T on metal

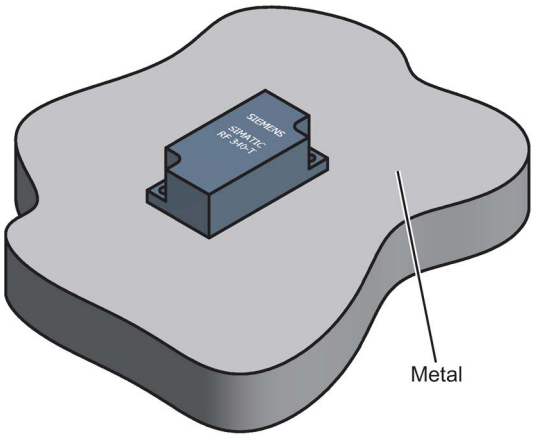


Figure 7-9 Mounting of RF340T on metal

Flush-mounting of RF340T in metal:

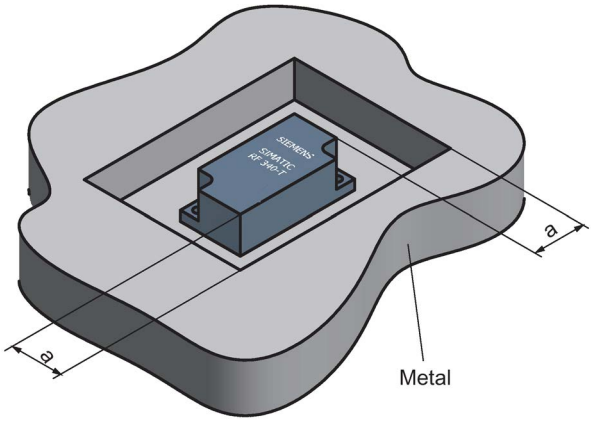


Figure 7-10 Flush-mounting of RF340T in metal

The standard value for a is ≥ 20 mm. At lower values, the field data change significantly, resulting in a reduction in the range.

7.4.4 Technical specifications

Table 7- 10 Technical specifications for RF340T

	6GT2800-4BB00
Product type designation	SIMATIC RF340T
Memory	
Memory organization	in bytes
Memory configuration	
• UID	• 4 bytes EEPROM
• User memory	• 8 KB FRAM
• OPT memory	• 20 bytes EEPROM
Read cycles (at < 40 °C)	> 10^{10}
Write cycles (at < 40 °C)	> 10^{10}
Data retention time (at < 40 °C)	> 10 years
Write/read distance (S_g)	Dependent on the reader used, see section "Field data of RF300 transponders (Page 49)"
MTBF (Mean Time Between Failures)	1200 years
Mechanical specifications	
Housing	
• Material	• Plastic PA 12
• Color	• Anthracite
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 +85 °C
• during storage	• -40 to +85 °C
Degree of protection to EN 60529	• IP68 • IPx9K
Shock-resistant to EN 60721-3-7, Class 7 M3	50 g [1)]
Vibration-resistant to EN 60721-3-7, Class 7 M3	20 g [1)]
Torsion and bending load	Not permitted

	6GT2800-4BB00
Design, dimensions and weight	
Dimensions (L x W x H)	48 x 25 x 15 mm
Weight	25 g
Type of mounting	2 x M3 screws ≤ 1.0 Nm

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

7.4.5 Dimension drawing

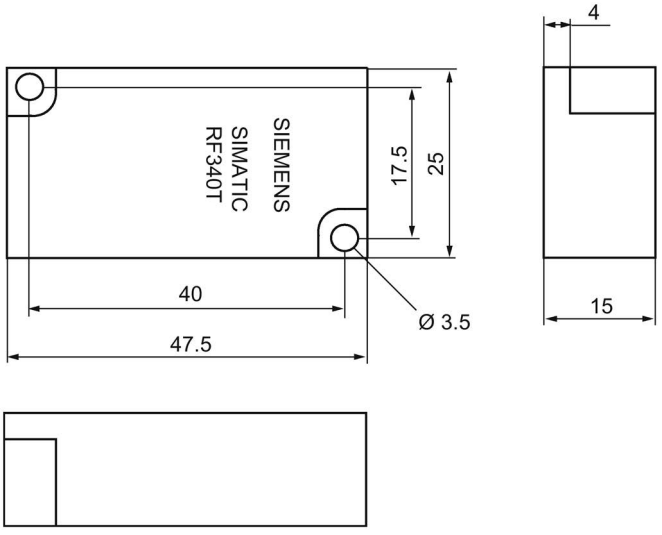


Figure 7-11 RF340T dimension drawing

Dimensions in mm

7.5 SIMATIC RF350T

7.5.1 Features

RF350T	Characteristics	
	Area of application	Identification tasks on small assembly lines in harsh industrial environments
	Memory size	32 KB FRAM user memory
	Write/read range	See section Field data of RF300 transponders (Page 49)
	Mounting on metal	Yes
	Degree of protection	IP68

7.5.2 Ordering data

Table 7- 11 Ordering data RF350T

	Article number
RF350T	6GT2800-5BD00

7.5.3 Mounting on metal

Direct mounting of the RF350T on metal is permitted.

Mounting of RF350T on metal

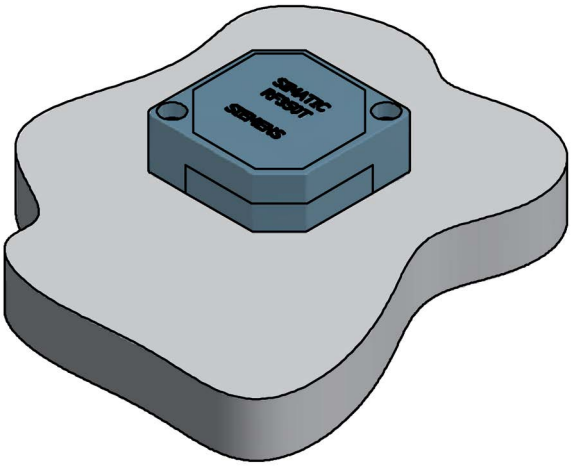


Figure 7-12 Mounting of RF350T on metal

Flush-mounting of RF350T in metal:

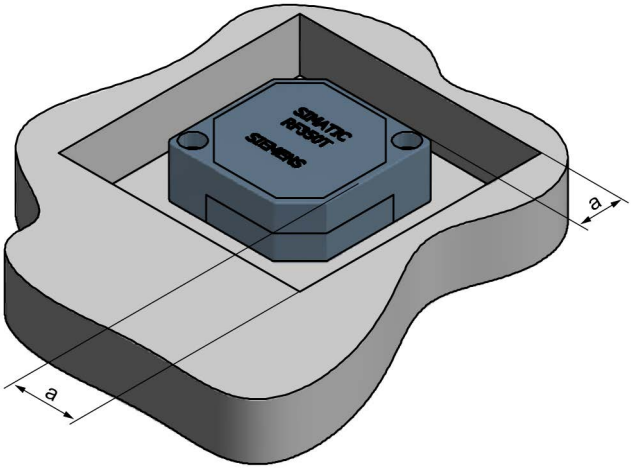


Figure 7-13 RF350T flush-mounted in metal

The standard value for a is ≥ 20 mm. At lower values, the field data change significantly, resulting in a reduction in the range.

7.5.4 Mounting options

Mounting with fixing frame

The RF350T transponder can be mounted as shown with the fixing frame:

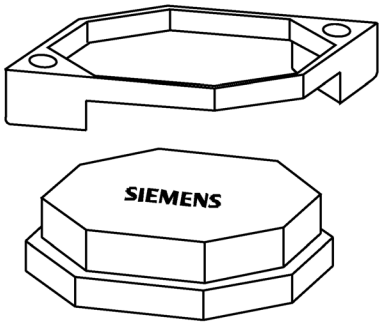


Figure 7-14 Installation diagram

Dimensions of the fixing frame

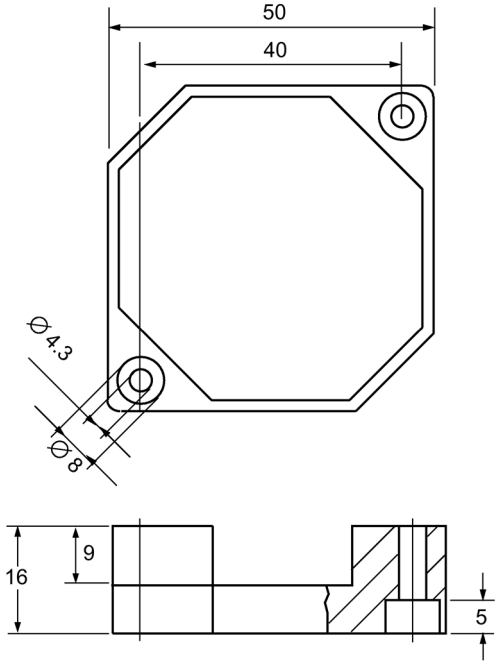


Figure 7-15 RF350T fixing frame

7.5.5 Technical data

Table 7- 12 Technical specifications for RF350T

	6GT2800-5BD00
Product type designation	SIMATIC RF350T
Memory	
Memory organization	in bytes
Memory configuration	
• UID	• 4 bytes EEPROM
• User memory	• 32 KB FRAM
• OPT memory	• 20 bytes EEPROM
Read cycles (at < 40 °C)	> 10^{10}
Write cycles (at < 40 °C)	> 10^{10}
Data retention time (at < 40 °C)	> 10 years
Write/read distance (S_g)	Dependent on the reader used, see section "Field data of RF300 transponders (Page 49)"
MTBF (Mean Time Between Failures)	1200 years
Mechanical specifications	
Housing	
• Material	• Plastic PA 12
• Color	• Anthracite
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 +85 °C
• during storage	• -40 to +85 °C
Degree of protection to EN 60529	IP68
Shock-resistant to EN 60721-3-7, Class 7 M3	50 g [1)]
Vibration-resistant to EN 60721-3-7, Class 7 M3	20 g [1)]
Torsion and bending load	Not permitted

	6GT2800-5BD00
Design, dimensions and weight	
Dimensions (L x W x H)	50 x 50 x 20 mm
Weight	25 g
Type of mounting	2 x M4 screws ≤ 1.5 Nm

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

7.5.6 Dimension drawing

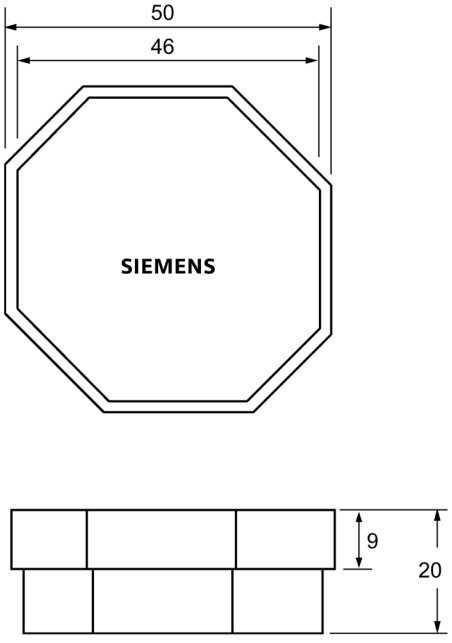


Figure 7-16 RF350T dimension drawing

Dimensions in mm

7.6 SIMATIC RF360T

7.6.1 Features

RF360T	Characteristics	
	Area of application	Identification tasks on small assembly lines in harsh industrial environments
	Memory size	• 8 KB FRAM user memory • 32 KB FRAM user memory
	Write/read range	see section Field data of RF300 transponders (Page 49)
	Mounting on metal	Yes, with spacer
	Degree of protection	IP67

7.6.2 Ordering data

Table 7- 13 Ordering data RF360T

	Article number
RF360T 8 KB FRAM user memory	6GT2800-4AC00
RF360T 32 KB FRAM user memory	6GT2800-5AC00

Table 7- 14 Ordering data for RF360T accessories

	Article number
Spacer (in conjunction with fixing pocket 6GT2190-0AB00)	6GT2190-0AA00
Fixing pocket (in conjunction with spacer 6GT2190-0AA00)	6GT2190-0AB00

7.6.3 Mounting on metal

Direct mounting of the RF360T on metal is not allowed. A distance ≥ 20 mm is recommended. This can be achieved using the spacer 6GT2190-0AA00 in combination with the fixing pocket 6GT2190-0AB00.

Mounting of RF360T on metal

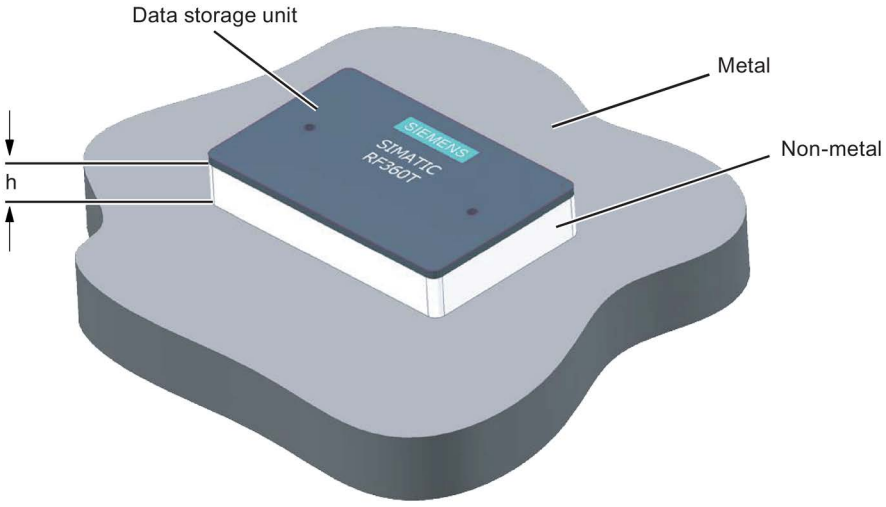


Figure 7-17 Mounting of RF360T with spacer

The standard value for h is ≥ 20 mm.

Flush-mounting of RF360T in metal:

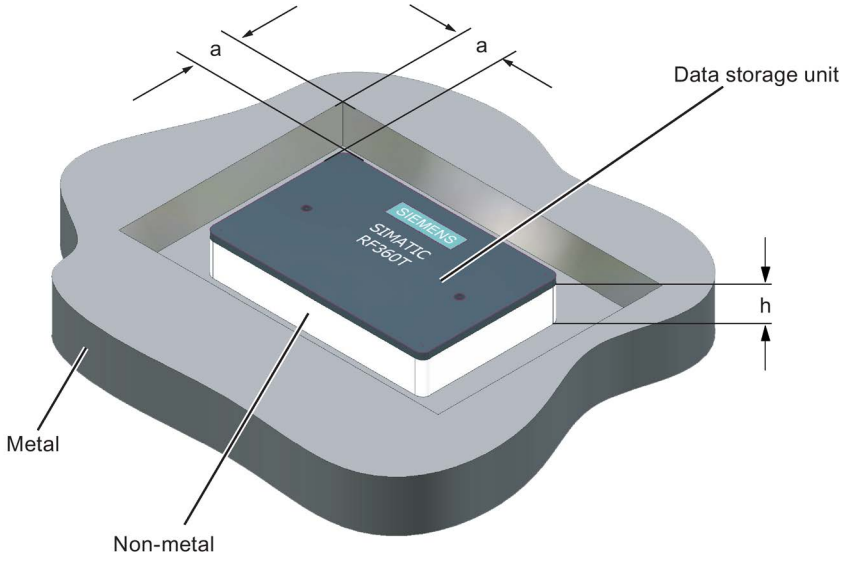


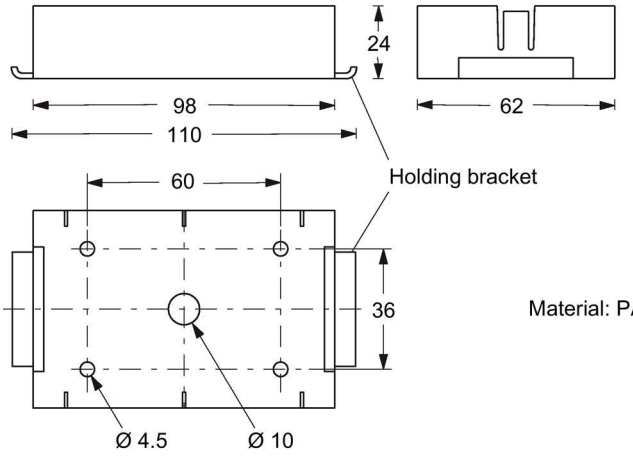
Figure 7-18 Flush-mounting of RF360T with spacer

The standard value for a is ≥ 20 mm. At lower values, the field data change significantly, resulting in a reduction in the range.

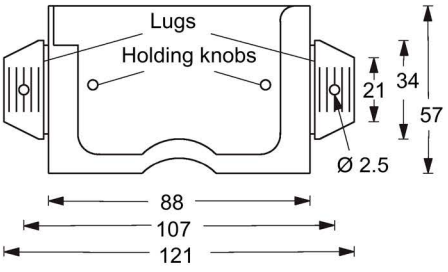
Dimensions of spacer and fixing pocket for RF360T

Dimension sketch

Spacers: 6GT2190-0AA00



Mounting bracket: 6GT2190-0AB00

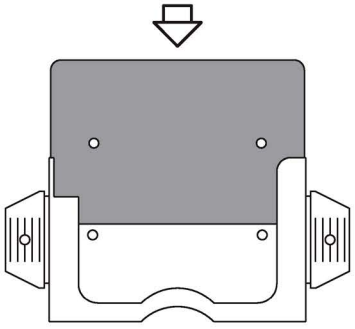


Material: PA 6

The spacer can be mounted directly on metal. Together with the mounting bracket, this results in a distance of 20 mm between transponder and metal.

Mounting:
- With 2 or 4 screws (M4)
- With rubber pads on the holding brackets (e.g. on mesh boxes)
- With cable ties on the holding brackets (e.g. on mesh boxes)

Transponder with mounting bracket

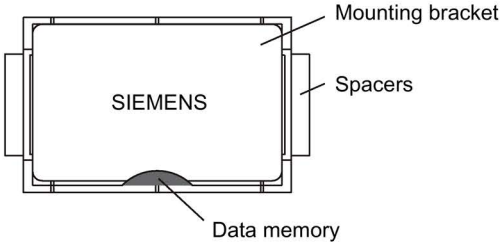


The transponder is pushed into the mounting bracket. Locking takes place with holding knobs in the mounting bracket.w

The tabs of the mounting bracket are secured to a non-metal base. This can be done as follows:
- Screws in the holes provided
- Rivets in the holes provided
- Nails through the holes
- Staples through the plastic of the tabs
- Insertion in the spacer

The tabs can also be bent by 90°.

Transponder with mounting bracket and spacer (assembled)



Re-assembly instructions:

Slide transponder into the mounting bracket. The tabs are then bent by 90° and inserted into the spacer. Position the mounting bracket so that it covers the transponder (see Figure). It is automatically locked into place.

Figure 7-19 Dimensions of spacer and fixing pocket for RF360T

7.6.4 Technical data

Table 7- 15 Technical specifications for RF360T

	6GT2800-4AC00 6GT2800-5AC00
Product type designation	SIMATIC RF360T
Memory	
Memory organization	in bytes
Memory configuration	
• UID	• 4 bytes EEPROM
• User memory	• 8 KB FRAM
• OPT memory	• 20 bytes EEPROM
Read cycles (at < 40 °C)	> 10^{10}
Write cycles (at < 40 °C)	> 10^{10}
Data retention time (at < 40 °C)	> 10 years
Write/read distance (S_g)	Dependent on the reader used, see section "Field data of RF300 transponders (Page 49)"
MTBF (Mean Time Between Failures)	1200 years
Mechanical specifications	
Housing	
• Material	• Epoxy resin
• Color	• Anthracite
Recommended distance to metal	≥ 20 mm
Power supply	Inductive, without battery
Permitted ambient conditions	
Ambient temperature	
• during write/read access	• -25 to +75 °C
• outside the read/write field	• -40 to +85 °C
• during storage	• -40 to +85 °C
Degree of protection to EN 60529	IP67
Shock-resistant to EN 60721-3-7, Class 7 M3	50 g
Vibration-resistant to EN 60721-3-7, Class 7 M3	20 g
Torsion and bending load	Not permitted

	6GT2800-4AC00 6GT2800-5AC00
Design, dimensions and weight	
Dimensions (L x W x H)	86 x 55 x 2.5 mm
Weight	25 g
Type of mounting	• 2 x M3 screws ≤ 1.0 Nm • Fixing pocket (6GT2190-0AB00)

7.6.5 Dimension drawing

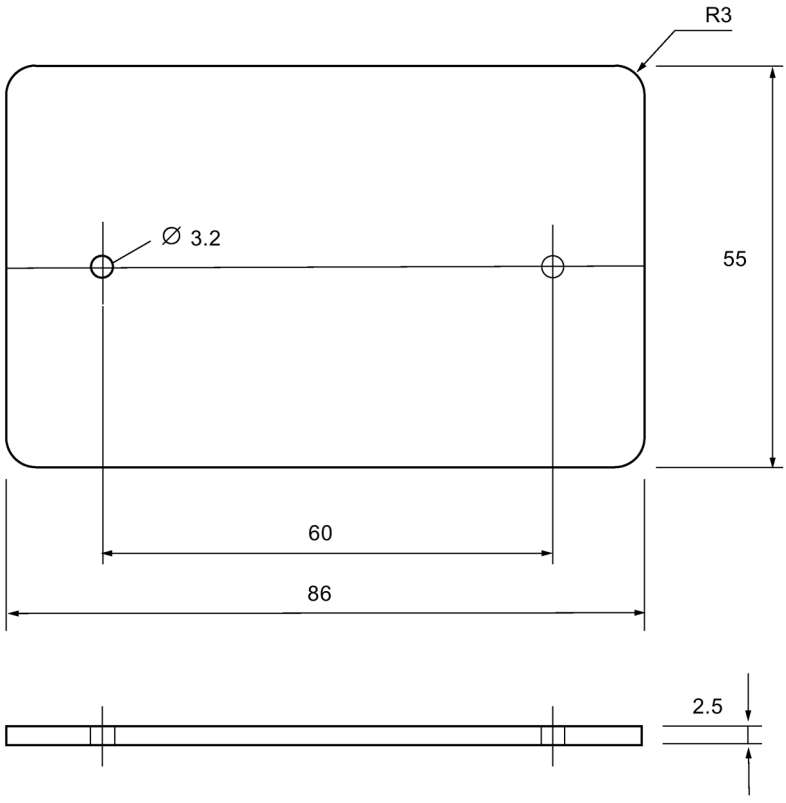


Figure 7-20 RF360T dimension drawing

Dimensions in mm

7.7 SIMATIC RF370T

7.7.1 Features

The SIMATIC RF370T transponder is a passive (i.e. battery-free) data carrier in a square type of construction.

RF370T	Characteristics	
	Area of application	Identification tasks on assembly lines in harsh industrial environments, due to high resistance to oils, lubricants and cleaning agents, and suitable for larger ranges, e.g. automotive industry
	Memory size	• 32 KB FRAM user memory • 64 KB FRAM user memory
	Write/read range	see section Field data of RF300 transponders (Page 49)
	Mounting on metal	Yes
	Degree of protection	IP68/IPx9K

7.7.2 Ordering data

Table 7- 16 Ordering data RF370T

	Article number
RF370T 32 KB FRAM user memory	6GT2800-5BE00
RF370T 64 KB FRAM user memory	6GT2800-6BE00

7.7.3 Mounting on metal

Direct mounting of the RF370T on metal is permitted.

Mounting of RF370T on metal

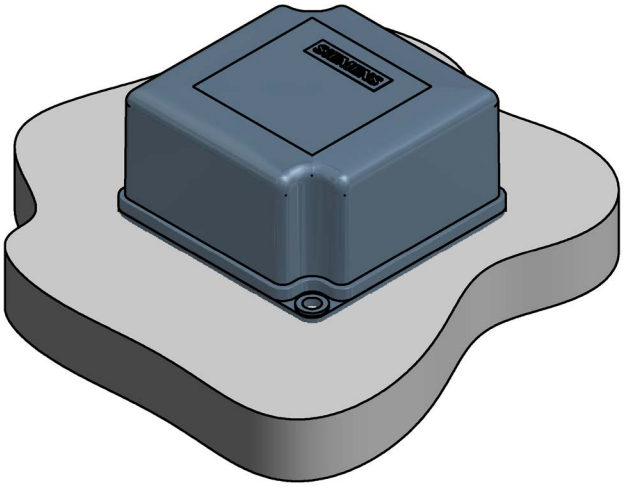


Figure 7-21 Mounting of RF370T on metal

Flush-mounting of RF370T in metal:

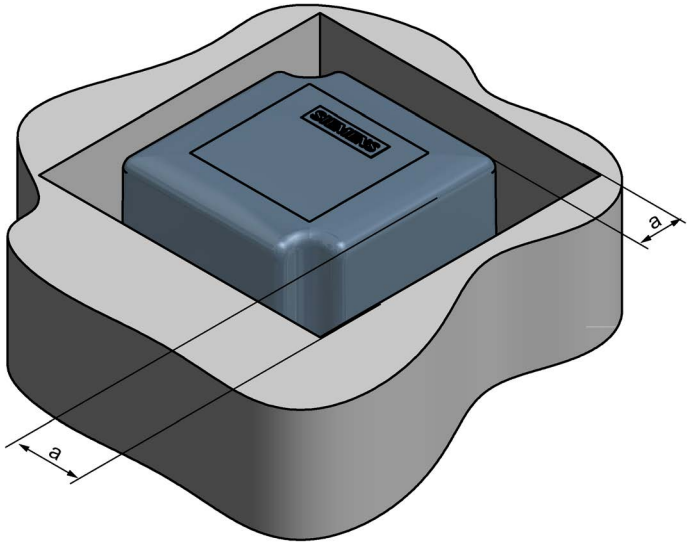


Figure 7-22 RF370T flush-mounted in metal

The standard value for a is ≥ 20 mm. At lower values, the field data change significantly, resulting in a reduction in the range.

7.7.4 Mounting instructions

It is essential that you observe the instructions in the Section Installation guidelines (Page 63).

Properties	Description
Type of installation	Screw fixing (two M5 screws)
Tightening torque	< 1.2 Nm (at room temperature)

7.7.5 Technical specifications

Table 7- 17 Technical specifications RF370T

	6GT2800-5BE00 6GT2800-6BE00
Product type designation	SIMATIC RF370T
Memory	
Memory organization	in bytes
Memory configuration	
• UID	• 4 bytes EEPROM
• User memory	• 32 or 64 KB FRAM
• OPT memory	• 20 bytes EEPROM
Read cycles (at < 40 °C)	> 10^{10}
Write cycles (at < 40 °C)	> 10^{10}
Data retention time (at < 40 °C)	> 10 years
Write/read distance (S_g)	Dependent on the reader used, see section "Field data of RF300 transponders (Page 49)"
MTBF (Mean Time Between Failures)	1200 years
Mechanical specifications	
Housing	
• Material	• Plastic PA 12
• Color	• Anthracite
Recommended distance to metal	≥ 0 mm
Power supply	Inductive, without battery

	6GT2800-5BE00 6GT2800-6BE00
Permitted ambient conditions	
Ambient temperature	
• during write/read access	• -25 to +85 °C
• outside the read/write field	• -40 to +85 °C
• during storage	• -40 to +85 °C
Degree of protection to EN 60529	IPx9K
Shock-resistant to EN 60721-3-7, Class 7 M3	50 g [1]
Vibration-resistant to EN 60721-3-7, Class 7 M3	20 g [1]
Torsion and bending load	Not permitted
Design, dimensions and weight	
Dimensions (L x W x H)	75 x 75 x 41 mm
Weight	200 g
Type of mounting	2 x M5 screws ≤ 1.5 Nm

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

7.7.6 Dimensional drawing

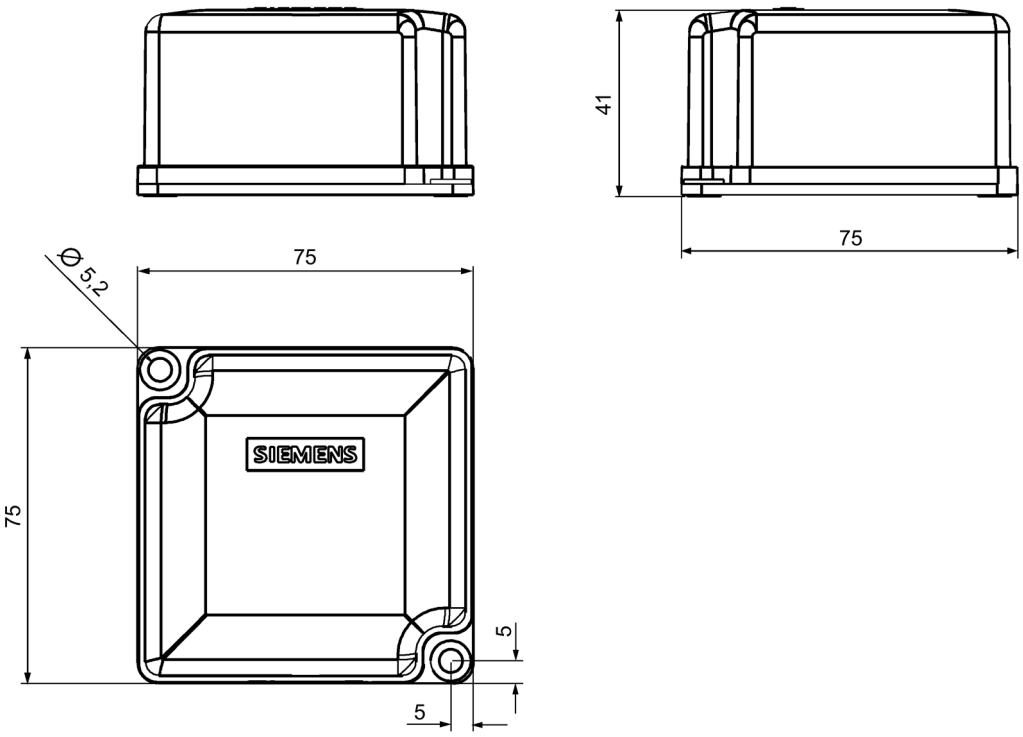


Figure 7-23 RF370T dimension drawing

Dimensions in mm

7.8 SIMATIC RF380T

7.8.1 Features

The SIMATIC RF380T transponder is an extremely rugged and heat-resistant round data carrier suitable e.g. for applications in the automotive industry.

SIMATIC RF380T transponder	Characteristics	
	Area of application	Identification tasks in applications (e.g. automotive industry) with cyclic high temperature stress > 85 °C and < 220 °C Highly resistant to mineral oils, lubricants and cleaning agents Typical applications: • Primer coat, electrolytic dip area, cataphoresis with the associated drying furnaces • Top coat area with drying furnaces • Washing areas at temperatures > 85°C • Other applications with higher temperatures
	Memory size	32 KB FRAM user memory
	Write/read range	see section "Field data of RF300 transponders (Page 49)"
	Mounting on metal	Yes, flush-mounted in metal
	Degree of protection	IP68

7.8.2 Ordering data

Table 7- 18 Ordering data RF380T

	Article number
RF380T User memory 32 KB FRAM (read/write) and 4 bytes EEPROM	6GT2800-5DA00

Table 7- 19 Ordering data for RF380T

	Article number
Holder (short version)	6GT2090-0QA00
Holder (long version)	6GT2090-0QA00-0AX3
Shrouding cover	6GT2090-0QB00
Universal holder	6GT2590-0QA00

7.8.3 Installation guidelines for RF380T

It is essential that you observe the instructions in the Section Installation guidelines (Page 63).

The following section only deals with features specific to the SIMATIC RF380T.

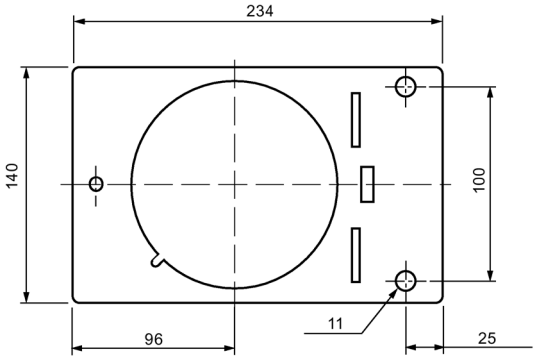
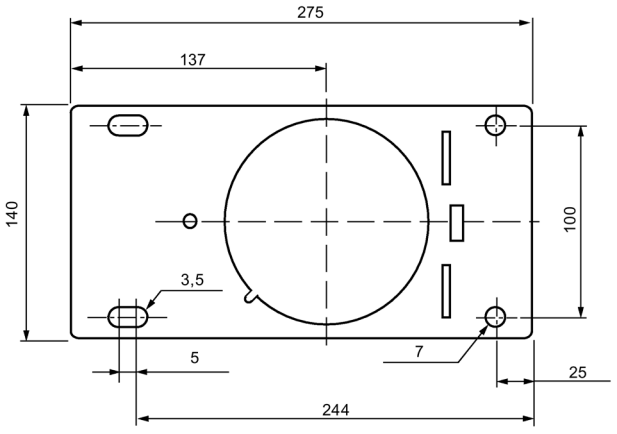
7.8.3.1 Mounting instructions

Note

Only use tag with original holder

You are strongly recommended to only use the tag with the original holder specified. Only this holder guarantees that the data memory observes the listed values for shock, vibration and temperature. A protective cover is recommendable for applications in paint shops.

Data memory holder

Short version (6GT2 090-0QA00)	Long version (6GT2090-0QA00-0AX3)
	
Material: V2A sheet-steel with thickness 2.5 mm BI 2.5 DIN 59382 1.4541	

Assembly of data memory with holder

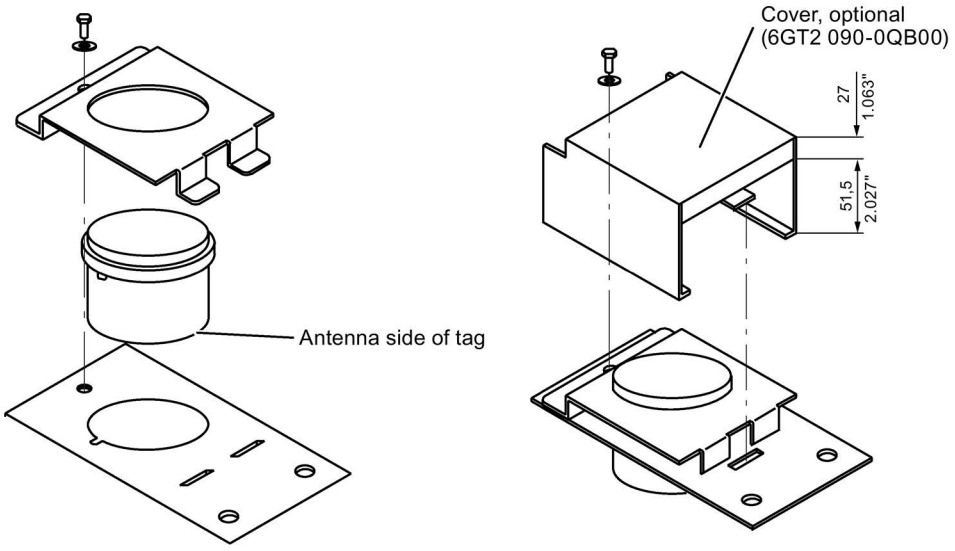


Figure 7-24 Assembly of tag with holder

Scope of supply

The holder is provided with all mounting parts and a mounting diagram. Mounting screws for securing the holder are not included. The mounting screws are of diameter M 10. The minimum length is 25 mm. The optional cover can be used for the long and short versions of the holder.

Universal holder

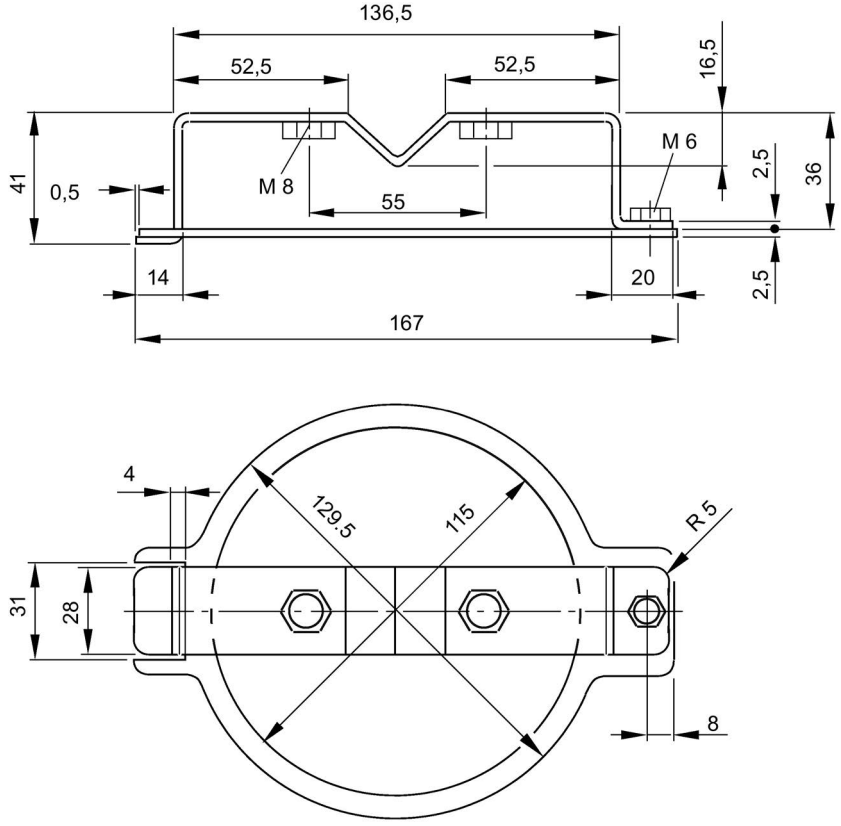


Figure 7-25 Universal holder 6GT2590-0QA00

7.8.3.2 Metal-free area

Direct mounting of the RF380T on metal is permitted.

Mounting of RF380T on metal

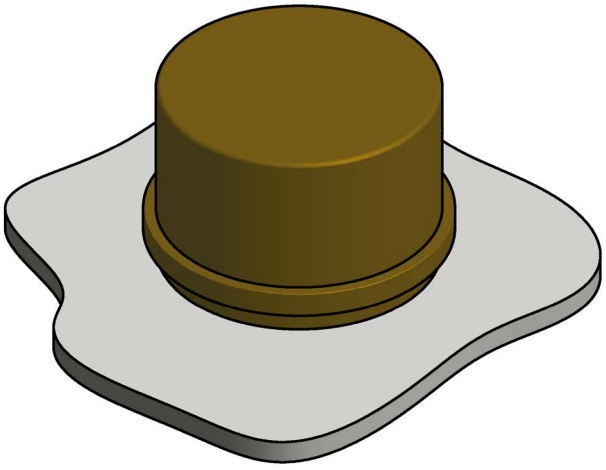


Figure 7-26 Mounting of RF380T on metal

Flush-mounting of RF380T in metal:

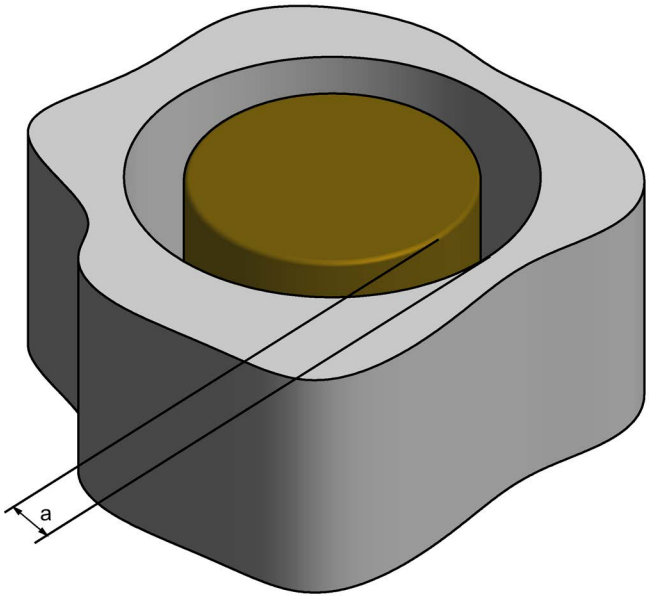


Figure 7-27 RF380T flush-mounted in metal

The standard value for a is ≥ 40 mm. At lower values, the field data change significantly, resulting in a reduction in the range.

7.8.4 Configuring instructions

7.8.4.1 Temperature dependence of the transmission window

The guidelines in the section "Planning the RF300 system" apply to configuration of heat-resistant data memories, with the exception of the limit distance and field length at temperatures above 85 °C. At temperatures above 85 °C, the length of the transmission window is reduced by up to 10%.

7.8.4.2 Temperature response in cyclic operation

At ambient temperatures (T_u) up to 110 °C, cyclic operation is not necessary, i.e. up to this temperature, the transponder can be in constant operation.

Note

Calculation of the temperature curves

Calculation of the temperature curves or of a temperature profile can be carried out on request by Siemens AG. Exact knowledge of the internal temperature facilitates configuration for time-critical applications.

You can also carry out the calculation with the aid of the "SIMATIC RF Temperature Calculator" on the "Ident Systems Software & Documentation" DVD (refer to the section "DVD "Ident Systems Software & Documentation" (Page 419)").

Ambient temperatures > 110 °C

Note

Cancellation of warranty

The internal temperature of the data memory must not exceed the critical threshold of 110 °C. Each heating phase must be followed by a cooling phase. No warranty claims will otherwise be accepted.

Some limit cycles are listed in the table below:

Table 7- 20 Limit cycles of data memory temperature

T_u (heating up)	Heating up	T_u (cooling down)	Cooling down
220 °C	0.5 h	25 °C	> 2 h
200 °C	1 h	25 °C	> 2 h
190 °C	1 h	25 °C	> 1 h 45 min
180 °C	2 h	25 °C	> 5 h
170 °C	2 h	25 °C	> 4 h

The internal temperature of the tag follows an exponential function with which the internal temperature and the operability of the tag can be calculated in advance. This is particularly relevant to temperature-critical applications or those with a complex temperature profile.

Ambient temperatures > 220°C

Note

Cancellation of warranty

The data memory must not be exposed to ambient temperatures > 220 °C. No warranty claims will otherwise be accepted.

However, the mechanical stability is retained up to 230 °C!

Example of a cyclic sequence

Table 7- 21 Typical temperature profile of an application in the paint shop

Start of tag at initial point	Duration (min)	Ambient temperature (°C)
Electrolytic dip	20	30
Electrolytic dip dryer	60	200
Transport	60	25
PVC dryer	25	170
Transport	60	25
Filler dryer	60	160
Transport	60	25
Top coat dryer	60	120
Transport	60	25
Wax dryer	25	100
Transport	150	25

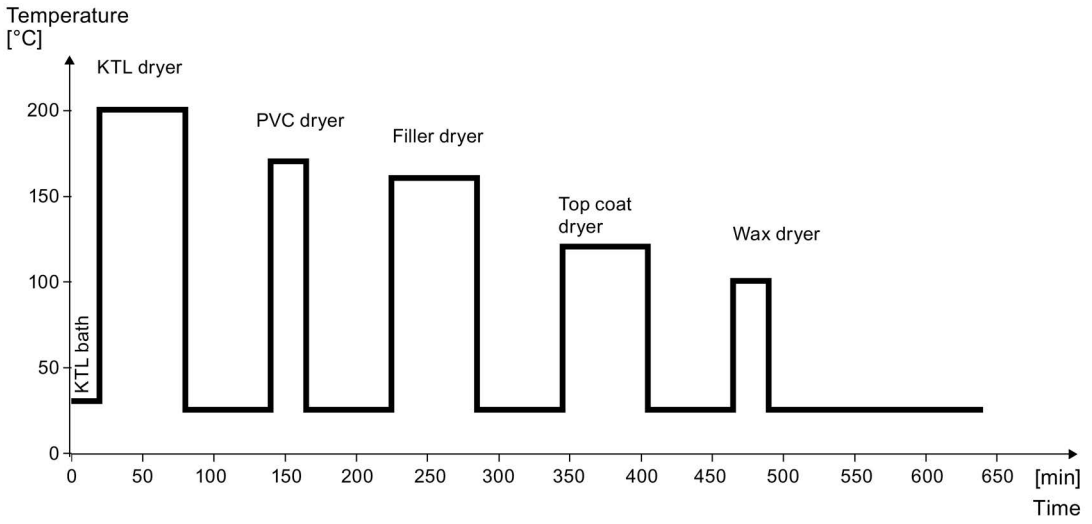


Figure 7-28 Graphic trend of temperature profile from above table

The simulation results in the following:

Following a simulation time of 36.5 hours, a total of 3 cycles were carried out, and an internal temperature of 90 degrees Celsius was reached.

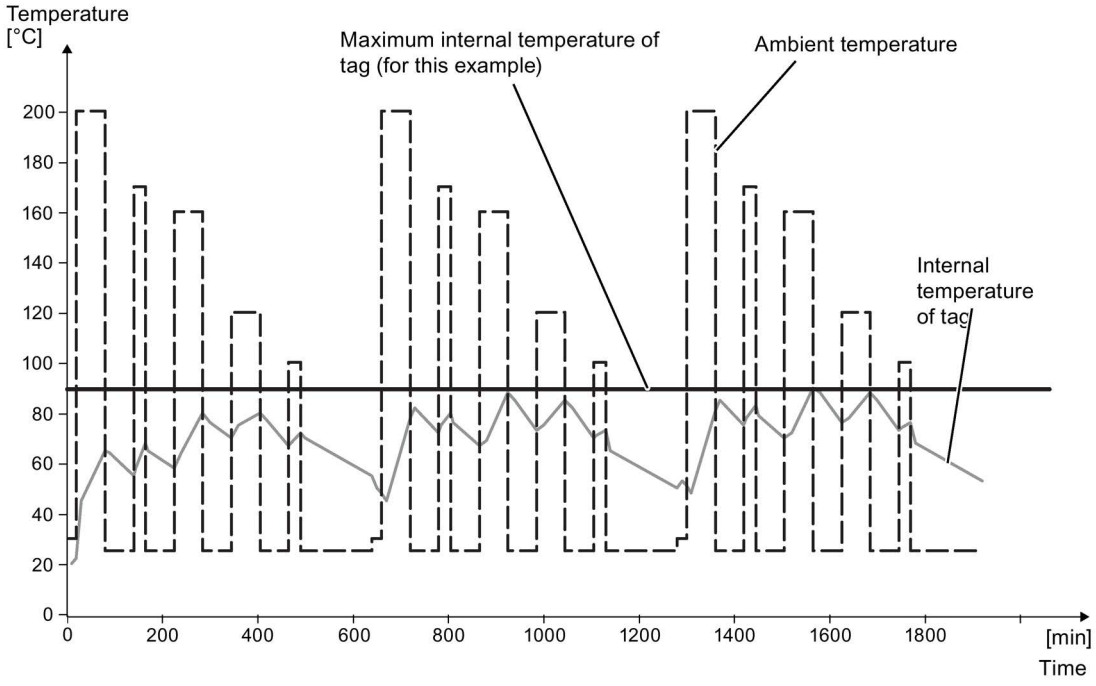


Figure 7-29 Complete temperature response due to simulation

7.8.5 Use of the transponder in the Ex protection area

The TÜV SÜD Automotive GmbH as approved test center as well as the TÜV SÜD Product Service GmbH as certification center, identification number 0123, as per Article 9 of the Directive of the European Council of 23 March 1994 (94/9/EC), has confirmed the compliance with the essential health and safety requirements relating to the design and construction of equipment and protective systems intended for use in hazardous areas as per Annex II of the Directive. The essential health and safety requirements are satisfied in accordance with the following standards:

Table 7- 22 Approvals

Document	Title
EN 60079-0: 2006	Electrical equipment for hazardous gas atmospheres - Part 0: General requirements
EN 60079-15: 2005	Electrical equipment for hazardous gas atmospheres - Part 15: Design, testing and identification of electrical equipment with type of protection "n"
DIN VDE 0848-5: 2001 (in parts)	Safety in electrical, magnetic and electromagnetic fields - Part 5: Explosion protection
ZLS SK 107.1	Central office of the states for safety; test components

Identification

Table 7- 23 The identification of the electrical equipment as an encapsulated unit

	II 3G Ex nC IIB T5
-25°C to +70°C	
Um=30Vdc	

The equipment is assigned the following references:

XXXYYYZZZ [= serial number, is assigned during production]
TPS 09 ATEX 1 459 X [= certificate number]

"No use of the equipment in the vicinity of processes generating high charges"

7.8.5.1 Use of the transponder in hazardous areas for gases

Temperature class delineation for gases

The temperature class of the transponder for hazardous areas depends on the ambient temperature range:

Ambient temperature range	Temperature class
-25 °C to +70 °C	T5

⚠ WARNING

Ignitions of gas-air mixtures

- When using the RF380T transponder, check that the temperature class is kept to in conjunction with the requirements of the area of application.
  If the temperature ranges are exceeded during use of the transponder, gas-air mixtures may be ignited.
- The maximum transmit power of the transmitter used to operate the transponder must not exceed 2 W.
  If the transmit power id not kept to, gas-air mixtures may ignite.

7.8.5.2 Installation and operating conditions for the hazardous area

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.

7.8.6 Cleaning the mobile data memory

Note

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 Chapter Chemical resistance of the transponders (Page 91).

7.8.7 Technical specifications

Table 7- 24 RF380T technical specifications

	6GT2800-5DA00
Product type designation	SIMATIC RF380T
Memory	
Memory organization	in bytes
Memory configuration	
• UID	• 4 bytes EEPROM
• User memory	• 32 KB FRAM
• OPT memory	• 20 bytes EEPROM

	6GT2800-5DA00
Read cycles (at < 40 °C)	> 10^{10}
Write cycles (at < 40 °C)	> 10^{10}
Data retention time (at < 40 °C)	> 10 years
Write/read distance (S_g)	Dependent on the reader used, see section "Field data of RF300 transponders (Page 49)"
MTBF (Mean Time Between Failures)	1177 years

Mechanical specifications	
Housing	
• Material	• PPS
• Color	• Anthracite
Recommended distance to metal	≥ 0 mm
Power supply	Inductive, without battery

Permitted ambient conditions	
Ambient temperature	
• during write/read access	• -25 … +110 °C > 110 °C °C: cyclic operation possible
• outside the read/write field	• -40 ... +220 °C
• during storage	• -40 to +110 °C
Degree of protection to EN 60529	IP68
Shock-resistant to EN 60721-3-7, Class 7 M3	50 g [1)2)]
Vibration-resistant to EN 60721-3-7, Class 7 M3	5 g [2)]
Torsion and bending load	Not permitted

Design, dimensions and weight	
Dimensions (Ø x H)	114 x 83 mm
Weight	900 g
Type of mounting	Holder (must be ordered separately)

1) Applies only in conjunction with the original support

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

7.8.8 Dimensional drawing

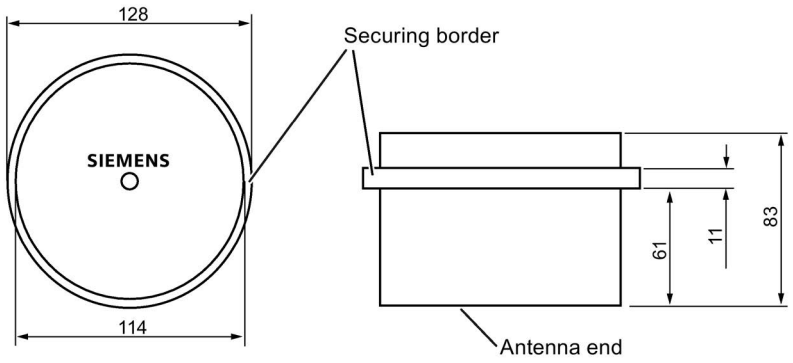


Figure 7-30 Dimension drawing RF380T

Dimensions in mm

ISO transponder

8

Features of the ISO transponders

The transponders (MDS D) that are compatible with ISO 15693 represent a cost-effective alternative to RF300 transponders. The performance that can be achieved with this (transmission speed, memory size), however, is considerably less than with RF300 transponders.

You will find more information on transmission speeds in the section "Communication between communications module, reader and transponder (Page 47)".

8.1 Memory configuration of ISO the transponders

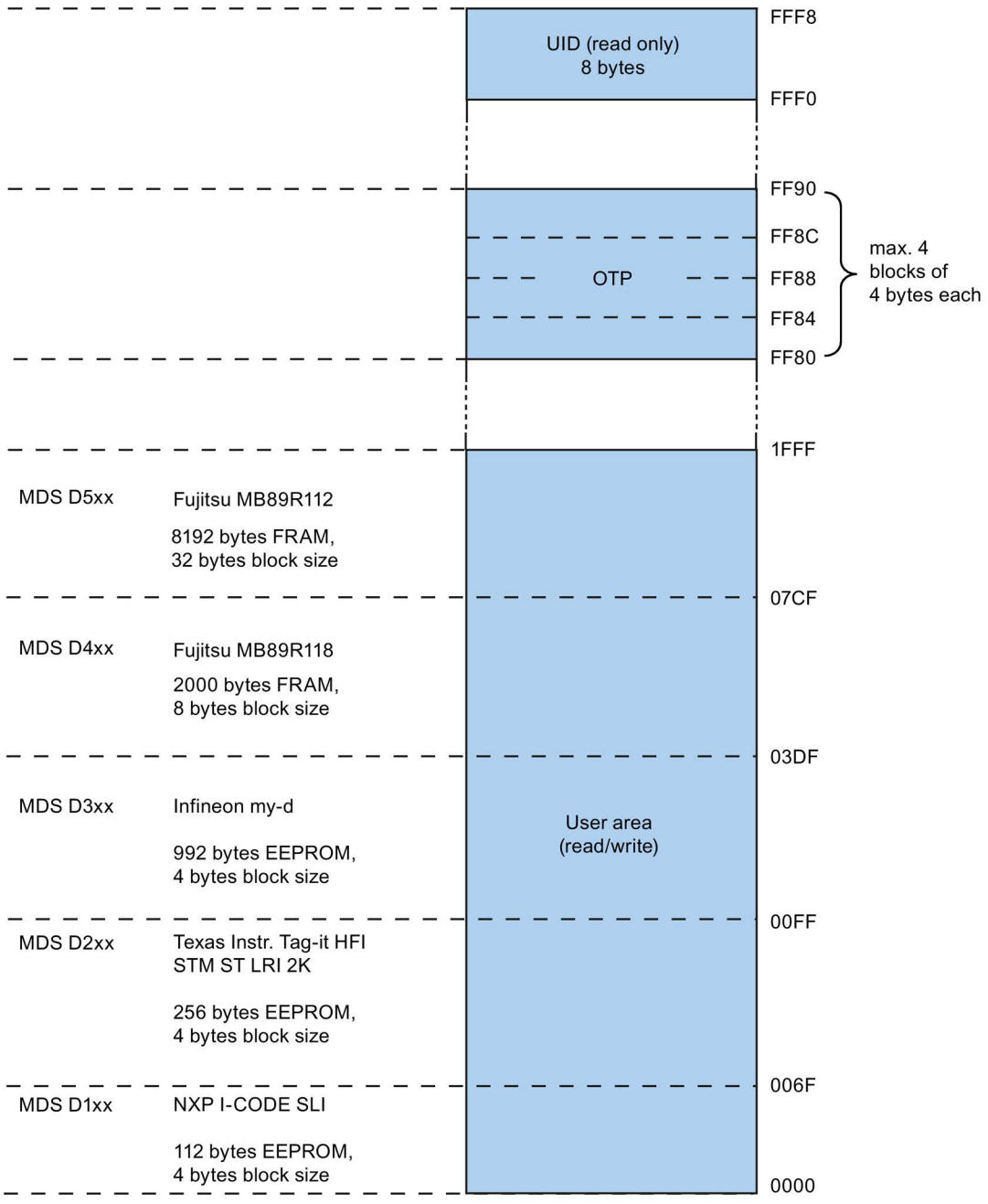


Figure 8-1 Memory configuration of ISO the transponders

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 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.

OTP area

For the OTP area, a 16-byte address space is always reserved at the end of the memory area. The blocks are divided up depending on the chip (see technical specifications). Note that the corresponding addresses for the user data are therefore not available to the application when the OTP area is used.

A total of 4 block addresses ("mapped" addresses) are provided:

- FF80
- FF84
- FF88
- FF8C

A write command to this block address with a valid length (4, 8, 12, 16 bytes depending on the block address) protects the written data from subsequent overwriting.

Note

Exception Fujitsu chip (MDS D4xx and MDS D5xx)

The Fujitsu chip MB89R118 (MDS D4xx) has 8-byte blocks, which means that only 2 block addresses have to be addressed: FF80 and FF88 with the length 8 and 16 bytes).

The Fujitsu chip MB89R112 (MDS D5xx) has 32 byte blocks and can therefore not be addressed in the OTP area.

Note

Restriction to the use of the OTP

Observe the following restrictions when using OTP:

- The OTP write/lock command can only be sent in static operation.
- The OTP write/lock command can not be sent as a chained command.

The Fujitsu chip MB89R112 (MDS D5xx) has 32 byte blocks and can therefore not be addressed in the OTP area.

Note

Use of the OTP area is not reversible

If you use the OPT area, you cannot undo it, because the OPT area can only be written to once.

8.2 MDS D100

8.2.1 Characteristics

MDS D100	Characteristics	
	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 of ISO transponders (MDS D) (Page 51).
	Mounting on metal	Yes, with spacer
	ISO standard	ISO 15693
	Degree of protection	IP68

8.2.2 Ordering data

Table 8- 1 Ordering data for MDS D100

	Article number
MDS D100	6GT2600-0AD10

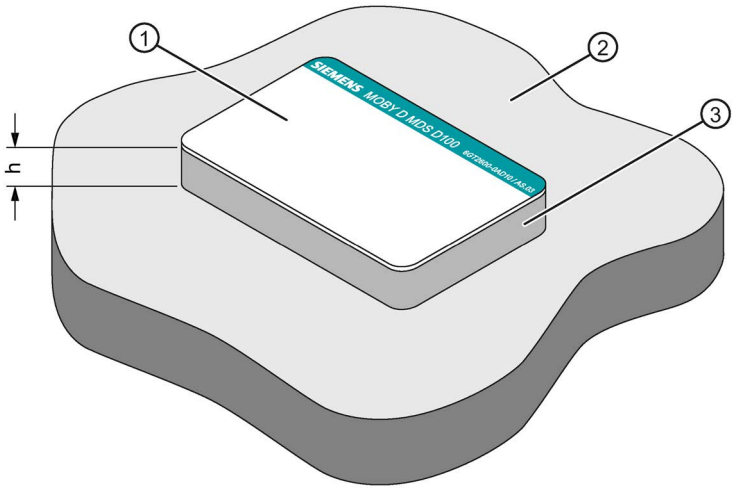
Table 8- 2 Ordering data for MDS D100 accessory

	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

8.2.3 Metal-free area

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

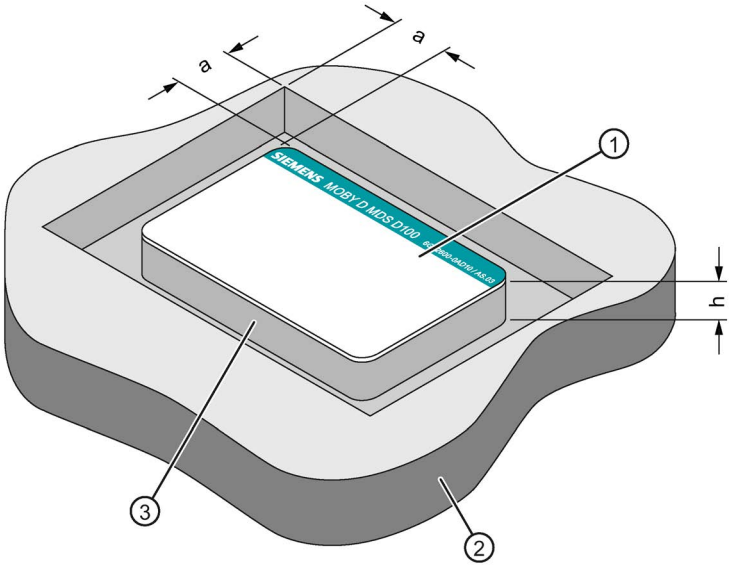
Mounting on metal



h ≥ 20 mm
① Data memory
② Metal
③ Non-metal

Figure 8-2 Mounting of the MDS D100 on metal with spacer

Flush-mounting



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

Figure 8-3 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.

8.2.4 Technical data

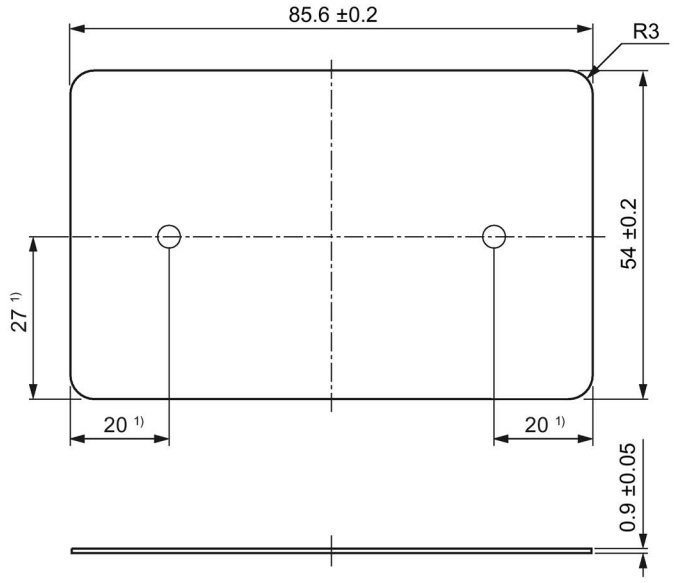
Table 8- 3 Technical specifications for MDS D100

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

	6GT2600-0AD10
Read cycles (at < 40 °C)	> 10^{14}
Write cycles (at < 40 °C)	> 10^{6}
Data retention time (at < 40 °C)	> 10 years
Write/read distance (S_g)	Dependent on the reader used, see section "Field data of ISO transponders (MDS D) (Page 51)"
MTBF (Mean Time Between Failures)	228 years
Mechanical specifications	
Housing	
• Material	• PC
• Color	• White/petrol
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 [1]
Vibration-resistant to EN 60721-3-7, class 7M3	ISO 10373 / ISO 7810 [1]
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	• Fixing pocket • Glued

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

8.2.5 Dimension drawing



Dimensions in mm

1) Dimensions for mounting holes

Figure 8-4 MDS D100 dimension drawing

8.3 MDS D117

8.3.1 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 of ISO transponders (MDS D) (Page 51)."
	Mounting in metal	Yes, flush-mounted in metal
	ISO standard	ISO 15693
	Degree of protection	IP68/IPx9K

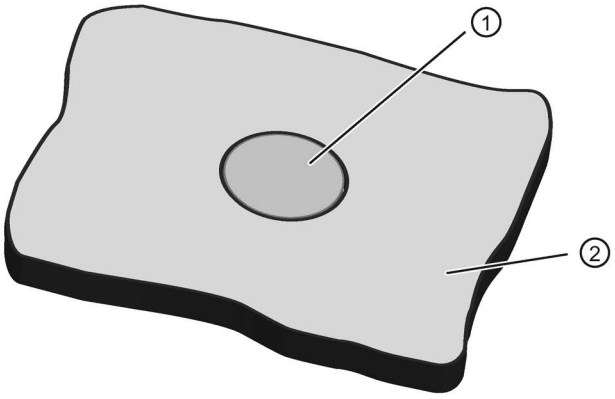
8.3.2 Ordering data

Table 8- 4 Ordering data for MDS D117

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

8.3.3 Mounting in metal

Flush-mounted in metal



① Transponder
② Metal

8.3.4 Technical specifications

Table 8- 5 Technical specifications for MDS D117

	6GT2600-0AG00
Product type designation	SIMATIC MDS D117
Memory	
Memory configuration	
• UID	• 8 bytes
• User memory	• 112 bytes EEPROM
• OPT memory	• 16 bytes (EEPROM)
Read cycles (at < 40 °C)	> 10^{14}
Write cycles (at < 40 °C)	> 10^{6}
Data retention time (at < 40 °C)	> 10 years
Write/read distance (S_g)	Dependent on the reader used, see section "Field data of ISO transponders (MDS D) (Page 51)"
MTBF (Mean Time Between Failures)	228 years
Mechanical specifications	
Housing	
• Material	• PPS
• Color	• Black

	6GT2600-0AG00
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
Shock-resistant to EN 60721-3-7 class 7M3	100 g [1]
Vibration-resistant to EN 60721-3-7, class 7M3	20 g [1]
Torsion and bending load	Not permitted
Design, dimensions and weight	
Dimensions (Ø x H)	4 x 5.2 mm
Weight	1 g
Type of mounting	• Fixing pocket • Glued

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

8.3.5 Dimension drawing

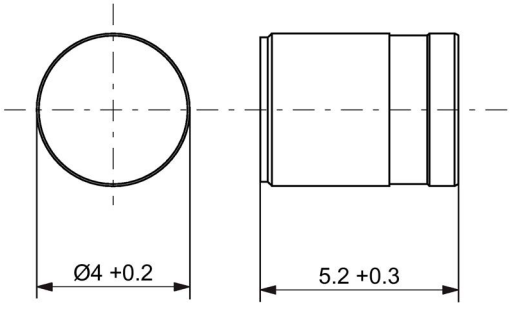


Figure 8-5 Dimensions in mm

8.4 MDS D124

8.4.1 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 of ISO transponders (MDS D) (Page 51)".
	Mounting on metal	Yes, with spacer
	ISO standard	ISO 15693
	Degree of protection	IP68/IPx9K

8.4.2 Ordering data

Table 8- 6 Ordering data for MDS D124

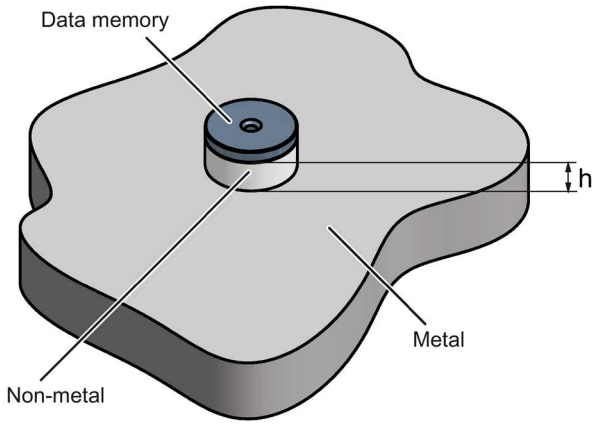
	Article number
MDS D124	6GT2600-0AC10

Table 8- 7 Ordering data for MDS D124 accessories

	Article number
Spacer	6GT2690-0AK00

8.4.3 Mounting on metal

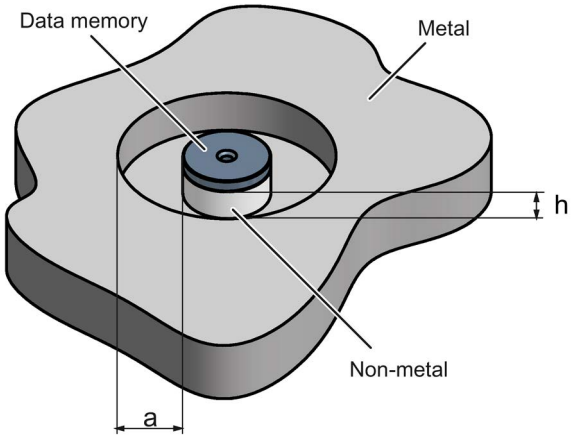
Mounting on metal



h ≥ 15 mm

Figure 8-6 Mounting the MDS D124/D324/D424/D524/E624 and RF320T on metal with spacer

Flush-mounting



h ≥ 15 mm

a ≥ 25 mm

Figure 8-7 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.

8.4.4 Technical specifications

Table 8- 8 Technical specifications for MDS D124

	6GT2600-0AC10
Product type designation	SIMATIC MDS D124
Memory	
Memory configuration	
• UID	• 8 bytes
• User memory	• 112 bytes EEPROM
• OPT memory	• 16 bytes (EEPROM)
Read cycles (at < 40 °C)	> 10^{14}
Write cycles (at < 40 °C)	> 10^{6}
Data retention time (at < 40 °C)	> 10 years
Write/read distance (S_g)	Dependent on the reader used, see section "Field data of ISO transponders (MDS D) (Page 51)"
MTBF (Mean Time Between Failures)	228 years
Mechanical specifications	
Housing	
• Material	• PPS
• Color	• Black
Recommended distance to metal	≥ 15 mm
Power supply	Inductive, without battery
Permitted ambient conditions	
Ambient temperature	
• during write/read access	• -25 to +180 °C
	• from +125 °C: 20% reduction in the limit distance
	• from +140 °C: No processing possible

	6GT2600-0AC10
	• at +180 °C: Tested up to 5000 hours or 3000 cycles
• outside the read/write field	• -40 to +180 °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-resistant to EN 60721-3-7 class 7M3	100 g [1]
Vibration-resistant to EN 60721-3-7, class 7M3	20 g [1]
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	• 1 x M3 screw [2] ≤ 1 Nm • Glued • With spacer

[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.

8.4.5 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 8- 9 Ambient temperature

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

8.4.6 Dimension drawing

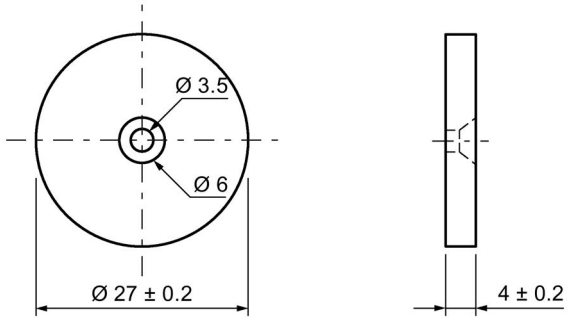


Figure 8-8 Dimension drawing of MDS D124

All dimensions in mm

8.5 MDS D126

8.5.1 Characteristics

MDS D126	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	112 bytes of EEPROM user memory
	Write/read range	See section Field data of ISO transponders (MDS D) (Page 51)
	Mounting on metal	Yes, with spacer
	ISO standard	ISO-15693
	Degree of protection	IP68

8.5.2 Ordering data

Table 8- 10 Ordering data for MDS D126

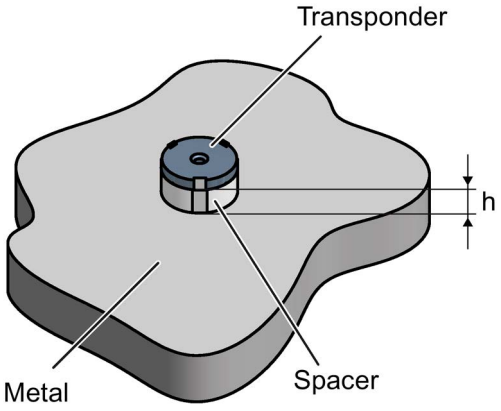
	Article number
MDS D126	6GT2600-0AE00

Table 8- 11 Ordering data for MDS D126 accessories

	Article number
Spacer	6GT2690-0AL00

8.5.3 Mounting on metal

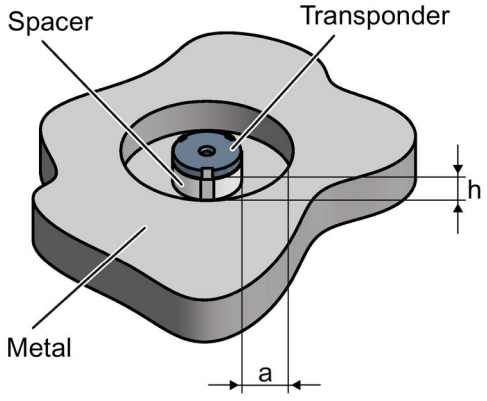
Mounting on metal



h ≥ 25 mm

Figure 8-9 Mounting the MDS D126 / D426 / D526 on metal with spacer

Flush-mounted in metal



h ≥ 25 mm

a ≥ 50 mm

Figure 8-10 Flush installation of the MDS D126 / D426 / D526 in metal with spacer

8.5.4 Technical specifications

Table 8- 12 Technical specifications for the MDS D126

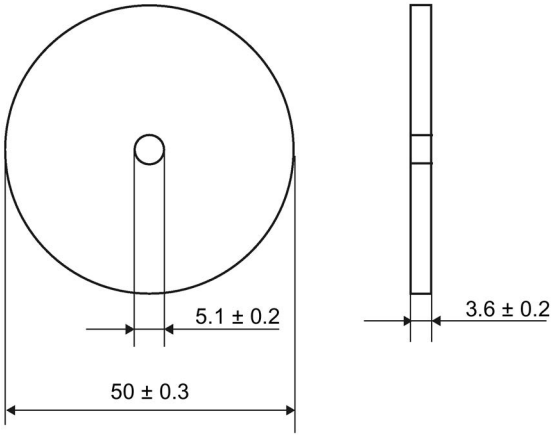
	6GT2600-0AE00
Product type designation	SIMATIC MDS D126
Memory	
Memory configuration	
• UID	• 8 bytes
• User memory	• 112 bytes EEPROM
• OPT memory	• 16 bytes (EEPROM)
Read cycles (at < 40 °C)	> 10^{14}
Write cycles (at < 40 °C)	> 10^{6}
Data retention time (at < 40 °C)	> 10 years
Write/read distance (S_g)	Dependent on the reader used, see section "Field data of ISO transponders (MDS D) (Page 51)"
MTBF (Mean Time Between Failures)	228 years
Mechanical specifications	
Housing	
• Material	• PA6.6 GF
• Color	• Black
Recommended distance to metal	≥ 25 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 +100 °C
• during storage	• -40 to +100 °C
Degree of protection to EN 60529	IP68 2 hours, 2 bar, +20 °C
Shock-resistant to EN 60721-3-7 class 7M3	50 g [1)]
Vibration-resistant to EN 60721-3-7, class 7M3	20 g [1)]
Torsion and bending load	Not permitted

	6GT2600-0AE00
Design, dimensions and weight	
Dimensions (Ø x H)	50 x 3.6 mm
Weight	13 g
Type of mounting	• 1 x M4 screw [2)] ≤ 1 Nm • Glued

[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.

8.5.5 Dimension drawing



Dimensions in mm

Figure 8-11 Dimension drawing of MDS D126

8.6 MDS D127

8.6.1 Features

MDS D127	Characteristics	
	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 of ISO transponders (MDS D) (Page 51)"
	Mounting on metal	Yes, flush-mounted in metal
	ISO standard	ISO 15693
	Degree of protection	IP68/IPx9K

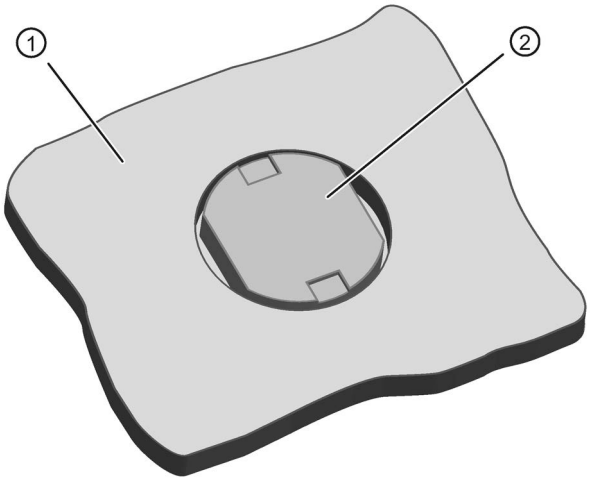
8.6.2 Ordering data

Table 8- 13 Ordering data for MDS D127

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

8.6.3 Mounting in metal

Flush-mounted in metal



① Metal
② Transponders

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.

Figure 8-12 Screw-in aid for mounting the MDS D127

8.6.4 Technical specifications

Table 8- 14 Technical specifications for MDS D127

	6GT2600-0AF00
Product type designation	SIMATIC MDS D127
Memory	
Memory configuration	
• UID	• 8 bytes
• User memory	• 112 bytes EEPROM
• OPT memory	• 16 bytes (EEPROM)
Read cycles (at < 40 °C)	> 10^{14}
Write cycles (at < 40 °C)	> 10^{6}
Data retention time (at < 40 °C)	> 10 years
Write/read distance (S_g)	Dependent on the reader used, see section "Field data of ISO transponders (MDS D) (Page 51)"
MTBF (Mean Time Between Failures)	228 years
Mechanical specifications	
Housing	
• Material	• PA6
• Color	• Black
Recommended distance to metal	≥ 0 mm
Power supply	Inductive, without battery
Permitted ambient conditions	
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	• IP68 2 hours, 2 bar, +20 °C • IPx9K steam jet: 150 mm; 10 to 15 l/min; 100 bar; 75 °C
Shock-resistant to EN 60721-3-7 class 7M3	100 g [1)]
Vibration-resistant to EN 60721-3-7, class 7M3	20 g [1)]
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	• Glued • 1 x M3 screw

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

8.6.5 Dimension drawing

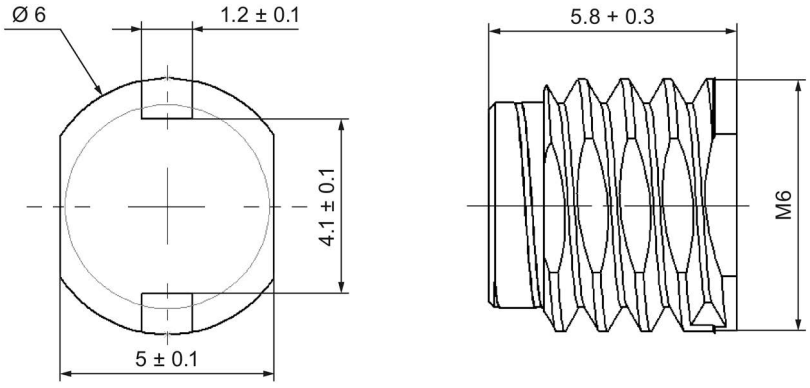


Figure 8-13 Dimensions in mm

8.7 MDS D139

8.7.1 Characteristics

MDS D139	Characteristics	
	Area of application	Applications in production logistics and in assembly lines subject to high temperatures (up to +220 °C) Typical application areas: • Paintshops and their preparatory treatments) • Primer coat, electrolytic dip area, cataphoresis with the associated drying furnaces • Top coat area with drying furnaces • Washing areas at temperatures > 85 °C • Other applications with higher temperatures
	Memory size	112 bytes of EEPROM user memory
	Write/read range	See section Field data of ISO transponders (MDS D) (Page 51).
	Mounting on metal	Yes, with spacer
	ISO standard	ISO 15693
	Degree of protection	IP68/IPx9K

Note

Compatibility with SIMATIC RF300 depending on the article number

The transponder MDS D139 with article number 6GT2600-0AA10 is compatible with the SIMATIC RF300 system. The transponder MDS D139 with article number 6GT2600-0AA00 is not compatible.

8.7.2 Ordering data

Table 8- 15 Ordering data for MDS D139

	Article number
MDS D139	6GT2600-0AA10

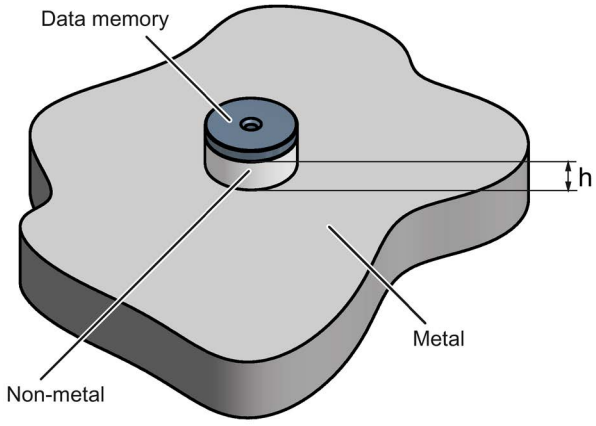
Table 8- 16 Ordering data for MDS D139 accessory

	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

8.7.3 Mounting on metal

Direct mounting of the MDS D139/D339 on metal is not allowed. A distance of ≥ 30 mm is recommended. This can be achieved using spacers (see "Ordering data (Page 425)").

Mounting on metal

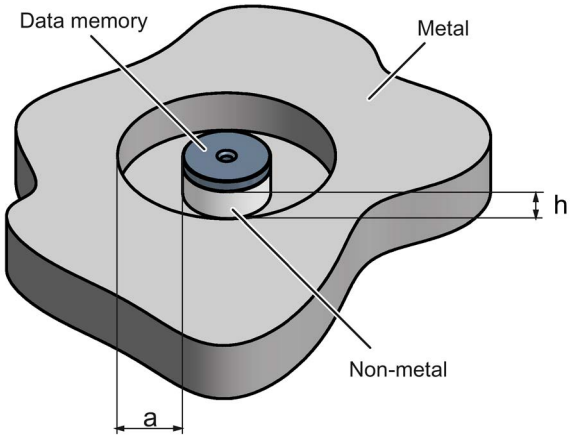


h ≥ 30 mm

Figure 8-14 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 ≥ 30 mm

a ≥ 100 mm

Figure 8-15 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.

8.7.4 Cleaning the mobile data memory

Note

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 Chapter Chemical resistance of the transponders (Page 91).

8.7.5 Technical specifications

Table 8- 17 Technical specifications for MDS D139

	6GT2600-0AA10
Product type designation	SIMATIC MDS D139
Memory	
Memory configuration	
• UID	• 8 bytes
• User memory	• 112 bytes EEPROM
• OPT memory	• 16 bytes (EEPROM)
Read cycles (at < 40 °C)	> 10^{14}
Write cycles (at < 40 °C)	> 10^{6}
Data retention time (at < 40 °C)	> 10 years
Write/read distance (S_g)	Dependent on the reader used, see section "Field data of ISO transponders (MDS D) (Page 51)"
MTBF (Mean Time Between Failures)	228 years
Mechanical specifications	
Housing	
• Material	• PPS
• Color	• Black
Recommended distance to metal	≥ 30 mm
Power supply	Inductive, without battery
Permitted ambient conditions	
Ambient temperature	
• during write/read access	• -25 to +220 °C
	• from +125 °C: 20% reduction in the limit distance
	• from +140 °C: No processing possible
	• at +200 °C: Tested up to 5000 hours or 6000 cycles
	• at +220 °C: Tested up to 2000 hours or 2000 cycles
• outside the read/write field	• -40 to +220 °C
• during storage	• -40 to +100 °C

	6GT2600-0AA10
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-resistant to EN 60721-3-7 class 7M3	50 g [1)]
Vibration-resistant to EN 60721-3-7, class 7M3	20 g [1)]
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 [2)] 1.5 Nm

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

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

8.7.6 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:

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

8.7.7 Dimension drawings

Dimensional drawing of MDS D139

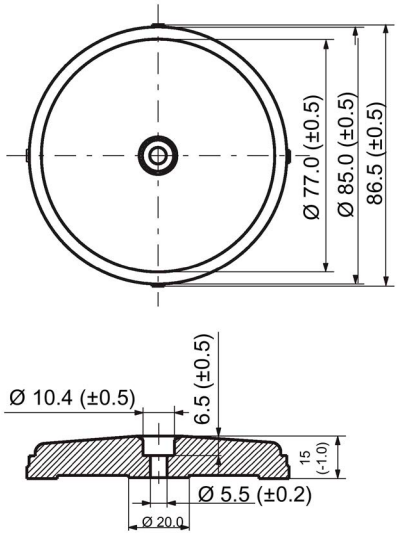


Figure 8-16 Dimensional drawing of MDS D139

Dimensions in mm

8.8 MDS D160

8.8.1 Characteristics

MDS D160	Characteristics	
	Area of application	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. Typical applications are, for example: • Rented work clothing • Hotel laundry • Surgical textiles • Hospital clothing • Dirt collection mats • Clothing for nursing homes/hostels
	Memory size	112 bytes of EEPROM user memory
	Write/read range	See section Field data of ISO transponders (MDS D) (Page 51).
	Mounting on metal	Yes, with spacer
	ISO standard	ISO 15693
	Degree of protection	IP68/IPx9K

8.8.2 Information for RF300 compatibility

Note

Compatibility with SIMATIC RF300 depending on MLFB number

Only the MDS D160 with MLFB 6GT2600-0AB10 is compatible with SIMATIC RF300.

8.8.3 Ordering data

Table 8- 18 Ordering data for MDS D160

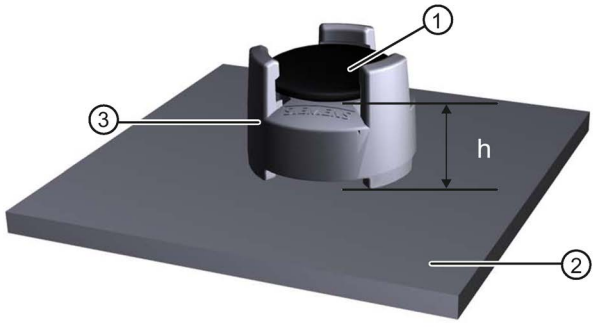
	Article number
MDS D160	6GT2600-0AB10

Table 8- 19 Ordering data for MDS D160 accessories

	Article number
Spacer	6GT2690-0AG00

8.8.4 Mounting on metal

Mounting on metal



① Transponder
② Metal carrier
③ Spacer
h ≥ 10 mm

Figure 8-17 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!

8.8.5 Technical specifications

Table 8- 20 Technical specifications for the MDS D160

	6GT2600-0AB10
Product type designation	SIMATIC MDS D160
Memory	
Memory configuration	
• UID	• 8 bytes
• User memory	• 112 bytes EEPROM
• OPT memory	• 16 bytes (EEPROM)
Read cycles (at < 40 °C)	> 10^{14}
Write cycles (at < 40 °C)	> 10^{6}
Data retention time (at < 40 °C)	> 10 years
Write/read distance (S_g)	Dependent on the reader used, see section "Field data of ISO transponders (MDS D) (Page 51)"
MTBF (Mean Time Between Failures)	228 years
Mechanical specifications	
Housing	
• Material	• PPS
• Color	• beige
Recommended distance to metal	≥ 10 mm
Power supply	Inductive, without battery
Permitted ambient conditions	
Ambient temperature	
• during write/read access	• -25 … +85 °C
	• -40 … +175 °C
	• from +125 °C: for 1000 hours, 20% reduction of the limit distance
	• from +140 °C: No processing possible
	• at +175 °C: 100 washing cycles tested
	• at +220 °C: Tested once for up to 30 seconds

	6GT2600-0AB10
• outside the read/write field	• -40 to +175 °C
• during storage	• -25 to +100 ℃
Mechanical strength	
• 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-resistant to IEC 68-2-27	40 g [1)] 18 ms; 6 axes; 2000 repetitions/h
Vibration-resistant to IEC 68-2-6	10 g [1)] 10 to 2000 Hz; 3 axes; 2.5 h
Torsion and bending load	Not permitted
Design, dimensions and weight	
Dimensions (Ø x H)	16 x 3 mm
Weight	1.2 g
Type of mounting	• Patched • Sewn in • Glued

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

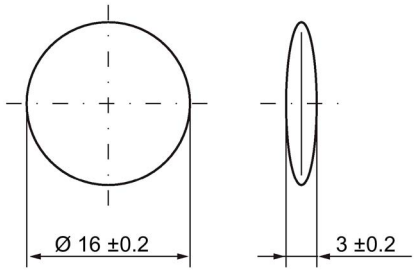
Note

Regeneration time between washing cycles

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

8.8.6 Dimension drawings

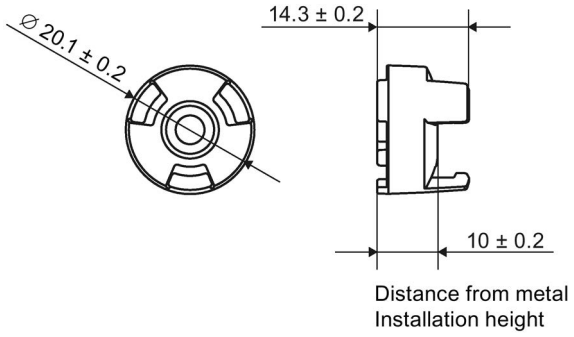
Dimensional drawing of MDS D160



Dimensions in mm

Figure 8-18 Dimensional drawing of MDS D160

Dimensional drawing of spacer



Dimensions in mm

Figure 8-19 Dimensional drawing of spacer

8.9 MDS D165

8.9.1 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 of ISO transponders (MDS D) (Page 51).
	Mounting on metal	Yes, with spacer
	ISO standard	ISO 15693
	Degree of protection	IP65

8.9.2 Ordering data

Table 8- 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)

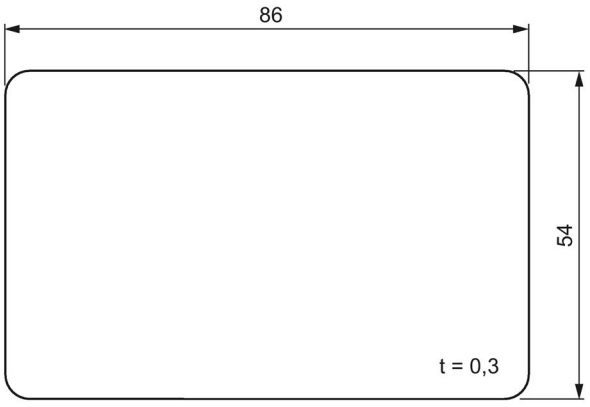
8.9.3 Technical data

Table 8- 22 Technical specifications for MDS D165

	6GT2600-1AB00-0AX0
Product type designation	SIMATIC MDS D165
Memory	
Memory configuration	
• UID	• 8 bytes

			6GT2600-1AB00-0AX0
• User memory	• 112 bytes EEPROM		
• OPT memory	• 16 bytes (EEPROM)		
Read cycles (at < 40 °C)	> 10^{14}		
Write cycles (at < 40 °C)	> 10^{6}		
Data retention time (at < 40 °C)	> 10 years		
Write/read distance (S_g)	Depending on the reader used, see section "Field data of ISO transponders (MDS D) (Page 51)"		
MTBF (Mean Time Between Failures)	228 years		
Mechanical specifications			
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		
Permitted ambient conditions			
Ambient temperature			
• during write/read access	• -25 to +85 °C		
• outside the read/write field	• -25 to +85 °C		
• during storage	• +20 to +30 °C Can be stored for 2 years, determined by the durability of the adhesive.		
Degree of protection	IP65		
Design, dimensions and weight			
Dimensions (L x W x H)	86 x 54 x 0.3 mm		
Weight	1 g		
Type of mounting	Glued with self-adhesive label		

8.9.4 Dimension drawing



Dimensions in mm

Figure 8-20 Dimension drawing of MDS D165

8.10 MDS D200

8.10.1 Features

MDS D200	Characteristics	
	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 of ISO transponders (MDS D) (Page 51).
	Mounting on metal	Yes, with spacer
	ISO standard	15693 with Tag-it HFI technology
	Degree of protection	IP67

8.10.2 Ordering data

Table 8- 23 Ordering data for MDS D200

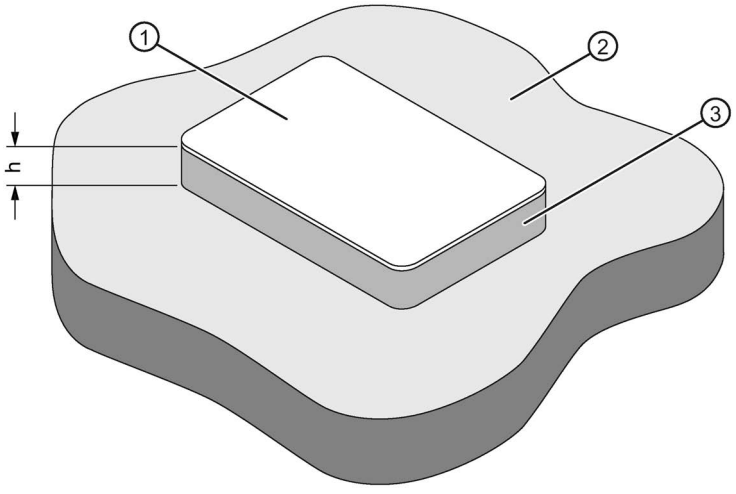
	Article number
MDS D200 (special version ISO-CARD)	6GT2600-1AD00-0AX0

Table 8- 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

8.10.3 Mounting on metal

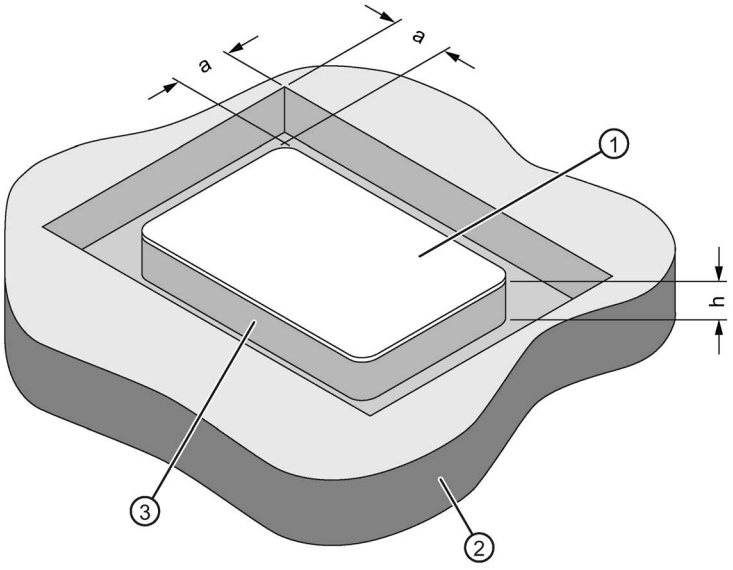
Mounting on metal



h ≥ 20 mm
① Data memory
② Metal
③ Non-metal

Figure 8-21 Mounting of the MDS D200 on metal with spacer

Flush-mounting



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

Figure 8-22 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.

8.10.4 Technical data

Table 8- 25 Technical specifications for MDS D200

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

	6GT2600-1AD00-0AX0
• OTP memory	• 16 bytes (EEPROM)
Read cycles (at < 25 °C)	> 10^{14}
Write cycles (at < 25 °C)	> 10^{6}
Data retention time (at < 25 °C)	> 10 years
Write/read distance (S_g)	Dependent on the reader used, see section "Field data of ISO transponders (MDS D) (Page 51)"
MTBF (Mean Time Between Failures)	228 years

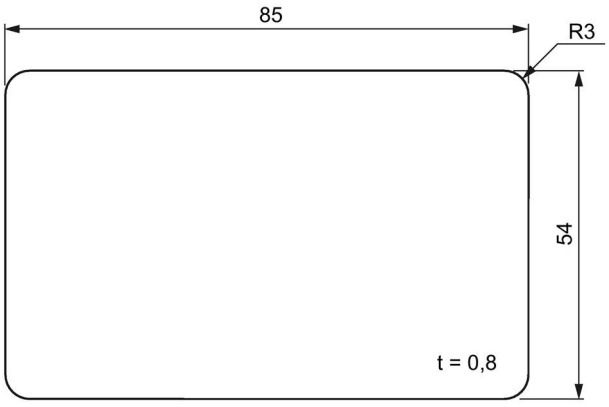
Mechanical specifications	
Housing	
• Material	• PET
• Color	• White
Recommended distance to metal	≥ 20 mm
Power supply	Inductive, without battery

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 [1]
Vibration-resistant to EN 60721-3-7, class 7M3	ISO 10373 / ISO 7810 [1]
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	• Fixing pocket • Glued

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

8.10.5 Dimension drawing



Dimensions in mm

Figure 8-23 Dimension drawing of MDS D200

8.11 MDS D261

8.11.1 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 of ISO transponders (MDS D) (Page 51).
	Mounting on metal	Yes, with spacer
	ISO standard	ISO 15693
	Degree of protection	IP65

8.11.2 Ordering data

Table 8- 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)

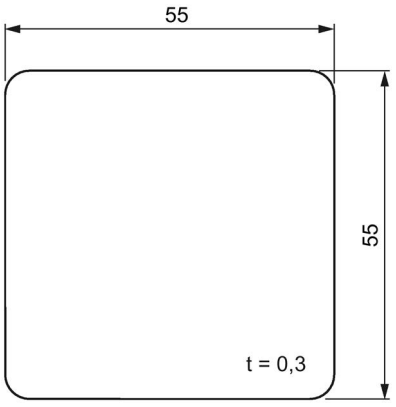
8.11.3 Technical data

Table 8- 27 Technical specifications of MDS D261

	6GT2600-1AA01-0AX0
Product type designation	SIMATIC MDS D261
Memory	
Memory configuration	
• UID	• 8 bytes

			6GT2600-1AA01-0AX0
• User memory	• 256 bytes EEPROM		
• OTP memory	• 16 bytes (EEPROM)		
Read cycles (at < 40 °C)	> 10^{14}		
Write cycles (at < 40 °C)	> 10^{6}		
Data retention time (at < 40 °C)	> 10 years		
Write/read distance (S_g)	Dependent on the reader used, see section "Field data of ISO transponders (MDS D) (Page 51)"		
MTBF (Mean Time Between Failures)	228 years		
Mechanical specifications			
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		
Permitted ambient conditions			
Ambient temperature			
• during write/read access	• -25 to +85 °C		
• outside the read/write field	• -25 to +85 °C		
• During transportation and storage	• +20 to +30 °C Can be stored for 2 years, determined by the durability of the adhesive		
Degree of protection	IP65		
Design, dimensions and weight			
Dimensions (L x W x H)	55 x 55 x 0.3 mm		
Weight	1 g		
Type of mounting	Glued with self-adhesive label		

8.11.4 Dimension drawing



Dimensions in mm

Figure 8-24 Dimension drawing of MDS D261

8.12 MDS D324

8.12.1 Characteristics

MDS D324	Characteristics	
	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 of ISO transponders (MDS D) (Page 51)."
	Mounting on metal	Yes, with spacer
	ISO standard	ISO 15693
	Degree of protection	IP67; IPx9K

8.12.2 Ordering data

Table 8- 28 Ordering data MDS D324

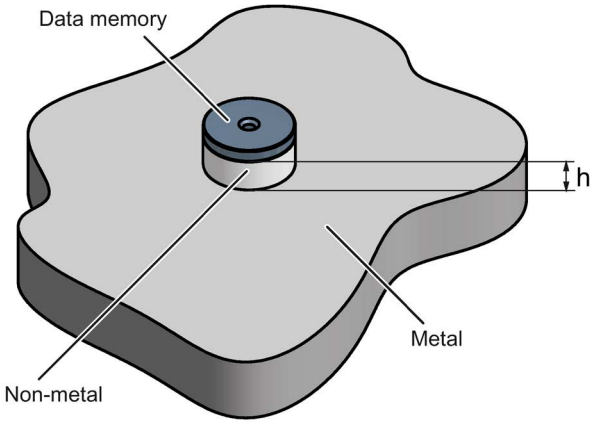
	Article number
MDS D324	6GT2600-3AC00

Table 8- 29 Ordering data MDS D324 accessories

	Article number
Spacer	6GT2690-0AK00

8.12.3 Mounting on metal

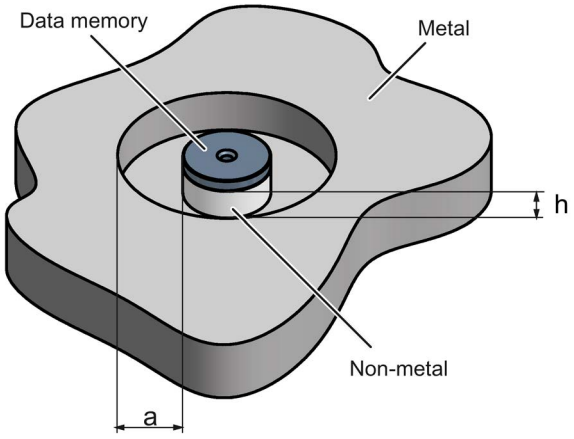
Mounting on metal



h ≥ 15 mm

Figure 8-25 Mounting the MDS D124/D324/D424/D524/E624 and RF320T on metal with spacer

Flush-mounting



h ≥ 15 mm

a ≥ 25 mm

Figure 8-26 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.

8.12.4 Technical specifications

Table 8- 30 Technical specifications of MDS D324

	6GT2600-3AC00
Product type designation	SIMATIC MDS D324
Memory	
Memory configuration	
• UID	• 8 bytes
• User memory	• 992 bytes EEPROM
• OPT memory	• 16 bytes (EEPROM)
Read cycles (at < 40 °C)	> 10^{14}
Write cycles (at < 40 °C)	> 10^{6}
Data retention time (at < 40 °C)	> 10 years

	6GT2600-3AC00
Write/read distance (S_g)	Dependent on the reader used, see section "Field data of ISO transponders (MDS D) (Page 51)"
MTBF (Mean Time Between Failures)	228 years

Mechanical specifications	
Housing	
• Material	• Epoxy resin
• Color	• Black
Recommended distance to metal	≥ 15 mm
Power supply	Inductive, without battery

Permitted ambient conditions	
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
Degree of protection to EN 60529	• IP67 • IPx9K
Shock-resistant to EN 60721-3-7 class 7M3	100 g [1)]
Vibration-resistant to EN 60721-3-7, class 7M3	20 g [1)]
Torsion and bending load	Not permitted

Design, dimensions and weight	
Dimensions (Ø x H)	27 x 4 mm
Weight	5 g
Type of mounting	• 1 x M3 screw [2)] ≤ 1 Nm • Glued

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.

8.12.5 Dimension drawing

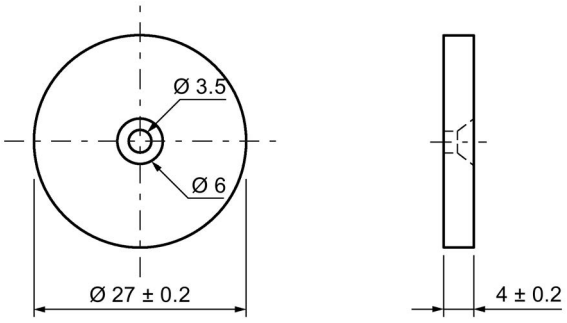


Figure 8-27 Dimension drawing of MDS D324

All dimensions in mm

8.13 MDS D339

8.13.1 Characteristics

MDS D339	Characteristics	
	Area of application	Applications in production automation with high temperature demands (up to +220 °C) Typical application areas: • Paintshops and their preparatory treatments • Primer coat, electrolytic dip area, cataphoresis with the associated drying furnaces • Top coat area with drying furnaces • Washing areas at temperatures > 85 °C • Other applications with higher temperatures
	Memory size	992 bytes of EEPROM user memory
	Write/read range	See section Field data of ISO transponders (MDS D) (Page 51).
	Mounting on metal	Yes, with spacer
	ISO standard	ISO 15693
	Degree of protection	IP68/IPx9K

8.13.2 Ordering data

Table 8- 31 Ordering data for MDS D339

	Article number
MDS D339	6GT2600-3AA10

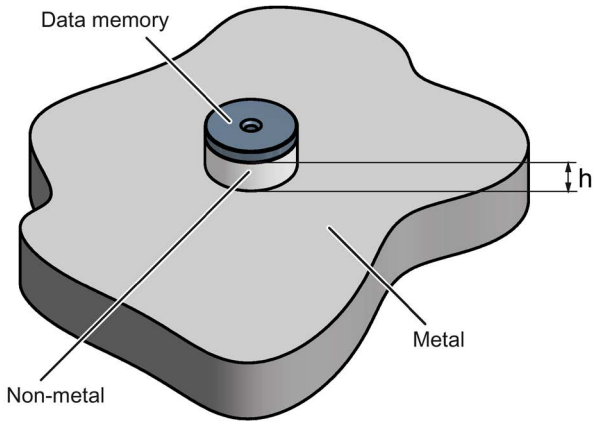
Table 8- 32 Ordering data for MDS D339 accessories

	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

8.13.3 Mounting on metal

Direct mounting of the MDS D139/D339 on metal is not allowed. A distance of ≥ 30 mm is recommended. This can be achieved using spacers (see "Ordering data (Page 312)").

Mounting on metal

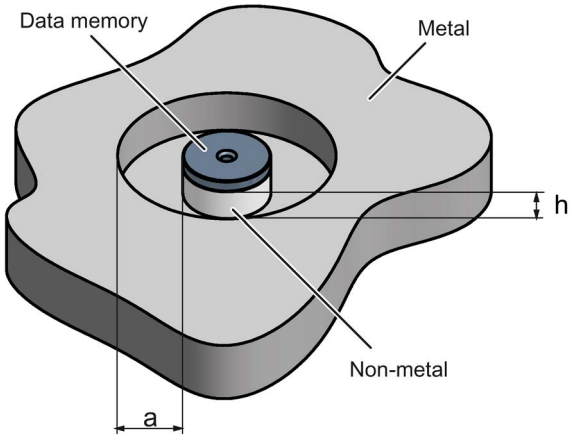


h ≥ 30 mm

Figure 8-28 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 ≥ 30 mm

a ≥ 100 mm

Figure 8-29 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.

8.13.4 Cleaning the mobile data memory

Note

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 cleaning agents listed in the section "Chemical resistance of the MDS".

8.13.5 Technical specifications

Table 8- 33 Technical specifications of MDS D339

	6GT2600-3AA10
Product type designation	SIMATIC MDS D339
Memory	
Memory configuration	
• UID	• 8 bytes
• User memory	• 992 bytes EEPROM
• OPT memory	• 16 bytes (EEPROM)
Read cycles (at < 40 °C)	> 10^{14}
Write cycles (at < 40 °C)	> 10^{6}
Data retention time (at < 40 °C)	> 10 years
Write/read distance (S_g)	Dependent on the reader used, see section "Field data of ISO transponders (MDS D) (Page 51)"
MTBF (Mean Time Between Failures)	228 years

	6GT2600-3AA10
Mechanical specifications	
Housing	
• Material	• PPS
• Color	• Black
Recommended distance to metal	≥ 30 mm
Power supply	Inductive, without battery
Permitted ambient conditions	
Ambient temperature	
• during write/read access	• -25 to +220 °C
	• from +125 °C: 20% reduction in the limit distance
	• from +140 °C: No processing possible
	• at +200 °C: Tested up to 5000 hours or 6000 cycles
	• at +220 °C: Tested up to 2000 hours or 2000 cycles
• outside the read/write field	• -40 to +220 °C
• during storage	• -40 to +100 °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-resistant to EN 60721-3-7 class 7M3	50 g [1)]
Vibration-resistant to EN 60721-3-7, class 7M3	20 g [1)]
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 [2)] 1.5 Nm

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

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

8.13.6 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

Ii 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

8.13.7 Dimensional drawing

MDS D339

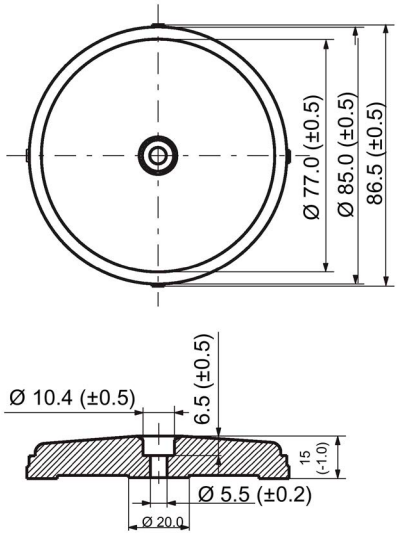


Figure 8-30 Dimension drawing of the MDS D339

Dimensions in mm

8.14 MDS D400

8.14.1 Features

MDS D400	Characteristics	
	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 of ISO transponders (MDS D) (Page 51)"
	Mounting on metal	Yes, with spacer
	ISO standard	ISO 15693
	Degree of protection	IP67

8.14.2 Ordering data

Table 8- 34 Ordering data of MDS D400

	Article number
MDS D400	6GT2600-4AD00

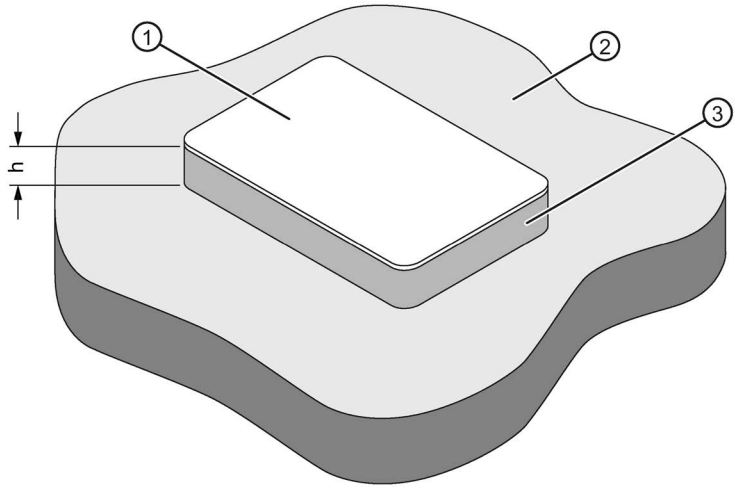
Table 8- 35 Ordering data of MDS D400 accessories

	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

8.14.3 Mounting on metal

Mounting on metal

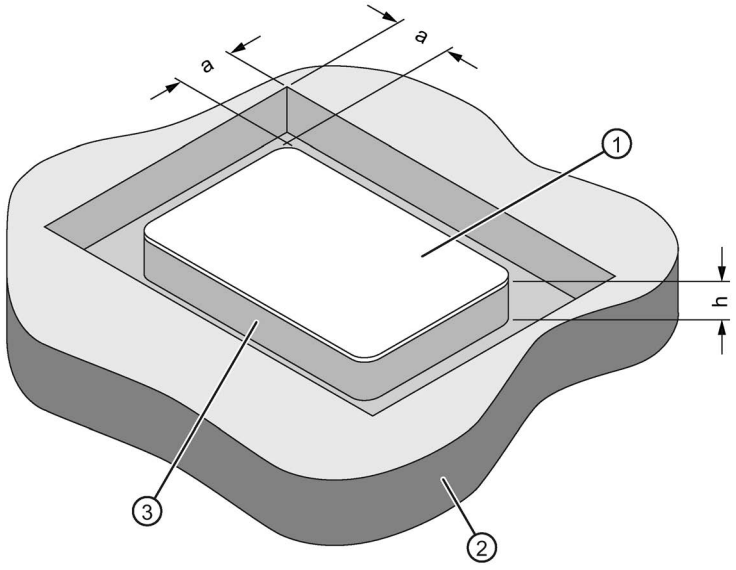
It is possible to mount the MDS D400 on metal.



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

Figure 8-31 Mounting of the MDS D400 on metal with spacer

Flush-mounted in metal



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

Figure 8-32 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.

8.14.4 Technical specifications

Table 8- 36 Technical specifications for MDS D400

	6GT2600-1AD00-0AX0
Product type designation	SIMATIC MDS D400
Memory	
Memory configuration	
• UID	• 8 bytes
• User memory	• 256 bytes FRAM

	6GT2600-1AD00-0AX0
• OPT memory	• 16 bytes FRAM
Read cycles (at < 25 °C)	> 10^{12}
Write cycles (at < 25 °C)	> 10^{12}
Data retention time (at < 25 °C)	> 10 years
Write/read distance (S_g)	Dependent on the reader used, see section "Field data of ISO transponders (MDS D) (Page 51)"
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 [1]
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	• Fixing lug • Glued

[1] The values for vibration are maximum values and must not be applied continuously.

8.14.5 Dimension drawing

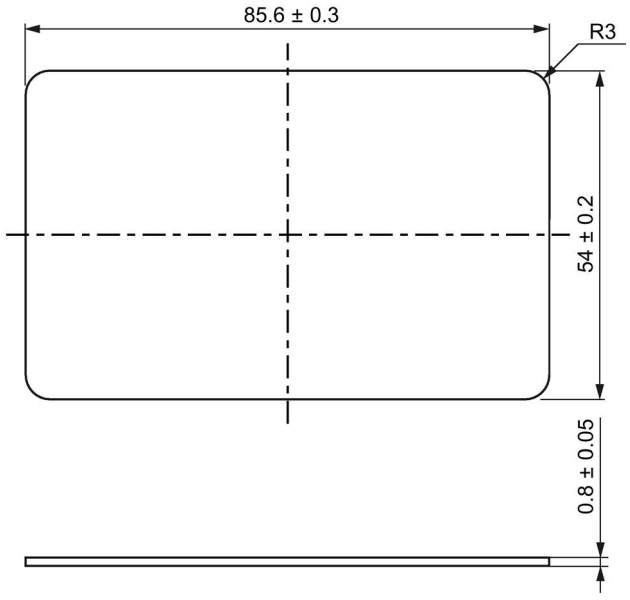


Figure 8-33 Dimensional drawing MDS D400 (dimensions in mm)

8.15 MDS D421

8.15.1 Characteristics

MDS D421	Characteristics	
	Area of application	The MDS D421 is designed for tool coding in accordance with DIN 69873. It can be used wherever small data carriers and exact positioning are required, e.g. tool identification, workpiece holders. The rugged housing of the MDS D421 means that it can also be used in a harsh industrial environment without problems.
	Memory size	2000 bytes of FRAM user memory
	Write/read range	See section "Field data of ISO transponders (MDS D) (Page 51)"
	Mounting on metal	Yes, flush-mounted in metal
	ISO standard	ISO 15693
	Degree of protection	IP67/IPx9K

8.15.2 Ordering data

Table 8- 37 Ordering data of MDS D421

	Article number
MDS D421	6GT2600-4AE00

8.15.3 Mounting on metal

Mounting on metal

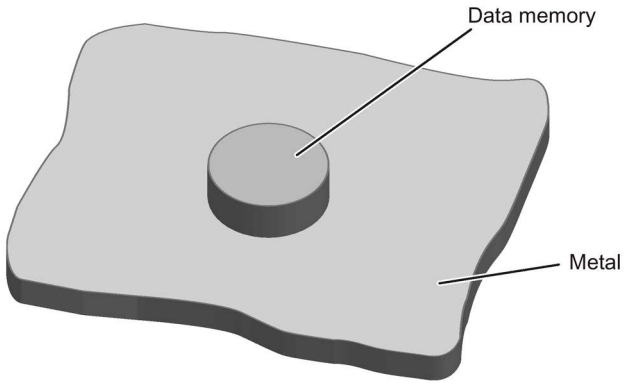


Figure 8-34 Mounting of MDS D421/D521/E623 on metal

Flush-mounting

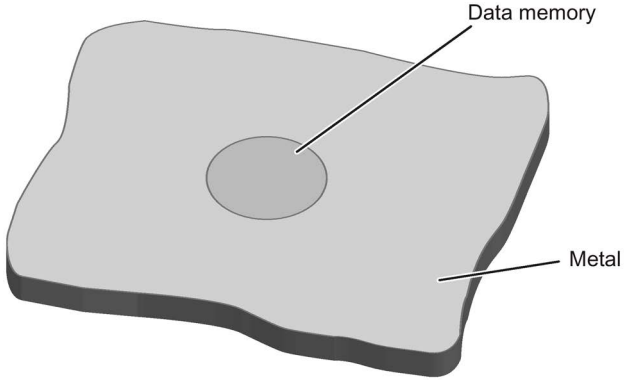


Figure 8-35 Mounting of MDS D421/D521/E623 in metal

Flush-mounting of the MDS in metal with tools

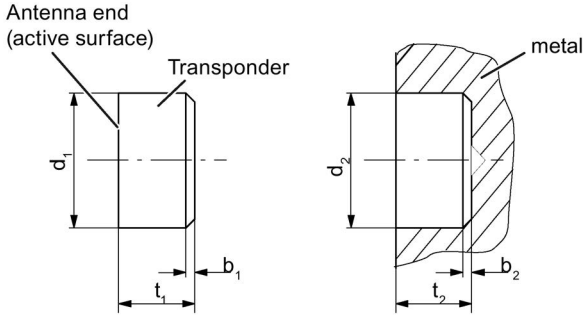


Figure 8-36 Flush-mounting of MDS D421/D521/E623 in metal with tools

b_1	0.5 x 45°	b_2	0.3 x 45° or R0.3
d_1	10 (-0.04... -0.13)	d_2	10 (+0.09... 0)
t_1	4.5 (-0 ... -0.1)	t_2	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 transponder using your fingers; with antenna side to the outside (see figure above)
- Remove residues of adhesive
- Allow to cure according to the manufacturer's instructions
- Flush-mounting of the transponder in metal with tools

Installation examples

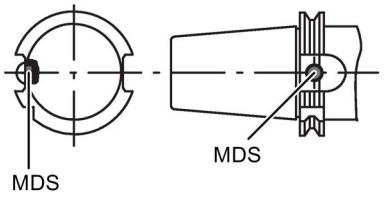


Figure 8-37 Installation example of MDS D421/D521/E623 in a steep cone

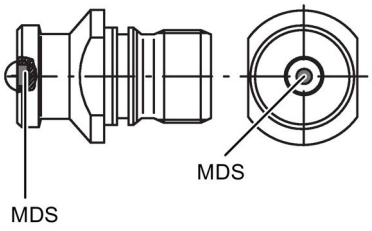


Figure 8-38 Installation example of MDS D421/D521/E623 in a stud bolt

8.15.4 Technical specifications

Table 8- 38 Technical specifications for the MDS D421

	6GT2600-4AE00
Product type designation	SIMATIC MDS D421
Memory	
Memory configuration	
• UID	• 8 bytes
• User memory	• 2000 bytes FRAM
• OPT 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 of ISO transponders (MDS D) (Page 51)"
MTBF (Mean Time Between Failures)	228 years
Mechanical specifications	
Housing	
• Material	• Epoxy resin
• Color	• Black
Recommended distance to metal	≥ 0 mm
Power supply	Inductive, without battery
Permitted ambient conditions	

	6GT2600-4AE00
Ambient temperature	
• during write/read access	• -25 to +85 ℃
• outside the read/write field	• -40 to +100 ℃
• during storage	• -40 to +100 ℃
Degree of protection to EN 60529	• IP67 • IPx9K steam jet: 150 mm; 10 to 15 l/min; 100 bar; 75 °C
Shock-resistant to EN 60721-3-7 class 7M3	100 g [1]
Vibration-resistant to EN 60721-3-7, class 7M3	20 g [1]
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[2]

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

[2] The manufacturer's processing instructions must be observed.

8.15.5 Dimension drawing

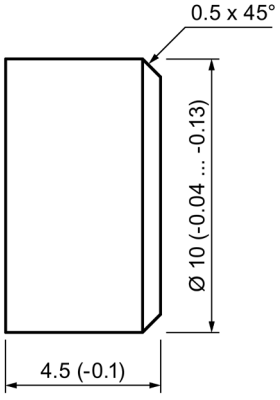


Figure 8-39 Dimension drawing of MDS D421

All dimensions in mm

8.16 MDS D422

8.16.1 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 of ISO transponders (MDS D) (Page 51).
	Mounting on metal	Yes
	ISO standard	ISO 15693
	Degree of protection	IP68

8.16.2 Ordering data

Table 8- 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

8.16.3 Mounting in metal

Flush-mounting

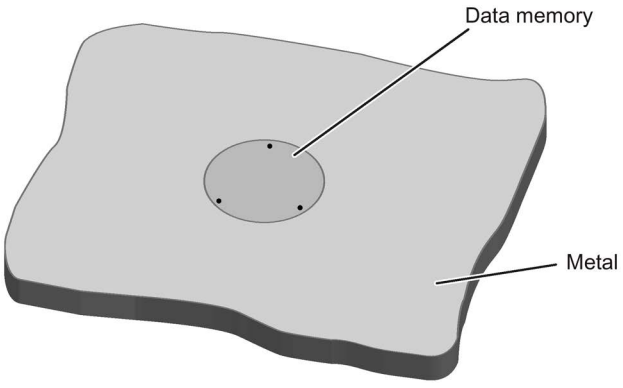


Figure 8-40 Mounting of MDS D422 in metal

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

8.16.4 Technical specifications

Table 8- 40 Technical specifications for the MDS D422

		6GT2600-4AF00
Product type designation	SIMATIC MDS D422	
Memory		
Memory configuration		

	6GT2600-4AF00
• UID	• 8 bytes
• User memory	• 2000 bytes FRAM
• OPT 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 of ISO transponders (MDS D) (Page 51)"
MTBF (Mean Time Between Failures)	285 years

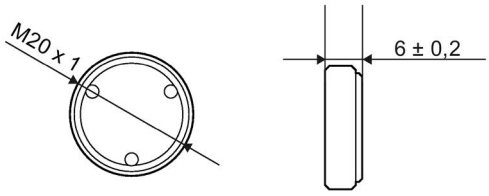
Mechanical specifications	
Housing	
• Material	• Plastic PA 6.6 GF; brass nickel plated
• Color	• Black/silver
Recommended distance to metal	≥ 0 mm
Power supply	Inductive, without battery

Permitted ambient conditions	
Ambient temperature	
• during write/read access	• -25 to +85 °C
• outside the read/write field	• -40 to +100 °C
• during storage	• -40 to +100 °C
Degree of protection to EN 60529	IP68 2 hours, 2 bar, +20 °C
Shock-resistant to EN 60721-3-7 class 7M3	50 g [1]
Vibration-resistant to EN 60721-3-7, class 7M3	20 g [1]
Torsion and bending load	Not permitted

Design, dimensions and weight	
Dimensions (Ø x H)	20 x 6 mm
Weight	13 g
Type of mounting	• Glued • 1 x transponder thread M20 ≤ 1 Nm

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

8.16.5 Dimension drawing



Dimensions in mm

Figure 8-41 Dimensional drawing of MDS D422

8.17 MDS D423

8.17.1 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 of ISO transponders (MDS D) (Page 51)"
	Mounting on metal	Yes, flush-mounted in metal
	ISO standard	ISO 15693
	Degree of protection	IP68/IPx9K

8.17.2 Ordering data

Table 8- 41 Ordering data of MDS D423

	Article number
MDS D423	6GT2600-4AA00

Table 8- 42 Ordering data of MDS D423 accessories

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

8.17.3 Mounting on metal

Mounting on metal

Direct mounting of the MDS D423 on metal is possible.

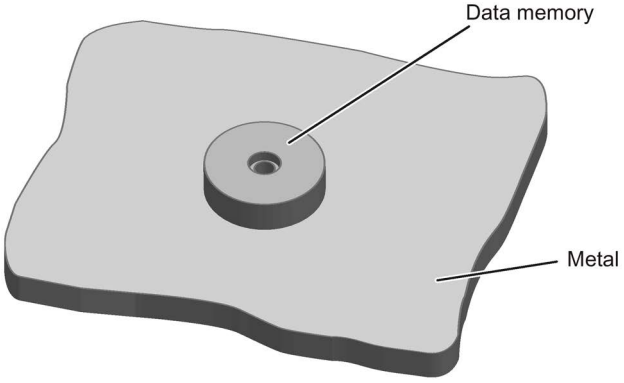
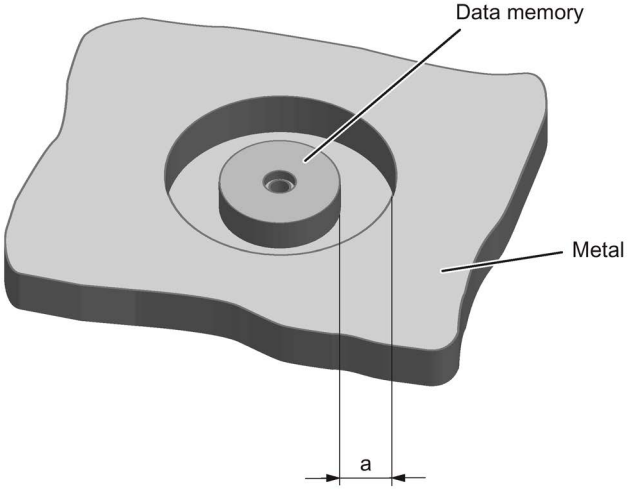


Figure 8-42 Mounting the MDS D423 on metal

Flush-mounted in metal

It is possible to mount the MDS D423 in metal.



a ≥ 10 mm

Figure 8-43 Flush-mounting of the MDS D423 in metal with 10 mm clearance

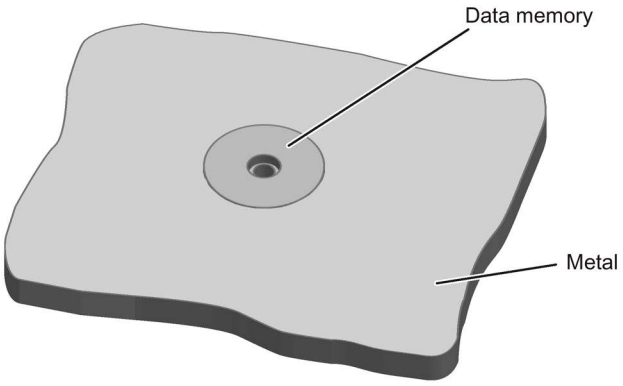


Figure 8-44 Flush-mounting of the MDS D423 in metal without clearance

Note

Reduction of the write/read range

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

8.17.4 Technical specifications

Table 8- 43 Technical specifications of MDS D423

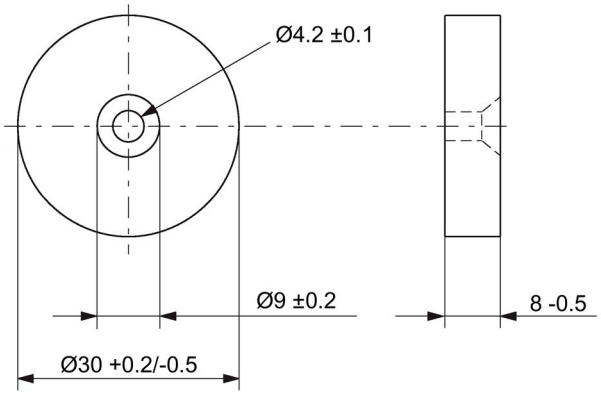
	6GT2600-4AA00
Product type designation	SIMATIC MDS D423
Memory	
Memory configuration	
• UID	• 8 bytes
• User memory	• 2000 bytes FRAM
• OPT memory	• 16 bytes FRAM
Read cycles (at < 40 °C)	> 10^{12}
Write cycles (at < 40 °C)	> 10^{12}
Data retention time (at < 40 °C)	> 10 years
Write/read distance (S_g)	Dependent on the reader used, see section "Field data of ISO transponders (MDS D) (Page 51)"
MTBF (Mean Time Between Failures)	228 years

	6GT2600-4AA00
Mechanical specifications	
Housing	
• Material	• Plastic PPS
• 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 +100 °C
• during storage	• -40 to +100 °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-resistant to EN 60721-3-7 class 7M3	50 g [1]
Vibration-resistant to EN 60721-3-7, class 7M3	20 g [1]
Pressure resistance	• Low pressure resistant vacuum dryer: up to 20 mbar • High pressure resistant (see degree of protection IPx9K)
Torsion and bending load	Not permitted
Design, dimensions and weight	
Dimensions (Ø x H)	30 x 8 mm
Weight	15 g
Type of mounting	1 x M4 screw [2] ≤ 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.

8.17.5 Dimensional drawing



Dimensions in mm

Figure 8-45 Dimension drawing for MDS D423

8.18 MDS D424

8.18.1 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 of ISO transponders (MDS D) (Page 51)."
	Mounting on metal	Yes, with spacer
	ISO standard	ISO 15693
	Degree of protection	IP67; IPx9K

8.18.2 Ordering data

Table 8- 44 Ordering data of MDS D424

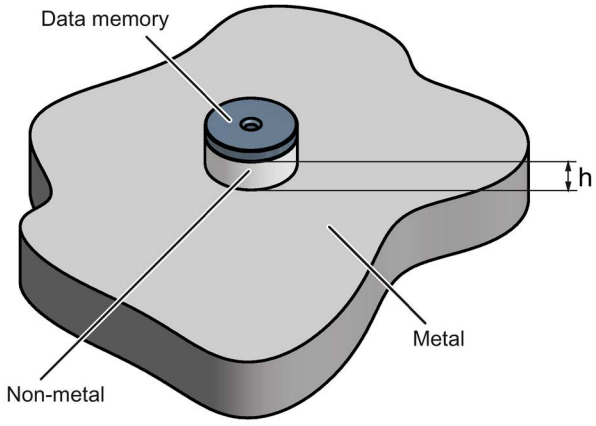
	Article number
MDS D424	6GT2600-4AC00

Table 8- 45 Ordering data of MDS D424 accessories

	Article number
Spacer	6GT2690-0AK00

8.18.3 Mounting on metal

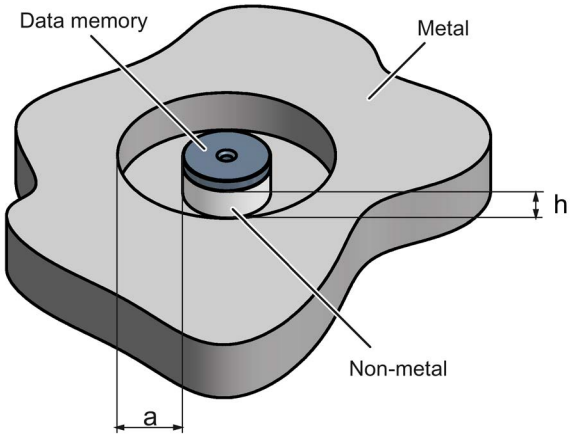
Mounting on metal



h ≥ 15 mm

Figure 8-46 Mounting the MDS D124/D324/D424/D524/E624 and RF320T on metal with spacer

Flush-mounting



h ≥ 15 mm

a ≥ 25 mm

Figure 8-47 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.

8.18.4 Technical specifications

Table 8- 46 Technical specifications for the MDS D424

	6GT2600-4AC00
Product type designation	SIMATIC MDS D424
Memory	
Memory configuration	
• UID	• 8 bytes
• User memory	• 2000 bytes FRAM
• OPT 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

	6GT2600-4AC00
Write/read distance (S_g)	Dependent on the reader used, see section "Field data of ISO transponders (MDS D) (Page 51)"
MTBF (Mean Time Between Failures)	228 years

Mechanical specifications	
Housing	
• Material	• Epoxy resin
• Color	• Black
Recommended distance to metal	≥ 15 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 +100 °C
• during storage	• -40 to +100 °C
Degree of protection to EN 60529	• IP67 • IPx9K
Shock-resistant to EN 60721-3-7 class 7M3	100 g [1]
Vibration-resistant to EN 60721-3-7, class 7M3	20 g [1]
Torsion and bending load	Not permitted

Design, dimensions and weight	
Dimensions (Ø x H)	27 x 4 mm
Weight	5 g
Type of mounting	• Glued • 1 x M3 screw [2] ≤ 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.

8.18.5 Dimension drawing

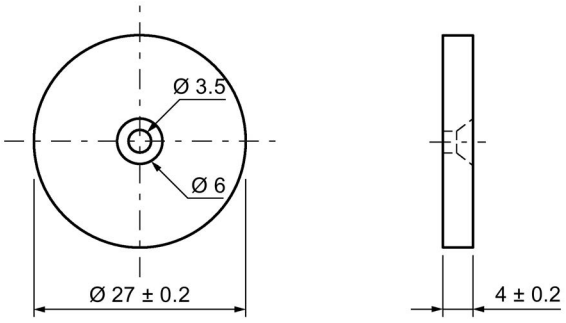


Figure 8-48 Dimension drawing of MDS D424

All dimensions in mm

8.19 MDS D425

8.19.1 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 workpiece 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 of ISO transponders (MDS D) (Page 51)".
	Mounting on metal	Yes
	ISO standard	ISO 15693
	Degree of protection	IP68/IPx9K

8.19.2 Ordering data

Table 8- 47 Ordering data of MDS D425

	Article number
MDS D425	6GT2600-4AG00

8.19.3 Application example

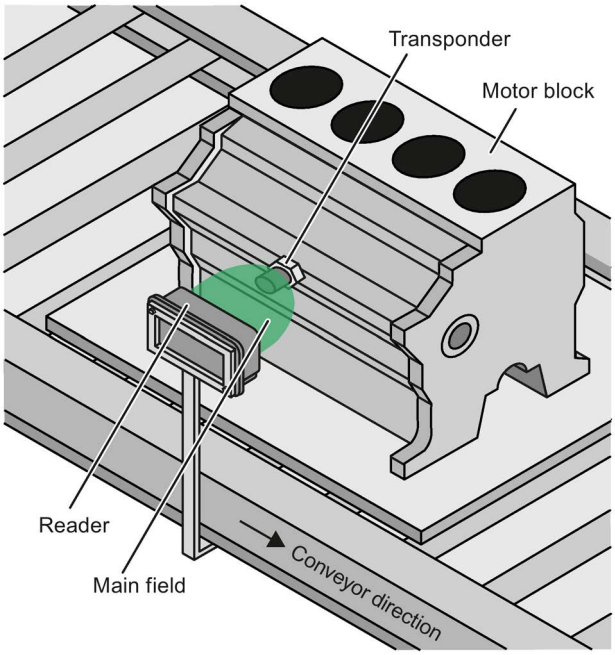


Figure 8-49 Application example

8.19.4 Technical specifications

Table 8- 48 Technical specifications for the MDS D425

	6GT2600-4AG00
Product type designation	SIMATIC MDS D425
Memory	
Memory configuration	
• UID	• 8 bytes
• User memory	• 2000 bytes FRAM
• OPT memory	• 16 bytes FRAM

	6GT2600-4AG00
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 of ISO transponders (MDS D) (Page 51)"
MTBF (Mean Time Between Failures)	228 years

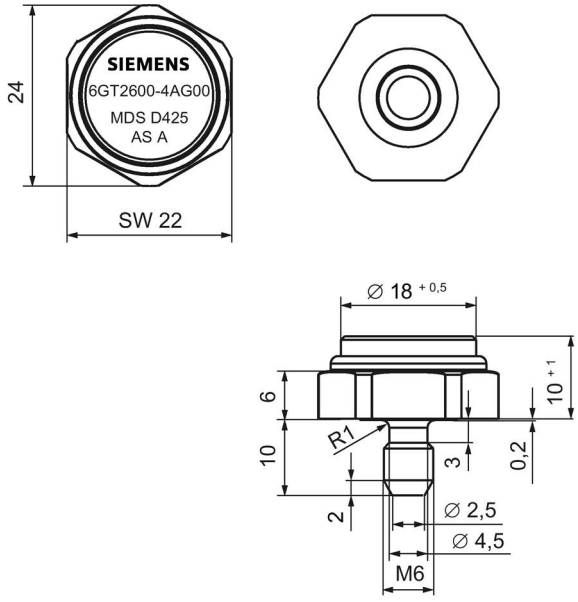
Mechanical specifications	
Housing	
• Material	• Plastic PA 6.6 GF
• Color	• Black
Recommended distance to metal	≥ 0 mm
Power supply	Inductive, without battery

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	• IP68 2 hours, 2 bar, +20 °C • IPx9K steam jet: 150 mm; 10 to 15 l/min; 100 bar; 75 °C
Shock-resistant to IEC 68-2-27	50 g [1)]
Vibration-resistant to IEC 68-2-6	20 g [1)]
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

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

8.19.5 Dimension drawing



Dimensions in mm

Figure 8-50 Dimension drawing of MDS D425

8.20 MDS D426

8.20.1 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 of ISO transponders (MDS D) (Page 51)
	Mounting on metal	Yes, with spacer
	ISO standard	ISO 15693
	Degree of protection	IP68

8.20.2 Ordering data

Table 8- 49 Ordering data of MDS D426

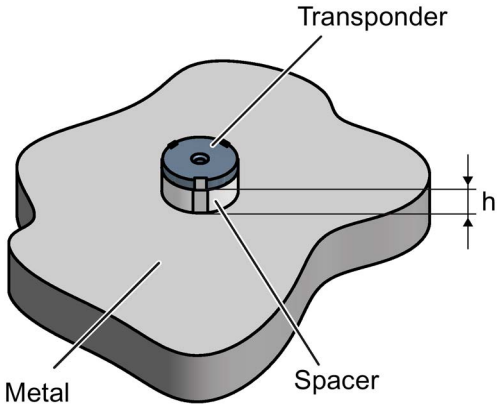
	Article number
MDS D426	6GT2600-4AH00

Table 8- 50 Ordering data of MDS D426 accessories

	Article number
Spacer	6GT2690-0AL00

8.20.3 Mounting on metal

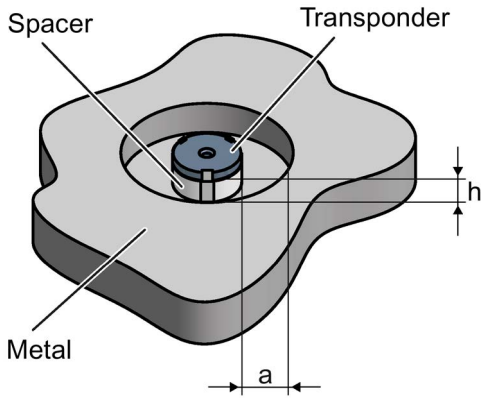
Mounting on metal



h ≥ 25 mm

Figure 8-51 Mounting the MDS D126 / D426 / D526 on metal with spacer

Flush-mounted in metal



h ≥ 25 mm

a ≥ 50 mm

Figure 8-52 Flush installation of the MDS D126 / D426 / D526 in metal with spacer

8.20.4 Technical specifications

Table 8- 51 Technical specifications for the MDS D426

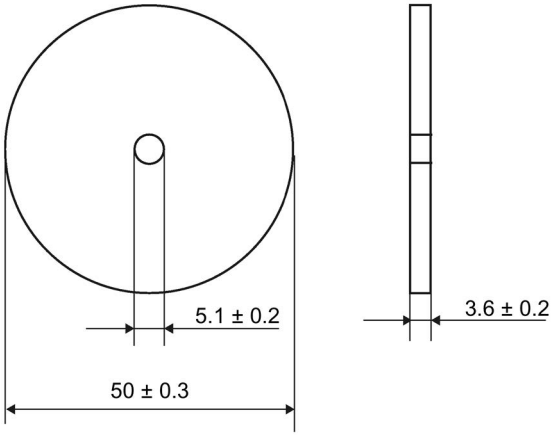
	6GT2600-4AH00
Product type designation	SIMATIC MDS D426
Memory	
Memory configuration	
• UID	• 8 bytes
• User memory	• 2000 bytes FRAM
• OPT memory	• 16 bytes FRAM
Read cycles (at < 40 °C)	> 10^{12}
Write cycles (at < 40 °C)	> 10^{12}
Data retention time (at < 40 °C)	> 10 years
Write/read distance (S_g)	Dependent on the reader used, see section "Field data of ISO transponders (MDS D) (Page 51)"
MTBF (Mean Time Between Failures)	228 years
Mechanical specifications	
Housing	
• Material	• Plastic PA 6.6 GF
• Color	• Black
Recommended distance to metal	≥ 25 mm

	6GT2600-4AH00
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 +100 °C
• during storage	• -40 to +100 °C
Degree of protection to EN 60529	IP68 2 hours, 2 bar, +20 °C
Shock-resistant to IEC 68-2-27	50 g [1]
Vibration-resistant to IEC 68-2-6	20 g [1]
Torsion and bending load	Not permitted
Design, dimensions and weight	
Dimensions (Ø x H)	50 x 3.6 mm
Weight	13 g
Type of mounting	1 x M4 screw [2] ≤ 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.

8.20.5 Dimension drawing



Dimensions in mm

Figure 8-53 Dimension drawing of MDS D426

8.21 MDS D428

8.21.1 Characteristics

MDS D428	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 D428 means that it can also be used in extreme environmental conditions without problems.
	Memory size	2000 bytes of FRAM user memory
	Write/read range	See section "Field data of ISO transponders (MDS D) (Page 51)"
	Mounting on metal	Yes
	ISO standard	ISO 15693
	Degree of protection	IP68/IPx9K

8.21.2 Ordering data

Table 8- 52 Ordering data of MDS D428

	Article number
MDS D428	6GT2600-4AK00-0AX0

8.21.3 Application example

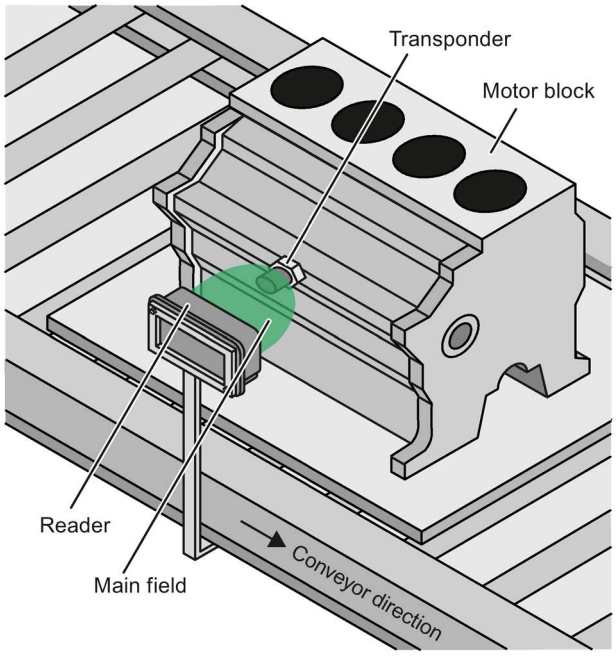


Figure 8-54 Application example

8.21.4 Technical specifications

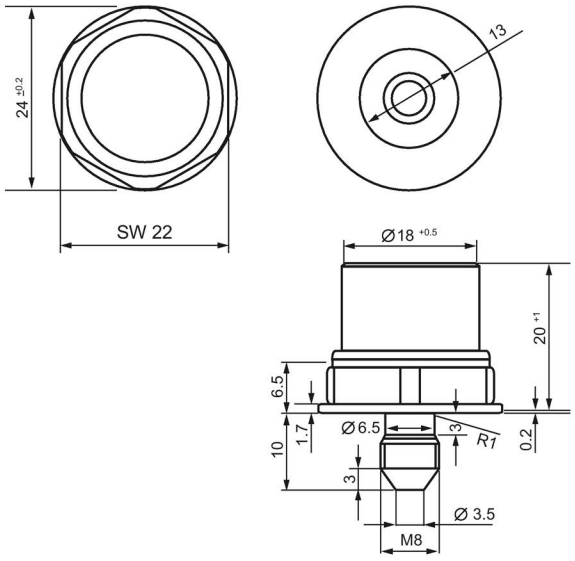
Table 8- 53 Technical specifications for the MDS D428

	6GT2600-4AK00
Product type designation	SIMATIC MDS D428
Memory	
Memory configuration	
• UID	• 8 bytes
• User memory	• 2000 bytes FRAM
• OPT 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 of ISO transponders (MDS D) (Page 51)"
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-resistant to IEC 68-2-27	50 g [1]
Vibration-resistant to IEC 68-2-6	20 g [1]
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; ≤ 8 Nm

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

8.21.5 Dimension drawing



Dimensions in mm

Figure 8-55 Dimension drawing of MDS D428

8.22 MDS D460

8.22.1 Characteristics

MDS D460	Characteristics	
	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 of ISO transponders (MDS D) (Page 51).
	Mounting on metal	Yes, with spacer
	ISO standard	ISO 15693
	Degree of protection	IP67/IPx9K

8.22.2 Ordering data

Table 8- 54 Ordering data of MDS D460

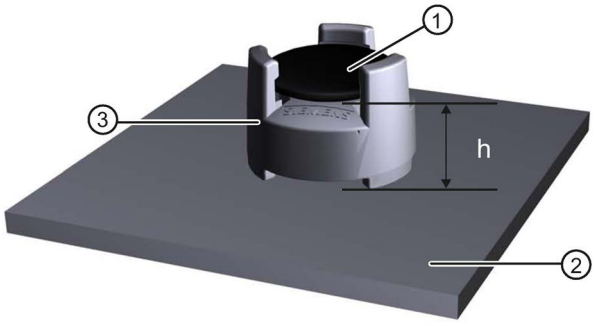
	Article number
MDS D460	6GT2600-4AB00

Table 8- 55 Ordering data of MDS D460 accessories

	Article number
Spacer	6GT2690-0AG00

8.22.3 Mounting on metal

Mounting option on metal with spacer



① Transponder
② Metal
③ Spacer
h ≥ 10 mm

Figure 8-56 Mounting the MDS D460 on metal with spacer

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!

8.22.4 Technical specifications

Table 8- 56 Technical specifications for MDS D460

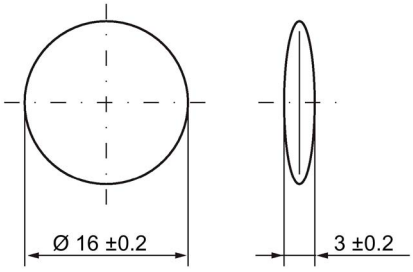
	6GT2600-4AB00
Product type designation	SIMATIC MDS D460
Memory	
Memory configuration	
• UID	• 8 bytes
• User memory	• 2000 bytes FRAM
• OPT memory	• 16 bytes FRAM
Read cycles (at < 40 °C)	> 10^{12}
Write cycles (at < 40 °C)	> 10^{12}
Data retention time (at < 40 °C)	> 10 years
Write/read distance (S_g)	Dependent on the reader used, see section "Field data of ISO transponders (MDS D) (Page 51)"
MTBF (Mean Time Between Failures)	228 years
Mechanical specifications	
Housing	
• Material	• Epoxy resin
• Color	• Black
Recommended distance to metal	≥ 10 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 +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-resistant to IEC 68-2-27	50 g [1)]
Vibration-resistant to IEC 68-2-6	20 g [1)]
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	• Glued • With spacer

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

8.22.5 Dimension drawings

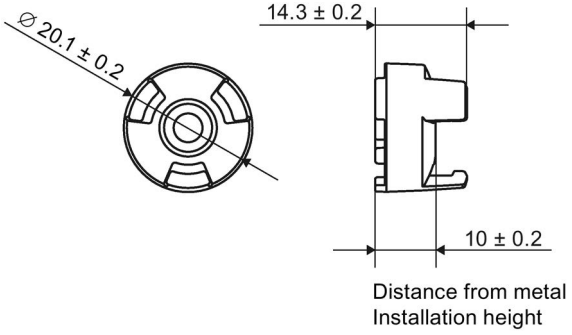
Dimensional drawing of MDS D460



Dimensions in mm

Figure 8-57 Dimensional drawing of MDS D460

Dimensional drawing of spacer



Dimensions in mm

Figure 8-58 Dimensional drawing of spacer

8.23 MDS D521

8.23.1 Characteristics

MDS D521	Characteristics	
	Area of application	The MDS D521 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. The rugged housing of the MDS D521 means that it can also be used in a harsh industrial environment without problems.
	Memory size	8192 bytes of FRAM user memory
	Write/read range	See section "Field data of ISO transponders (MDS D) (Page 51)"
	Mounting on metal	Yes, flush-mounted in metal
	ISO standard	ISO 15693
	Degree of protection	IP67/IPx9K

8.23.2 Ordering data

Table 8- 57 Ordering data for MDS D521

	Article number
MDS D521	6GT2600-5AE00

8.23.3 Mounting on metal

Mounting on metal

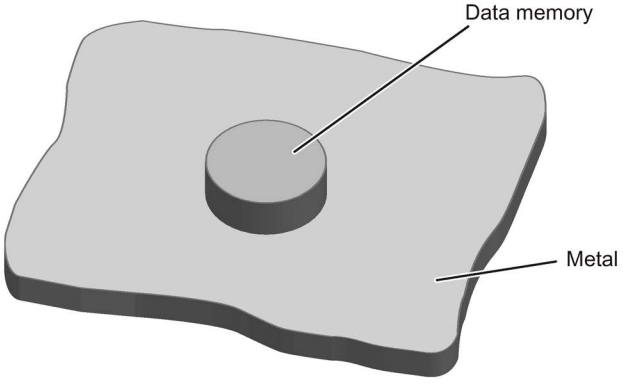


Figure 8-59 Mounting of MDS D421/D521/E623 on metal

Flush-mounting

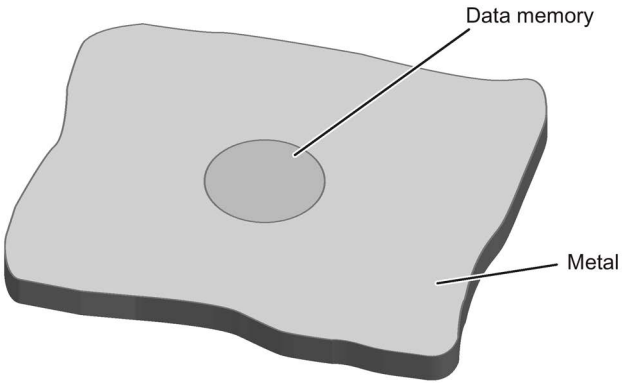


Figure 8-60 Mounting of MDS D421/D521/E623 in metal

Flush-mounting of the MDS in metal with tools

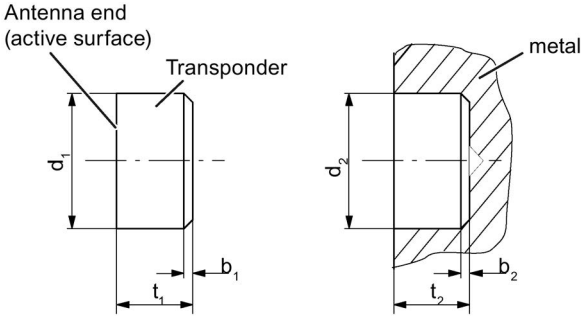


Figure 8-61 Flush-mounting of MDS D421/D521/E623 in metal with tools

b_1	0.5 x 45°	b_2	0.3 x 45° or R0.3
d_1	10 (-0.04... -0.13)	d_2	10 (+0.09... 0)
t_1	4.5 (-0 ... -0.1)	t_2	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 transponder using your fingers; with antenna side to the outside (see figure above)
- Remove residues of adhesive
- Allow to cure according to the manufacturer's instructions
- Flush-mounting of the transponder in metal with tools

Installation examples

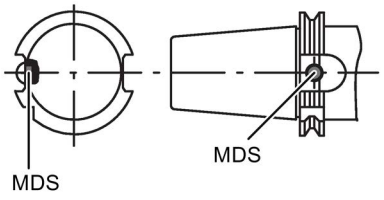


Figure 8-62 Installation example of MDS D421/D521/E623 in a steep cone

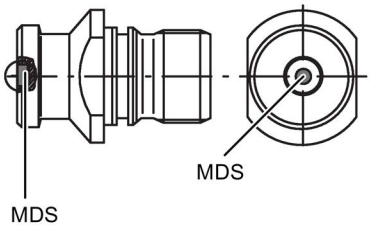


Figure 8-63 Installation example of MDS D421/D521/E623 in a stud bolt

8.23.4 Technical specifications

Table 8- 58 Technical specifications for MDS D521

	6GT2600-5AE00
Product type designation	SIMATIC MDS D521
Memory	
Memory configuration	
• UID	• 8 bytes
• User memory	• 8192 bytes FRAM

	6GT2600-5AE00
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 of ISO transponders (MDS D) (Page 51)"
MTBF (Mean Time Between Failures)	228 years
Mechanical specifications	
Housing	
• Material	• Epoxy resin
• Color	• Black
Recommended distance to metal	> 25 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 +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-resistant to EN 60721-3-7 class 7M3	100 g [1]
Vibration-resistant to EN 60721-3-7, class 7M3	20 g [1]
Torsion and bending load	Not permitted
Design, dimensions and weight	
Dimensions (Ø x H)	10 x 4.5 mm
Weight	4 g
Type of mounting	Glued[2]

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

[2] The manufacturer's processing instructions must be observed.

8.23.5 Dimension drawing

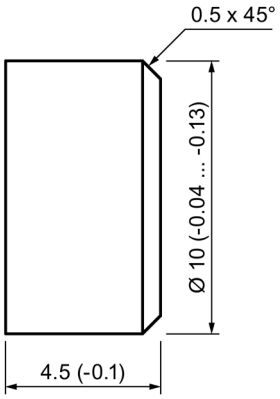


Figure 8-64 Dimension drawing of MDS D521

All dimensions in mm

8.24 MDS D522

8.24.1 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 of ISO transponders (MDS D) (Page 51)."
	Mounting in metal	Yes
	ISO standard	ISO 15693
	Degree of protection	IP68

8.24.2 Ordering data

Table 8- 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

8.24.3 Mounting in metal

Flush-mounting

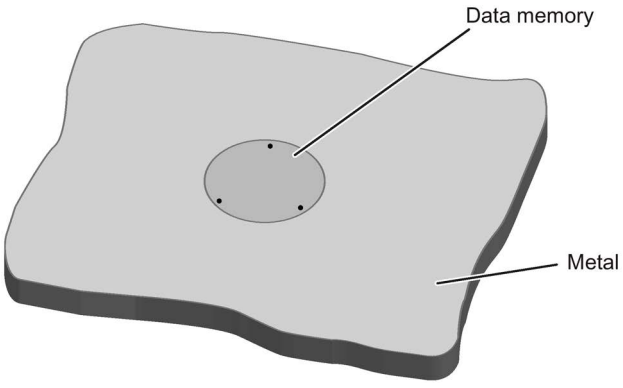


Figure 8-65 Mounting of MDS D522 in metal

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

8.24.4 Technical specifications

Table 8- 60 Technical specifications for MDS D522

		6GT2600-5AF00
Product type designation	SIMATIC MDS D522	
Memory		
Memory configuration		

	6GT2600-5AF00
• UID	• 8 bytes
• User memory	• 8192 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 of ISO transponders (MDS D) (Page 51)"
MTBF (Mean Time Between Failures)	285 years
Mechanical specifications	
Housing	
• Material	• Plastic PA 6.6 GF; brass nickel plated
• Color	• Black/silver
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 +100 °C
• during storage	• -40 to +100 °C
Degree of protection to EN 60529	IP68 2 hours, 2 bar, +20 °C
Shock-resistant to EN 60721-3-7 class 7M3	50 g [1]
Vibration-resistant to EN 60721-3-7, class 7M3	20 g [1]
Torsion and bending load	Not permitted
Design, dimensions and weight	
Dimensions (Ø x H)	20 x 6 mm
Weight	13 g
Type of mounting	• Glued • 1 x transponder thread M20 ≤ 1 Nm

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

8.24.5 Dimension drawing

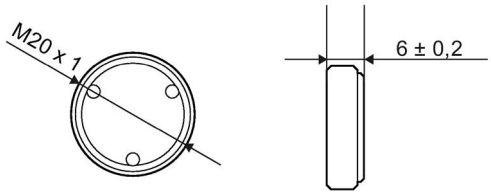


Figure 8-66 Dimensional drawing of MDS D522

All dimensions in mm

8.25 MDS D522 special variant

8.25.1 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 of ISO transponders (MDS D) (Page 51)."
	Mounting in metal	Yes
	ISO standard	ISO 15693
	Degree of protection	IP68

8.25.2 Ordering data

Table 8- 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

8.25.3 Mounting in metal

Flush-mounting

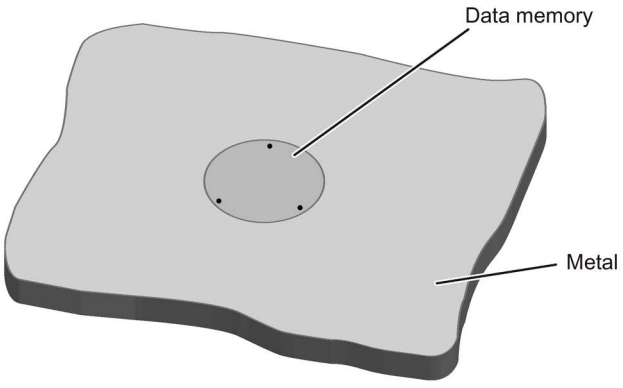


Figure 8-67 Flush installation of the MDS D522 special version in metal without clearance

8.25.4 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.

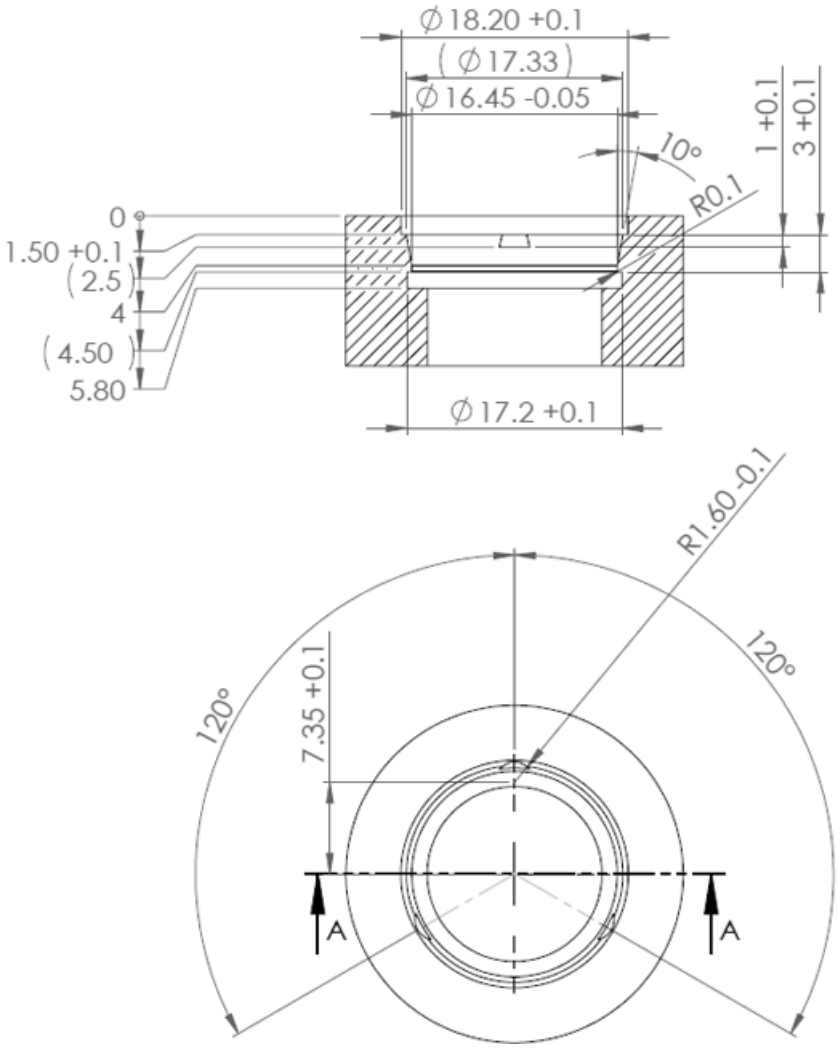


Figure 8-68 Dimension drawing: Workpiece drill hole for mounting the MDS D522 special version

8.25.5 Technical specifications

Table 8- 62 Technical data of MDS D522 special version

	6GT2600-5AF00-0AX0
Product type designation	SIMATIC MDS D522 special version
Memory	
Memory configuration	
• UID	• 8 bytes
• User memory	• 8192 bytes FRAM
Read cycles (at < 40 °C)	> 10^{12}

	6GT2600-5AF00-0AX0
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 of ISO transponders (MDS D) (Page 51)"
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 +100 °C
• during storage	• -40 to +100 °C
Degree of protection to EN 60529	IP68 2 hours, 2 bar, +20 °C
Shock-resistant to EN 60721-3-7 class 7M3	50 g [1)]
Vibration-resistant to EN 60721-3-7, class 7M3	20 g [1)]
Torsion and bending load	Not permitted

Design, dimensions and weight	
Dimensions (Ø x H)	18 (+0.1) × 5.2 mm
Weight	Approx. 1.2 g
Type of mounting	Clipping in once (with accompanying tool)

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

8.25.6 Dimensional drawing

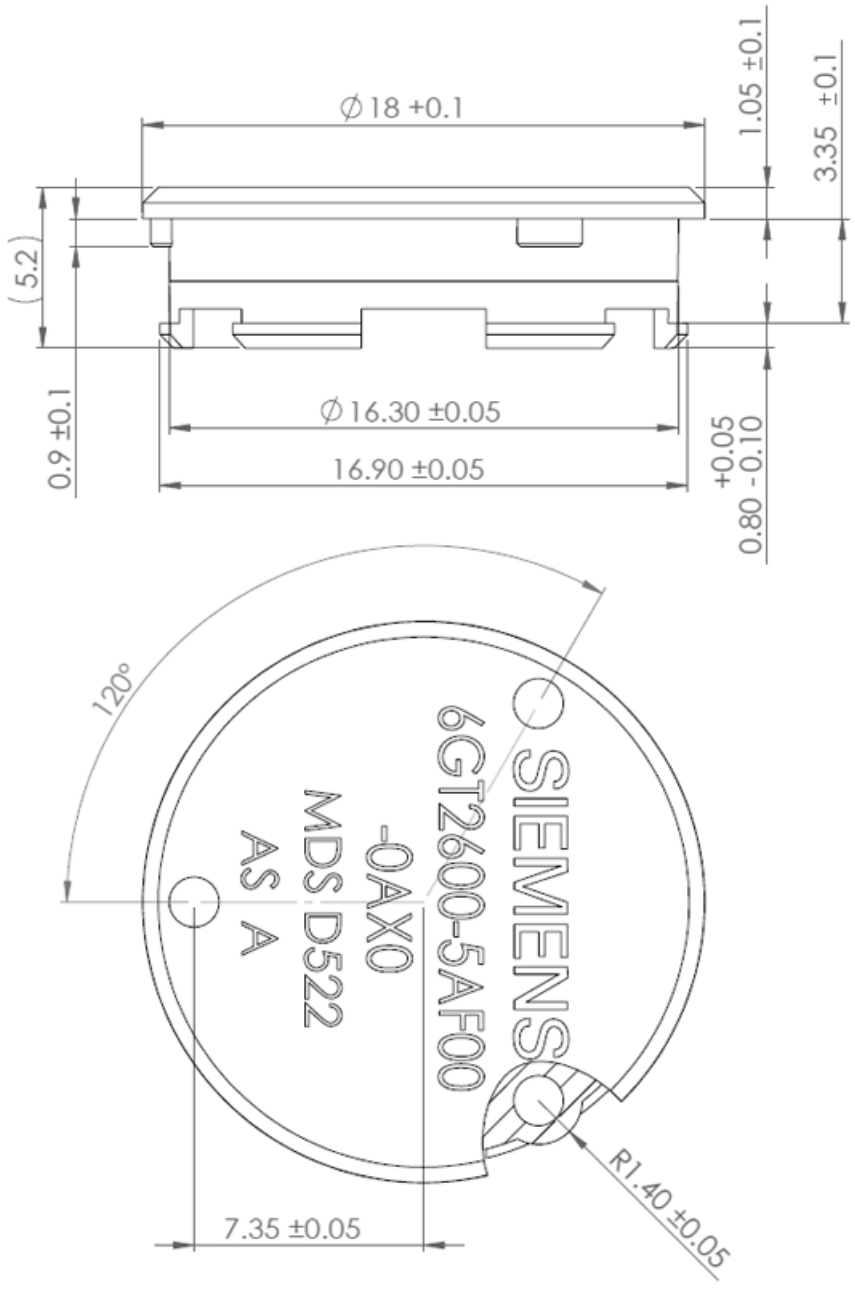


Figure 8-69 Dimension drawing MDS D522 special version

All dimensions in mm

8.26 MDS D524

8.26.1 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 of ISO transponders (MDS D) (Page 51)."
	Mounting on metal	Yes, with spacer
	ISO standard	ISO 15693
	Degree of protection	IP67; IPx9K

8.26.2 Ordering data

Table 8- 63 Ordering data for MDS D524

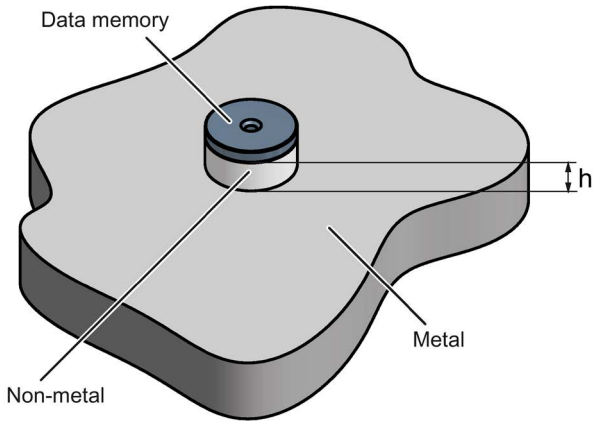
	Article number
MDS D524	6GT2600-5AC00

Table 8- 64 Ordering data of MDS D524 accessories

	Article number
Spacer	6GT2690-0AK00

8.26.3 Mounting on metal

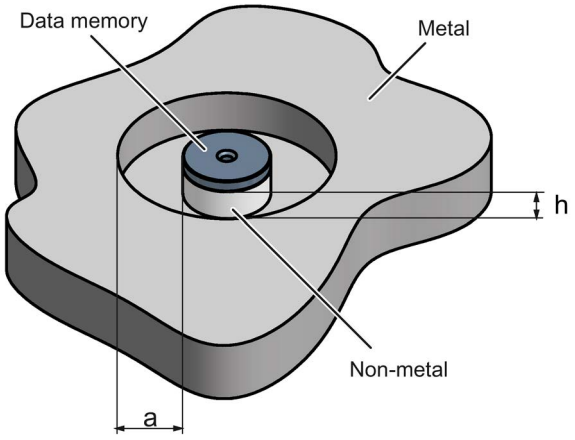
Mounting on metal



h ≥ 15 mm

Figure 8-70 Mounting the MDS D124/D324/D424/D524/E624 and RF320T on metal with spacer

Flush-mounting



h ≥ 15 mm

a ≥ 25 mm

Figure 8-71 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.

8.26.4 Technical specifications

Table 8- 65 Technical specifications for MDS D524

	6GT2600-5AC00
Product type designation	SIMATIC MDS D524
Memory	
Memory configuration	
• UID	• 8 bytes
• User memory	• 8192 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 of ISO transponders (MDS D) (Page 51)"
MTBF (Mean Time Between Failures)	228 years
Mechanical specifications	
Housing	
• Material	• Epoxy resin
• Color	• Black
Recommended distance to metal	≥ 25 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 +100 °C
• during storage	• -40 to +100 °C

	6GT2600-5AC00
Degree of protection to EN 60529	• IP67 • IPx9K
Shock-resistant to EN 60721-3-7 class 7M3	100 g [1]
Vibration-resistant to EN 60721-3-7, class 7M3	20 g [1]
Torsion and bending load	Not permitted

Design, dimensions and weight	
Dimensions (Ø x H)	27 x 4 mm
Weight	5 g
Type of mounting	• Glued • 1 x M3 screw [2] ≤ 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.

8.26.5 Dimension drawing

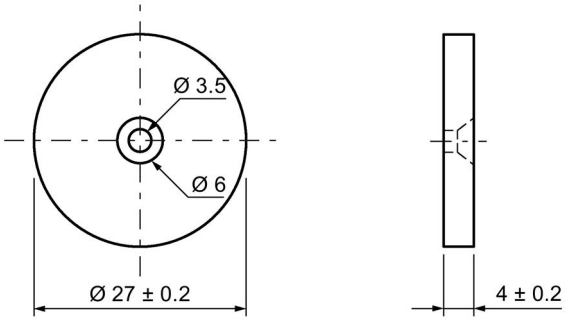


Figure 8-72 Dimensional drawing of MDS D524

All dimensions in mm

8.27 MDS D525

8.27.1 Characteristics

MDS D525	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 workpiece holders Rugged packaging of the MDS D525; can therefore also be used under extreme environmental conditions without problems
	Memory size	8192 bytes of FRAM user memory
	Write/read range	See section "Field data of ISO transponders (MDS D) (Page 51)".
	Mounting on metal	Yes
	ISO standard	ISO 15693
	Degree of protection	IP68/IPx9K

8.27.2 Ordering data

Table 8- 66 Ordering data for MDS D525

	Article number
MDS D525	6GT2600-5AG00

8.27.3 Application example

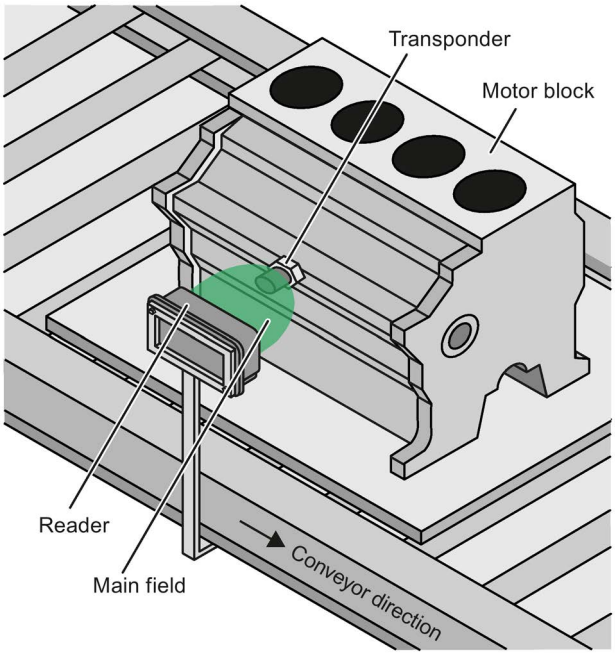


Figure 8-73 Application example

8.27.4 Technical specifications

Table 8- 67 Technical specifications for MDS D525

	6GT2600-5AG00
Product type designation	SIMATIC MDS D525
Memory	
Memory configuration	
• UID	• 8 bytes
• User memory	• 8192 bytes FRAM
• OPT 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 of ISO transponders (MDS D) (Page 51)"
MTBF (Mean Time Between Failures)	228 years

	6GT2600-5AG00
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 ℃
• outside the read/write field	• -40 to +125 ℃
• during storage	• -40 to +125 ℃
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-resistant to IEC 68-2-27	50 g [1)]
Vibration-resistant to IEC 68-2-6	20 g [1)]
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

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

8.27.5 Dimension drawing

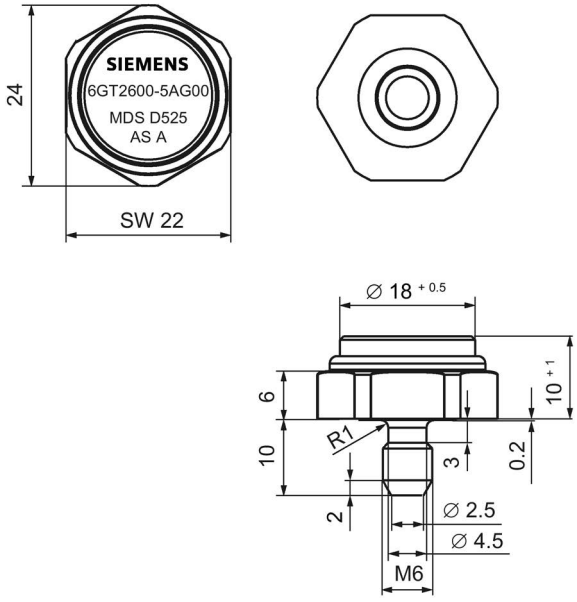


Figure 8-74 Dimensional drawing of MDS D525

All dimensions in mm

8.28 MDS D526

8.28.1 Characteristics

MDS D526	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	8192 bytes of FRAM user memory
	Write/read range	See section "Field data of ISO transponders (MDS D) (Page 51)."
	Mounting on metal	Yes, with spacer
	ISO standard	ISO 15693
	Degree of protection	IP68

8.28.2 Ordering data

Table 8- 68 Ordering data for MDS D526

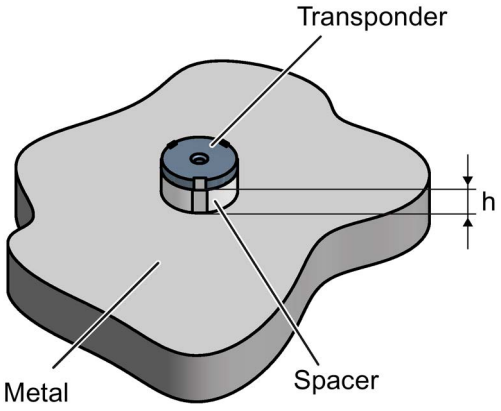
	Article number
MDS D526	6GT2600-5AH00

Table 8- 69 Ordering data for MDS D526 accessories

	Article number
Spacer	6GT2690-0AL00

8.28.3 Mounting on metal

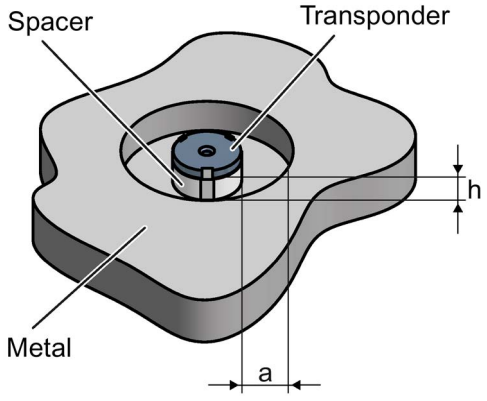
Mounting on metal



h ≥ 25 mm

Figure 8-75 Mounting the MDS D126 / D426 / D526 on metal with spacer

Flush-mounted in metal



h ≥ 25 mm

a ≥ 50 mm

Figure 8-76 Flush installation of the MDS D126 / D426 / D526 in metal with spacer

8.28.4 Technical specifications

Table 8- 70 Technical specifications for MDS D526

	6GT2600-5AH00
Product type designation	SIMATIC MDS D526
Memory	
Memory configuration	
• UID	• 8 bytes
• User memory	• 8192 bytes FRAM
• OTP	• 32 bytes
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 of ISO transponders (MDS D) (Page 51)"
MTBF (Mean Time Between Failures)	228 years
Mechanical specifications	
Housing	
• Material	• Plastic PA 6.6 GF
• Color	• Black
Recommended distance to metal	≥ 25 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 +100 °C
• during storage	• -40 to +100 °C
Degree of protection to EN 60529	IP68 2 hours, 2 bar, +20 °C
Shock-resistant to IEC 68-2-27	50 g [1)]
Vibration-resistant to IEC 68-2-6	20 g [1)]
Torsion and bending load	Not permitted

	6GT2600-5AH00
Design, dimensions and weight	
Dimensions (Ø x H)	50 x 3.6 mm
Weight	13 g
Type of mounting	1 x M4 screw [2] ≤ 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.

8.28.5 Dimension drawing

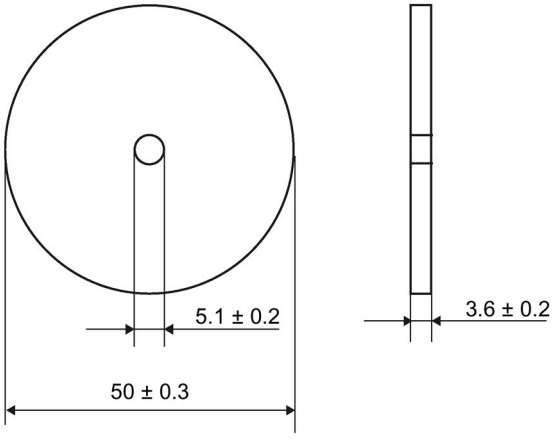


Figure 8-77 Dimensional drawing of MDS D526

All dimensions in mm

8.29 MDS D528

8.29.1 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 of ISO transponders (MDS D) (Page 51)"
	Mounting on metal	Yes
	ISO standard	ISO 15693
	Degree of protection	IP68/IPx9K

8.29.2 Ordering data

Table 8- 71 Ordering data for MDS D528

	Article number
MDS D528	6GT2600-5AK00

8.29.3 Application example

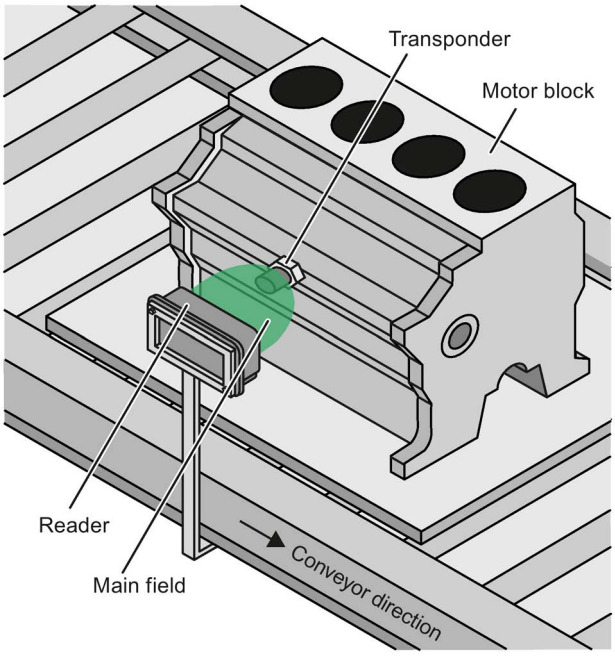


Figure 8-78 Application example

8.29.4 Technical specifications

Table 8- 72 Technical specifications for MDS D528

	6GT2600-5AK00
Product type designation	SIMATIC MDS D528
Memory	
Memory configuration	
• UID	• 8 bytes
• User memory	• 8192 bytes FRAM
• OTP	• 32 bytes
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 of ISO transponders (MDS D) (Page 51)"
MTBF (Mean Time Between Failures)	228 years

	6GT2600-5AK00
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 ℃
• outside the read/write field	• -40 to +125 ℃
• during storage	• -40 to +125 ℃
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-resistant to IEC 68-2-27	50 g [1)]
Vibration-resistant to IEC 68-2-6	20 g [1)]
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; ≤ 8 Nm

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

8.29.5 Dimension drawing

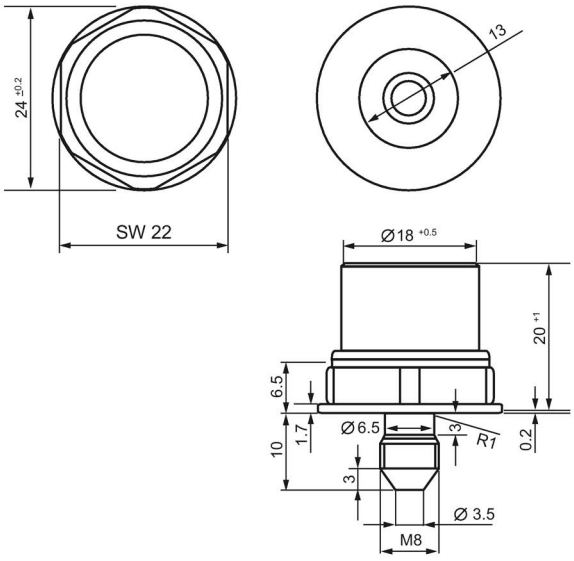


Figure 8-79 Dimensional drawing of MDS D528

All dimensions in mm

System integration

9

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.

9.1 Introduction

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. You will find information on the following blocks on the Internet in "Industry Online Support (https://support.industry.siemens.com/cs/ww/en/ps/14971)".

- Ident profile and Ident blocks, standard function for RFID systems

  The Ident library linked into the TIA Portal as of STEP 7 Basic / Professional V14 SP 1
- RFID standard profile; standard functions for RFID systems
- FB 45 for MOBY U, MOBY D, RF200, RF300
- FB 55
- RF160C communications module with FC 44

Interface modules/communication modules and function blocks

The following table shows the most important characteristics of the interface modules/communications modules.

Table 9- 1 Overview of interface modules/communication modules

ASM/ communications module	Interfaces to the application (PLC)	Interfaces to the reader	Reader connections	Dimensions (W x H x D)	Temperature range	Degree of protection
ASM 456	PROFIBUS DP-V1	2 x 8-pin connector socket, M12	2 (parallel)	60 x 210 x 54 or 79 mm	0 ℃ to +55 ℃	IP67
ASM 475	S7-300 (central), ET200M (PROFIBUS)	Via screw terminals in front connector	2	40 x 125 x 120 mm	0 ℃ to +60 ℃	IP20
SIMATIC RF120C	S7-1200 (central)	9-pin D-sub socket	1	30 x 100 x 75 mm	0 ℃ to +55 ℃	IP20
SIMATIC RF160C	PROFIBUS DP / DP-V0	2 x 8-pin connector socket, M12	2 (parallel)	60 x 210 x 30 mm	0 ℃ to +55 ℃	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 ℃ to +60 ℃	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 9- 2 Compatible program blocks

ASM/ communications module	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
SIMATIC RF160C	FC 44 Application blocks for RF160C	FC 44 Application blocks for RF160C	Application blocks for RF160C

ASM/ communications module	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
SIMATIC RF170C	FB 45 FB 55	FB 45 FB 55	--
SIMATIC RF180C	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

9.2 ASM 456

Configured with ASM 456

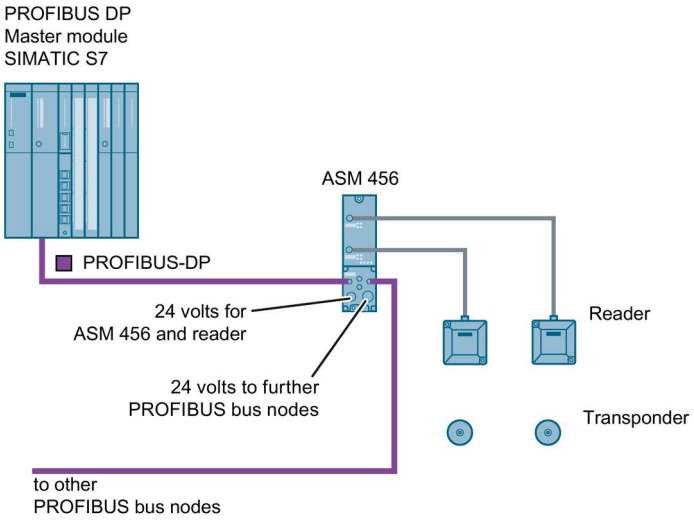


Figure 9-1 Configuration of ASM 456

For more detailed information, please refer to ASM 456 Operating Instructions (https://support.industry.siemens.com/cs/ww/en/view/32629442).

9.3 ASM 475

9.3.1 Features

Area of application

The ASM 475 interface module acting as the link between all RF300 systems and SIMATIC S7-300 performs the functions of a communication module. It can be operated centrally in the S7-300 or decentrally in an ET200M.

As many as eight ASM 475 interface modules can be plugged into one SIMATIC S7-300 rack and operated. In a configuration with several racks (max. four), the ASM 475 can be plugged into and operated on any rack. This means that as many as 32 ASMs can be operated in the maximum configuration of a SIMATIC S7-300. The ASM can also be operated in the ET 200M distributed I/O on PROFIBUS. Operation in an S7-400 environment is therefore problem-free. Up to 7 ASMs can be operated on each ET 200M.

Error messages and operating statuses are indicated by LEDs.
Since there is electrical isolation between the read/write device and the SIMATIC S7-300 bus, a configuration that is immune to interference is possible.

Figure 9-2 Interface module ASM 475

The ASM 475 with the article number 6GT2002-0GA10 is a module that can be set in the parameters. The basic functions of the module are then already specified when the module is configured in HW Config (e.g. standard addressing).

The data in the MDS is accessed direct by means of physical addresses using the ASM 475. Operation in a SIMATIC S7 is controlled by the function block FB 45.

ASM 475 and FB 45 form a unit that is used for reading the data of the MDS simply and at optimal speed.

9.3.2 Ordering data

Table 9- 3 Ordering data for ASM 475

	Article number
ASM 475 interface module for SIMATIC S7 2 x RF3xxR reader with RS-422 can be connected in parallel, without front connector	6GT2002-0GA10

Table 9- 4 Ordering data for ASM 475 accessories

	Article number
Front connector (1 x per ASM)	6ES7392-1AJ00-0AA0
Connecting cable ASM 475 ↔ RF3xxR	
Plug-in cable, pre-assembled, length: 2 m (standard length)	6GT2891-0EH20
Plug-in cable, pre-assembled, length: 5 m	6GT2891-0EH50
Terminal element (1 x per reader cable)	6ES7390-5BA00-0AA0
Shield connecting element	6ES7390-5AA00-0AA0

The plug-in cables 6GT2891-4Fxx can be used as extension cables.

9.3.3 Indicators

Bezel and indicator elements

The figure below illustrates the bezel of the ASM 475 and the inside of the front door complete with the associated connection diagram. The read/write devices must be connected to the ASM in accordance with the connection diagram.

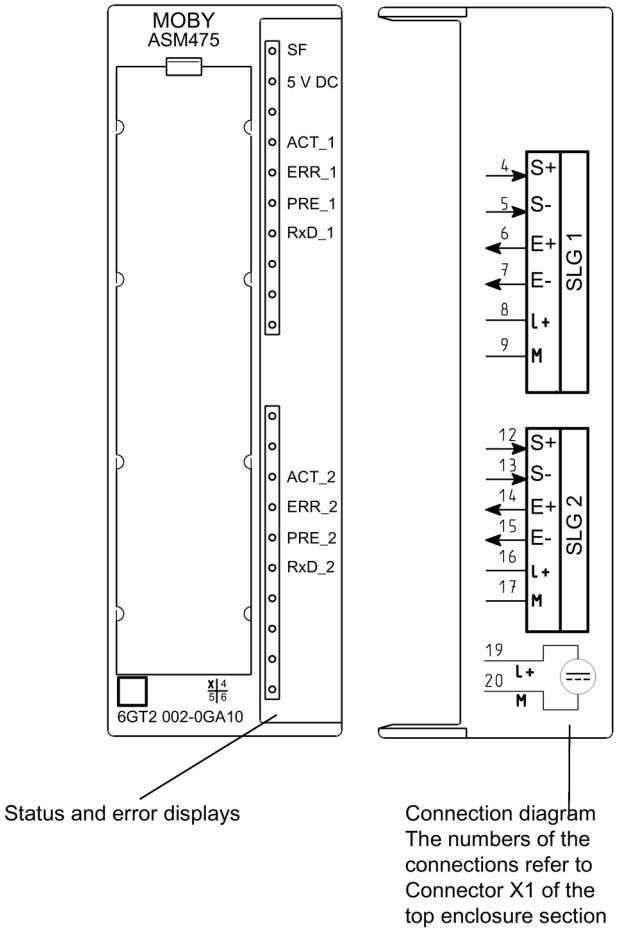


Figure 9-3 Bezel and inside of the front door of the ASM 475

Display elements on the ASM

Table 9- 5 Function of the LEDs on the ASM 475

Light emitting diode	Meaning
SF	System fault (hardware error on ASM)
DC 5V	24 V are connected to ASM and the 5 V voltage on ASM is OK.
ACT_1, ACT_2	The corresponding reader is active in processing a user command.
ERR_1, ERR_2	A flashing pattern indicates the last error to occur. This display can be reset using the parameter Option 1.
PRE_1, PRE_2	Indicates the presence of a transponder.
RxD_1, RxD_2	Indicates live communication with the reader. In the event of a fault on the reader, this display may also be lit.

On the ASM 475, further operating states are indicated with the LEDs PRE, ERR and SF:

Table 9- 6 Operating status display on ASM 475 via LEDs

SF	PRE_1	ERR_1	PRE_2	ERR_2	Meaning
ON	OFF/ON	ON (perm.)	OFF/ON	ON (perm.)	Hardware is defective (RAM, Flash, etc.)
ON	OFF	ON	OFF	OFF	Charger is defective (can only be repaired in the factory).
OFF	2 Hz	OFF	2 Hz	OFF	Firmware loading is active or no firmware detected • Firmware download • ASM must not be switched off
OFF	2 Hz	2 Hz	2 Hz	2 Hz	Firmware loading terminated with errors • Restart required • Load firmware again • Check update files
Any value	5 Hz	5 Hz	5 Hz	5 Hz	Operating system error • Switch ASM off/on
OFF	OFF	1 flash every 2 s	OFF	1 flash every 2 s	ASM has booted and is waiting for a RESET (init_run) from the user.

9.3.4 Configuration

Centralized configuration with SIMATIC S7-300

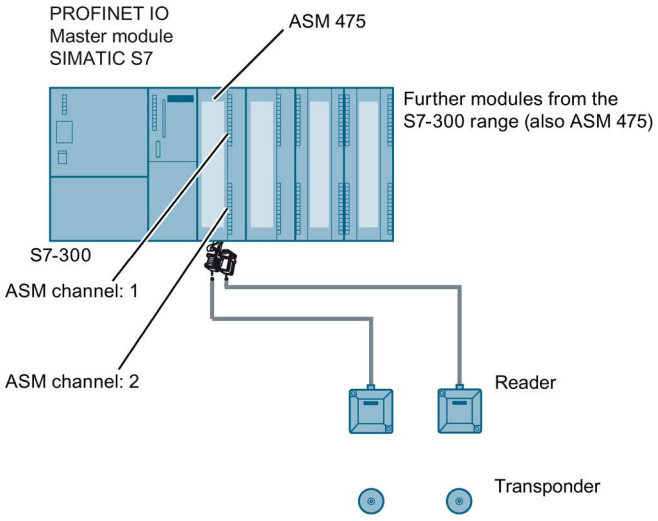


Figure 9-4 Configuration of ASM 475 central

Distributed configuration with ET200M

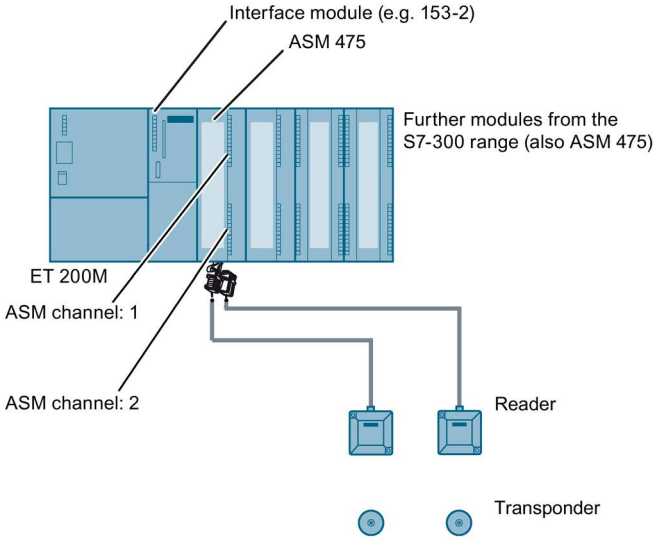


Figure 9-5 Configuration of ASM 475 distributed

Reader connection system

You will find more information on the reader connector technology in the section "Reader RF3xxR (RS422) with ASM 475 (Page 422)".

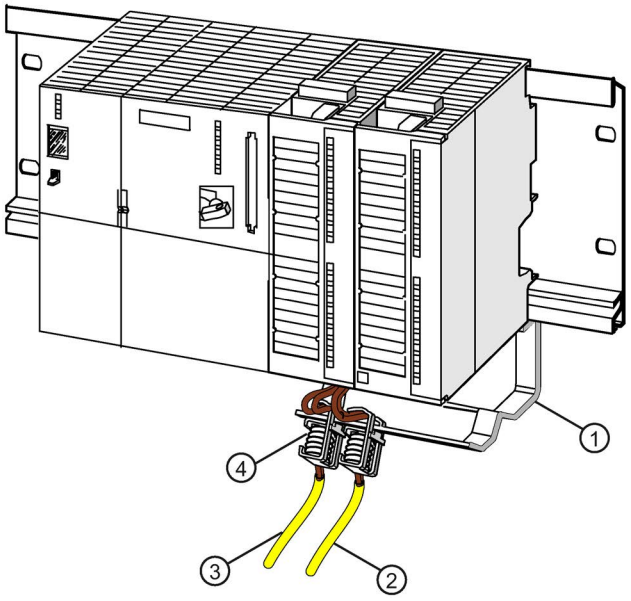
Cable installation

Signal	Pin on M12 connect-or	Cable	Labeling
24 VDC	1	white	1 Reader 2 8 -16
TX -	2	brown	1 Reader 2 7-15
GND	3	Green	1 Reader 2 9-17
TX +	4	Yellow	1 Reader 2 6-14
RX +	5	Gray	1 Reader 2 4-12
RX -	6	Pink	1 Reader 2 5-13
Shield	8 +	-	

Cable assignment for connection of an RF300 reader to ASM 475

9.3.5 Shield connection

When the reader is connected to the ASM 475, the cable shield must be connected to a shield terminal. Shield terminals and holding clips are standard components of the product spectrum of S7-300.



① Holding bracket
② Cable to 2nd reader
③ Cable to 1st reader
④ Shield terminal

Figure 9-6 Shield terminal ASM 475

9.3.6 Technical data

Table 9- 7 Technical specifications for ASM 475

	6GT2002-0GA10
Product type designation	ASM 475 communications module
Interfaces	
Design of the interface point-to-point link	RS-422
Number of connectable readers	2
Electrical connector design	
• Backplane bus	• S7-300 backplane bus
• PROFIBUS interface	• (according to the head module)
• Industrial Ethernet interface	• (according to the head module)

	6GT2002-0GA10
• Supply voltage	• Screw-type or spring-loaded terminals
Design of the interface to the reader for communication	Screw-type or spring-loaded terminals

Mechanical specifications

Housing	
• Material	• Noryl
• Color	• Anthracite

Supply voltage, current consumption, power loss

Supply voltage	24 VDC
Typical current consumption	
• Without connected devices	• 0.1 A
• Including connected devices	• 1.0 A
Power dissipation of the module, typ.	2 Watts
Current consumption from I/O bus, max.	80 mA
Electrical isolation between S7-300 and RF300	Yes
Fuse 24 V for the reader	Yes, electronic

Permitted ambient conditions

Ambient temperature	
• During operation (horizontal installation)	0 ... +60 °C
• During operation (vertical installation)	0 ... +40 °C
• During transportation and storage	-40 ... +70 °C
Degree of protection	IP20
Shock-resistant to IEC 61131-2	150 m/s^2
Vibration-resistant to IEC 61131-2	10 m/s^2

Design, dimensions and weight

Dimensions (L x W x H)	120 x 40 x 125 mm
Weight	0.2 kg
Type of mounting	S7-300 rack
Cable length for RS-422 interface, maximum	1000 m

	6GT2002-0GA10
Product properties, functions, components general	
LED display design	• 4 LEDs per reader connector • 2 LEDs for device status
Product function transponder file handler addressable	Yes
Protocol supported S7 communication	Yes
Product functions management, configuration, engineering	
Type of parameter assignment	Object manager, GSD
Type of programming	FB 45, FB 55, FC 56 (FC 45/55 with restricted functionality)
Type of computer-based communication	2 words cyclic, 238 bytes acyclic
Transponder addressing	Direct access via addresses
Commands	Initialize transponder, read data from transponder, write data to transponder
Standards, specifications, approvals	
Proof of suitability	CE, FCC, UL/CSA

9.4 RF120C

Configuration with RF120C

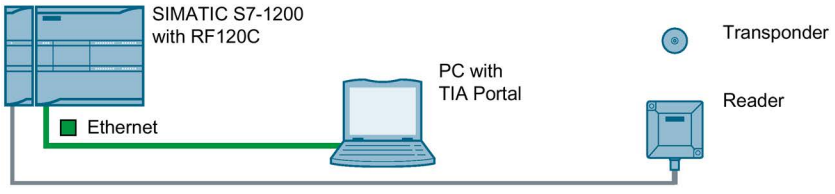


Figure 9-7 Configuration RF120C

For more detailed information, refer to the section " RF120C communications module (https://support.industry.siemens.com/cs/ww/en/view/77485950)".

9.5 RF160C

Configuration with RF160C

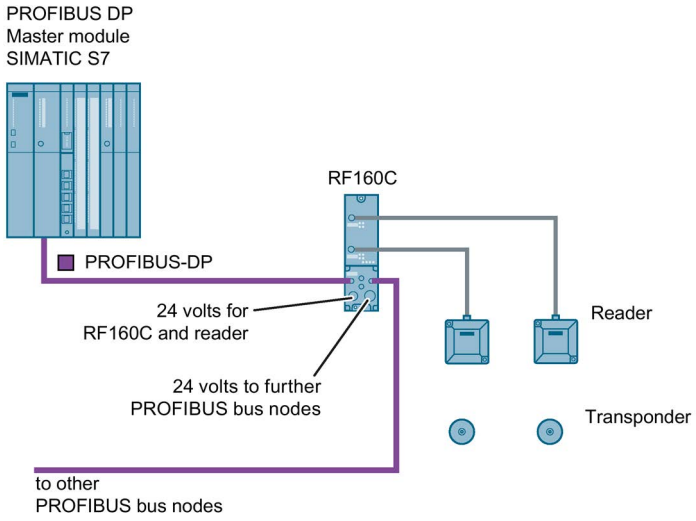


Figure 9-8 Configuration RF160C

For more detailed information, refer to Operating Instructions RF160C (https://support.industry.siemens.com/cs/ww/en/view/42788808).

9.6 RF170C

Configuration with RF170C

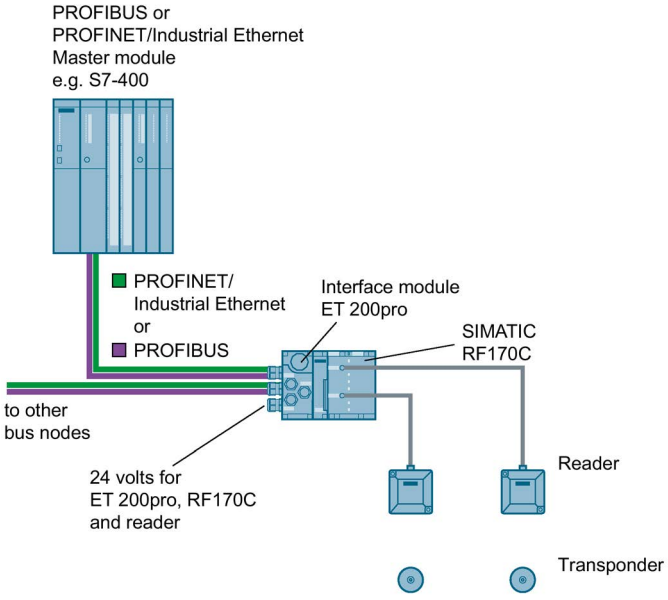


Figure 9-9 Configuration RF170C

For more detailed information, please refer to SIMATIC RF170C Operating Instructions (https://support.industry.siemens.com/cs/ww/en/view/32622825).

9.7 RF180C

Configured with RF180C

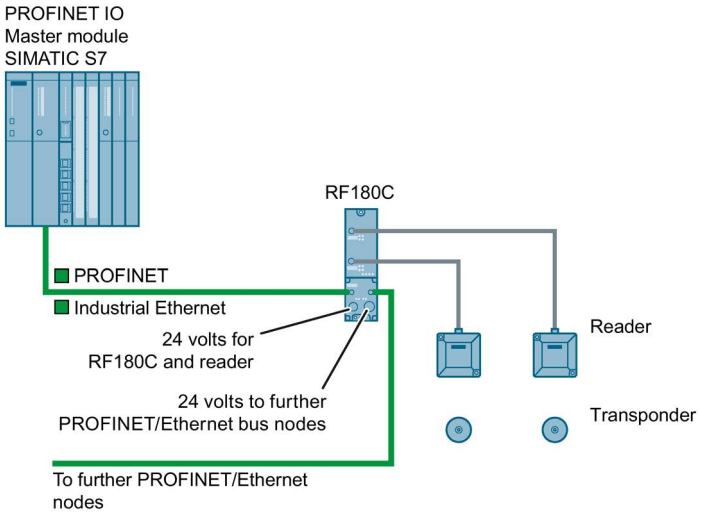


Figure 9-10 Configuration of RF180C

For more detailed information, refer to SIMATIC RF180C Operating Instructions (https://support.industry.siemens.com/cs/ww/en/view/30012157).

9.8 RF182C

Configuration with RF182C

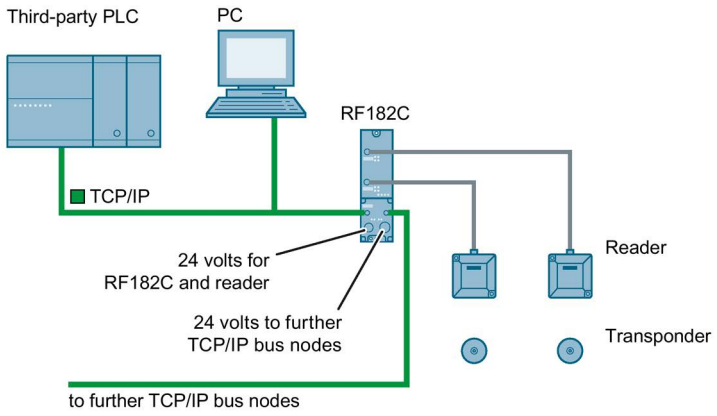


Figure 9-11 Configuration with RF182C

For more detailed information, refer to SIMATIC RF182C Operating Instructions (https://support.industry.siemens.com/cs/ww/en/view/38507897).

System diagnostics 10

10.1 Error codes

Error codes of the RF300 readers

Note

Validity of the error codes

The following error codes apply only to RF300 readers with an RS-422 interface (except for Scanmode).

You can identify the error code in different ways:

- Directly on the reader/interface module by counting the flashing pattern of the red error LED
- In the Ident profile with the output variable "Status"
- with FB 45 / FB 55 variable "error_MOBY".

Table 10- 1 Error codes of the readers

Flashing of the red LED operating display on the reader	Error code (hexa-decimal)	Description
00	00	No error
02	01	Presence error; possible causes: • The active command was not carried out completely • The transponder left the antenna field while the command was being processed • Communication problem between reader and transponder
05	05	Parameter assignment error, possible causes: • Unknown command • Incorrect parameter • Function not allowed
06	06	Air interface faulty
11	0B	The MDS E transponder could not be successfully authenticated.

Flashing of the red LED operating display on the reader	Error code (hexa-decimal)	Description
12	0C	The transponder memory cannot be written, possible causes: • Hardware fault (memory faulty) • Memory write-protected (corresponding OTP area has already been written)
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: bad parameter in RESET command
24	18	Command was sent to a reader that has not yet been initialized
25	19	Previous command is still active
28	1C	Antenna is not identified Possible causes: • Antenna is not connected. • Antenna cable is defective.
30	1E	Incorrect number of characters in frame
31	1F	Running command cancelled by "RESET" command

10.2 Diagnostics functions - STEP 7

10.2.1 Overview

Extended diagnostic functions with SIMATIC RF300

With SIMATIC RF300, extended diagnostics functions are available with STEP 7 Classic / Basic / Professional which simplify commissioning and maintenance.

Extensive diagnostics functions for the SIMATIC RF300 readers with the TIA Portal for STEP 7 Basic / Professional are being planned. With the aid of the Ident profile and the Ident blocks, you can make different diagnostics queries.

You can access this diagnostics data using the SIMATIC function blocks and the commands "Reader status" and "Tag status" (SLG-STATUS and MDS-STATUS). These two commands can each be called in various modes (subcommands) for which corresponding data structures (UDTs) are defined.

Table 10- 2 In RF300 mode

Command	Mode (subcommand)	Meaning
Reader-Status (SLG-STATUS)	01	Hardware and firmware configuration, parameterization status
	06	Communication error counter, current command status
Tag-Status (MDS-STATUS)	01	Serial number of the transponder (UID), memory configuration. EEPROM write-protection status
	02	Serial number of the transponder (UID), HF field strength value, communication error counter, presence counter (duration)
	03	Serial number of the transponder (UID), in the field of identified transponder type (number = tag type, see reset parameter "ftim"), memory configuration, write protection status (OTP), size and number of blocks in the user memory

Overview of the diagnostic functions

Table 10- 3 In ISO mode: ISO 15693, ISO 18000-03 or ISO 14443

Command	Mode (subcommand)	Meaning
Reader-Status (SLG-STATUS)	01	Hardware and firmware configuration, parameterization status
	06	Communication error counter, current command status
Tag-Status (MDS-STATUS)	03	Serial number of the transponder (UID), in the field of identified transponder type (number = tag type, see reset parameter "ftim"), memory configuration, write protection status (OTP), size and number of blocks in the user memory

10.2.2 Reader diagnostics with "reader status" (SLG-STATUS)

With this command you can query the status and diagnostics data of the reader.

Note

Scope of the described UDTs

Note that below only the variables are listed that are relevant for the RF300 system. You will find the full UDTs in the manual "Ident Profile and Ident Blocks".

Mode 81 (mode 01), corresponds to UDT 110

Name	Type	Possible Hex values	Comment
hardware	char	(31 … 38)	Type of hardware
hardware_version	word		HW version
		0 ... FF	= Version (high byte): Unused
		0 ... FF	= Version (low byte)
loader_version	word		Version of loader
		0 ... FF	= Version (high byte)
		0 ... FF	= Version (low byte)
firmware	char	0 ... FF	Type of firmware
firmware_version	word		Firmware version
		0 ... FF	= Version (high byte)
		0 ... FF	= Version (low byte)
driver	char		Type of driver
		31	3964R
driver_version	word		Version of driver
		0 ... FF	= Version (high byte)
		0 ... FF	= Version (low byte)
interface	byte		Interface type
		01	= RS422
		02	= RS232 (only RF380R)
baud	byte		Transmission speed
		01	= 19.2 Kbaud
		03	= 57.6 Kbaud
		05	= 115,2 Kbaud
distance_limiting_SLG	byte	This variable is only provided for the RF380R. Users are therefore able to check the output power actually set. An incorrect value in the parameter "distance_limiting" of the RESET frame results in the default setting "05".	
			Transmit power
		02	0.5 W

Name	Type	Possible Hex values	Comment
		03	0.75 W
		04	1.0
		05	1.25 W (default)
		06	1.5 W
		07	1.75 W
		08	2.0 W
multitag_SLG	byte		Number of transponders (Multi/Pulk) that can be processed in the antenna field
		01	= Single tag mode
field_ON_time_SLG	byte	00	= RF300 transponder
		01	= ISO transponder (non-specific)
		03	= ISO transponder (Infineon, MDS D3xx)
		04	= ISO transponder (Fujitsu, MDS D4xx)
		05	= ISO transponder (NXP, MDS D1xx)
		06	= ISO transponder (Texas Instruments, MDS D2xx)
		07	= ISO transponder (ST, LRI2K)
		08	= ISO transponder (Fujitsu, MDS D5xx)
		0E	= ISO (setting with "scanning_time" and "fcon")
		10	= RF300 transponder
		20	= MDS E transponder
		31	= General Mode
		FF	= Setting with "scanning_time" and "fcon"
status_ant	byte		Status of the antenna
		01	= Antenna On
		02	= Antenna Off
MDS_control	byte		Presence mode
		00	= Operation without presence message
		01	= Operation with presence message
		04	= Operation with presence message (antenna is off. The antenna is turned on only when a Read or Write command is sent.)

Mode 86 (mode 06), corresponds to UDT 280

Name	Type	Possible Hex values	Comment
FZP	byte	0 ... FF	= Error counter, passive (errors during idle time)
ABZ			= Abort counter
CFZ			= Code error counter
SFZ			= Signature error counter
CRCFZ			= CRC error counter
BSTAT			= Current command status
ASMFZ			= Interface problems to host (ASM/PC) parity, BCC, frame error

Note

Counter values are deleted.

Note that the counter values are deleted after they have been read out (command "Reader status" or "SLG-STATUS").

Explanations:

- "FZP": counts interference pulses when communication with a transponder is not taking place (e.g. electromagnetic interference caused by contactors, motors, etc.). Counter values can, however, also be generated when a transponder is located at the edge of the field even when there is no external interference.
- "ABZ", "CFZ", "SFZ" and "CRCFZ" are counters for protocol errors which may occur during reader-transponder communication. This can be caused by unsuitable reader/transponder positioning (e.g. transponder on field boundary, several transponders in the antenna field) or external EMC interference.

To ensure clear diagnostics of the quality of communication, it is recommended that a "Reader status" (SLG STATUS) command with mode 86 (mode 06) is executed following receipt of the presence message to reset the error counters.

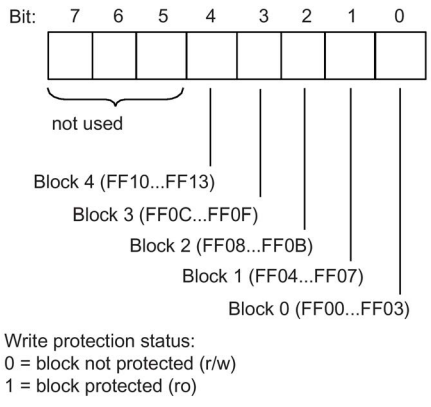
The protocol error counters are not mutually independent. If a code error (CFZ) occurs, this will cause a signature (SFZ) or CRC- (CRCFZ) error.

- "BSTAT" is the status for the most recently executed command. A value other than 0 means that the previous command was repeated by the reader due to faults (see above).
- "ASMFZ" signals line-conducted communication interference between the communications module and the reader. Faults of this type can be caused by contact problems on the connector or the cable connection.

10.2.3 Transponder diagnostics with "Tag status" (MDS-STATUS)

With this command you can query the status and diagnostics data from the transponder currently located in the antenna field.

Attribute "0x04" (mode 01), corresponds to UDT 260 (only for RF300 transponders)

Name	Type	Possible Hex values	Comment
UID	array[1…8] byte	000000005555555 ... 00000000FFFFFFFF	Unique identifier = b0-31: 4 byte TAG ID, b32-63: 0
MDS_type	byte	01 02 03 04	Transponder memory configuration = Transponder without FRAM = Transponder with FRAM 8 KB = Transponder with FRAM 32 KB = Transponder with FRAM 64 KB
Lock_state	byte	0 ... FF	EEPROM write protection status  Write protection status: 0 = block not protected (r/w) 1 = block protected (ro)

Attribute "0x82" (mode 02), corresponds to UDT 270 (only for RF300 transponders)

Name	Type	Possible Hex values	Comment
UID	array[1…8] byte	0000000055555555 ... 00000000FFFFFFFF	Unique identifier = b0-31: 4 byte TAG ID, b32-63: 0
LFD	byte	0 ... FF	= Value for field strength determined in the transponder
FZP	byte	0 ... FF	= Error counter (passive) → errors during idle time
FZA	byte	0 ... FF	= Error counter (active)
ANWZ	byte	0 ... FF	= Presence counter

Note

Counter values are deleted.

All counter values are deleted when the transponder exits the antenna field or when the antenna is switched off.

Explanations:

- "LFD" is a measured value for the field strength that is determined in the transponder. The lower the value, the higher the field strength.
- "FZP" counts interference pulses when communication with a transponder is not taking place (e.g. electromagnetic interference caused by contactors, motors, etc.). Counter values can also be generated when a transponder is located at the edge of the field even when there is no external interference.
- "FZA" counts errors that can occur during reader-to-transponder communication. This can be caused by unsuitable reader/transponder positioning (e.g. transponder on field boundary, several data carriers in the field) or external electromagnetic interference.
- "ANWZ" is the value for the time that the transponder remains in the field before the "Tag status" (MDS STATUS) with mode 82 (mode 02) is executed. A time step is 10 ms. The maximum time that can be recorded is therefore 2.5 s.

Attribute "0x83" (mode 03), corresponds to UDT 230

Name	Type	Possible Values	Comment
UID	array[1…8] byte		Unique identifier
		0000000000000000 ... FFFFFFFFFFFFFFFF	=8 byte UID, MSB first
MDS_type	byte		Transponder type (vendor, identification)
		00	= ISO transponder (non-specific)
		03	= ISO transponder (Infineon, MDS D300)
		04	= ISO transponder (Fujitsu, MDS D400)
		05	= ISO transponder (Philips, MDS D100)
		06	= ISO transponder (Texas Instruments, MDS D200)
		07	= ISO transponder (ST, LRI2K)
		08	= ISO transponder (Fujitsu, MDS D500)
		11	= RF300 transponder (0 kB)
		12	= RF300 transponder (8 kB)
		13	= RF300 transponder (32 kB)
		14	= RF300 transponder (64 kB)
		15	= RF300 transponder (128 kB)
		16	= RF300 transponder (256 kB)
		21	= ISO transponder (NXP, 1 kB, MDS E)
		22	= ISO transponder (Infineon, 1 kB, MDS E)
		23	= ISO transponder (NXP, 4 kB)

Name	Type	Possible Values	Comment
	binary	0 ... 255	Vendor-specific value
IC_version	byte	0 ... FF	Chip version
size	byte	0 ... FF	Memory size in bytes Depending on transponder type, e.g. my-d: 992 bytes
lock_state	byte	0 ... FF	Lock state, OTP information: One bit is used per block (4 x 4 bytes or 2 x 8 bytes) (bit = 1: block is locked) Example: 01 = Block 1 of address FF80 ... FF83 is locked or 03 = Block 1 and 2 of address FF80 ... FF87 are locked, e.g. for the Philips SL2 ICS20 (MDS D124, D160 or D100). This chip provides a usable memory with 112 bytes EEPROM from address 0000 - 006F (total OTP area "0060 ... 006F"). In this memory, the locked area corresponds to the addresses 0060 ... 0063 or 0060 ... 0067
block_size	byte	0 ... FF	Block size of the transponder Depending on transponder type, e.g. my-d: 4 bytes
nr_of_blocks	byte	0 ... FF	Number of blocks Depending on transponder type, e.g. my-d: 248 bytes

Appendix A

A.1 Certificates and approvals

All the latest RFID radio approvals are available on the Internet (http://www.siemens.com/rfid-approvals).

Labeling	Description
CE	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
UL	Underwriters Laboratories (UL) to UL 60950 Standard (I.T.E), UL508 or UL61010-1/UL61010-2-201 (IND.CONT.EQ)
c UL	Underwriters Laboratories (UL) according to Canadian standard C22.2 No. 60950 (I.T.E), C22.2 No. 142 or C22.2 NO. 61010-1-12 (IND.CONT.EQ)
c UL us	Underwriters Laboratories (UL) according to Standard UL 60950, Report E11 5352 and Canadian standard C22.2 No. 60950 (I.T.E), UL508 or UL61010-1/UL61010-2-201 (IND.CONT.EQ) and C22.2 No. 142 or C22.2 NO. 61010-1-12 (IND.CONT.EQ)

Labeling	Description
	UL recognition mark
	Canadian Standard Association (CSA) acc. to standard C22.2. No. 60950 (LR 81690), C22.2 No. 142 or C22.2 NO. 61010-1-12 (LR 63533)
 NRTL	Canadian Standard Association (CSA) acc. to American Standard UL 60950 (LR 81690), UL508 or UL61010-1/UL61010-2-201 (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
 ANATEL	Brazil (ANATEL) ANATEL-ID: XXXX-YY-ZZZZ
Mexico (COFETEL)	Mexico (COFETEL)
	South Africa (ICASA)
China (CMIIT)	China (CMIIT) CMIIT ID: XXXXYYZZZZ
	South Korea (KCC)
 総務省指定 第XXXX号	Japan (VCCI)

A.2 Accessories

A.2.1 Transponder holders

Table A- 1 Overview of the transponder holders and spacers

Product photo	Insertable transponders	Characteristics
 6GT2190-0AA00	• MDS D100 • MDS D200 • MDS D400 • MDS E600 • MDS E611 • RF360T	• Spacer for mounting on metal, in conjunction with the fixing pocket 6GT2190-0AB00 • Distance from transponder to metal: 25 mm • Mounting: 4 x M4 screws • Material: PA6 • Weight: 31 g • Dimensions (L x W x H): 110 x 62 x 24 mm
 6GT2190-0AB00	• MDS D100 • MDS D200 • MDS D400 • MDS E600 • MDS E611 • RF360T	• Fixing pocket in conjunction with spacer 6GT2190-0AA00 • Mounting: – Locks into spacer – 2 x screws/nails – Tacked • Material: PA6 • Weight: 12 g • Dimensions (L x W x H): 121 x 57 x 5 mm
 6GT2390-0AA00	• MDS D100 • MDS D200 • MDS D400	• Fixing pocket not suitable for mounting directly on metal • Mounting: 2 x M4 countersunk screws • Material: PA6 • Weight: 21 g • Dimensions (L x W x H): 110 x 65 x 5 mm

Product photo	Insertable transponders	Characteristics
 6GT2690-0AA00	• MDS D139 • MDS D339	• Spacer for mounting on metal • Distance from transponder to metal: 30 mm • Mounting: 1 x M5 stainless steel screw • Tightening torque: 1.5 Nm • Material: PPS • Weight: 50 g • Dimensions (Ø x H): 85 x 30 mm
 6GT2690-0AH00	• MDS D139 • MDS D339	• Quick change holder for mounting on metal • Distance from transponder to metal: 30 mm • Mounting: Screw-in • Material: Stainless steel VA • Weight: 80 g • Dimensions (Ø x H): 22 x 60 mm
 6GT2690-0AH10	• MDS D139 • MDS D339	• Quick change holder for mounting on metal • Distance from transponder to metal: 30 mm • Mounting: Screw-in • Material: Stainless steel VA • Weight: 60 g • Dimensions (Ø x H): 22 x 47 mm
 6GT2690-0AK00	• MDS D124 • MDS D324 • MDS D424 • MDS D524	• Spacer for mounting on metal • Distance from transponder to metal: 15 mm • Mounting: 1 x M4 countersunk screw • Tightening torque: ≤ 1 Nm • Material: PPS • Weight: Approx. 4 g • Remounting cycles: min. 10 • Dimensions (Ø x H): 36 x 22 mm

Product photo	Insertable transponders	Characteristics
 6GT2690-0AL00	• MDS D126 • MDS D426 • MDS D526 • MDS E624	• Spacer for mounting on metal • Distance from transponder to metal: 25 mm • Mounting: 1 x M4 countersunk screw • Tightening torque: ≤ 1 Nm • Material: PA6 • Weight: Approx. 12 g • Remounting cycles: min. 10 • Dimensions (Ø x H): 59 x 30 mm
 6GT2690-0AG00	• MDS D160 • MDS D460	• Spacer for mounting on metal • Distance from transponder to metal: 10 mm • Mounting: 1 x M3 countersunk screw • Material: PA6 • Weight: 2 g • Dimensions (Ø x H): 20 x 14 mm
 6GT2690-0AE00	• MDS D423 • RF330T	• Fixing hood • Mounting: 2 x M4 or 2 x M5 screws with max. head diameter of 9.5 mm • Tightening torque ≤ 0.8 Nm (M4 only with flat washer) • Material: PPS • Weight: 3 g • Dimensions (L x W x H): 49.4 x 20 x 9.8 mm

Dimensional drawings

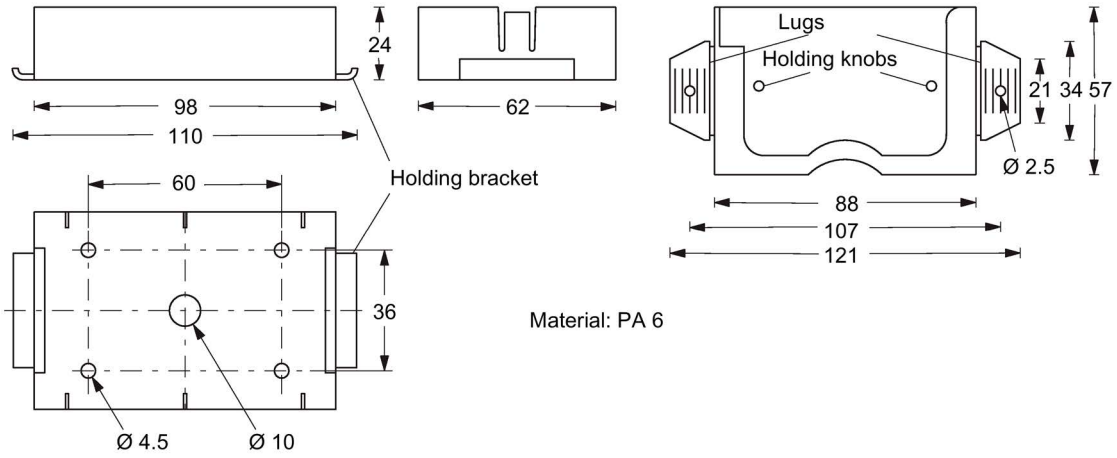


Figure A-1 Dimension drawing of spacer 6GT2190-0AA00 with fixing pocket 6GT2190-0AB00

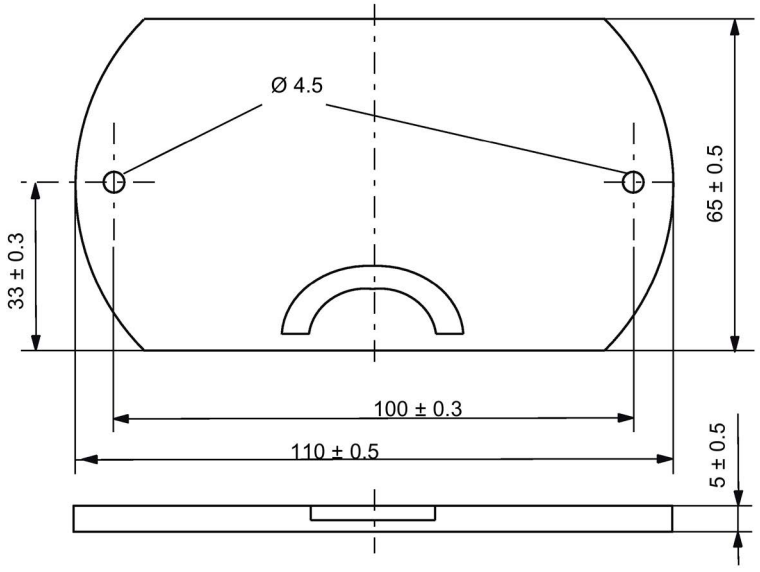


Figure A-2 Dimension drawing of fixing pocket 6GT2390-0AA00

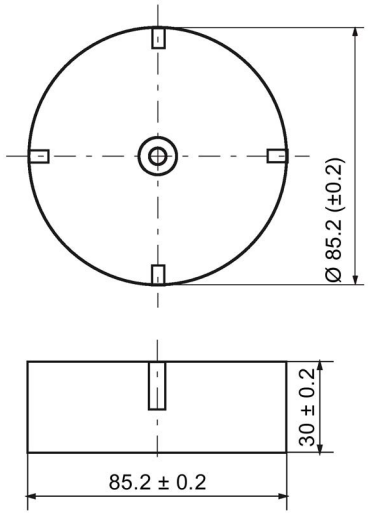


Figure A-3 Dimension drawing of spacer 6GT2690-0AA00

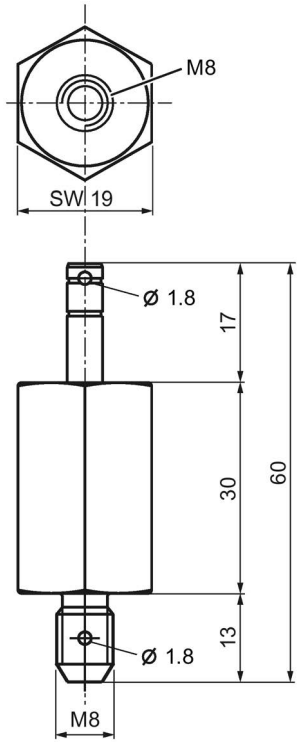


Figure A-4 Dimension drawing of quick change holder 6GT2690-0AH00

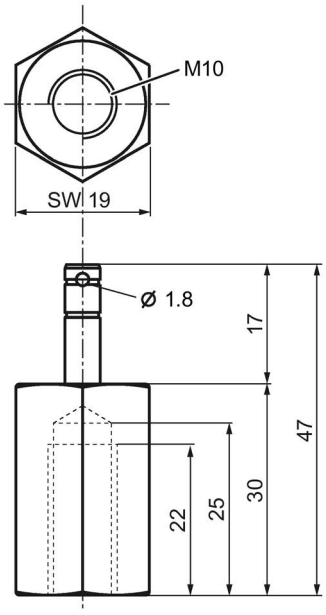


Figure A-5 Dimension drawing of quick change holder 6GT2690-0AH10

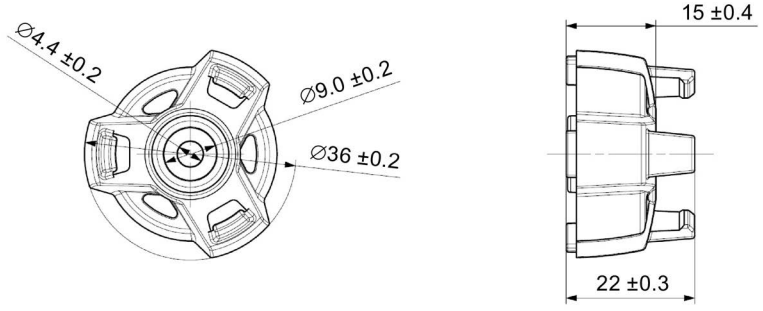


Figure A-6 Dimension drawing of spacer 6GT2690-0AK00

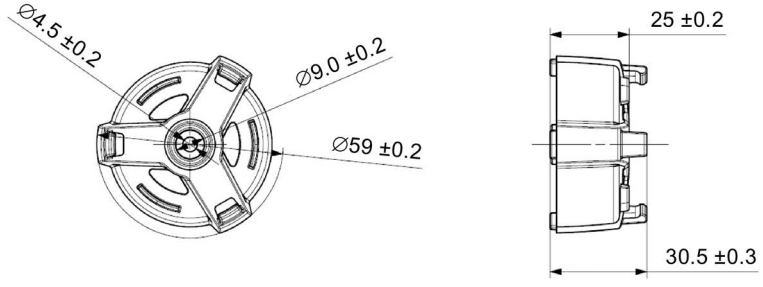


Figure A-7 Dimension drawing of spacer 6GT2690-0AL00

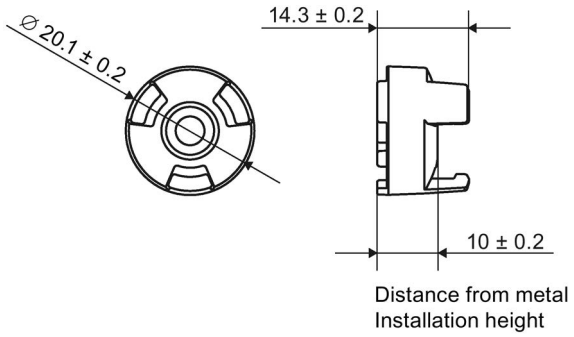


Figure A-8 Dimension drawing of spacer 6GT2690-0AG00

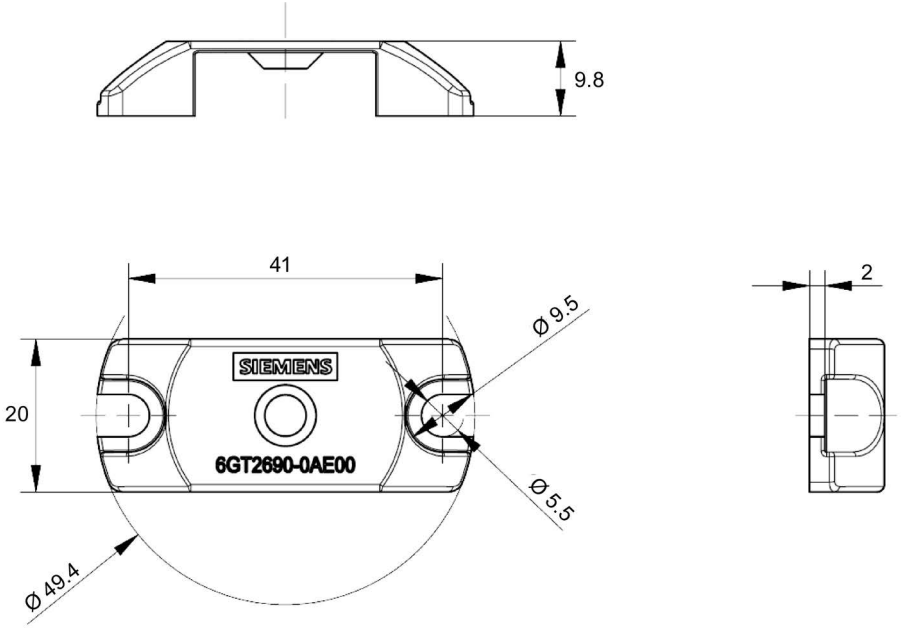


Figure A-9 Dimension drawing of fixing hood 6GT2690-0AE00

A.2.2 MOBY I migration

The RF300 readers of the new generation provide the option of simple migration of existing MOBY I systems to SIMATIC RF300. The so-called MOBY I emulation processes frames of the MOBY I protocol on its serial interface and communicates with the established RF300 transponders.

If the RF300 reader is connected to a communications module with MOBY I capability, the reader automatically recognizes the serial protocol and sets the MOBY I protocol. As a communications module with MOBY I capability, all the communications modules sold for MOBY I count regardless of the mode in which the MOBY I communications modules are operated. This property allows even projects with the ECC mode turned on or with file handlers to be migrated.

Communication modules with MOBY I capability:

RF180C, RFID 181EIP, RF170C, ASM 456, ASM 475, ASM 470, ASM450, ASM 451, ASM 452, ASM 472, ASM 473, ASM 424, ASM 454, ASM 400, CM 422, CM 423, ASM 410, ASM 420, ASM 421, ASM 440, ES030

With the aid of the adapter cable (0.3 m; article number 6GT2091-4VE30) you can migrate existing MOBY I projects without needing to re-cable the connected RFID devices.

The transfer is as usual with MOBY I with a transmission speed of 19.2 kBd. The transmission speed in the application is identical (or slightly slower) than with the original MOBY I hardware.

NOTICE
Changed field geometry When replacing MOBY I components with RF300 components note that the field geometry changes.

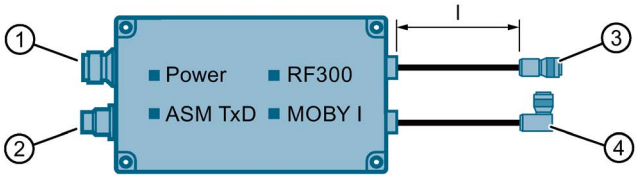
Note

LED reaction of the readers in MOBY I mode

Presence and errors are not displayed on the reader. These are only displayed via the connected CM.

Design of the Y adapter

With the aid of the Y adapter (article number 6GT2090-4VE00) a slow migration of a MOBY I application to RF300 is possible. The Y adapter is mounted in the vicinity of a MOBY I SLG. It forwards signals of a communications module both to the MOBY I SLG and to the RF300 reader to be newly installed. The transponder commands are handled either with a MOBY I transponder or with an RF300 transponder. To do this, no change to the MOBY I application is necessary.



①	Power	Optional 24 VDC supply voltage; M12 plug, 4-pin
②	ASM TxD	Connector for the communications module; SLG plug, 6-pin acc. to EN 175201-804
③	RF300	Connector for RF 300 reader; M12 socket, 8-pin, cable length: 0.5 m max. 2 m cable extension permitted
④	MOBY I	Connector for the MOBY I reader; SLG socket (angled), 6-pin acc. to EN 175201-804; cable length: 0.5 m

Figure A-10 Connection graphic of the MOBY Y adapter for MOBY I

Command set

The complete command set of the MOBY I SLGs is supported by the RF300 readers. You will find a list of the commands and a description of the commands in the manuals "FB 45" and "FC 56". These manuals can be found in the archive of the DVD "Ident Systems Software & Documentation" (6GT2080-2AA20).

A.2.3 DVD "Ident Systems Software & Documentation"

The DVD contains:

- FB/FC for SIMATIC, 3964R
- Drivers for DOS/Windows XP/Win 7
- C libraries
- PC demonstration program
- RFID documentation in PDF format, especially RFID system manuals, programming instructions and operating instructions

Table A- 2 Ordering data DVD

	Article number
DVD "Ident Systems Software & Documentation"	6GT2080-2AA20

Note

Notes on "Ident Systems Software" and licensing

When purchasing a communication module or an interface module, no software or documentation is supplied. The "Ident Systems Software & Documentation" DVD contains all available FBs/FCs for the SIMATIC, C libraries, demo programs, etc. and needs to be ordered separately. In addition, the DVD contains the complete Ident documentation (German and English) in PDF format.

The purchase of a communications module or an interface module includes a payment for the use of the software, including documentation, on the "Ident Systems Software & Documentation" DVD and the purchaser acquires the right to make copies (copy license) insofar as they are required as part of the customer-specific application or development for the plant.

The contract accompanying the DVD pertaining to the use of software products against a one-off payment also applies.

A.3 Connecting cable

In the following chapter, you will find an overview of the connecting cables between the readers and communication modules or PCs.

A.3.1 RF3xxR reader (RS-422) with ASM 456 / RF160C / RF170C / RF180C / RF182C

Connecting cable with straight connector

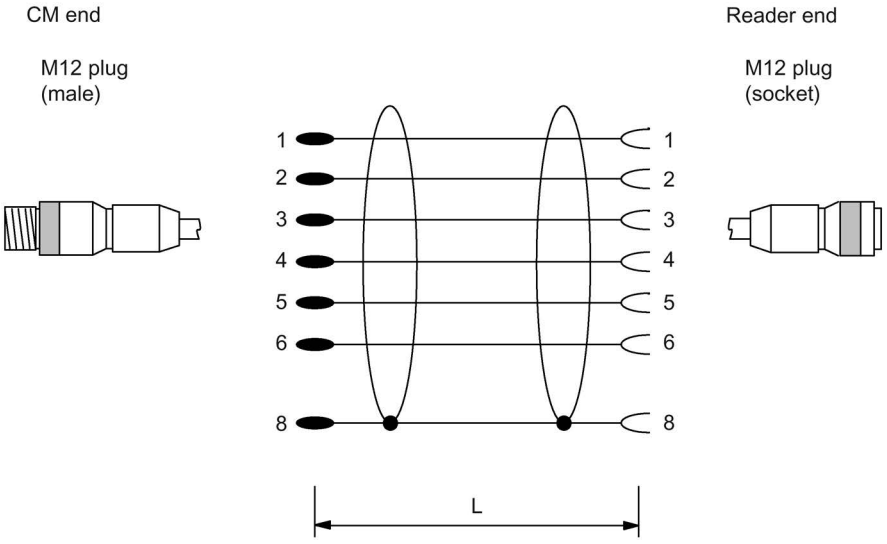


Figure A-11 Connecting cable between ASM 456, RF160C, RF170C, RF180C, RF182C and RF3xxR reader (RS-422)

Table A- 3 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

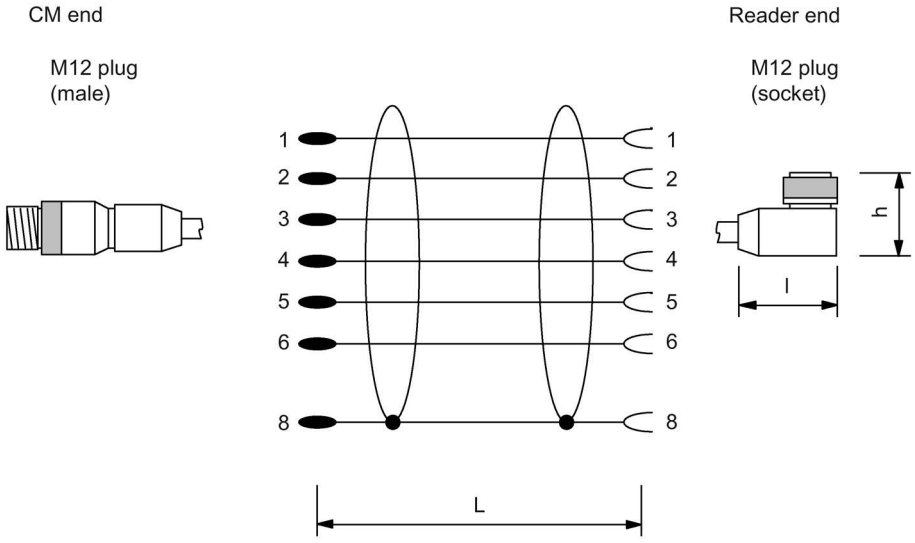


Figure A-12 Connecting cable between ASM 456, RF160C, RF170C, RF180C and RF3xxR reader (RS-422) with angled connector

Table A- 4 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.

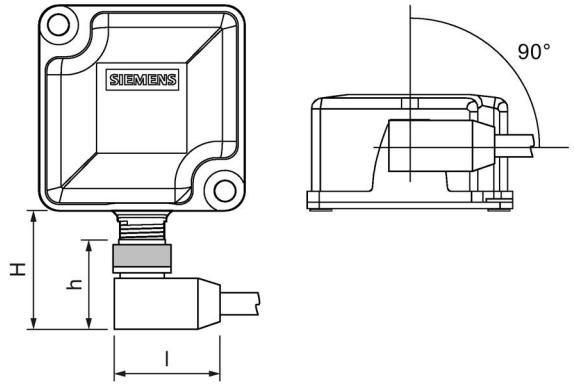


Figure A-13 Distance between connector edge and housing edge

The distance between the connector edge and the housing edge of the reader (H) depends on the reader being used and can be up to 38 mm. If you look at the front of the reader, the angled connector always points to the right and runs parallel to the housing.

A.3.2 Reader RF3xxR (RS422) 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 6GT2891-4E… plug-in cables.

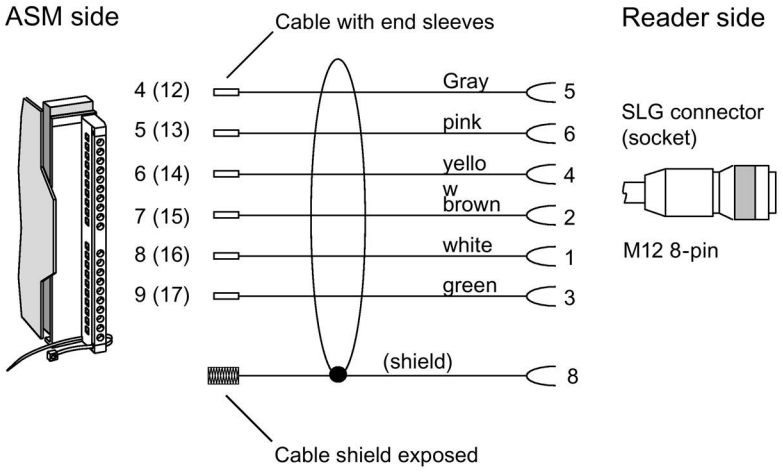


Figure A-14 Structure of the connecting cable between ASM 475 and RF3xx reader with RS-422

Table A- 5 Ordering data

Length L	Article number
2 m	6GT2891-4EH20
5 m	6GT2891-4EH50

A.3.3 Reader RF3xxR (RS-422) with RF120C

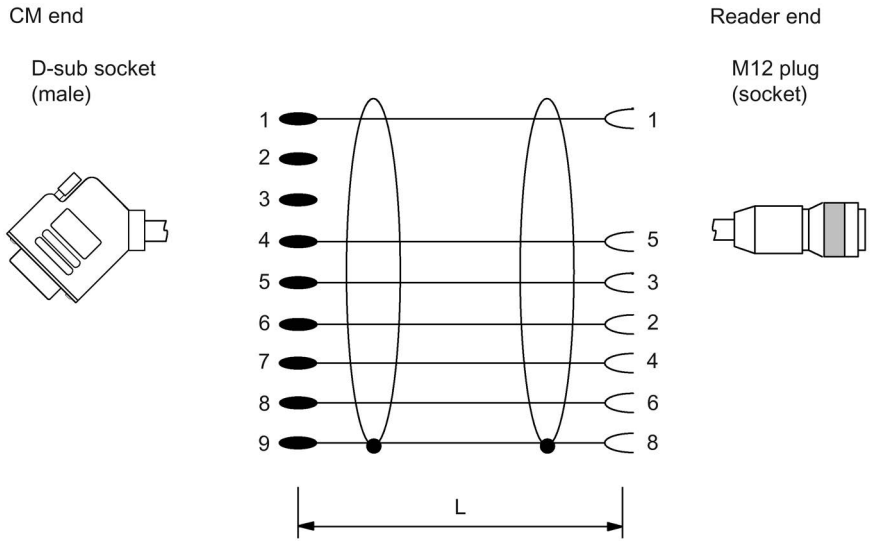


Figure A-15 Connecting cable between RF120C and RF3xxR reader (RS-422)

Table A- 6 Ordering data

Length L	Article number
2 m	6GT2091-4LH20
5 m	6GT2091-4LH50
10 m	6GT2091-4LN10

A.3.4 Reader RF380R (RS232) - 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

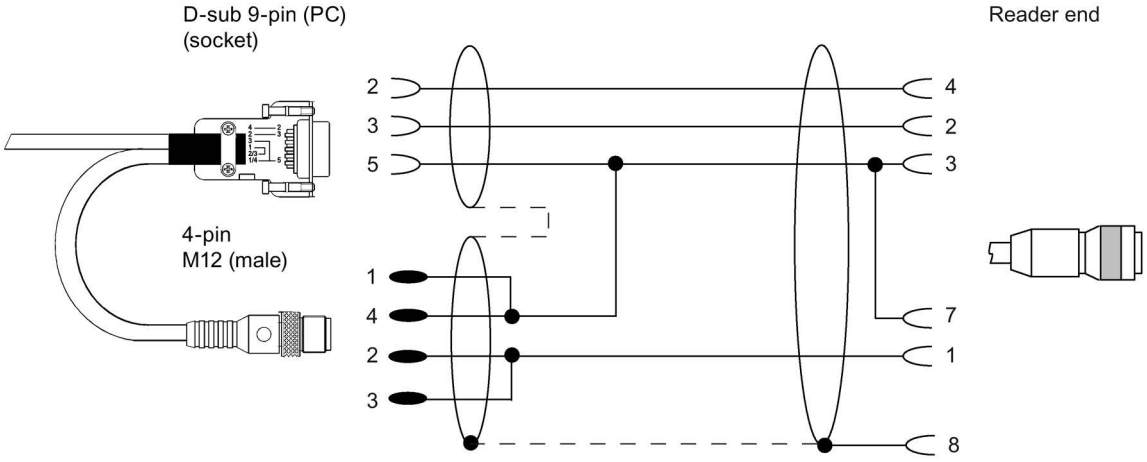


Figure A-16 Connecting cable between PC and RF380R (RS-232) with 4-pin power supply connector

Suitable power supply unit: e.g. wide-range power supply unit

With open ends for the power supply

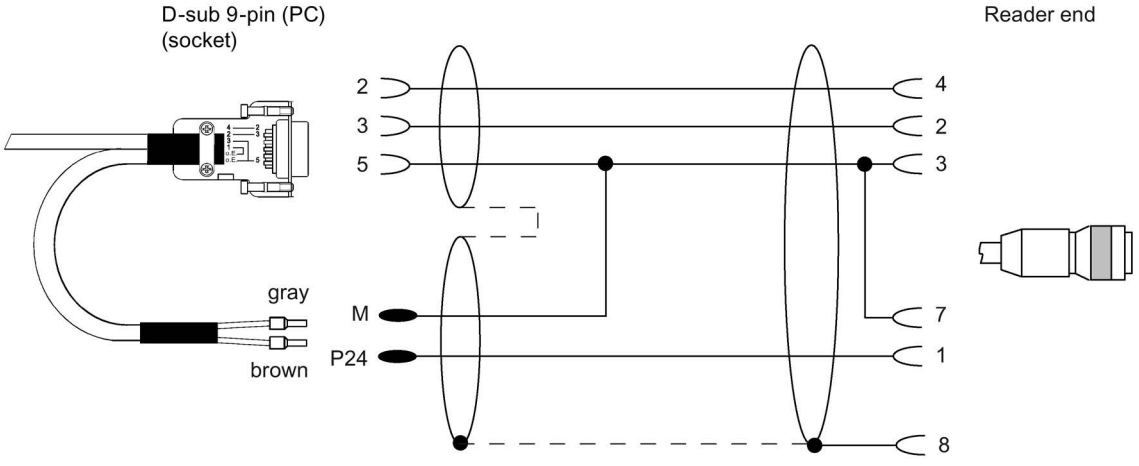


Figure A-17 Connecting cable between PC and RF380R (RS-232) with open ends for the power supply

Table A- 7 Ordering data connecting cable

	Article number
Connecting cable with 4-pin power supply connector (5 m)	6GT2891-4KH50
Connecting cable with open ends (5 m)	6GT2891-4KH50-0AX0

Table A- 8 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

A.4 Ordering data

RF300 components

Note

Product update

Note that readers with the article numbers "6GT2801-xABxx" are being replaced by readers with the article numbers "6GT2801-xBAxx".

Table A- 9 RF300 reader

Reader	Description		Article number
RF310R (RS-422)	• With RS422 interface (3964R) • IP67 • Operating temperature: -25 °C ... +70 °C • Dimensions (L x W x H): 55 x 75 x 30 mm • with integrated antenna • ISO 15693 compatible	horizontal base plate	6GT2801-1AB10
		base plate turned through 90°	6GT2801-1AB10-0AX1
RF310R (Scanmode)	• with RS-422 interface (Scanmode) • IP67 • Operating temperature: -25 °C ... +70 °C • Dimensions (L x W x H): 55 x 75 x 30 mm • with integrated antenna • ISO 15693 compatible		6GT2801-1AB20-0AX1

Reader	Description	Article number
RF310R second generation	• With RS-422 interface (3964R) • IP67 • Operating temperature: -25 °C ... +70 °C • Dimensions (L x W x H): 55 x 75 x 30 mm • with integrated antenna • ISO 15693 compatible • ISO 14443 (MOBY E) compatible	6GT2801-1BA10
RF340R	• With RS422 interface (3964R) • IP67 • Operating temperature -25 °C ... +70 °C • Dimensions (L x W x H): 75 x 75 x 41 mm • with integrated antenna • ISO 15693 compatible	6GT2801-2AB10
RF340R second generation	• With RS-422 interface (3964R) • IP67 • Operating temperature -25 °C ... +70 °C • Dimensions (L x W x H): 75 x 75 x 41 mm • with integrated antenna • ISO 15693 compatible • ISO 14443 (MOBY E) compatible	6GT2801-2BA10
RF350R	• With RS-422 interface (3964R) • IP65 • Operating temperature: -25 °C ... +70 °C • Dimensions (L x W x H): 75 x 75 x 41 mm • Reader for external antennas, with the option of connecting ANT 1, ANT 3, ANT 12, ANT 18, ANT 30 • ISO 15693 compatible	6GT2801-4AB10
RF350R second generation	• With RS422 interface (3964R) • IP65 • Operating temperature: -25 °C ... +70 °C • Dimensions (L x W x H): 75 x 75 x 41 mm • Reader for external antennas, with the option of connecting ANT 1, ANT 3, ANT 12, ANT 18, ANT 30 • ISO 15693 compatible • ISO 14443 (MOBY E) compatible	6GT2801-4BA10

Reader	Description	Article number
RF380R	• with RS-422 interface (3964R) and RS-232 interface (3964R) • IP67 • Operating temperature: -25 °C ... +70 °C • Dimensions (L x W x H): 160 x 80 x 41 mm • with integrated antenna • ISO 15693 compatible	6GT2801-3AB10
RF380R Scanmode	• with RS-422 interface (Scanmode) and RS-232 interface (Scanmode) • IP67 • Operating temperature: -25 °C ... +70 °C • Dimensions (L x W x H): 160 x 80 x 41 mm • with integrated antenna • ISO 15693 compatible	6GT2801-3AB20-0AX1
RF382R (Scanmode)	• with RS-422 interface (Scanmode) and RS-232 interface (Scanmode) • IP67 • Operating temperature: -25 °C ... +70 °C • Dimensions (L x W x H): 160 x 80 x 41 mm • with integrated antenna • ISO 15693 compatible	6GT2801-3AB20-0AX0
RF350M	• IP54 • Operating temperature: -20 °C ... +55 °C • Dimensions (L x W x H): 250 x 90 x 47 mm • Mobile reader with integrated antenna	6GT2803-1BA00
RF350M	• IP54 • Operating temperature: -20 °C ... +55 °C • Dimensions (L x W x H): 250 x 90 x 47 mm • Mobile reader for external antennas, with the option of connecting ANT 8, ANT 12, ANT 18, ANT 30	6GT2803-1BA10

Table A- 10 RF300 transponder

RF300 transponder	Description	Article number
RF320T	• Memory size: 20 bytes of EEPROM user memory • Dimensions (Ø x H): 27 x 4 mm	6GT2800-1CA00
RF330T	• Memory size: 32 KB FRAM user memory • Dimensions (Ø x H): 30 x 8 mm	6GT2800-5BA00
RF340T (8 KB FRAM)	• Memory size: 8 KB FRAM user memory • Dimensions (L x W x H): 48 x 25 x 15 mm	6GT2800-4BB00

RF300 transponder	Description	Article number
RF340T (32 KB FRAM)	• Memory size: 32 KB FRAM user memory • Dimensions (L x W x H): 48 x 25 x 15 mm	6GT2800-5BB00
RF350T	• Memory size: 32 KB FRAM user memory • Dimensions (L x W x H): 50 x 50 x 20 mm	6GT2800-5BD00
RF360T (8 KB FRAM)	• Memory size: 8 KB FRAM user memory • Dimensions (L x W x H): 85.8 x 54.8 x 2.5 mm	6GT2800-4AC00
RF360T (32 KB FRAM)	• Memory size: 32 KB FRAM user memory • Dimensions (L x W x H): 85.8 x 54.8 x 2.5 mm	6GT2800-5AC00
RF370T (32 KB FRAM)	• Memory size: 32 KB FRAM user memory • Dimensions (L x W x H): 75 x 75 x 41 mm	6GT2800-5BE00
RF370T (64 KB FRAM)	• Memory size: 64 KB FRAM user memory • Dimensions (L x W x H): 75 x 75 x 41 mm	6GT2800-6BE00
RF380T	• Memory size 32 KB FRAM user memory • Dimensions (Ø x H): 114 x 83 mm	6GT2800-5DA00

Table A- 11 ISO transponder

ISO transponder	Description	Article number
MDS D100	• Memory size: 112 bytes of EEPROM user memory • Dimensions (L x W x H): 85.6 x 54 x 0.9 mm • Credit card format	6GT2600-0AD10
MDS D117	• Memory size: 112 bytes of EEPROM user memory • Dimensions (Ø x H): 4 x 5 mm	6GT2600-0AG00
MDS D124	• Memory size: 112 bytes of EEPROM user memory • Dimensions (Ø x H): 27 (±0.2) x 4 (±0.2) mm	6GT2600-0AC10
MDS D126	• Memory size: 112 bytes of EEPROM user memory • Dimensions (Ø x H): 50 x 3.6 mm • Round design with mounting hole	6GT2600-0AE00
MDS D127	• Memory size: 112 bytes of EEPROM user memory • Dimensions (Ø x H): M6 x 5.8 (±0.2) mm	6GT2600-0AF00
MDS D139	• Memory size: 112 bytes of EEPROM user memory • Dimensions (Ø x H): 85 (±0.5) x 15 (-1.0) mm	6GT2600-0AA10
MDS D160	• Memory size: 112 bytes of EEPROM user memory • Dimensions (Ø x H): 16 (±0.2) x 3.0 (±0.2) mm • Laundry transponder for cyclic applications	6GT2600-0AB10

ISO transponder	Description	Article number
MDS D165	• Memory size: 112 bytes of EEPROM user memory • Dimensions (L x W): 86 x 54 mm • Smartlabel (PET) in credit card format	6GT2600-1AB00-0AX0
MDS D200	• Memory size: 256 bytes of EEPROM user memory • Dimensions (L x W x H): 86 x 54 x 0.8 mm • Credit card format	6GT2600-1AD00-0AX0
MDS D261	• Memory size: 256 bytes of EEPROM user memory • Dimensions (L x W): 55 x 55 mm • Smartlabel (PET), small design	6GT2600-1AA00-0AX0
MDS D324	• Memory size: 992 bytes of EEPROM user memory • Dimensions (Ø x H): 27 (±0.2) x 4 (±0.2) mm	6GT2600-3AC00
MDS D339	• Memory size: 992 bytes of EEPROM user memory • Dimensions (Ø x H): 85 (±0.5) x 15 (-1.0) mm	6GT2600-3AA10
MDS D400	• Memory size: 2000 bytes of FRAM user memory • Dimensions (L x W x H) 85.6 (±0.3) × 54 (±0.2) × 0.8 (±0.05) mm	6GT2600-4AD00
MDS D421	• Memory size: 2000 bytes of FRAM user memory • Dimensions (Ø x H): 10 x 4.5 mm	6GT2600-4AE00
MDS D422	• Memory size: 2000 bytes of FRAM user memory • Dimensions (Ø x H): M20 x 6 (±0.2) mm • Can be screwed into metal (flush-mounted)	6GT2600-4AF00
MDS D423	• Memory size: 2000 bytes of FRAM user memory • Dimensions (Ø x H): 30 (+0.2/-0.5) x 8 (-0.5) mm	6GT2600-4AA00
MDS D424	• Memory size: 2000 bytes of FRAM user memory • Dimensions (Ø x H): 27 (±0.2) x 4 (±0.2) mm	6GT2600-4AC00
MDS D425	• Memory size: 2000 bytes of FRAM user memory • Dimensions (Ø x H): 24 X 10 mm; M6 thread • Screw transponder	6GT2600-4AG00
MDS D426	• Memory size: 2000 bytes of FRAM user memory • Dimensions (Ø x H): 50 x 3.6 mm • Round design with mounting hole	6GT2600-4AH00
MDS D428	• Memory size: 2000 bytes of FRAM user memory • Dimensions (Ø x H): 18(±1) x 20(±1) mm (without thread); thread M8	6GT2600-4AK00-0AX0
MDS D460	• Memory size: 2000 bytes of FRAM user memory • Dimensions (Ø x H): 16 (±0.2) x 3.0 (±0.2) mm	6GT2600-4AB00
MDS D521	• Memory size: 8192 bytes of FRAM user memory • Dimensions (Ø x H): 10 x 4.5 mm	6GT2600-5AE00

ISO transponder	Description	Article number
MDS D522	• Memory size: 8192 bytes of FRAM user memory • Dimensions (Ø x H): M20 x 6 (±0.2) mm • Can be screwed into metal (flush-mounted)	6GT2600-5AF00
MDS D522 **Special variant**	• Memory size: 8192 bytes of FRAM user memory • Dimensions (Ø x H): 18 (+0.1) x 5.2 mm • Can be clipped into metal (flush-mounted)	6GT2600-5AF00-0AX0
MDS D524	• Memory size: 8192 bytes of FRAM user memory • Dimensions (Ø x H): 27 (±0.2) x 4 (±0.2) mm	6GT2600-5AC00
MDS D525	• Memory size: 8192 bytes of FRAM user memory • Dimensions (Ø x H): 24 x 10 (+1.0) mm	6GT2600-5AG00
MDS D526	• Memory size: 8192 bytes of FRAM user memory • Dimensions (Ø x H): 50 x 3.6 mm • Round design with mounting hole	6GT2600-5AH00
MDS D528	• Memory size: 8192 bytes of FRAM user memory • Dimensions (Ø x H): 18(±1) x 20(±1) mm (without thread); thread M8	6GT2600-5AK00

Table A- 12 Communication modules/interface modules

Communications module	Description	Article number
ASM 456	ASM 456 for PROFIBUS DP-V1 max. 2 readers connectable	6GT2002-0ED00
ASM 475	ASM 475 for SIMATIC S7 max. 2 RF3xxR readers with RS-422 can be connected in parallel without a front connector	6GT2002-0GA10
RF120C	Communications module RF120C for SIMATIC S7-1200	6GT2002-0LA00
RF160C	Communications module RF160C for PROFIBUS DP V0 max. 2 readers connectable	6GT2002-0EF00
RF170C	RF170C communications module	6GT2002-0HD00
	RF170C connecting block	6GT2002-1HD00
RF180C	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
RF182C	RF182C communications 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

Communications module	Description	Article number
RFID 181EIP	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- 13 Antennas

Antenna	Description	Article number
ANT 1	• IP67 • Operating temperature: -25 °C ... +70 °C • Dimensions (L x W x H): 75 x 75 x 20 mm • incl. an integrated antenna cable 3 m	6GT2398-1CB00
ANT 3	• IP67 • Operating temperature: -25 °C ... +70 °C • Dimensions (L x W x H): 50 x 28 x 10 mm • without antenna connecting cable	6GT2398-1CD30-0AX0
	• incl. one plug-in antenna connecting cable 3 m	6GT2398-1CD40-0AX0
ANT 3S	• IP67 • Operating temperature: -25 °C ... +70 °C • Dimensions (L x W x H): 50 x 28 x 10 mm • without antenna connecting cable	6GT2398-1CD50-0AX0
	• incl. one plug-in antenna connecting cable 3 m	6GT2398-1CD60-0AX0
ANT 8	• IP67 • Operating temperature: -25 °C ... +70 °C • Dimensions (Ø x L): M8 x 40 mm • without antenna connecting cable	6GT2398-1CF00
	• incl. one plug-in antenna connecting cable 3 m	6GT2398-1CF10
ANT 12	• IP67 • Operating temperature: -25 °C ... +70 °C • Dimensions (Ø x L): M12 x 40 mm • incl. one plug-in antenna connecting cable 3 m	6GT2398-1CC00

Antenna	Description	Article number
ANT 18	• IP67 (front) • Operating temperature: -25 °C ... +70 °C • Dimensions (Ø x L): M18 x 55 mm • incl. one plug-in antenna connecting cable 3 m	6GT2398-1CA00
ANT 30	• IP67 • Operating temperature: -25 °C ... +70 °C • Dimensions (Ø x L): M30 x 58 mm • incl. one plug-in antenna connecting cable 3 m	6GT2398-1CD00

Accessories

Table A- 14 Accessories for RF300 reader

Reader	Accessories	Article number
RF380R	RS-232 plug-in cable with 4-pin connector	6GT2891-4KH50
	Plug-in cable RS-232 with open ends (5 m)	6GT2891-4KH50-0AX0
	Plug-in cable RS-232 with D-SUB ↔ M12, 8-pin and with M8, 3-pin power unit connector	6GT2891-4KH50-0AX1

Table A- 15 RF300 transponder accessories

Transponder	Accessories	Article number
RF320T	Spacer (Ø x H): 36 x 22 mm	6GT2690-0AK00
RF330T	Fixing hood (L x W x H): 49.4 x 20 x 9.8 mm	6GT2690-0AE00
RF360T	Spacer (L x W x H): 110 x 62 x 24 mm (in conjunction with fixing pocket 6GT2190-0AB00)	6GT2190-0AA00
	Fixing pocket (L x W x H): 121 x 57 x 5 mm (in conjunction with spacer 6GT2190-0AA00)	6GT2190-0AB00
RF380T	Holder (short version)	6GT2090-0QA00
	Holder (long version)	6GT2090-0QA00-0AX3
	Shrouding cover	6GT2090-0QB00
	Universal holder	6GT2590-0QA00

Table A- 16 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

Transponder	Accessories	Article number
	Quick change holder (Ø x H): 22 x 60 mm	6GT2690-0AH00
	Quick change holder (Ø x H): 22 x 47 mm	6GT2690-0AH10
MDS D124 / D324 / D424 / D524	Spacer (Ø x H): 36 x 22 mm	6GT2690-0AK00
MDS D126 / D426 / D526 / E624	Spacer (Ø x H): 59 x 30 mm	6GT2690-0AL00
MDS D160 / D460	Spacer (Ø x H): 20 x 14 mm	6GT2690-0AG00
MDS D423	Spacer (L x W x H): 49.4 x 20 x 9.8 mm	6GT2690-0AE00

Table A- 17 Accessory connecting RF300 reader ↔ PC

Connecting cable	Accessories	Article number
RF240R / RF260R / RF290R (RS232) 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

Table A- 18 Accessories - connecting cable communications module/ASM ↔ reader

Connecting cables	Description Length	Article number
ASM 456 / RF160C / RF170C / RF180C and reader RF3xxR (RS422)	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 RF3xxR reader (RS-422) with angled connector	2 m	6GT2891-4JH20
	5 m	6GT2891-4JH50
	10 m	6GT2891-4JN10
ASM 475 and reader RF3xxR (RS422)	2 m	6GT2891-4EH20
	5 m	6GT2891-4EH50
RF120C and reader RF3xxR (RS422)	2 m	6GT2091-4LH20
	5 m	6GT2091-4LH50
	10 m	6GT2091-4LN10

Table A- 19 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: 6GT2898-0AC00
	UK: 6GT2898-0AC10
	US: 6GT2898-0AC20
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)

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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