SIEMENS

SIMATIC Ident

RFID systems SIMATIC RF300

System Manual

05/2022
C79000-G8976-C345-10

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.

Proper use of Siemens products

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.

Trademarks

All names identified by ® are registered trademarks of Siemens AG. The remaining trademarks in this publication may be trademarks whose use by third parties for their own purposes could violate the rights of the owner.

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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Ⓟ 05/2022 Subject to change

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Introduction 1

1.1 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 with a delivery condition as of 05/2022.

Additional information

You will find additional information on the devices listed in this manual and their configuration and parameter assignment in the following manuals:

- Operating Instructions "Mobile reader RF350M"
- Compact operating instructions "SIMATIC RF310R Scan Mode"
- Compact operating instructions "SIMATIC RF382R Scan Mode"
- Function manual "Ident profile and Ident blocks, standard function for Ident systems"
- Function manual "FB 45 for MOBY U, MOBY D, RF200, RF300"

You will find the latest versions of these manuals on the pages of the Siemens Industry Online Support (https://support.industry.siemens.com/cs/ww/en/ps/14971/man).

Detailed information on peer-to-peer communication (P2P), also referred to as reader-reader communication, is available in the Product Information "P2P operation for the RF300 system (https://support.industry.siemens.com/cs/ww/en/view/109749570)".

Registered trademarks

The following and possibly other names not identified by the registered trademark sign ® are registered trademarks of Siemens AG:

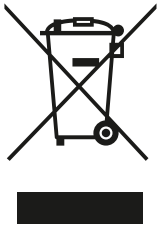
SIMATIC ®, SIMATIC RF ® and MOBY ®

Decommissioning

Decommission the device properly to prevent unauthorized persons from accessing confidential data in the device memory.

To do this, reset the device to the factory settings.

Recycling and disposal



The products are low in harmful substances, can be recycled and meet the requirements of the Directive 2012/19/EU for disposal of waste electrical and electronic equipment (WEEE).

Do not dispose of the products at public disposal sites.

For environmentally compliant recycling and disposal of your electronic waste, please contact a company certified for the disposal of electronic waste or your Siemens representative.

Note the different country-specific regulations.

History

Currently released versions of the SIMATIC RF300 system manual:

Edition	Remark
05/2005	First Edition
...	...
02/2019	Revised and expanded edition Expanded by the following components: • Readers of the 2nd generation RF310R scan mode • Stainless steel variants of the antennas ANT 12, ANT 18, ANT 30
02/2021	Revised and expanded edition Cancellation of 1st generation readers Expanded by the following components: • Reader RF360R • ISO Transponder MDS D560
05/2022	Revised and expanded edition Approvals updated and expanded by UKEX approvals

Abbreviations and naming conventions

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

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

Power supply

The equipment is designed for operation with Safety Extra-Low Voltage (SELV) by a Limited Power Source (LPS). Therefore, the power supply must meet at least one of the following conditions:

- Only SELV / LPS complying with IEC 60950-1 / EN 60950-1 / VDE 0805-1 or IEC 62368-1 / EN 62368-1 / VDE 62368-1 can be connected to the power supply terminals.
- The power supply unit for the device must meet NEC Class 2 according to the National Electrical Code (r) (ANSI / NFPA 70).

There is an additional requirement if devices are operated with a redundant power supply:

If the equipment is connected to a redundant power supply (two separate power supplies), both must meet these requirements.

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 3S: ≥ 25 mm
- RF350R + ANT 8: ≥ 25 mm
- RF350R + ANT 12: ≥ 25 mm
- RF350R + ANT 18: ≥ 50 mm
- RF350R + ANT 30: ≥ 80 mm
- RF360R: ≥ 160 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.

2.1 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 constitute one element of such a concept.

Customers are responsible for preventing unauthorized access to their plants, systems, machines and networks. Such systems, machines and components should only be connected to an enterprise network or the internet if and to the extent such a connection is necessary and only when appropriate security measures (e.g. firewalls and/or network segmentation) are in place.

For additional information on industrial security measures that may be implemented, please visit
https://www.siemens.com/industrialsecurity.

Siemens' products and solutions undergo continuous development to make them more secure. Siemens strongly recommends that product updates are applied as soon as they are available and that the latest product versions are used. Use of product versions that are no longer supported, and failure to apply the 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
https://www.siemens.com/cert.

Note on firmware/software support

Siemens only provides bug and security fixes for the last released firmware/software version. This means that Siemens only monitors the current firmware/software version for security vulnerabilities.

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**	**SIMATIC RF600**
Transmission frequency	13.56 MHz	13.56 MHz	865 ... 928 MHz [1]
Range, max.	650 mm	240 mm	8 m
Protocols (air interface)	• ISO 15693 • ISO 18000-3	• ISO 15693 • ISO 14443 (MOBY E, MIFARE Classic) • RF300 (proprietary)	• ISO 18000-62 • ISO 18000-63
Standards, specifications, approvals	• EN 300330, EN 301489, CE • FCC Part 15 • UL/CSA	• EN 300330, EN 301489, CE • FCC Part 15 • UL/CSA • ATEX	• ETSI EN 3002208, CE • FCC • UL
Memory capacity, max.	992 bytes (EEPROM) 8192 bytes (FRAM)	64 kB (EEPROM) 8192 bytes (FRAM)	496 bits (EPC), 3424 bytes
Maximum data transfer rate for wireless transmission	25.5 kbps	106 kbps	300 kbps
Multitag capability	With RF290R reader only	No	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 • ECC mode (memory error detection) • P2P communication (Reader-Reader)	• 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

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 - 2nd generation

Apart from additional performance characteristics, the 2nd generation readers are 100% compatible with the RF300 of the 1st generation.

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 [MOBY E, MIFARE Classic])
- 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
- 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
  - Reader-Reader communication (peer-to-peer communication / P2P)
    For direct data exchange between RF300 readers.
  - Automatic antenna recognition with the reader RF350R (depending on the antenna)
  - Service mode (for Siemens employees for service purposes)

Table 3-2 Differences in the features

Feature	SIMATIC RF300 1st generation	SIMATIC RF300 2nd generation
Transponder protocol RF300	✓	✓
Transponder protocol ISO 15693	✓	✓
Transponder protocol ISO 14443 (MOBY E, MIFARE Classic)	--	✓
Multi-transponder mode	--	--
MOBY I emulation to the controller	--	✓
Integrated setup help	--	✓
LED display	Single (3 colors)	Double (5 colors)
Technology object "SIMATIC Ident"	✓ [1)]	✓ [1)]
Fast Command (MDS D1xx, D4xx, D5xx)	--	✓
P2P communication	--	✓

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

Configuration and parameter assignment by means of TIA Portal technology object

You can easily and quickly configure and parameterize the entire RF300 system in the TIA Portal (as of STEP 7 Basic / Professional V14 SP 1) with the help of the "SIMATIC Ident" technology object. You can find detailed information about the technology object in the TIA Portal help.

→ Search for: Technology object "SIMATIC Ident"

For a video with a brief introduction for easier commissioning, improved antenna position determination and migration of older MOBY I readers, go to: SIMATIC Ident - RF300 new generation (https://support.industry.siemens.com/cs/ww/en/view/109751831)

3.2.2 RFID components and their function

System components overview

Table 3-3 RF300 system components

Component	Description
Communication module	A communication 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 communication module (e.g. SIMATIC RF186C).
Transponder	The transponder stores all data relevant for production and is used, for example, instead of barcode.

RF300 system components for high-performance applications

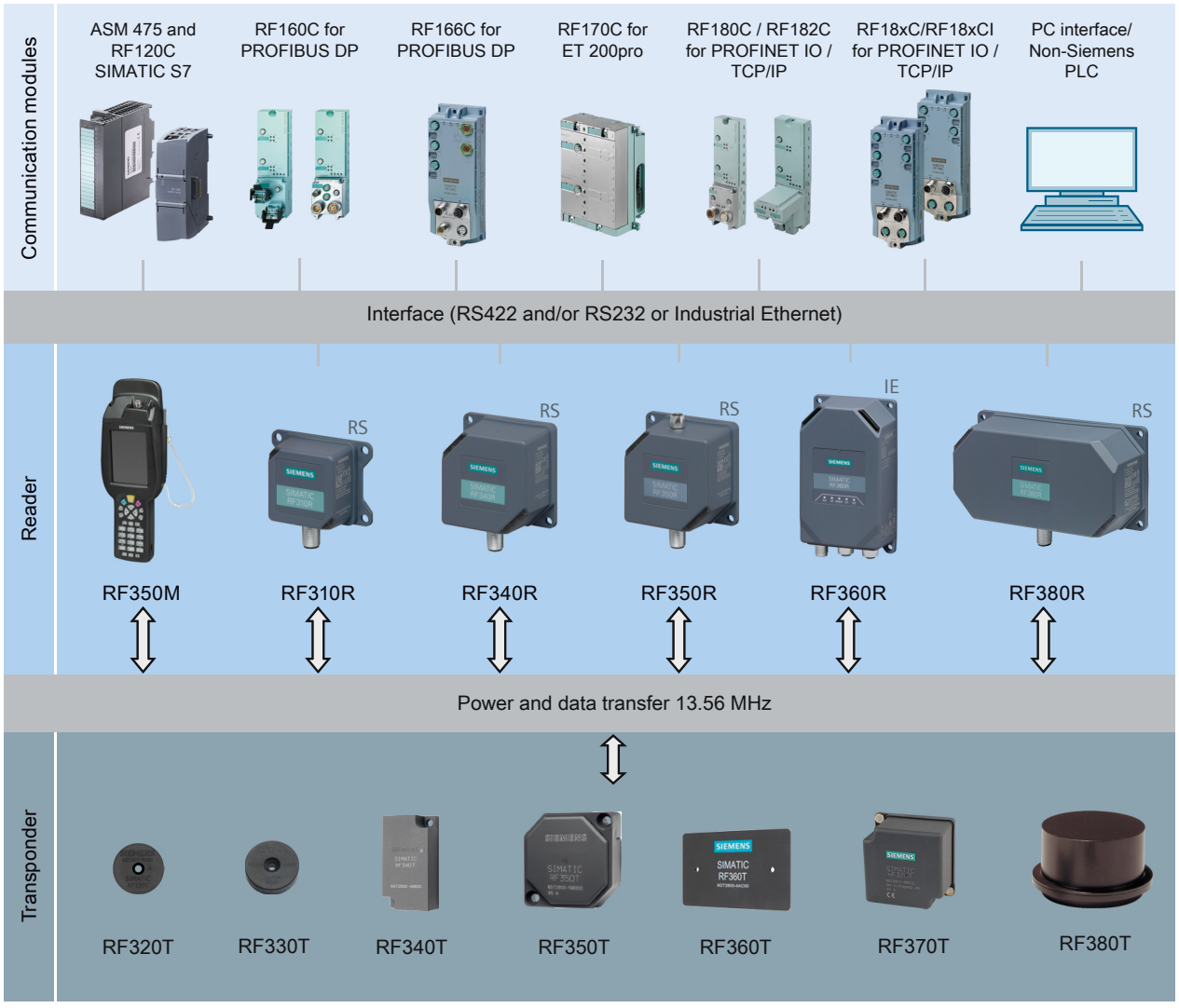


Figure 3-1 High performance system overview

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

Transponder	RF310R	RF340R	RF360R	RF380R
RF320T	✓	✓	✓	✓
RF330T	✓	✓	✓	✓
RF340T	✓	✓	✓	✓
RF350T	✓	✓	✓	✓
RF360T	✓	✓	✓	✓
RF370T	✓ [1)]	✓	✓	✓
RF380T	--	✓	✓	✓

[1)] as of reader version "AS ≥ D"

Table 3-5 Reader-transponder combination options for high-performance applications II

Transponder	RF350R with ANT 1	RF350R with ANT 3	RF350R with ANT 3S	RF350R with ANT 8	RF350R with ANT 12	RF350R with ANT 18	RF350R with ANT 30
RF320T	✓	✓	--	--	--	✓	✓
RF330T	✓	✓	--	--	○	✓	✓
RF340T	✓	✓	--	--	○	✓	✓
RF350T	✓	○	--	--	--	--	✓
RF360T	✓	○	--	--	--	○	✓
RF370T	✓	--	--	--	--	--	○
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

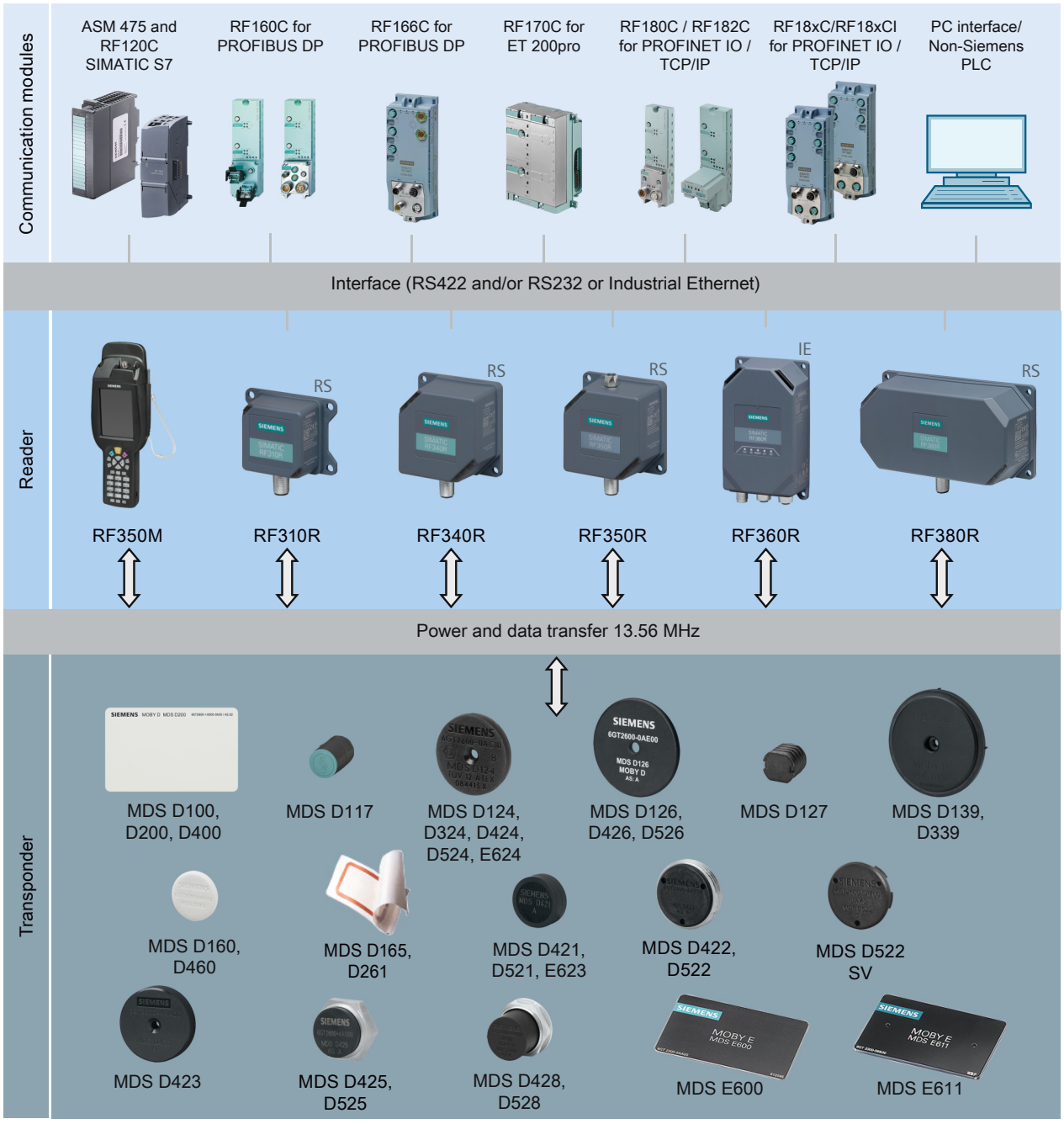


Figure 3-2 System overview medium-performance

Table 3-6 Reader-transponder combination options for medium-performance applications I

Transponder / MDS	RF310R (RS-422)	RF340R	RF360R	RF380R
MDS D100	✓	✓	✓	✓
MDS D117	--	--	--	--

Transponder / MDS	RF310R (RS-422)	RF340R	RF360R	RF380R
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 D560	✓	✓	--	✓
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.

Table 3-7 Reader-transponder combination options for medium-performance applications II

Transponder / MDS	RF350R with ANT 1	RF350R with ANT 3	RF350R with ANT 3S	RF350R with ANT 8	RF350R with ANT 12	RF350R with ANT 18	RF350R with ANT 30
MDS D100	✓	--	--	--	--	--	○
MDS D117	--	--	✓	✓	✓	✓	--
MDS D124	✓	✓	--	--	--	✓	✓
MDS D126	✓	--	--	--	--	--	✓

Transponder / MDS	RF350R with ANT 1	RF350R with ANT 3	RF350R with ANT 3S	RF350R with ANT 8	RF350R with ANT 12	RF350R with ANT 18	RF350R with ANT 30
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 D560	✓	✓	--	--	✓	✓	✓
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 2nd generation (article number "6GT2801-xBAxx").

RF300 system components for Scanmode applications

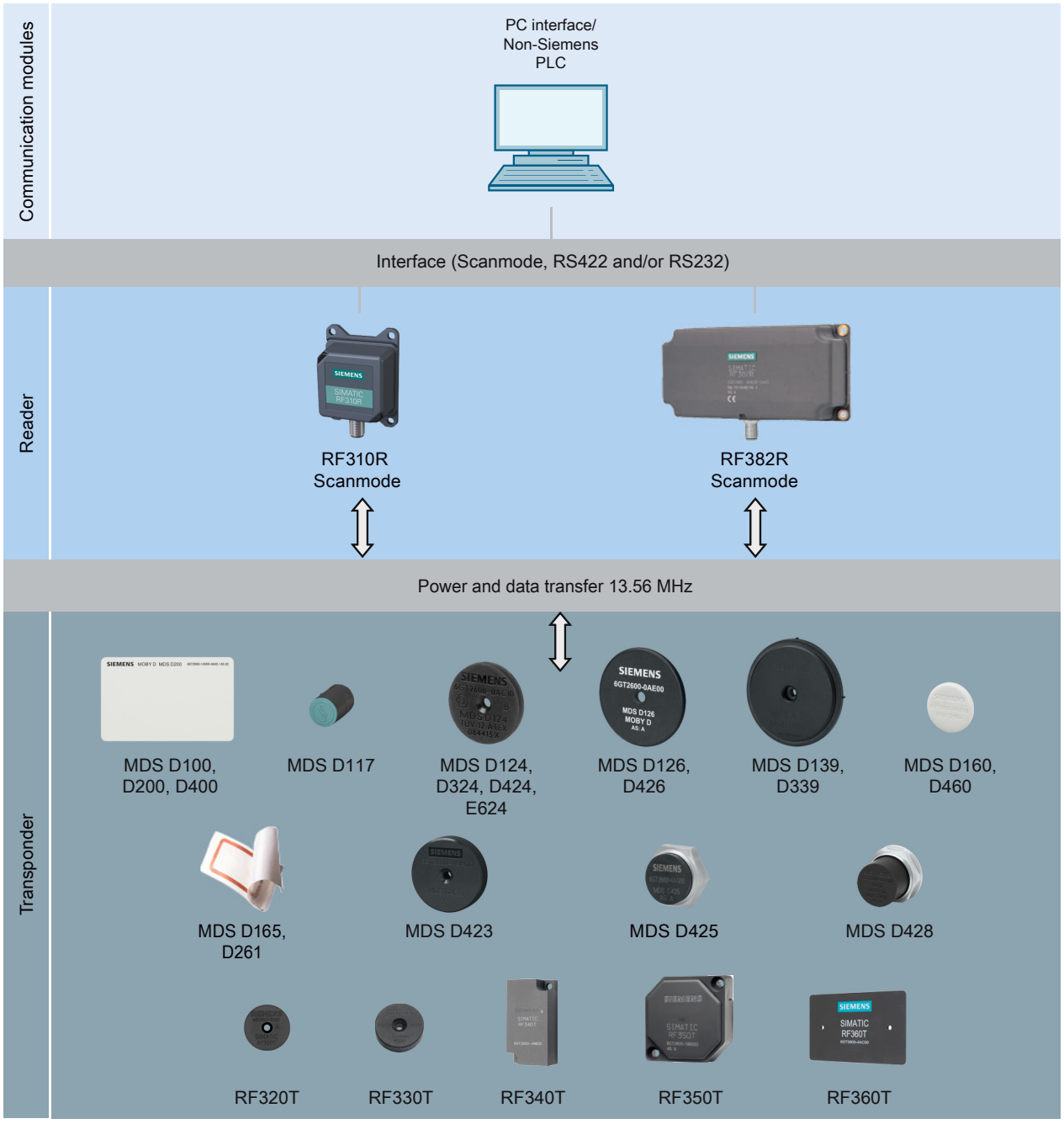


Figure 3-3 Scanmode system overview

Table 3-8 Reader-transponder combination options for Scanmode applications

Transponder / MDS	RF310R	RF380R	RF382R
MDS D100	✓	✓	--
MDS D124	✓	✓	✓

Transponder / MDS	RF310R	RF380R	RF382R
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 2nd 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

Note

Limitation of application

Note that the SIMATIC RF300 system is not a product line for access control or other security-related authorization.

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.

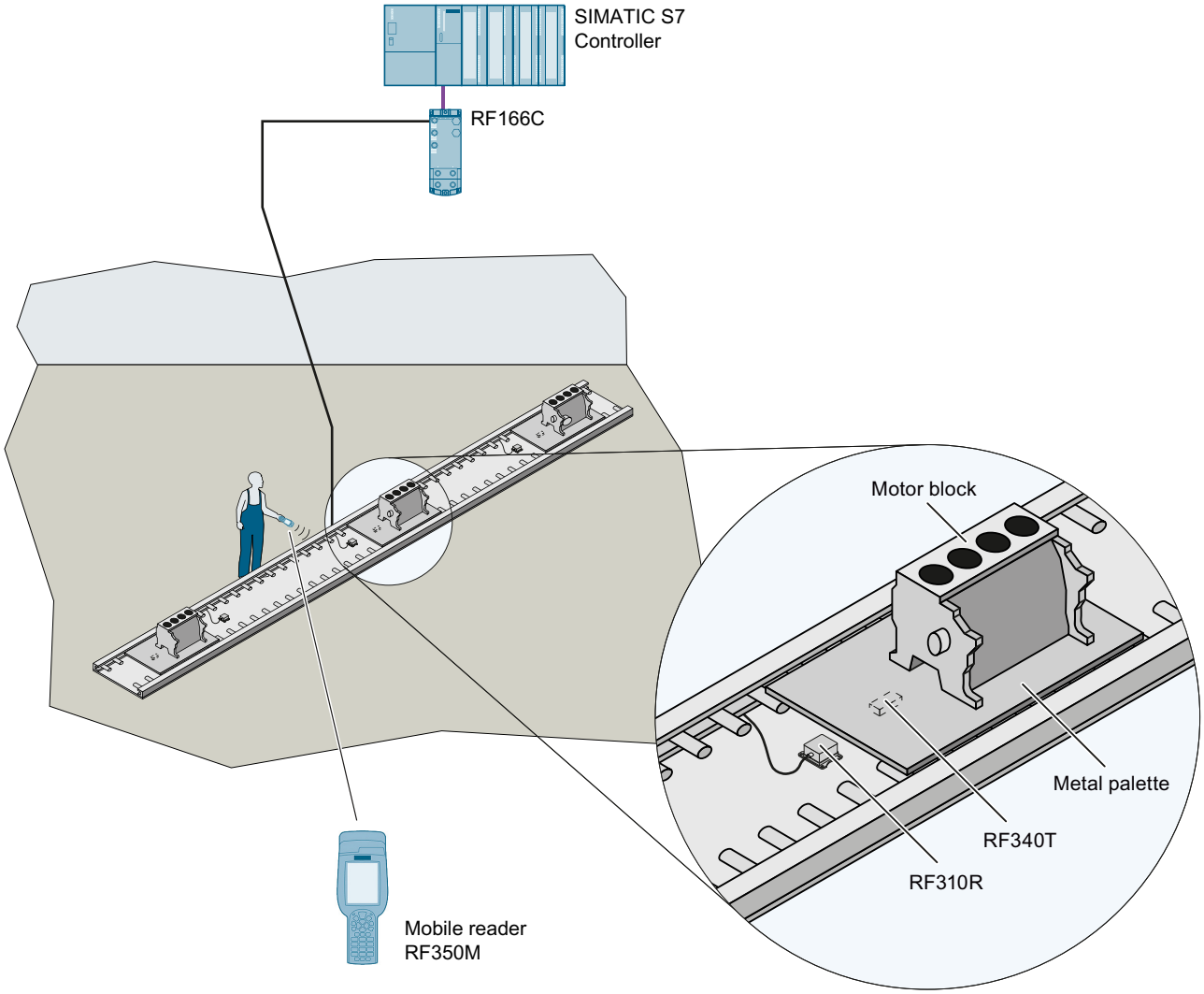


Figure 3-4 Example of engine block production

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.

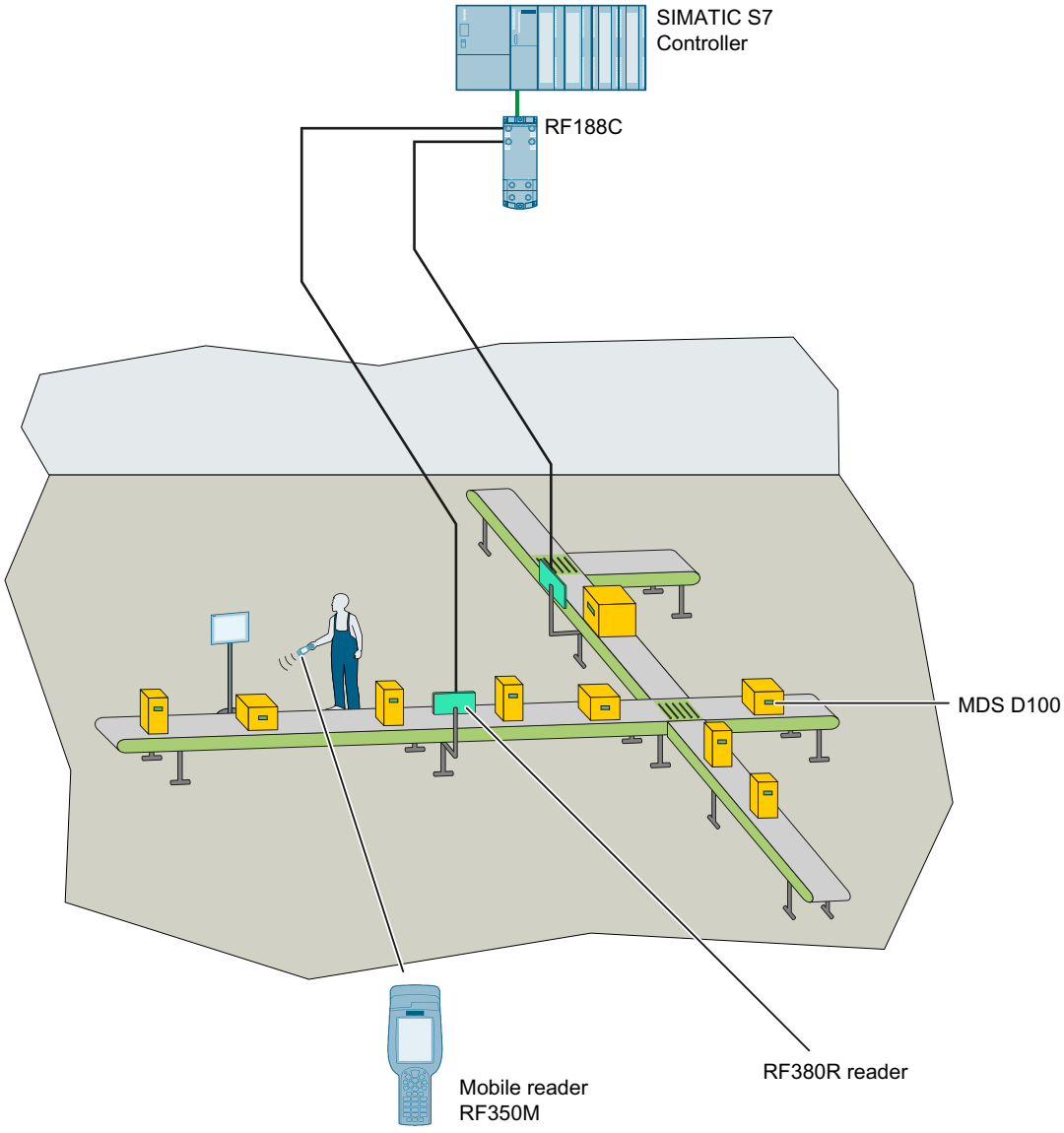


Figure 3-5 Example of container and cardboard container handling

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
- Velocity in case of dynamic transfer
- Metal-free rooms for transponders and readers
- Ambient conditions such as relative humidity, temperature, chemical impacts, etc.

Support during selection

The following tools support you in compiling and planning your Ident system with all relevant components:

- TIA Selection Tool (http://www.siemens.com/tia-selection-tool)
- SIMATIC Ident Configuration Guide (https://support.industry.siemens.com/cs/ww/en/view/67384964)

TIA Selection Tool

The TIA Selection Tool offers you a free configuration wizard with which you can easily and quickly assemble all relevant automation products into a complete system. The TIA Selection Tool can create a complete order list from your product selection or product configuration.

SIMATIC Ident Configuration Guide

The SIMATIC Ident Configuration Guide is an ID-specific guide that supports you in selecting the products relevant for your Ident system by clearly displaying all compatible devices and connecting cables.

4.1.2 Transmission window and read/write distance

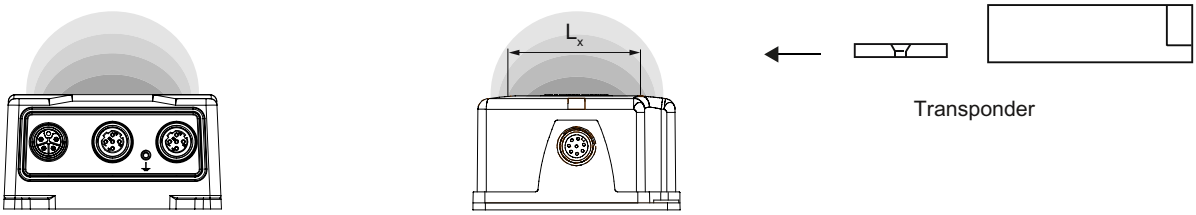
The reader generates an inductive alternating field - also referred to as an antenna field. The antenna field is strongest close to the reader, whereby a read/write distance of "zero" between reader and transponder is not recommended.

The field strength of the alternating 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.

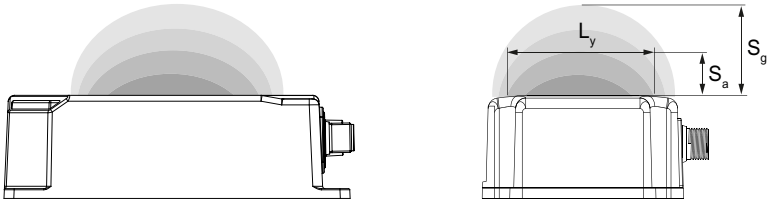
For the transponder to function correctly, a minimum field strength at the transponder must be achieved at a distance S_g from the reader or the antenna.

The figures below show the transmission window between transponder and reader or between transponder and antenna:

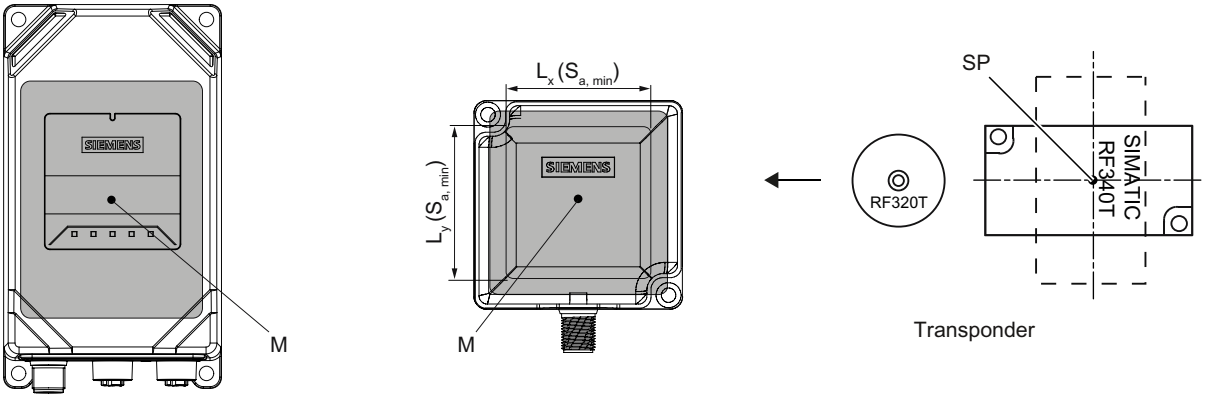
Front view



Side view



Top view



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

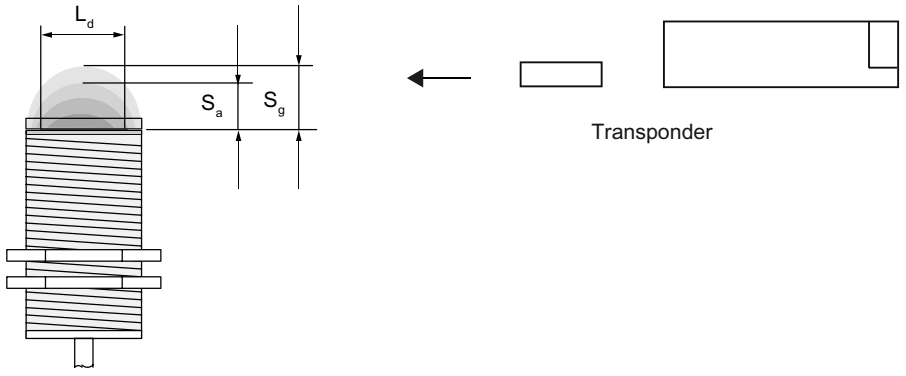
Figure 4-1 Transmission window and read/write distance reader

Note

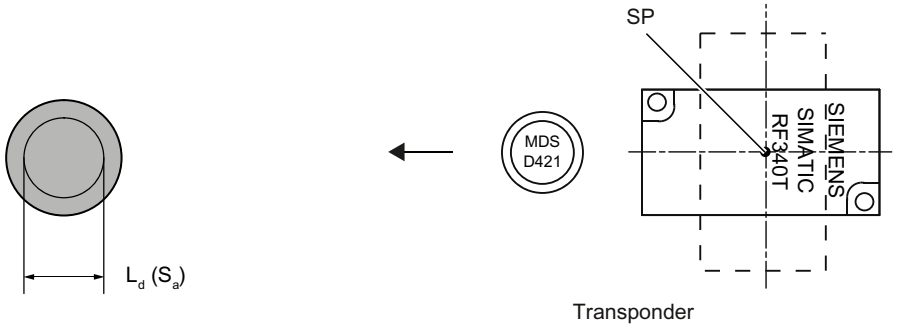
Transmission window with RF380R and RF382R

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.

Front 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_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.

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:

$$W = 0.4 \times L$$

W: Width of the transmission window

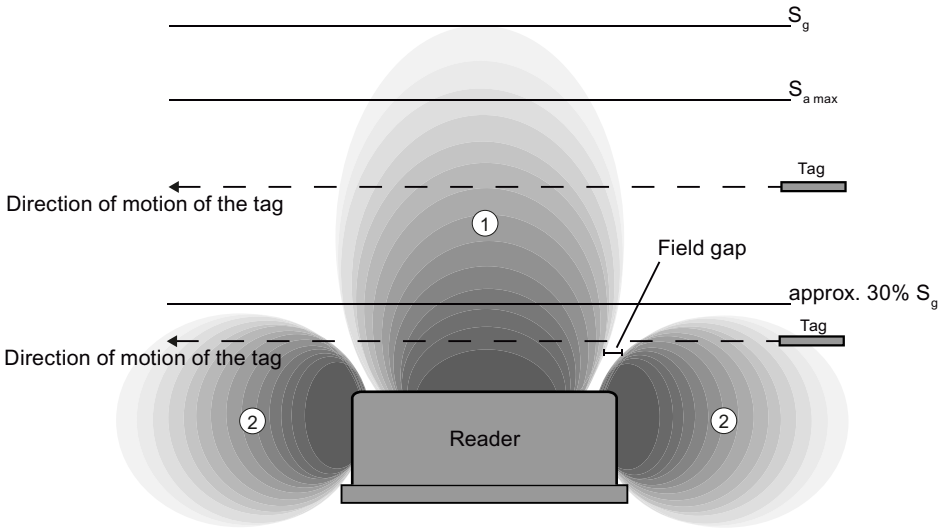
L: Length of the transmission window

Tracking tolerance

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

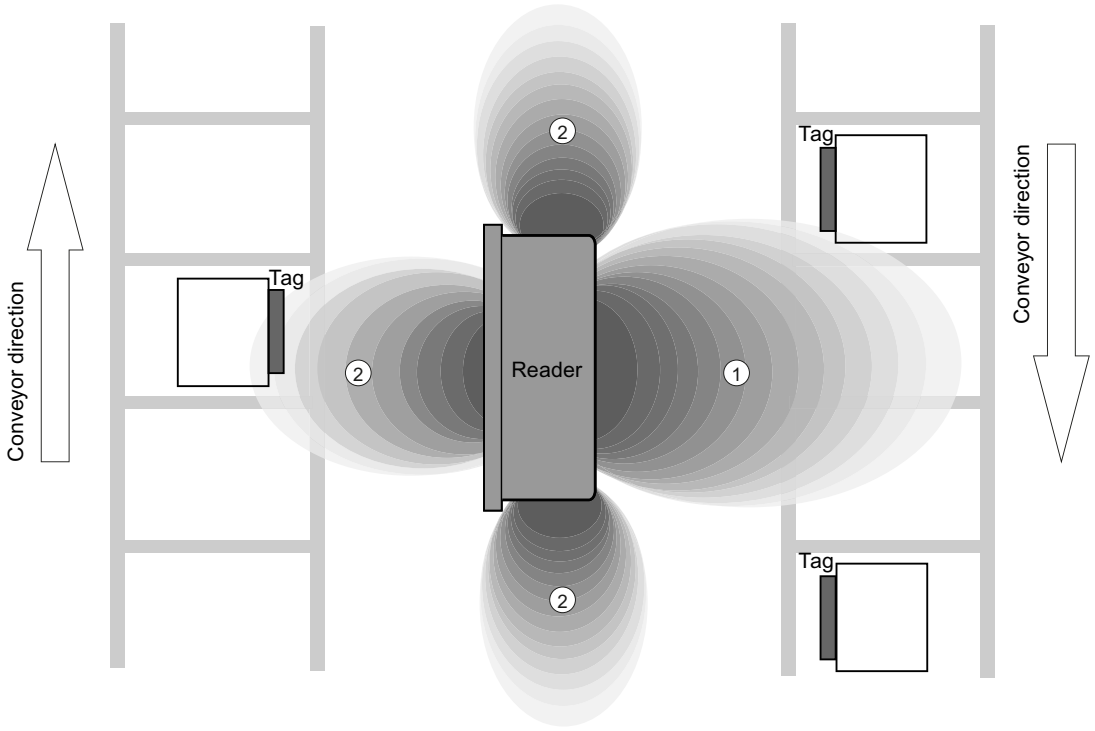


① Main field
② Secondary field

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

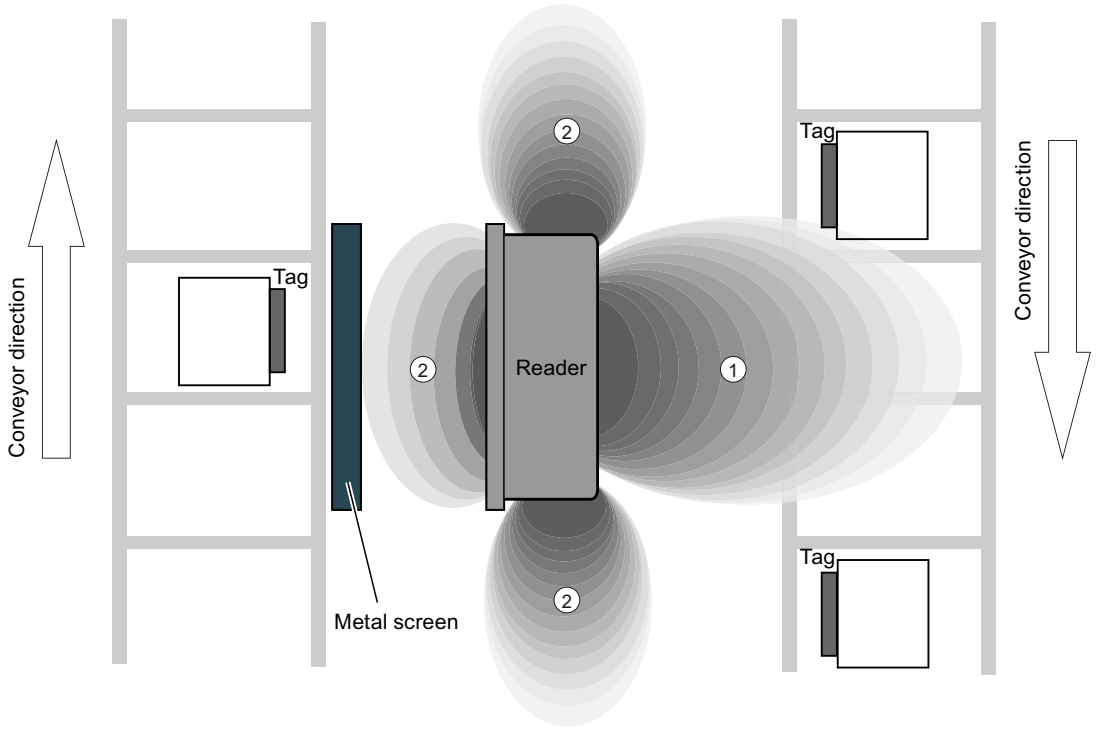
Figure 4-4 Secondary field without shielding

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 aid for the reader

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 switched on, in contrast to the 1st generation in which the antenna is switched on by a RESET.

In this status "search for transponders" the reader scans the antenna field for transponders with all air interface 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 about the quality of the communication with the transponder via the LED. Depending on the environment (metal, interference) or the field coupling with the transponder (size of the transponder antenna) as well as the individual field geometry (shape of the main and side lobe) of the reader, communication can be very good (permanent light) or good (flickering) at certain locations in the antenna field. These factors give users the option of finding the optimal area in the specific installation situation or in a combination. 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 quality of the communication, 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:

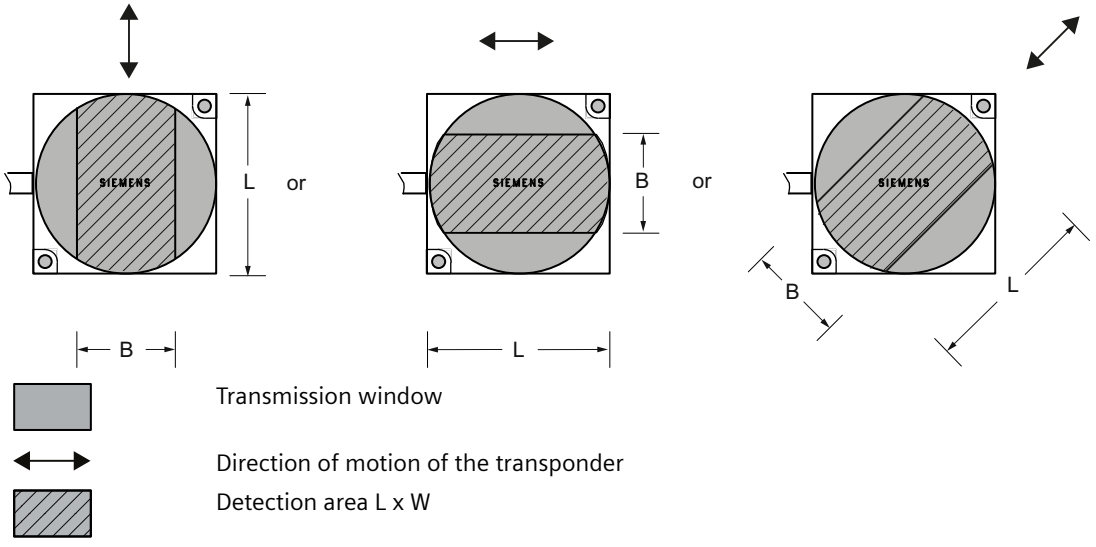


Figure 4-6 Detection areas of the reader for different directions of transponder motion

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:

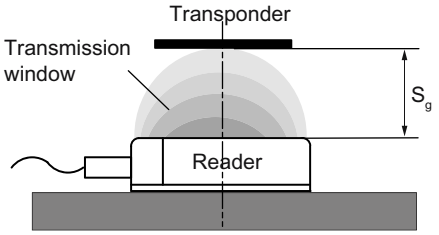


Figure 4-7 Operation in static mode

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. For possible consequences, refer to the section "Field data for transponders, readers and antennas (Page 47)".

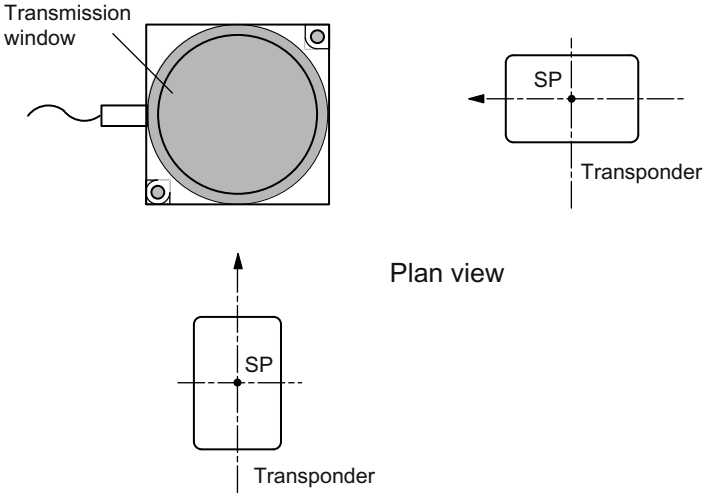


Figure 4-8 Operation in dynamic mode

4.1.8 Dwell time of the transponder

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

The dwell time is calculated as follows:

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

t_V: Dwell time of the transponder

L: Length of the transmission window

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

0.8: Constant factor used to compensate for temperature influence and production tolerances

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

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

$$t_V \geq t_K$$

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

t_K: Communication time between transponder and communication module

4.1.9 Communication between communications module, reader and transponder

Field data collection

The free "TIA Selection Tool" configurator also supports you during field data collection. Using this tool, among other things, you can calculate the operating distance (Sa), limit distance (Sg) and transmission window (L).

You can find the TIA Selection Tool using the following link (http://www.siemens.com/tia-selection-tool).

Calculating the data transfer times

Calculation examples for data transfer times

You can find the calculation examples for data transfer time, depending on the components used, on the pages of the Siemens Industry Online Support. You can find the calculation examples using the following link (https://support.industry.siemens.com/cs/ww/en/view/82255083).

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 technical data listed is typical data and is applicable for an ambient room temperature of between 0 and +50 °C, a supply voltage of between 22 V DC and 27 V DC as well as an environment free of metal. **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 42)".

Note

Possible reader-transponder combinations

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

Note

Deviations for antennas with plug-in antenna cable

When using antennas with a plug-in 60 cm antenna cable, note that deviations of 10 - 20% can occur for the field data.

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	1...10	13
RF330T	10	1...11	13
RF340T	20	1...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	1...15	20
RF330T	22	2...15	18
RF340T	35	1...25	30
RF350T	35	1...35	40
RF360T	80	2...32	38

All values are in mm

Table 4-8 Field data RF360R 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	40	55	1...20	25
RF330T	30	50	2...18	23
RF340T	50	100	2...50	58
RF350T	60	100	2...60	75
RF360T	70	115	2...65	85
RF370T	65	105	5...60	80
RF380T	75	115	5...80	100

All values are in mm

Table 4-9 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	48
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

RF380R reader: Setting the output power

This output power does not need to be manually set for RF380R readers of the 2nd generation (6GT2801-3BAx0) because the power limits are optimized automatically depending on the reader-transponder distance. For reasons of compatibility this setting can nevertheless be

made. Note that the values "02", "03" and "04" bring about a reduction of the power of approximately 50%. Settings outside the range (02 ... 08) have the effect of setting the default value (0.6 W). In this case, there is no error message for reasons of compatibility.

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 4-10 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...90	105
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
MDS D560	30	1...32	38

All values are in mm

Table 4-11 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	40...100 [2]	120
MDS D324	50	2...55	70
MDS D339	100	5...75	85
MDS D400	140	2...100	125
MDS D423	65	5...40	48
MDS D424	50	2...55	70
MDS D425	45	2...20	30
MDS D426	110	1...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	1...80	100
MDS D528	45	2...40	50
MDS D560	45	2...25	40

[1] With an ambient temperature > 50 °C, the operating distance (S_a) is 15 ... 80 mm.

[2] When operating the reader of the 1st generation the operating distance (S_a) is 10 ... 100 mm and the limit distance (S_g) is 115 mm.

All values are in mm

Table 4-12 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	115	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

	Length of the transmission window (L)	Operating distance (S_a)	Limit distance (S_g)
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	2...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	2...85	105
MDS D528	40	2...35	50
MDS D560	40	2...32	38

All values are in mm

Table 4-13 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
MDS D522	20	1...17	19
MDS D524	40	5...46	50
MDS D525	25	2...21	24
MDS D528	30	2..24	26
MDS D560	30	1...20	28

All values are in mm

Table 4-14 Field data RF350R reader / ANT 3S

	Diameter of the transmission window (L_d)	Operating distance (S_a)	Limit distance (S_g)
MDS D117	6	0...2	3
MDS D127	6	0...2	3

	Diameter of the transmission window (L_d)	Operating distance (S_a)	Limit distance (S_g)
MDS D421	7	0...4	5
MDS D521	7	0...3	4

All values are in mm

Table 4-15 Field data RF350R reader / ANT 8

	Diameter of the transmission window (L_d)	Operating distance (S_a)	Limit distance (S_g)
MDS D117	3	0...4	5
MDS D127	3	0...4	5
MDS D421	4	0...3	4
MDS D521	4	0...3	4

All values are in mm

Table 4-16 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...2	3
MDS D428	15	1...10	17
MDS D460	8	1...8	10
MDS D521	6	0...2	3
MDS D528	15	1...10	17
MDS D560	8	1...8	10

All values are in mm

Table 4-17 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...4	6
MDS D422	20	1...10	13
MDS D424	25	1...27	35

	Diameter of the transmission window (L_d)	Operating distance (S_a)	Limit distance (S_g)
MDS D425	17	1...10	14
MDS D428	17	1...15	20
MDS D460	15	1...12	16
MDS D521	10	0...4	6
MDS D522	20	1...10	13
MDS D524	25	1...27	35
MDS D525	17	1...10	14
MDS D528	17	1...15	20
MDS D560	15	1...12	16

All values are in mm

Table 4-18 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	1...42	50
MDS D160	25	1...24	28
MDS D324	30	1...35	40
MDS D422	30	1...14	16
MDS D423	45	5...22	28
MDS D424	28	1...45	50
MDS D425	25	1...15	20
MDS D426	65	1...45	48
MDS D428	25	1...25	28
MDS D460	22	1...18	20
MDS D522	30	1...15	18
MDS D524	28	1...45	50
MDS D525	25	1...15	20
MDS D526	65	1...45	48
MDS D528	25	1...25	28
MDS D560	22	1...18	20

All values are in mm

Table 4-19 Field data RF360R reader

	Length of the transmission window		Operating distance (S_a)	Limit distance (S_g)
	in x direction (L_x)	in the y direction (L_y)		
MDS D100	115	90	5...110	140
MDS D124	75	60	2...60	75

	Length of the transmission window		Operating distance (S_a)	Limit distance (S_g)
	in x direction (L_x)	in the y direction (L_y)		
MDS D126	105	80	2...85	110
MDS D139	115	90	5...80	110
MDS D200	160	125	10...100	115
MDS D324	65	50	2...55	70
MDS D339	130	100	5...75	85
MDS D400	160	125	2...100	125
MDS D424	60	50	2...55	70
MDS D426	140	110	1...80	100
MDS D524	60	50	2...55	70
MDS D526	140	110	1...80	100

All values are in mm

Table 4-20 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[1)]	140	100	10...170	210
MDS D124	80	80	1...120	140
MDS D126	180	140	2...145	190
MDS D139	140	90	5...200	230
MDS D160	80	40	2...64	80
MDS D165 [1)]	200	140	10...170	200
MDS D200[2)]	200	160	20...150	195
MDS D261[3)]	190	120	20..120	160
MDS D324	100	60	2...96	120
MDS D339	290	140	17...160	180
MDS D400	240	120	10...165	185
MDS D423	110	60	5...75	80
MDS D424	100	70	2...120	140
MDS D425	80	45	2...35	50
MDS D426	220	160	2...155	195
MDS D428	80	50	2...70	95
MDS D460	80	70	2...65	90
MDS D524	100	70	2...115	130
MDS D525	80	45	2...35	50
MDS D526	220	160	2...155	195

	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 D528	80	50	2...70	95
MDS D560	80	70	2...65	90

1) Keep in mind that the minimum distance must be increased by 10 mm with ambient temperatures of 40 °C and higher.

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

3) Be aware that the minimum distance of the reader to the transponder must be increased approximately by 3 mm (2nd generation) every 5 °C starting at an ambient temperature of 25 °C and approximately 14 mm starting at an ambient temperature of 50 °C.

All values are in mm

Table 4-21 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 of the 2nd generation.

Note that the MDS E transponders can only be operated in conjunction with the readers of the 2nd generation!

Table 4-22 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 4-23 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 4-24 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	20...50	65
MDS E624	55	2...35	45

All values are in mm

Table 4-25 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	4

All values are in mm

Table 4-26 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...10	15

All values are in mm

Table 4-27 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

Table 4-28 Field data RF380R reader

	Length of the transmission window		Operating distance (S_a)	Limit distance (S_g)
	in x direction (L_x)	in the y direction (L_y)		
MDS E600	100	70	10...80	95
MDS E611	110	100	10...115	135
MDS E624	90	50	5...50	60

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 4-29 Minimum distances RF300 transponder I

	RF310R	RF340R	RF360R	RF380R
RF320T	≥ 50	≥ 70	≥ 90	≥ 120
RF330T	≥ 40	≥ 50	≥ 80	≥ 120
RF340T	≥ 60	≥ 80	≥ 100	≥ 140
RF350T	≥ 60	≥ 80	≥ 100	≥ 150
RF360T	≥ 60	≥ 80	≥ 100	≥ 120

	RF310R	RF340R	RF360R	RF380R
RF370T	--	≥ 80	≥ 100	≥ 130
RF380T	--	≥ 80	≥ 120	≥ 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 4-30 Minimum distances RF300 transponder II

	RF350R / ANT 1	RF350R / ANT 3	RF350R / ANT 18	RF350R / ANT 30
RF320T	≥ 70	40	≥ 20	≥ 40
RF330T	≥ 50	60	≥ 20	≥ 30
RF340T	≥ 80	80	≥ 40	≥ 40
RF350T	≥ 80	--	--	≥ 50
RF360T	≥ 80	--	--	≥ 50
RF370T	≥ 80	--	--	--
RF380T	≥ 80	--	--	--

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

Table 4-31 Minimum distances ISO transponder I

	RF310R	RF340R	RF360R	RF380R	RF382R [1)]
MDS D100	≥ 120	≥ 240	≥ 300	≥ 420	--
MDS D117	--	--	--	--	--
MDS D124	≥ 100	≥ 180	≥ 240	≥ 360	≥ 100, 150
MDS D126	≥ 120	≥ 140	≥ 280	≥ 400	--
MDS D127	--	--	--	--	--
MDS D139	≥ 200	≥ 200	≥ 300	≥ 450	--
MDS D160	≥ 120	≥ 150	--	≥ 300	≥ 100, 120
MDS D165	≥ 120	≥ 140	--	≥ 500	--
MDS D200	≥ 120	≥ 150	≥ 300	≥ 500	--
MDS D261	≥ 160	≥ 200	--	≥ 400	--
MDS D324	≥ 120	≥ 180	≥ 240	≥ 360	≥ 100, 150
MDS D339	≥ 200	≥ 140	≥ 300	≥ 450	--
MDS D400	≥ 220	≥ 240	≥ 300	≥ 500	--
MDS D421	--	--	--	--	--
MDS D422	--	--	--	--	--
MDS D423	≥ 100	≥ 120	--	≥ 250	--
MDS D424	≥ 100	≥ 180	≥ 240	≥ 360	≥ 100, 180
MDS D425	≥ 70	≥ 100	--	≥ 250	--
MDS D426	≥ 120	≥ 120	≥ 280	≥ 400	--
MDS D428	≥ 100	≥ 150	--	≥ 300	--

	RF310R	RF340R	RF360R	RF380R	RF382R [1]
MDS D460	≥ 100	≥ 150	--	≥ 300	≥ 100, 120
MDS D521	--	--	--	--	--
MDS D522	--	--	--	--	--
MDS D524	≥ 100	≥ 180	≥ 240	≥ 360	≥ 100, 180
MDS D525	≥ 70	≥ 100	--	≥ 250	--
MDS D526	≥ 120	≥ 120	≥ 280	≥ 400	--
MDS D528	≥ 100	≥ 150	--	≥ 300	--
MDS D560	≥ 100	≥ 150	--	≥ 300	≥ 100, 180
MDS E600 [2]	≥ 120	≥ 240	--	≥ 420	--
MDS E611 [2]	≥ 120	≥ 240	--	≥ 500	--
MDS E623 [2]	--	--	--	--	--
MDS E624 [2]	≥ 100	≥ 180	--	≥ 360	--

[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] Phase-out product;only relevant for migration projects with the readers of the 2nd generation.

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

Table 4-32 Minimum distances ISO transponder II

	RF350R / ANT 1	RF350R / ANT 3	RF350R / ANT 3S	RF350R / ANT 8	RF350R / ANT 12	RF350R / ANT 18	RF350R / ANT 30
MDS D100	≥ 240	--	--	--	--	--	--
MDS D117	--	--	≥ 20	≥ 15	≥ 20	≥ 30	--
MDS D124	≥ 180	≥ 90	--	--	--	≥ 50	≥ 80
MDS D126	≥ 140	--	--	--	--	--	≥ 100
MDS D127	--	--	≥ 25	≥ 15	≥ 25	≥ 30	--
MDS D139	≥ 200	--	--	--	--	--	--
MDS D160	≥ 150	≥ 60	--	--	≥ 30	≥ 50	≥ 60
MDS D165	≥ 140	--	--	--	--	--	--
MDS D200	≥ 150	--	--	--	--	--	--
MDS D261	≥ 200	--	--	--	--	--	--
MDS D324	≥ 180	≥ 85	--	--	--	≥ 50	≥ 80
MDS D339	≥ 140	--	--	--	--	--	--
MDS D400	≥ 240	--	--	--	--	--	--
MDS D421	--	--	≥ 15	≥ 15	≥ 15	≥ 15	--
MDS D422	--	≥ 60	--	--	--	≥ 30	≥ 40
MDS D423	≥ 120	≥ 60	--	--	--	≥ 40	≥ 60
MDS D424	≥ 180	≥ 80	--	--	--	≥ 50	≥ 80
MDS D425	≥ 100	≥ 60	--	--	--	--	≥ 60
MDS D426	≥ 140	--	--	--	--	≥ 30	≥ 60
MDS D428	≥ 150	≥ 60	--	--	≥ 30	≥ 50	≥ 60
MDS D460	≥ 150	≥ 60	--	--	≥ 30	≥ 50	≥ 60

	RF350R / ANT 1	RF350R / ANT 3	RF350R / ANT 3S	RF350R / ANT 8	RF350R / ANT 12	RF350R / ANT 18	RF350R / ANT 30
MDS D521	--	--	≥ 15	≥ 15	≥ 15	≥ 15	--
MDS D522	--	≥ 60	--	--	--	≥ 30	≥ 40
MDS D524	≥ 180	≥ 80	--	--	--	≥ 50	≥ 80
MDS D525	≥ 100	≥ 60	--	--	--	--	≥ 60
MDS D526	≥ 140	--	--	--	--	≥ 30	≥ 60
MDS D528	≥ 150	≥ 60	--	--	≥ 30	≥ 50	≥ 60
MDS D560	≥ 150	≥ 60	--	--	≥ 30	≥ 50	≥ 60
MDS E600 [1]	≥ 240	--	--	--	--	--	--
MDS E611 [1]	≥ 240	--	--	--	--	--	--
MDS E623 [1]	--	--	--	--	≥ 15	≥ 15	--
MDS E624 [1]	≥ 180	≥ 80	--	--	--	≥ 50	≥ 80

[1] Phase-out product;only relevant for migration projects with the readers of the 2nd 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 4-33 Minimum distances reader

	RF310R to RF310R	RF340R to RF340R	RF360R to RF360R	RF380R to RF380	RF382R to RF382R
with 2 readers	≥ 150	≥ 350	≥ 380	≥ 400	≥ 200
with several readers	≥ 200	≥ 500	≥ 500	≥ 500	≥ 200

All values are in mm

Minimum distance from antenna to antenna

Table 4-34 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 in the respective antenna sections.

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 47)" 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 4-35 Interference due to metal rack

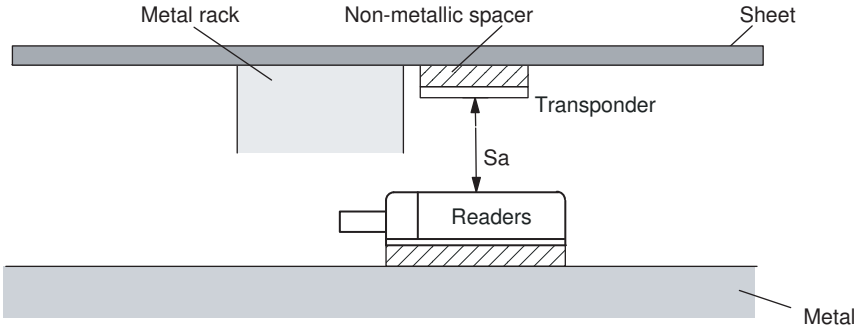
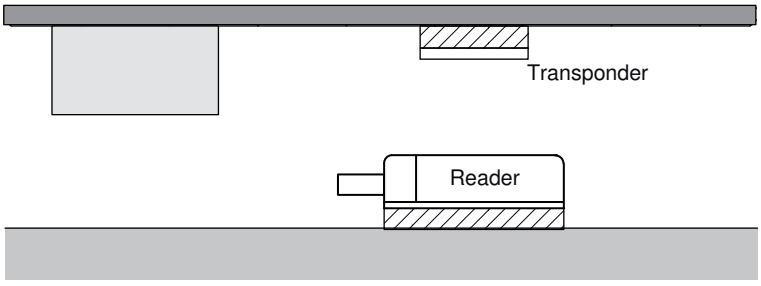
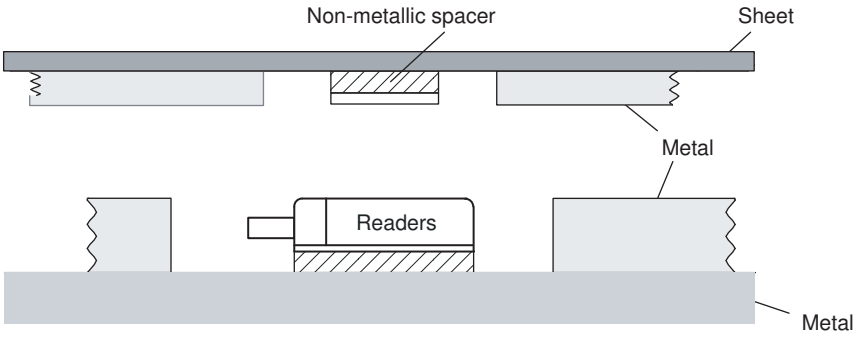
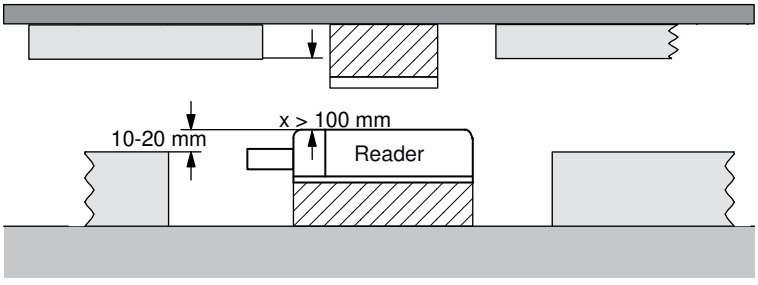
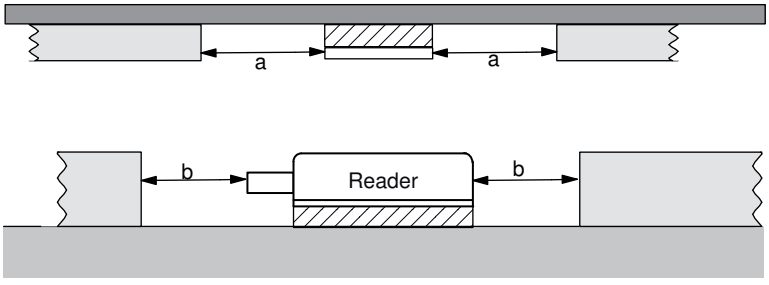
Representation	Description
	**Problem:** A metal rack is located above the transmission window of the reader. This affects the entire field. In particular, the transmission window between reader and transponder is reduced.
	**Remedy:** The transmission window is no longer affected if the transponder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

Table 4-36 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

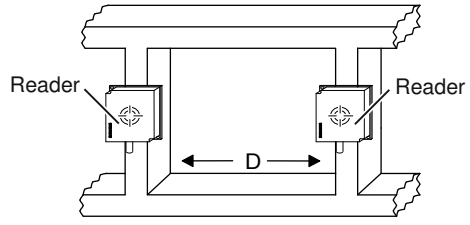
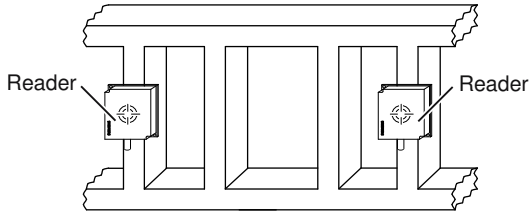
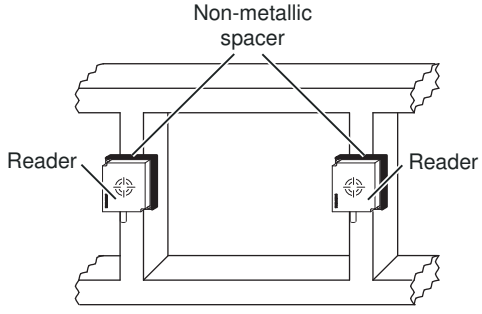
Any reader mounted on metal couples part of the field to the metal frame. There is normally no interaction as long as the minimum distance D and metal-free areas a, b are maintained. However, interaction may take place if an iron frame is positioned unfavorably. Longer data transfer times or sporadic 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 4-37 Mounting of 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, for reasons of communication reliability, when the transponders are flush-mounted in metal, a metal-free space around the transponders is recommended. This metal-free space should match the size of the antenna surface.
- The reduction of field data is also based on the minimum distance between the reader and transponder. The respective recommendations are listed in the following table.

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

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 4-38 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; circumferential distance 25 mm [2]	80	70	60
RF330T	Without metal	100	95	80
	On metal; distance 0 mm	100	85	75
	Flush-mounted in metal; circumferential distance 10 mm	85	80	70
	Flush-mounted in metal; without surrounding clearance [2]	30	30	25
RF340T	Without metal	100	95	80
	On metal; distance 0 mm	80	80	80
	Flush-mounted in metal; circumferential distance 20 mm [3]	70	70	70
RF350T	Without metal	100	95	85
	On metal; distance 0 mm	70	65	65
	Flush-mounted in metal; circumferential distance 20 mm [3]	60	60	60
RF360T	Without metal	100	95	85
	On metal; distance 20 mm	100	95	75
	Flush-mounted in metal; circumferential distance 20 mm [3]	60	60	60
RF370T	Without metal	100	95	80
	On metal; distance 0 mm	95	90	75
	Flush-mounted in metal; circumferential distance 20 mm [4]	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.

[2] Transponder flush-mounted in metal; minimum distance to the reader is 5 mm

[3] Transponder flush-mounted in metal; minimum distance to the reader is 10 mm

[4] Transponder flush-mounted in metal; minimum distance to the reader is 15 mm

With ISO transponders (MDS D)

Table 4-39 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; circumferential distance 20 mm [4)]	55	55	50
MDS D124[1)]	Without metal	100	95	80
	On metal; distance 15 mm	90	95	85
	Flush-mounted in metal; circumferential distance 25 mm [3)]	80	75	60
MDS D126[1)]	Without metal	100	90	85
	On metal; distance 25 mm	85	80	75
	Flush-mounted in metal; circumferential distance 50 mm [3)]	80	75	70
MDS D139[1)]	Without metal	100	90	80
	On metal; distance 30 mm	100	90	80
	Flush-mounted in metal; circumferential distance 100 mm [4)]	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; circumferential distance 20 mm [4)]	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; circumferential distance 25 mm [3)]	80	75	70

Transponder		RF310R reader		
		Without metal	**On metal**	**Flush-mounted in metal (20 mm all-round)**
MDS D339	Without metal	100	90	80
	On metal; distance 30 mm	100	90	80
	Flush-mounted in metal; circumferential distance 100 mm [4]	100	90	80
MDS D400[1]	Without metal	100	80	75
	On metal; distance 20 mm	65	60	55
	Flush-mounted in metal; circumferential distance 20 mm [4]	55	50	45
MDS D423	Without metal	100	95	90
	On metal; distance 0 mm	115 [5]	115 [5]	115 [5]
	Flush-mounted in metal; circumferential distance 0 mm [2]	70	60	60
MDS D424[1] **MDS D524**[1]	Without metal	100	90	80
	On metal; distance 15 mm	80	80	70
	Flush-mounted in metal; circumferential distance 25 mm [2]	60	60	50
MDS D425 **MDS D525**	Without metal	100	100	95
	On metal; distance 0 mm	90	85	80
MDS D426[1] **MDS D526**[1]	Without metal	100	90	80
	On metal; distance 25 mm	85	80	70
	Flush-mounted in metal; circumferential distance 50 mm [3]	80	75	65
MDS D428 **MDS D528**	Without metal	100	100	75
	On metal; distance 0 mm	100	100	75
MDS D460[1] **MDS D560**[1]	Without metal	100	100	80
	On metal; distance 10 mm	80	80	60

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

[2] Transponder flush-mounted in metal; minimum distance to the reader is 5 mm

[3] Transponder flush-mounted in metal; minimum distance to the reader is 10 mm

[4] Transponder flush-mounted in metal; minimum distance to the reader is 15 mm

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

With MIFARE transponders (MDS E)

Table 4-40 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; circumferential distance 20 mm [3]	55	55	50
MDS E611[1]	Without metal	100	95	80
	On metal; distance 20 mm	75	70	65
	Flush-mounted in metal; circumferential distance 20 mm [3]	55	55	50
MDS E624[1]	Without metal	100	95	80
	On metal; distance 15 mm	90	95	85
	Flush-mounted in metal; circumferential distance 25 mm [2]	80	75	60

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

[2] Transponder flush-mounted in metal; minimum distance to the reader is 5 mm

[3] Transponder flush-mounted in metal; minimum distance to the reader is 10 mm

4.3.4.2 RF340R

With RF300 transponders

Table 4-41 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; circumferential distance 25 mm [3]	75	75	65

Transponder		RF340R reader		
		Without metal	**On metal**	**Flush-mounted in metal (20 mm all-round)**
RF330T[1]	Without metal	100	95	90
	On metal; distance 0 mm	90	90	80
	Flush-mounted in metal; circumferential distance 10 mm [3]	65	65	60
RF340T	Without metal	100	95	80
	On metal; distance 0 mm	65	65	55
	Flush-mounted in metal; circumferential distance 20 mm [3]	60	60	55
RF350T	Without metal	100	90	85
	On metal; distance 0 mm	75	70	70
	Flush-mounted in metal; circumferential distance 20 mm [3]	55	55	45
RF360T	Without metal	100	95	80
	On metal; distance 20 mm	75	70	65
	Flush-mounted in metal; circumferential distance 20 mm [3]	70	60	50
RF370T	Without metal	100	95	80
	On metal; distance 0 mm	95	90	75
	Flush-mounted in metal; circumferential distance 20 mm [4]	70	65	65
RF380T	Without metal	100	95	75
	On metal; distance 0 mm	100	95	70
	Flush-mounted in metal; circumferential distance 40 mm [4]	80	75	60

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

[2] Transponder flush-mounted in metal; minimum distance to the reader is 5 mm

[3] Transponder flush-mounted in metal; minimum distance to the reader is 10 mm

[4] Transponder flush-mounted in metal; minimum distance to the reader is 15 mm

With ISO transponders (MDS D)

Table 4-42 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; circumferential distance 20 mm [4]	60	45	45
MDS D124[1]	Without metal	100	95	80
	On metal; distance 15 mm	85	85	75
	Flush-mounted in metal; circumferential distance 25 mm [2]	80	80	45
MDS D126[1]	Without metal	100	90	85
	On metal; distance 25 mm	80	80	70
	Flush-mounted in metal; circumferential distance 50 mm [3]	75	75	65
MDS D139[1]	Without metal	100	95	80
	On metal; distance 30 mm	100	90	75
	Flush-mounted in metal; circumferential distance 100 mm [4]	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 [4]	90	80	75
MDS D200[1]	Without metal	100	95	90
	On metal; distance 20 mm	90	85	80
	Flush-mounted in metal; circumferential distance 20 mm [3]	75	50	65
MDS D261	Without metal	100	100	100
	On metal, distance 25 mm [3]	70	95	90
MDS D324[1]	Without metal	100	95	80
	On metal; distance 15 mm	90	85	75
	Flush-mounted in metal; circumferential distance 25 mm [2]	80	80	60

Transponder		RF340R reader		
		Without metal	**On metal**	**Flush-mounted in metal (20 mm all-round)**
MDS D339	Without metal	100	95	80
	On metal; distance 30 mm	100	90	75
	Flush-mounted in metal; circumferential distance 100 mm [4]	100	90	75
MDS D400[1]	Without metal	100	90	80
	On metal; distance 20 mm	70	65	80
	Flush-mounted in metal; circumferential distance 20 mm [3]	55	50	50
MDS D423	Without metal	100	95	85
	On metal; distance 0 mm	110 [5]	105 [5]	105 [5]
	Flush-mounted in metal; circumferential distance 0 mm [2]	65	60	60
MDS D424[1] **MDS D524**[1]	Without metal	100	95	80
	On metal; distance 15 mm	85	85	75
	Flush-mounted in metal; circumferential distance 25 mm [3]	75	75	70
MDS D425 **MDS D525**	Without metal	100	95	95
	On metal; distance 0 mm	100	90	90
MDS D426[1] **MDS D526**[1]	Without metal	100	90	80
	On metal; distance 25 mm	80	75	70
	Flush-mounted in metal; circumferential distance 50 mm [3]	75	70	65
MDS D428 **MDS D528**	Without metal	100	95	80
	On metal; distance 0 mm	95	80	75
MDS D460[1] **MDS D560**[1]	Without metal	100	95	95
	On metal; distance 10 mm	85	85	85

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

[2] Transponder flush-mounted in metal; minimum distance to the reader is 5 mm

[3] Transponder flush-mounted in metal; minimum distance to the reader is 10 mm

[4] Transponder flush-mounted in metal; minimum distance to the reader is 15 mm

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

With MIFARE transponders (MDS E)

Table 4-43 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; circumferential distance 25 mm [3]	60	45	45
MDS E611[1]	Without metal	100	90	75
	On metal; distance 20 mm	70	65	60
	Flush-mounted in metal; circumferential distance 20 mm [3]	60	45	45
MDS E624[1]	Without metal	100	95	80
	On metal; distance 15 mm	85	85	75
	Flush-mounted in metal; circumferential distance 20 mm [2]	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.

[2] Transponder flush-mounted in metal; minimum distance to the reader is 5 mm

[3] Transponder flush-mounted in metal; minimum distance to the reader is 15 mm

4.3.4.3 RF350R

Reader RF350R with ANT 1 and with RF300 transponders

Table 4-44 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; circumferential distance 25 mm	75	75	65

Transponder		ANT 1 without metal	ANT 1 on metal	ANT 1 flush-mounted in metal (40 mm all-round)
RF330T	Without metal	100	90	90
	On metal; distance 0 mm	95	85	75
	Flush-mounted in metal; circumferential distance 10 mm	65	60	60
RF340T	Without metal	100	90	90
	On metal; distance 0 mm	65	65	60
	Flush-mounted in metal; circumferential distance 20 mm	60	60	55
RF350T	Without metal	100	90	85
	On metal; distance 0 mm	75	70	65
	Flush-mounted in metal; circumferential distance 20 mm	55	55	45
RF360T	Without metal	100	90	85
	On metal; distance 20 mm	75	75	65
	Flush-mounted in metal; circumferential distance 20 mm	65	60	50
RF370T	Without metal	100	90	85
	On metal; distance 0 mm	95	88	75
	Flush-mounted in metal; circumferential distance 20 mm	70	65	65
RF380T	Without metal	100	90	80
	On metal; distance 0 mm	100	90	70
	Flush-mounted in metal; circumferential distance 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 4-45 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; circumferential distance 20 mm	60	45	45

Transponder		ANT 1 without metal	ANT 1 on metal	ANT 1 mounted in metal (40 mm all-round)
MDS D124[1)]	Without metal	100	95	85
	On metal; distance 15 mm	85	85	80
	Flush-mounted in metal; circumferential distance 25 mm	85	80	50
MDS D126[1)]	Without metal	100	85	85
	On metal; distance 25 mm	85	75	75
	Flush-mounted in metal; circumferential distance 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; circumferential distance 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; circumferential distance 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; circumferential distance 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; circumferential distance 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; circumferential distance 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; circumferential distance 0 mm	80	65	65
MDS D424[1)] **MDS D524**[1)]	Without metal	100	90	75
	On metal; distance 15 mm	85	80	75
	Flush-mounted in metal; circumferential distance 25 mm	75	70	70

Transponder		ANT 1 without metal	ANT 1 on metal	ANT 1 mounted in metal (40 mm all-round)
MDS D425	Without metal	100	95	95
MDS D525	On metal; distance 0 mm	90	85	85
MDS D426[1)]	Without metal	100	90	85
MDS D526[1)]	On metal; distance 25 mm	85	80	75
	Flush-mounted in metal; circumferential distance 50 mm	80	75	70
MDS D428	Without metal	100	90	85
MDS D528	On metal; distance 0 mm	85	80	80
MDS D460[1)]	Without metal	100	90	80
MDS D560[1)]	On metal; distance 10 mm	85	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.

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

Table 4-46 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; circumferential distance 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; circumferential distance 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; circumferential distance 25 mm	85	80	50

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 4-47 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 (10 mm all-round)
RF320T[1]	Without metal	100	90	90
	On metal; distance 20 mm	35	35	35
	Flush-mounted in metal; circumferential distance 25 mm [3]	35	25	15
RF330T	Without metal	100	100	100
	On metal; distance 0 mm	117 [2]	106 [2]	106 [2]
	Flush-mounted in metal; circumferential distance 10 mm [3]	128 [2]	128 [2]	128 [2]
RF340T	Without metal	100	75	70
	On metal; distance 0 mm	70	75	63
	Flush-mounted in metal; circumferential distance 20 mm [3]	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.

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

[3] Transponder flush-mounted in metal; minimum distance to the reader is 5 mm

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

Table 4-48 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 (10 mm all-round)
MDS D124[1]	Without metal	100	100	90
	On metal; distance 20 mm	33	24	21
	Flush-mounted in metal; circumferential distance 25 mm	24	24	17
MDS D160[1]	Without metal	100	100	95
	On metal; distance 0 mm	16	16	21
	Flush-mounted in metal; circumferential distance 10 mm	24	18	13

Transponder		ANT 3 without metal	ANT 3 on metal	ANT 3 flush-mounted in metal (10 mm all-round)
MDS D324[1]	Without metal	100	100	92
	On metal; distance 0 mm	47	34	29
	Flush-mounted in metal; circumferential distance 25 mm	29	24	18
MDS D422	Without metal	100	100	83
MDS D522	On metal, distance 0 mm	111 [2]	111 [2]	111 [2]
MDS D423	Without metal	100	100	93
	On metal; distance 0 mm	125 [2]	125 [2]	121 [2]
	Flush-mounted in metal; circumferential distance 20 mm	125 [2]	143 [2]	136 [2]
MDS D424[1]	Without metal	100	100	94
MDS D524[1]	On metal; distance 0 mm	23	23	21
	Flush-mounted in metal; circumferential distance 20 mm	17	13	10
MDS D425	Without metal	100	100	100
MDS D525	On metal; distance 0 mm	89	100	71
	Flush-mounted in metal; circumferential distance 20 mm	71	54	36
MDS D428	Without metal	100	93	83
MDS D528	On metal; distance 0 mm	93	93	83
	Flush-mounted in metal; circumferential distance 20 mm	93	93	83
MDS D460[1]	Without metal	100	93	90
MDS D560[1]	On metal; distance 0 mm	33	33	20
	Flush-mounted in metal; circumferential distance 20 mm	33	33	17

[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 MIFARE transponders (MDS E)

Table 4-49 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 (10 mm all-round)
MDS E624[1)]	Without metal	100	100	94
	On metal; distance 0 mm	23	23	21
	Flush-mounted in metal; circumferential distance 25 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 3S and with ISO transponders (MDS D)

Table 4-50 Reduction of field data due to metal, range as %: Transponder and RF350R with ANT 3S

Transponder		ANT 3S without metal	ANT 3S on metal	ANT 3S Flush-mounted in metal (10 mm all-round)
MDS D117	Without metal	100	100	80
	On metal; distance 0 mm	85	85	80
	Flush-mounted in metal; circumferential distance 0 mm	60	60	60
MDS D127	Without metal	100	100	80
	On metal; distance 0 mm	85	85	80
	Flush-mounted in metal; circumferential distance 0 mm	60	60	60
MDS D421 **MDS D521**	Without metal	100	100	75
	On metal; distance 0 mm	85	85	70
	Flush-mounted in metal; circumferential distance 0 mm	65	65	55

Reader RF350R with ANT 8 and with ISO transponders (MDS D)

Table 4-51 Reduction of field data due to metal, range as %: Transponder and RF350R with ANT 8

Transponder		ANT 8 without metal	ANT 8 mounted in metal (0 mm all-round)
MDS D117	Without metal	100	100
	On metal; distance 0 mm	100	100
	Flush-mounted in metal; circumferential distance 0 mm	100	100

Transponder		ANT 8 without metal	ANT 8 mounted in metal (0 mm all-round)
MDS D127	Without metal	100	100
	On metal; distance 0 mm	120	100
	Flush-mounted in metal; circumferential distance 0 mm	125	100
MDS D421	Without metal	100	100
MDS D521	On metal; distance 0 mm	110	100
	Flush-mounted in metal; circumferential distance 0 mm	110	100

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

Table 4-52 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; circumferential distance 0 mm	65	65
MDS D127	Without metal	100	85
	On metal; distance 0 mm	95	85
	Flush-mounted in metal; circumferential distance 0 mm	65	65
MDS D160[1)]	Without metal	100	80
	On metal; distance 10 mm	100	80
MDS D421	Without metal	100	80
MDS D521	On metal; distance 0 mm	90	75
	Flush-mounted in metal; circumferential distance 0 mm	70	60
MDS D428	Without metal	100	75
MDS D528	On metal; distance 0 mm	95	75
MDS D460[1)]	Without metal	100	80
MDS D560[1)]	On metal; distance 10 mm	100	80

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

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

Table 4-53 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; circumferential distance 0 mm	70	60

Reader RF350R with ANT 18 and with RF300 transponders

Table 4-54 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; circumferential distance 25 mm	75	45
RF330T	Without metal	100	85
	On metal; distance 0 mm	120 [2)]	100
	Flush-mounted in metal; circumferential distance 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; circumferential distance 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 4-55 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; circumferential distance 25 mm	85	45
MDS D127	Without metal	100	90
	On metal, distance 0 mm	95	85
	Flush-mounted in metal; circumferential distance 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; circumferential distance 25 mm	80	65
MDS D421 **MDS D521**	Without metal	100	85
	On metal, distance 0 mm	90	65
	Flush-mounted in metal; circumferential distance 0 mm	40	20
MDS D422 **MDS D522**	Without metal	100	85
	On metal, distance 0 mm	95	85
MDS D424[1)] **MDS D524**[1)]	Without metal	100	85
	On metal 15 mm	85	80
	Flush-mounted in metal; circumferential distance 25 mm	75	75
MDS D425 **MDS D525**	Without metal	100	85
	On metal, distance 0 mm	100	85
MDS D428 **MDS D528**	Without metal	100	95
	On metal, distance 0 mm	95	95
MDS D460[1)] **MDS D560**[1)]	Without metal	100	95
	On metal, distance 15 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 MIFARE transponders (MDS E)

Table 4-56 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; circumferential distance 0 mm	40	20
MDS E624[1)]	Without metal	100	85
	On metal, distance 15 mm	85	75
	Flush-mounted in metal; circumferential distance 25 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 4-57 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; circumferential distance 25 mm	75	65
RF330T	Without metal	100	90
	On metal;	110 [2)]	100
	Flush-mounted in metal; circumferential distance 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; circumferential distance 20 mm	60	55
RF350T	Without metal	100	85
	Directly on metal	75	65
	Flush-mounted in metal; circumferential distance 20 mm	55	45

Transponder		Mounting the antenna	
		ANT 30 without metal	**ANT 30 mounted in metal (20 mm all-round)**
RF360T	Without metal	100	75
	On metal; distance 20 mm	75	55
	Flush-mounted in metal; circumferential distance 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 4-58 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; circumferential distance 25 mm	80	45
MDS D126[1]	Without metal	100	85
	On metal; distance 25 mm	90	75
	Flush-mounted in metal; circumferential distance 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; circumferential distance 25 mm	80	65
MDS D422	Without metal	100	85
	On metal, distance 0 mm	95	85
	Flush-mounted in metal; circumferential distance 0 mm	90	80
MDS D423	Without metal	100	80
	On metal, distance 0 mm	125 [2]	115 [2]
	Flush-mounted in metal; circumferential distance 0 mm	80	70
MDS D424[1] **MDS D524**[1]	Without metal	100	85
	On metal 15 mm	95	85
	Flush-mounted in metal; circumferential distance 25 mm	85	75

Transponder		ANT 30 without metal	ANT 30 mounted in metal (20 mm all-round)
MDS D425	Without metal	100	80
MDS D525	On metal, distance 0 mm	95	80
MDS D426[1]	Without metal	100	85
MDS D526[1]	On metal; distance 25 mm	90	75
	Flush-mounted in metal; circumferential distance 50 mm	80	70
MDS D428	Without metal	100	90
MDS D528	On metal, distance 0 mm	95	90
MDS D460[1]	Without metal	100	90
MDS D560[1]	On metal, distance 10 mm	95	85

[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 MIFARE transponders (MDS E)

Table 4-59 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; circumferential distance 25 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 RF360R

With RF300 transponders

Table 4-60 Reduction of field data due to metal, range as %: Transponder and RF360R

Transponder		Reader RF360R		
		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; circumferential distance 25 mm [1]	75	75	65
RF330T	Without metal	100	95	90
	On metal; distance 0 mm	90	90	80
	Flush-mounted in metal; circumferential distance 10 mm [1]	65	65	60
RF340T	Without metal	100	95	80
	On metal; distance 0 mm	65	65	55
	Flush-mounted in metal; circumferential distance 20 mm [1]	60	60	55
RF350T	Without metal	100	90	85
	On metal; distance 0 mm	75	70	70
	Flush-mounted in metal; circumferential distance 20 mm [1]	55	55	45
RF360T	Without metal	100	95	80
	On metal; distance 20 mm	75	70	65
	Flush-mounted in metal; circumferential distance 20 mm [1]	70	60	50
RF370T	Without metal	100	95	80
	On metal; distance 0 mm	95	90	75
	Flush-mounted in metal; circumferential distance 20 mm [2]	70	65	65
RF380T	Without metal	100	95	75
	On metal; distance 0 mm	100	95	70
	Flush-mounted in metal; circumferential distance 40 mm [2]	80	75	60

[1] Transponder flush-mounted in metal; minimum distance to the reader is 10 mm

[2] Transponder flush-mounted in metal; minimum distance to the reader is 15 mm

With ISO transponders (MDS D)

Table 4-61 Reduction of field data due to metal, range as %: Transponder and RF360R

Transponder		Reader RF360R		
		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; circumferential distance 20 mm [4]	60	45	45
MDS D124[1]	Without metal	100	95	80
	On metal; distance 15 mm	85	85	75
	Flush-mounted in metal; circumferential distance 25 mm [2]	80	80	45
MDS D126[1]	Without metal	100	90	85
	On metal; distance 25 mm	80	80	70
	Flush-mounted in metal; circumferential distance 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; circumferential distance 100 mm [4]	100	90	75
MDS D200[1]	Without metal	100	95	90
	On metal; distance 20 mm	90	85	80
	Flush-mounted in metal; circumferential distance 20 mm [3]	75	50	65
MDS D324[1]	Without metal	100	95	80
	On metal; distance 15 mm	90	85	75
	Flush-mounted in metal; circumferential distance 25 mm [2]	80	80	60
MDS D339	Without metal	100	95	80
	On metal; distance 30 mm	100	90	75
	Flush-mounted in metal; circumferential distance 100 mm [4]	100	90	75

Transponder		Reader RF360R		
		Without metal	**On metal**	**Flush-mounted in metal (20 mm all-round)**
MDS D400[1]	Without metal	100	90	80
	On metal; distance 20 mm	70	65	80
	Flush-mounted in metal; circumferential distance 20 mm [3]	55	50	50
MDS D424[1] **MDS D524**[1]	Without metal	100	95	80
	On metal; distance 15 mm	85	85	75
	Flush-mounted in metal; circumferential distance 25 mm [3]	75	75	70
MDS D426[1] **MDS D526**[1]	Without metal	100	90	80
	On metal; distance 25 mm	80	75	70
	Flush-mounted in metal; circumferential distance 50 mm [3]	75	70	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.

[2] Transponder flush-mounted in metal; minimum distance to the reader is 5 mm

[3] Transponder flush-mounted in metal; minimum distance to the reader is 10 mm

[4] Transponder flush-mounted in metal; minimum distance to the reader is 15 mm

4.3.4.5 RF380R

With RF300 transponders

Table 4-62 Reduction of field data due to metal, range as %: Transponder and RF380R

Transponder		RF380R reader		
		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; circumferential distance 20 mm [5]	60	55	50
RF330T	Without metal	100	90	80
	on metal, distance 0 mm [4]	70	65	60
	Flush-mounted in metal; circumferential distance 10 mm			

Transponder		RF380R reader		
		Without metal	**On metal**	**Flush-mounted in metal (20 mm all-round)**
RF340T	Without metal	100	90	80
	On metal; distance 0 mm	70	65	60
	Flush-mounted in metal; circumferential distance 20 mm [2]	60	60	55
RF350T	Without metal	100	85	80
	On metal; distance 0 mm	70	65	60
	Flush-mounted in metal; circumferential distance 20 mm [2]	55	50	45
RF360T[1]	Without metal	100	95	85
	On metal; distance 20 mm	75	70	65
	Flush-mounted in metal; circumferential distance 20 mm [3]	60	55	50
RF370T	Without metal	100	95	85
	On metal; distance 0 mm	90	85	80
	Flush-mounted in metal; circumferential distance 20 mm [4]	65	60	60
RF380T	Without metal	100	95	85
	On metal; distance 0 mm	95	90	80
	Flush-mounted in metal; circumferential distance 40 mm [4] [6]	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.

[2] Transponder flush-mounted in metal; minimum distance to the reader is 5 mm

[3] Transponder flush-mounted in metal; minimum distance to the reader is 10 mm

[4] Transponder flush-mounted in metal; minimum distance to the reader is 15 mm

[5] Transponder flush-mounted in metal; minimum distance to the reader is 20 mm

[6] Transponder flush-mounted in metal; minimum distance to the reader is 25 mm

With ISO transponders (MDS D)

Table 4-63 Reduction of field data due to metal, range as %: Transponder and RF380R

Transponder		RF380R 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	65	60	55
	Flush-mounted in metal; circumferential distance 20 mm [2]	55	50	45
MDS D124[1]	Without metal	100	95	90
	On metal; distance 15 mm	95	90	85
	Flush-mounted in metal; circumferential distance 20 mm [2]	70	65	50
MDS D126[1]	Without metal	100	90	80
	On metal; distance 25 mm	80	75	70
	Flush-mounted in metal; circumferential distance 50 mm [3]	75	65	65
MDS D139[1]	Without metal	100	90	75
	On metal; distance 30 mm	95	85	70
	Flush-mounted in metal; circumferential distance 100 mm [4]	90	80	70
MDS D160[1]	Without metal	100	95	90
	On metal, distance 10 mm [3]	85	85	80
MDS D165	Without metal	100	90	80
	On metal, distance 25 mm [4]	80	75	70
MDS D200[1]	Without metal	100	90	80
	On metal; distance 20 mm	80	75	70
	Flush-mounted in metal; circumferential distance 20 mm [3]	65	60	55
MDS D261	Without metal	100	95	85
	On metal, distance 25 mm [4]	85	80	75
MDS D324[1]	Without metal	100	95	85
	On metal; distance 15 mm	85	85	80
	Flush-mounted in metal; circumferential distance 25 mm [2]	70	65	60

Transponder		RF380R reader		
		Without metal	**On metal**	**Flush-mounted in metal (20 mm all-round)**
MDS D339[1]	Without metal	100	90	80
	On metal; distance 30 mm	85	80	75
	Flush-mounted in metal; circumferential distance 100 mm [5]	80	75	70
MDS D400[1]	Without metal	100	90	80
	On metal; distance 20 mm	75	70	60
	Flush-mounted in metal; circumferential distance 20 mm [4]	60	60	55
MDS D423	Without metal	100	95	85
	On metal; distance 0 mm	100	100	90
	Flush-mounted in metal; circumferential distance 10 mm [2]	75	65	60
MDS D424[1]	Without metal	100	90	75
MDS D524[1]	On metal; distance 15 mm	75	75	60
	Flush-mounted in metal; circumferential distance 25 mm [3]	60	55	40
MDS D425	Without metal	100	70	90
MDS D525	On metal, distance 0 mm [2]	75	70	60
MDS D426[1]	Without metal	100	90	80
MDS D526[1]	On metal; distance 25 mm	80	75	70
	Flush-mounted in metal; circumferential distance 50 mm [3]	75	65	65
MDS D428	Without metal	100	90	80
MDS D528	On metal, distance 0 mm [2]	85	80	65
MDS D460[1]	Without metal	100	95	80
MDS D560[1]	On metal, distance 10 mm [2]	80	75	60

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

[2] Transponder flush-mounted in metal; minimum distance to the reader is 5 mm

[3] Transponder flush-mounted in metal; minimum distance to the reader is 10 mm

[4] Transponder flush-mounted in metal; minimum distance to the reader is 15 mm

[5] Transponder flush-mounted in metal; minimum distance to the reader is 20 mm

[6] Transponder flush-mounted in metal; minimum distance to the reader is 28 mm

[7] Transponder flush-mounted in metal; minimum distance to the reader is 32 mm

With MIFARE transponders (MDS E)

Table 4-64 Reduction of field data due to metal, range as %: Transponder and RF380R

Transponder		RF380R reader		
		Without metal	On metal	Flush-mounted in metal (20 mm all-round)
MDS E600[1]	Without metal	100	95	90
	On metal, distance 20 mm	80	75	60
	Flush-mounted in metal; circumferential distance 20 mm [2]	65	65	60
MDS E611[1]	Without metal	100	95	85
	On metal, distance 20 mm	65	60	55
	Flush-mounted in metal; circumferential distance 20 mm [2]	50	50	45
MDS E624[1]	Without metal	100	95	90
	On metal, distance 15 mm [3]	75	75	70
	Flush-mounted in metal; circumferential distance 25 mm [3]	60	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] Transponder flush-mounted in metal; minimum distance to the reader is 10 mm

[3] Transponder flush-mounted in metal; minimum distance to the reader is 32 mm

4.3.4.6 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 4-65 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]

Transponder		Reader RF382R (ISO mode)	
		Without metal	On metal
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 Mechanical resistance of the readers and transponders

SIMATIC RF300 is a contactless identification system that meets high mechanical requirements for shock and vibration (EN 60721-3-7 class 7). Use the readers/transponders only for their intended use. They are not designed to withstand high mechanical stress and impact to the enclosure may cause damage and failure.

4.5 Chemical resistance of the readers and transponders

4.5.1 Readers

4.5.1.1 Overview of the readers and their housing materials

Resistance to chemicals depends on the housing materials used to manufacture the reader. The following table provides you with an overview of the housing materials that are used with the RF300 readers:

Table 4-66 Overview of the materials of the reader components

Individual part of the reader	Housing material of the reader
Top cover and bottom	Polyamide 12; The chemical resistance of this plastic is listed in the following section "Polyamide 12".
Fiber-optic cable	Makrolon®2405
Decorative membrane [1]	Autotex V200
Socket [1]	Brass (copper alloy) CuZn40Pb2

[1] Non-relevant component for resistance of complete housing

In case of questions please contact Siemens Support (section "Service & Support (Page 509)").

4.5.1.2 Polyamide 12 (PA 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 4-67 Chemical resistance - Polyamide 12 (PA 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	o
Chrome baths, tech.	-	20 °C	o
Iron salts, w.	c. s.	60 °C	++++
Acetic acid, w.	50%	20 °C	o
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	++++

Substance	Test conditions		Rating
	Concentration [%]	Temperature [°C]	
Lactic acid, w.	50%	20 °C	++
	10%	20 °C	+++
	10%	60 °C	++
Sodium carbonate, w. (soda)	c. s.	60 °C	++++
Sodium chloride, w.	c. s.	60 °C	++++
Sodium hydroxide	-	60 °C	++++
Nickel salts, w.	c. s.	60 °C	++++
Nitrobenzene	-	20 °C	+++
	-	60 °C	++
Phosphoric acid	10%	20 °C	+
Propane	-	60 °C	++++
Mercury	-	60 °C	++++
Nitric acid	10%	20 °C	+
Hydrochloric acid	10%	20 °C	+
Sulfur dioxide	low	60 °C	++++
Sulfuric acid	25%	20 °C	++
	10%	20 °C	+++
Hydrogen sulfide	low	60 °C	++++
Carbon tetrachloride	-	60 °C	++++
Toluene	-	20 °C	++++
	-	60 °C	+++
Detergent	high	60 °C	++++
Plasticizer	-	60 °C	++++

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

4.5.2 Transponder

4.5.2.1 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 4-68 Overview of the housing materials of the transponders

Housing material	Transponder	
Polyamide 12 (PA 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	
Epoxy resin	RF320T RF360T MDS D124 (6GT2600-0AC00) MDS D324 MDS D421 MDS D424 MDS D460	MDS D521 MDS D524 MDS D560 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.

4.5.2.2 Epoxy resin

Table 4-69 Resistance to chemicals - epoxy resin

Substance	Test conditions		Rating
	Concentration [%]	Temperature [°C]	
Allyl chloride	-	20 °C	++++
Formic acid	50%	20 °C	++++
	100%	20 °C	++
Ammonia, gaseous	-	20 °C	++++
Ammonia, liquid, water-free	-	20 °C	o
Ammonium hydroxide	10%	20 °C	++++
Ethanol	-	40 °C	++++
	-	60 °C	++++
Ethyl acrylate	-	20 °C	++++
Ethyl glycol	-	60 °C	++++
Gasoline, aroma-free	-	20 °C	++++
Gasoline, containing benzene	-	20 °C	++++
Benzoates (Na–, Ca– among others)	-	40 °C	++++
Benzoic acid	-	20 °C	++++
Benzene	-	20 °C	++++
Borax	-	60 °C	++++
Boric acid	-	20 °C	++++
Bromine, liquid	-	20 °C	o
Bromides (K–, Na– among others)	-	60 °C	++++
Bromoform	100%	20 °C	++++
Bromine water	-	20 °C	o
Butadien (1.3–)	-	20 °C	++++
Butane, gaseous	-	20 °C	++++
Butanol	-	20 °C	o
Butyric acid	100%	20 °C	++
Carbonates (ammonium–, Na– among others)	-	60 °C	++++
Chlorine, liquid	-	20 °C	o
Chlorine, gaseous, dry	100%	20 °C	o
Chlorobenzene	-	20 °C	++++
Chlorides (ammonium–, Na– among others)	-	60 °C	++++
Chloroform	-	20 °C	o
Chlorophyll	-	20 °C	++++
Chlorosulfuric acid	100%	20 °C	o
Chlorine water (saturated solution)	-	20 °C	++
Chromates (K–, Na– among others)	Up to 50 %	40 °C	++++
Chromic acid	Up to 30 %	20 °C	o
Chromosulfuric acid	-	20 °C	o

Substance	Test conditions		Rating
	Concentration [%]	Temperature [°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	o
Developer	-	40 °C	++++
Acetic acid	100%	20 °C	++
Ethanol	-	60 °C	++++
Fixing bath	-	40 °C	++++
Fluorides (ammonium–, K–, Na– among others)	-	40 °C	++++
Hydrofluoric acid	Up to 40 %	20 °C	++++
Formaldehyde	50%	20 °C	++++
Formamide	100%	20 °C	++++
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	o
Methanol	100%	40 °C	++++
Methylene chloride	-	20 °C	o
Lactic acid	100%	20 °C	++
Mineral oils	-	40 °C	++++
Nitrates (ammonium..., K– among others)	-	60 °C	++++
Nitroglycerin	-	20 °C	o
Oxalic acid	-	20 °C	++++
Phenol	1%	20 °C	++++
Phosphates (ammonium..., Na– among others)		60 °C	++++
Phosphoric acid	50%	60 °C	++++
	85%	20 °C	++++

Substance	Test conditions		Rating
	Concentration [%]	Temperature [°C]	
Propanol	-	20 °C	++++
Nitric acid	25%	20 °C	o
Hydrochloric acid	10%	20 °C	o
Brine	-	60 °C	o
Sulfur dioxide	100%	20 °C	++
Carbon disulfide	100%	20 °C	o
Sulfuric acid	40%	20 °C	o
Sulfurous acid	-	20 °C	++
Soap solution	-	60 °C	++++
Sulphates (ammonium..., Na– among others)	-	60 °C	++++
Sulfites (ammonium..., Na– among others)	-	60 °C	o
Tar, aroma-free	-	60 °C	++++
Turpentine	-	20 °C	++++
Trichloroethylene	-	20 °C	o
Hydrogen peroxide	30%	20 °C	++++
Tartaric acid	-	20 °C	++++

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

4.5.2.3 Polyamide 6 and Polyamide 6.6 GF30

Table 4-70 Chemical resistance - PA6 and PA6.6 GF30

Substance	Test conditions		Rating
	Concentration [%]	Temperature [°C]	
Mineral lubricants	-	-	++++
Aliphatic hydrocarbons	-	-	++++
Aromatic hydrocarbons	-	-	++++
Gasoline	-	-	++++
Weak mineral acids	-	-	+++
Strong mineral acids	-	-	o
Weak organic acids	-	-	++
Strong organic acids	-	-	o
Oxidizing acids	-	-	o

Substance	Test conditions		Rating
	Concentration [%]	Temperature [°C]	
Weak alkaline solutions	-	-	++
Strong alkaline solutions	-	-	o
Trichloroethylene	-	-	++++
Perchloroethylene	-	-	++++
Acetone	-	-	++++
Alcohols	-	-	++++
Hot water (hydrolysis resistance)	-	-	++

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

4.5.2.4 Polyamide 12 (PA 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 4-71 Chemical resistance - Polyamide 12 (PA 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	o
Chrome baths, tech.	-	20 °C	o

Substance	Test conditions		Rating
	Concentration [%]	Temperature [°C]	
Iron salts, w.	c. s.	60 °C	++++
Acetic acid, w.	50%	20 °C	o
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	+++
	10%	60 °C	++
Sodium carbonate, w. (soda)	c. s.	60 °C	++++
Sodium chloride, w.	c. s.	60 °C	++++
Sodium hydroxide	-	60 °C	++++
Nickel salts, w.	c. s.	60 °C	++++
Nitrobenzene	-	20 °C	+++
	-	60 °C	++
Phosphoric acid	10%	20 °C	+
Propane	-	60 °C	++++
Mercury	-	60 °C	++++
Nitric acid	10%	20 °C	+
Hydrochloric acid	10%	20 °C	+
Sulfur dioxide	low	60 °C	++++
Sulfuric acid	25%	20 °C	++
	10%	20 °C	+++
Hydrogen sulfide	low	60 °C	++++
Carbon tetrachloride	-	60 °C	++++
Toluene	-	20 °C	++++
	-	60 °C	+++
Detergent	high	60 °C	++++
Plasticizer	-	60 °C	++++

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

4.5.2.5 Polycarbonate (PC)

Table 4-72 Chemical resistance - polycarbonate (PPS)

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

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

4.5.2.6 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 4-73 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

4.5.2.7 Polyvinyl chloride (PVC)

Table 4-74 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

4.6 Guidelines for electromagnetic compatibility (EMC)

4.6.1 Overview

These EMC directives answer the following questions:

- Why are EMC directives necessary?
- What types of external interference have an impact on the system?
- How can interference be prevented?

- How can interference be eliminated?
- Examples of interference-free plant design

The description is aimed at "qualified personnel":

- Configuration engineers and planners who plan system configurations with RFID modules and have to observe the necessary guidelines.
- Installation 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

Observe the EMC directives

Failure to observe the specifically emphasized notes can result in dangerous conditions in the plant or the destruction of individual components or the entire plant.

4.6.2 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 RED 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

Adherence to EMC directives

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.

4.6.3 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.

4.6.4 Electromagnetic interference

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

- Interference source
- Coupling path
- Interference sink

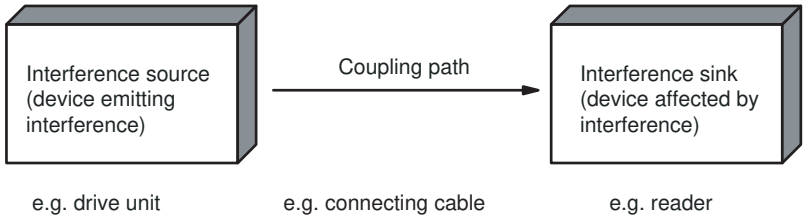


Figure 4-9 Propagation of interference

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 to prevent malfunctions due to interference. When setting up a plant, the manufacturer must take all possible measures 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

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

Table 4-75 Interference sources: Origin and effect

Interference source	Interference results from	Effect on the interference sink
Conveyor technology and transport units from a material that is conducive to electrostatic charging	Static charge	Electrical discharge currents, electrical field
Operator		
Contactor, electronic valves	Contacts	System disturbances
	Coils	Magnetic field
Electric 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. professional mobile radio)	Antenna	Electromagnetic field
Ground or reference potential difference	Voltage difference	Transient currents
Power cables	Current flow	Electrical and magnetic field, system disturbance
High-voltage cable	Voltage difference	Electrical field

What interference can affect RFID?

Table 4-76 Interference sources: Causes and remedies

Interference source	Cause	Remedy
Electrostatic charging (ESD)	Moving parts of the drive technology, such as rollers or wheels made of plastic/ rubber that charge metallic parts due to friction. For example, transfer drives or roller conveyors passing through in combination with transport units made of metal or vice versa (rollers made of metal and transport units made of plastic) that are designed so that they are insulated against the conveyor technology frame.	Prevent insulation of the transport units. Installation of ESD brushes or ESD springs for discharging the electrostatic charge.
Switched-mode power supply	Interference emitted from the current infeed	Replace the power supply unit
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:

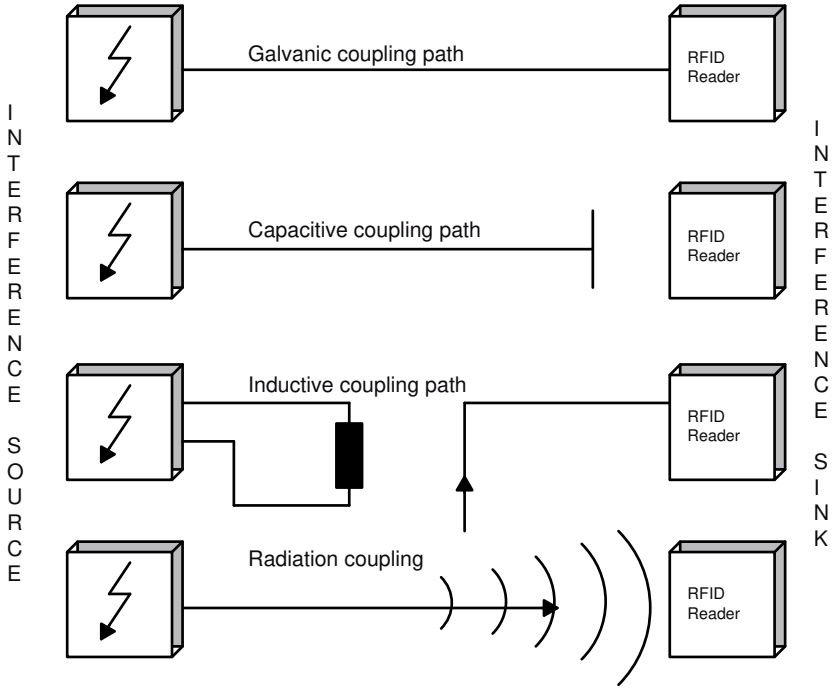


Figure 4-10 Ways in which interference can be coupled in

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

Table 4-77 Causes of coupling paths

Coupling path	Invoked by
Cables and wires	• 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

4.6.5 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.

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.

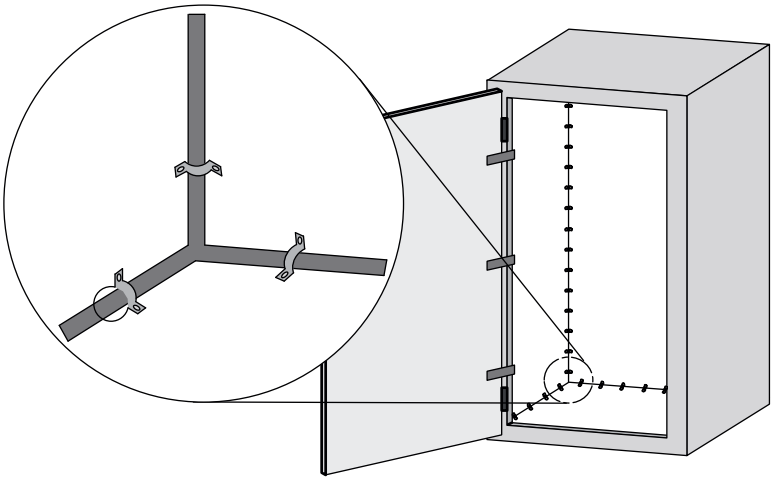


Figure 4-11 Shielding by enclosure

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).

The following generally applies:

- 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.

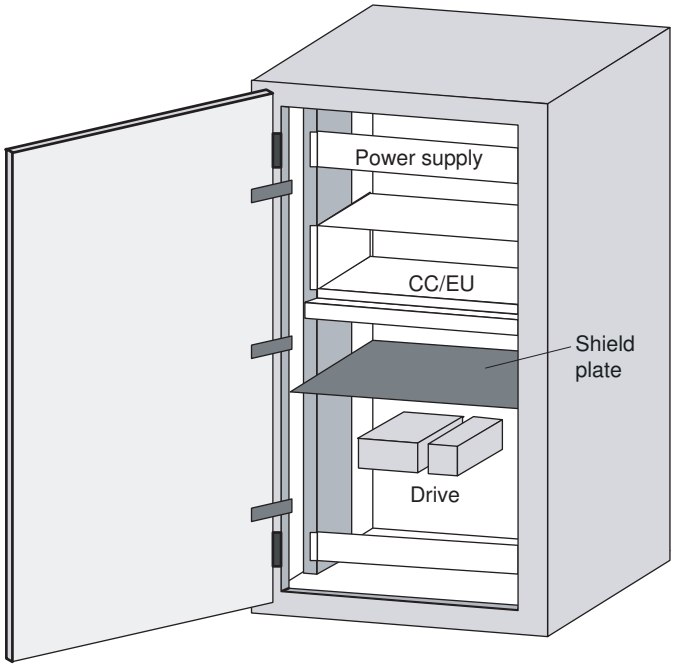


Figure 4-12 Prevention of interference by optimum configuration

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.

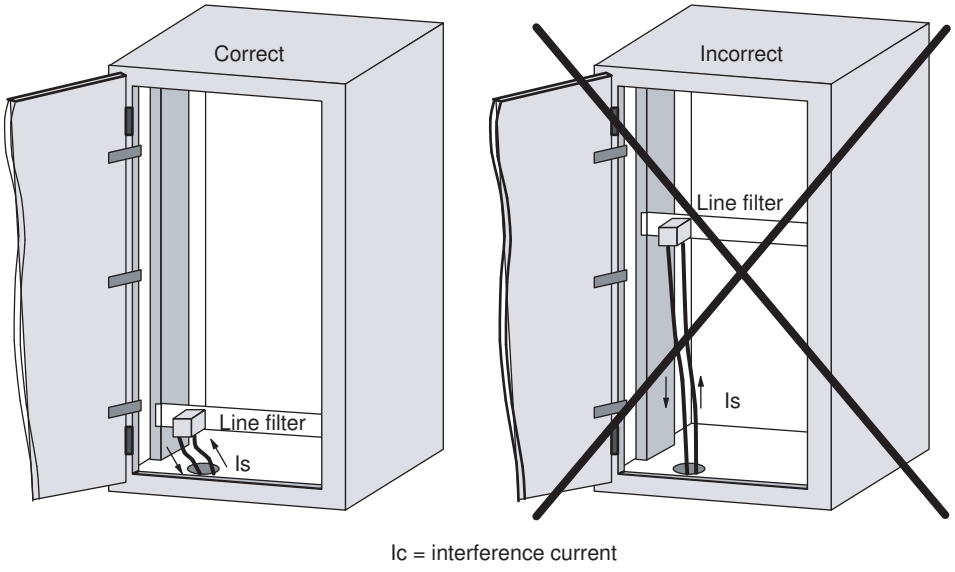


Figure 4-13 Filtering of the supply voltage

4.6.6 Prevention of interference sources

Avoid installing interferences sources into a plant to achieve greater interference immunity. 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.

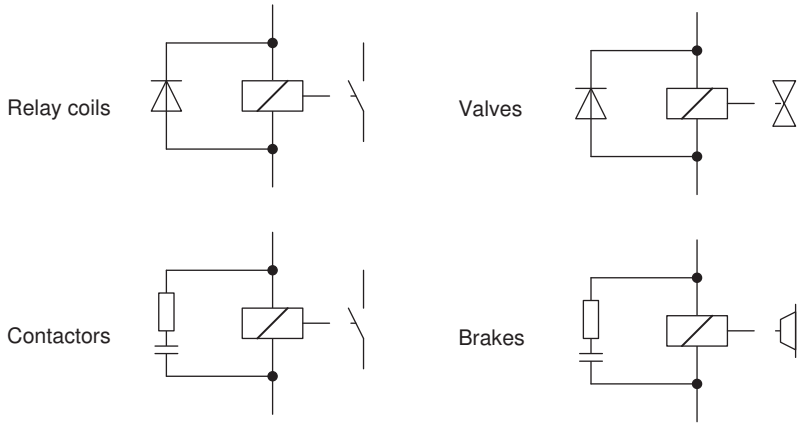


Figure 4-14 Suppression of inductance

Note

Suppressing interference sources

Suppress all coils in the cabinet. Make sure to include valves and motor brakes. Make sure that you test fluorescent lamps in the control cabinet separately.

4.6.7 Electrostatic discharges

This section describes how electrostatic discharges typically occur in RFID and how you can avoid them.

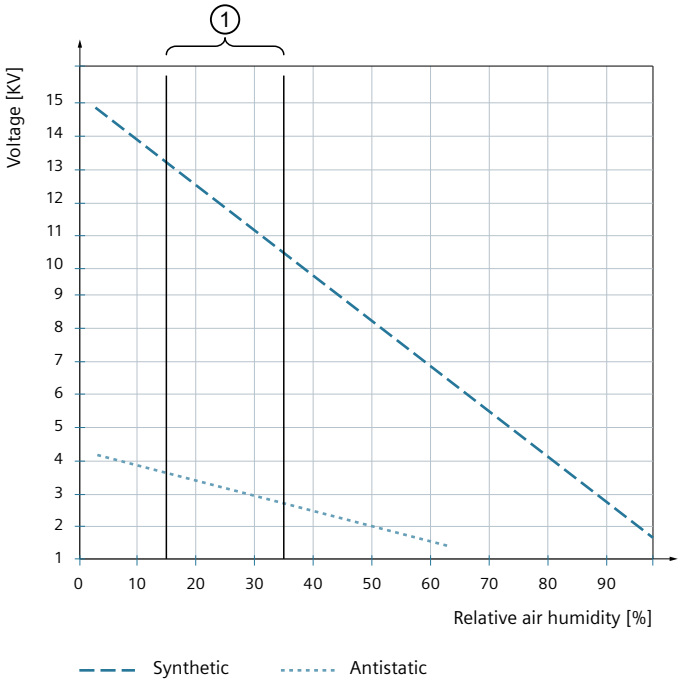
Plastic is increasingly being used in both conveyor systems and transport units. The risk of electrostatic charging has therefore increased.

Electrostatic discharge (ESD) occurs as a result. This is caused by the transfer of electrical charge between bodies of different electrostatic potential. The cause of the potential difference is usually a charge arising from frictional electricity.

4.6.7.1 Generation/formation

A widespread cause of electrostatic charge generation/formation is frictional electricity. This occurs when two materials with different potential differences rub against each other. Electrons are transferred from one of the material to the other in the process. A classic example of this is when a balloon is rubbed on a person's hair, which causes the hair to become electrostatically charged and to stand up. But electrostatic charges also occur when walking across a carpeted floor due to the friction between the shoe soles and the carpet. In industry, the effect often occurs in conveyor systems, e.g. when plastic pallets are transported over a roller conveyor.

The diagram below shows that the formation and level of electrostatic charge depends on the materials and the ambient conditions (relative humidity). A combination of synthetic fibers and dry atmosphere particularly promotes charging.



① Relative humidity in offices without humidity control (in winter)

Figure 4-15 Maximum electrostatic voltage to which an operator can be charged, depending on material and relative humidity

For detailed information on electrostatic discharge, as well as the effects of materials used and ambient conditions on this effect, refer to the standard IEC 61000-4-2.

4.6.7.2 Discharge and effect

Discharge often comes in the form of a spark that occurs when the electric field strength exceeds a value of approximately 4 to 30 kV/cm. This can lead to a very rapid increase in the number of free electrons and ions in the air, causing the air to abruptly become electrically conductive, as can be seen in lightning during a thunderstorm.

Alternatively, less visible "corona discharge" is possible, in which a discharge occurs between a strongly curved electrode, comparable to a screw or screw head, and a slightly curved electrode, such as a flat metal carriers, in which no spark can be seen.

The most spectacular form of an electrostatic discharge, however, is the spark. The possible consequences are minor discomfort to people, severe damage to electronic equipment, or fires and explosions if the air contains flammable gases or particles.

However, many electrostatic discharges occur without visible or audible sparks. A person carrying a relatively small electrical charge may not even feel a discharge, although this discharge would be sufficient to damage sensitive electronic components. Some equipment can be damaged by discharges as low as 30 V. These invisible forms of electrostatic discharge can cause total failure or less noticeable damage, potentially affecting the long-term reliability and performance of electronic equipment. For some devices, the damage may go unnoticed for much of their operating life.

EMC testing

Because of this, before RFID devices are released to the market (CE Declaration of Conformity), they are subjected to EMC testing to determine their reliability in terms of immunity to ESD. The tests for this are defined in the international standard, IEC 61000-4-2. The RFID devices are tested for up to 4 KV via contact discharge (via enclosure, connector) and for up to 8 kV via air discharge (metal carrier next to and above the reader).

4.6.7.3 Installation example

Installation example promoting electrostatic charge

The following installation example from the conveyor system technology shows a classic application that generates electrostatic charge and thus leads to electrostatic discharges.

Generation of the electrostatic charge

A pallet or its underside is made of plastic ① - a material that promotes electrostatic charging.

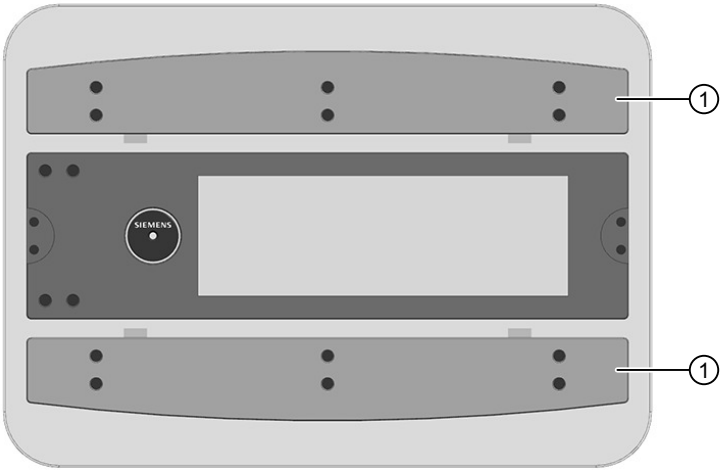


Figure 4-16 Pallet/workpiece carrier with an underside made of plastic.

This pallet is transported via a roller conveyor with metal rollers, in which the rollers permanently rotate. The friction between the pallet and the rollers generates electrostatic charges. The higher the friction, the faster the electrostatic charge increases. High frictional forces act to increase the electrostatic charge especially when the pallet stops ②.

Figure 4-17 Generation of high frictional forces by stopping the pallet

Note

Material combinations that promote electrostatic charging

The following material combinations in conveyor technology promote an electrostatic charge:

- Plastic pallet on a roller conveyor with metal rollers
- Metal pallet on a roller conveyor with plastic/rubber rollers or with drive belts made of plastic/rubber

Electrostatic discharges

If the electrostatic charges are not discharged in a targeted and controlled manner, as in this example, they discharge at points that offer low electrical resistance. Often this involves connectors or fastening screws of devices (e.g. RFID readers) or other metal structures that are in the vicinity and provide discharge due to their conductive properties.

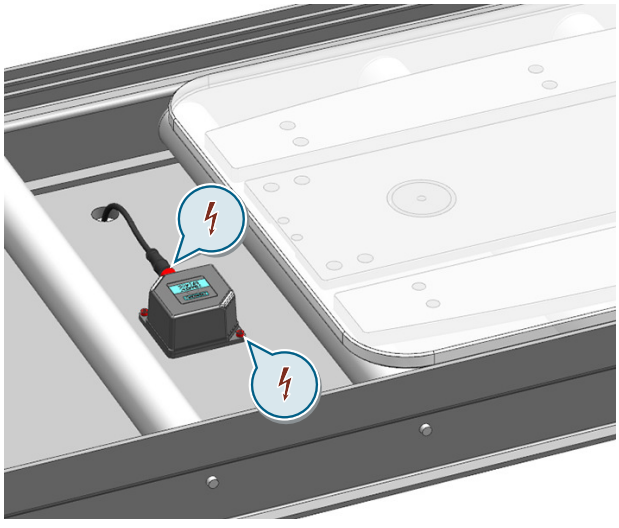


Figure 4-18 Points with low electrical resistance

The following indicators are mainly decisive for the time or place of a discharge:

- Distance between the pallet and the object over which the electrostatic discharge occurs.
- Conductivity of the object over which the electrostatic discharge occurs
- The momentary level of the electrostatic charge.

A charge of 10,000 V is sufficient for a discharge over a distance of 10 mm.

Installation example to prevent electrostatic charging

The following installation examples show how you can prevent electrostatic charging using ESD brushes or metal braided tapes.

Installation example with ESD brushes

Targeted and controlled discharge occurs over Via ESD brushes, so that high electrostatic charges and associated uncontrolled electrostatic discharges do not happen in the first place. The ESD brushes do not have to be installed everywhere. However, you should ensure that the pallet is always in contact with at least one ESD brush. The ESD brushes are usually mounted either on a profile rail ③ or in recesses provided for this purpose ④ on/in the inside of the roller conveyor wall.

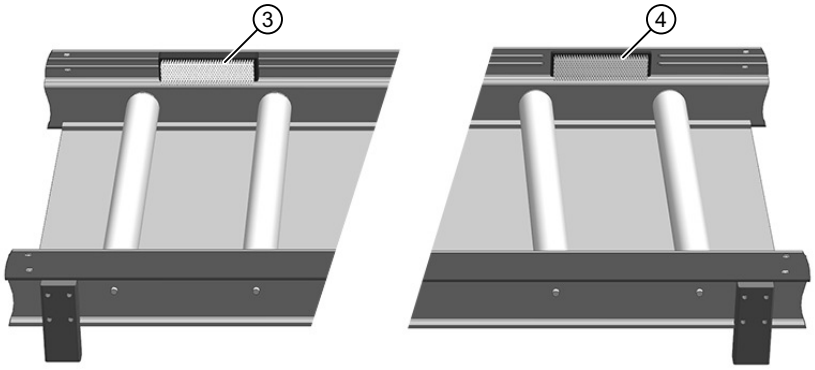


Figure 4-19 Installation example of ESD brushes on/in the inside of the roller conveyor wall.

Installation example without ESD brushes

As an alternative to installing ESD brushes, you can also provide the roller conveyor with EMC grounding and instead of installing ESD brushes on the inside of the roller conveyor wall, you can also install braided strips made of copper or other metal to prevent electrostatic charging.

4.6.8 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.

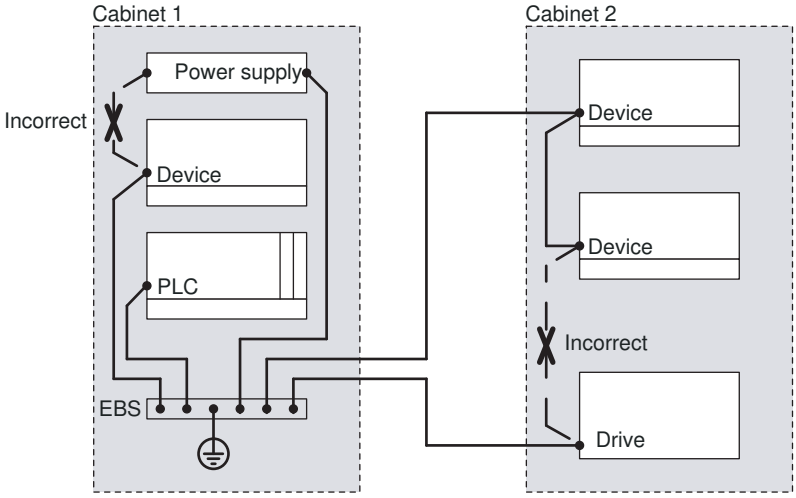


Figure 4-20 Equipotential bonding (EBS = Equipotential bonding strip)

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.

4.6.9 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.

The following generally applies:

- For analog signal cables, the shield has to be connected at one end on the receiver side
- For digital signals, the shield has to 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

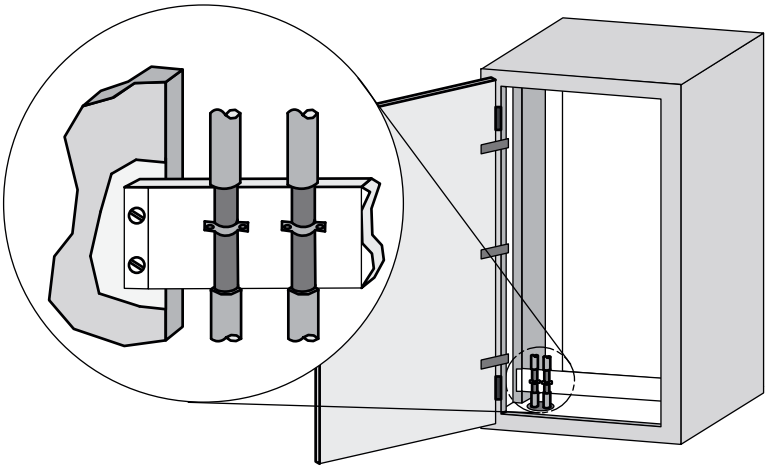


Figure 4-21 Cable shielding

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.

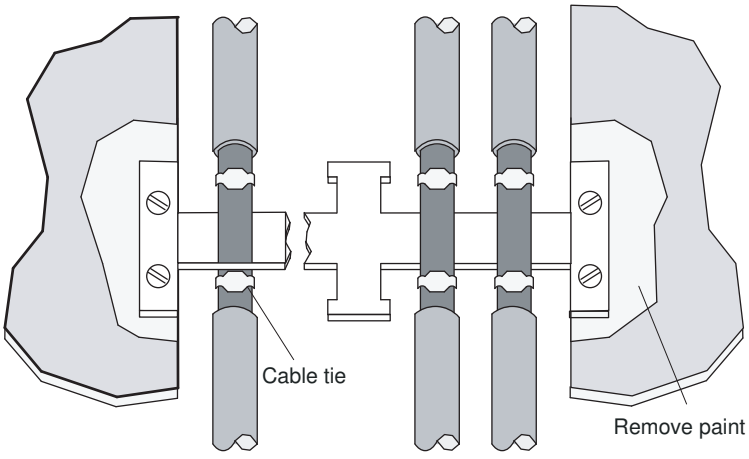


Figure 4-22 Connection of shielding bus

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.

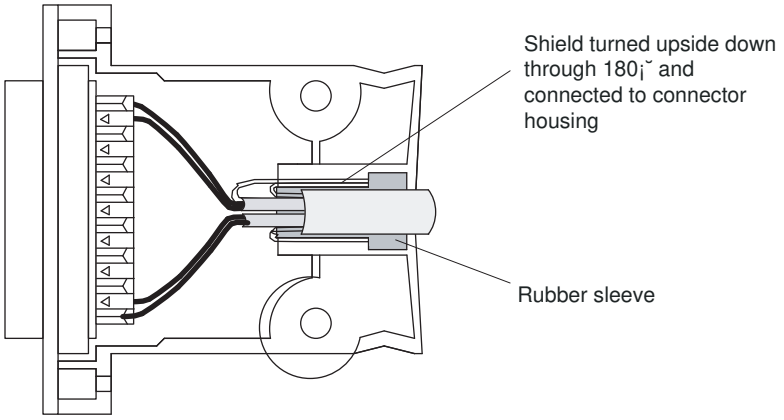


Figure 4-23 Interruption of shielded cables

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

Data transfer rate / volume

The transponder and reader communicate through inductive alternating fields, also referred to as antenna 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).

Note

Output power of the readers

The output power of the readers at the antenna (antenna input) does not correspond to the transmit power or radiated power of the device.

Physically, in an HF RFID system in the 13.56 MHz spectrum, the transmit power is hardly measurable because the physical process is induction (magnetic field) between the reader's antenna and the transponder's antenna. The measurable physical quantity is the field strength in amperes per meter (A/m).

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 "Input parameters for the RF300 system for programming via communications modules (https://support.industry.siemens.com/cs/ww/en/ps/15033/man)",
- Function manual "FB 45 (https://support.industry.siemens.com/cs/ww/en/view/21738808)" as of version "AS ≥ A3".

ISO 14443 functionality

You can use ISO 14443 transponders with all readers of the 2nd generation of the RF300 family - except the RF360R. The 2nd generation RF300 readers thus replace the MOBY E-Reader 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 by the 2nd generation readers in ISO 14443 operation:

- 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 LED operating display
	Area of application	Identification tasks on small assembly lines in harsh industrial environments

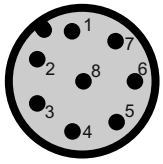
5.1.2 Ordering data

Table 5-1 RF310R ordering data

	Article number
RF310R with RS-422 interface (3964R)	6GT2801-1BA10
RF310R with RS422 interface (3964R) and ATEX, IECEx, UL HAZ. LOC approval	6GT2801-1BA10-0AX2

5.1.3 Pin assignment of the RS-422 interface

Table 5-2 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)

5.1.4 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 5-3 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 a transponder in the antenna field. The reader is in the "Setup" mode, in the status "Show quality", has not yet received a "RESET" command and is not ready. Depending on the signal strength, the LED flickers or is lit permanently.
■	The reader has received a "RESET" command.

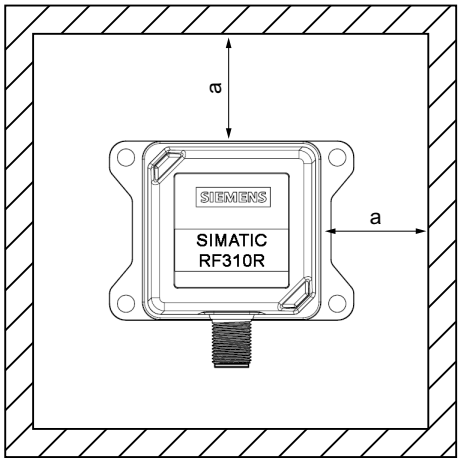
LED	Meaning
	The reader is turned on, the antenna is turned off.
	• Operating mode "with presence": Transponder present • Operating mode "without presence": Transponder present and command currently being executed
	There is an error. The number of flashes provides information about the current error. You will find more information on error messages in the section "System diagnostics (Page 461)".

5.1.5 Ensuring reliable data exchange

Note that the "center point" of the transponder must be in the area of the transmission window to ensure secure data exchange. You can find additional information on this in the section "Transmission window and read/write distance (Page 38)".

5.1.6 Metal-free area

The RF310R can be flush-mounted in metal. Note that mounting in metal leads to a slight reduction of the field data. To keep the reduction of the field data as low as possible, we recommend observing the minimum distance "a".

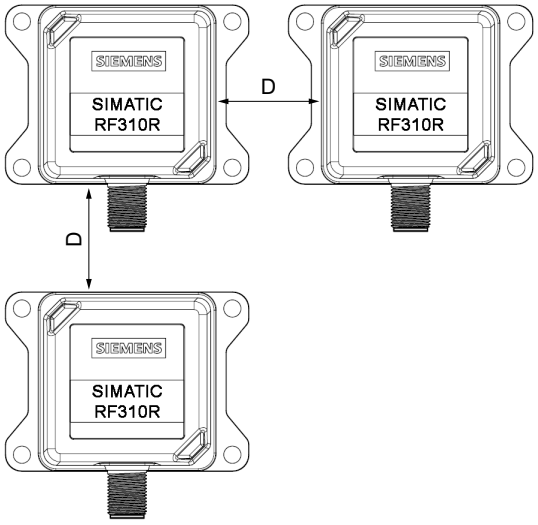


a ≥ 20 mm

Figure 5-1 Metal-free area for RF310R

5.1.7 Minimum distance between RF310R readers

RF310R side by side

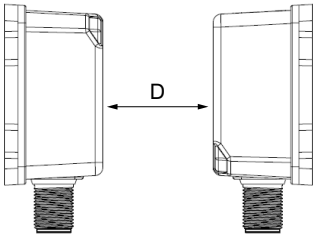


D ≥ 150 mm (with 2 readers)

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 Using the reader in hazardous area

⚠ WARNING

Risk of explosion

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

NOTICE
Issued approvals for the device The specified approvals apply only when the corresponding mark is printed on the product. You can check which of the following approvals have been granted for your product by the markings on the type plate.

ATEX / UKEX

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

Document	Title
EN IEC 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	Hazardous areas Part 31: Equipment dust ignition protection by enclosure "t"

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

ATEX mark

The identification of the electrical equipment is:

II 3 G Ex ec IIB T4 Gc
II 3 D Ex tc IIIC T80 °C Dc

-25 °C < Ta < +70 °C
IP64
U_n = 24 V DC, 60 mA

The equipment also has the following additional information:

XXXYYYZZZ	[= serial number, is assigned during production]
DEMKO 17 ATEX 1767 X	[= certificate number]

UKEX marking

The identification of the electrical equipment is:

II 3 G Ex ec IIB T4 Gc
II 3 D Ex tc IIIC T80 °C Dc

-25 °C < Ta < +70 °C

IP64
U_n = 24 V DC, 60 mA

The equipment also has the following additional information:

XXXYYYZZZ [= serial number, is assigned during production]
UL21UKEX2054X [= certificate number]

CCC-Ex

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

Document	Title
GB 3836.1	Hazardous areas Part 1: Equipment - General requirements
GB 3836.8	Hazardous areas Part 8: Equipment protection by type of protection "n"
GB 12476.1	Hazardous areas Part 1: Equipment dust ignition protection - General requirements
GB 12476.5	Hazardous areas Part 5: Equipment dust ignition protection - Protection by enclosure "tD"

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

CCC Ex marking

The identification of the electrical equipment is:

Ex nA IIB T4 Gc (not marked on device)
Ex tD A22 IP64 T80 °C (not marked on device)

-25 °C < Ta < +70 °C
IP64
U_n = 24 V DC, 60 mA

The equipment also has the following additional information:

XXXYYYZZZ [= serial number, is assigned during production]

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	Hazardous areas 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

The identification of the electrical equipment is:

Ex ec IIB T4 Gc
Ex tc IIIC T80 °C Dc
-25 °C < Ta < +70 °C
IP64
U_n= 24 V DC, 60 mA

The equipment also has the following additional information:

XXXYYYZZZ [= serial number, is assigned during production]
IECEx ULD 17.0012 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	Hazardous areas 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

The identification of the electrical equipment is:

LISTED 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 Gc, Ex ec IIB T4 Gc X
AEx tc IIIC T80 °C Dc, Ex tc IIIC T80 °C Dc X

-25 °C < Tamb. < +70 °C

IP64

U_n= 24 V DC, 60 mA

The equipment also has the following additional information:

XXXYYYZZZ [= serial number, is assigned during production]

5.1.8.1 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 °C < Ta < +70 °C	T4

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.

5.1.8.2 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.

5.1.8.3 Installation and operating conditions for hazardous areas:

NOTICE

Risk of explosion

Risk of explosion of dust-air mixtures or gas-air mixtures. Observe the following conditions when installing and operating the device in a hazardous area in order to avoid a risk of explosion and damage to the device:

- 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 should only be cleaned with a damp cloth.
- The device must be set up and installed in such a way 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 removing the connections (antenna cable, signal/supply cable), the connectors must be checked for contamination and, if necessary, cleaned before being inserted again.

5.1.8.4 Extended installation and operating conditions for hazardous areas for applications according to UL Hazardous Location (USA and Canada)

In addition to the instructions listed in ordinary locations File E85972-D1005.

For Div. 2:

This equipment is suitable for use in Class I, Division 2, Groups C and D in HAZARDOUS LOCATIONS, OR NON-HAZARDOUS LOCATIONS ONLY.

⚠ WARNING
WARNING EXPLOSION HAZARD - DO NOT DISCONNECT EQUIPMENT WHILE THE CIRCUIT IS LIVE OR UNLESS THE AREA IS KNOWN TO BE FREE OF IGNITABLE CONCENTRATIONS.

These devices are open-type devices that are to be installed in an enclosure suitable for the environment.

For Zone 2 only:

This equipment is suitable for use in Class I, Division 2, Groups C and D, Class II Groups F and G, OR Zone 2, Group IIB, OR Zone 22, Group IIIC in HAZARDOUS LOCATIONS, OR non-hazardous locations only.

⚠ WARNING
WARNING EXPLOSION HAZARD - DO NOT DISCONNECT EQUIPMENT WHILE THE CIRCUIT IS LIVE OR UNLESS THE AREA IS KNOWN TO BE FREE OF IGNITABLE CONCENTRATIONS.

⚠ WARNING
WARNING WARNING – POTENTIAL ELECTROSTATIC CHARGING HAZARD.

All models must be mounted in an enclosure with a minimum ingress protection rating of at least IP54 and must be Class I, Zone 2 certified, and used in an environment of not more than pollution degree 2.

The device may only be operated so that there is adequate protection against ultraviolet light.

The device must not be operated in areas influenced by charge-producing processes.

The device must be set up and installed so that it is mechanically protected.

After disconnecting connections (signal/supply cable), before the connectors are plugged in again, the connectors must be checked for contamination and, if necessary, cleaned.

5.1.9 Technical specifications

Table 5-4 Technical specifications of the RF310R reader with RS422 interface

		6GT2801-1BA10 **6GT2801-1BA10-0AX2**	
Product type designation	SIMATIC RF310R		
Radio frequencies			
Operating frequency, rated value	13.56 MHz		
Electrical data			
Output power (antenna input) [1]	≃ 0.3 W		
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 47)"		
Interfaces			
Electrical connector design	M12, 8-pin		
Standard for interfaces for communication	RS422		
Antenna	integrated		
Mechanical specifications			
Enclosure			
• Material	• Plastic PA 12		
• Color	• TI-Grey		
Recommended distance to metal	Mounting on metal permitted		
Supply voltage, current consumption, power loss			
Supply voltage	24 VDC		
Typical current consumption	60 mA		
Permitted ambient conditions			
Ambient temperature			
• During operation	• -25 ... +70 °C		
• During transportation and storage	• -40 ... +85 °C		

	6GT2801-1BA10 6GT2801-1BA10-0AX2
Degree of protection according to EN 60529	IP67
Shock-resistant acc. to EN 60721-3-7, Class 7 M2	500 m/s²
Vibration-resistant acc. to EN 60721-3-7, Class 7 M2	200 m/s²
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 with RS422 interface, maximum	1000 m (depending on the transmission speed)
LED display design	2 LEDs, 5 colors
Standards, specifications, approvals	
Proof of suitability	Radio according to RED and RER EN 300330, EN 301489, CE, FCC, UL/CSA (IEC 61010), Ex approval (only 6GT2801-1BA10-0AX2)
MTBF	273 years

[1] The output power of the readers at the antenna (antenna input) does not correspond to the transmit power or radiated power of the device.

5.1.10 Approvals

Declarations of Conformity

The Declaration of Conformity is available to all responsible authorities at:

Siemens AG
Digital Industries
Process Automation

DE-76181 Karlsruhe, Germany

EU Declaration of Conformity

Siemens AG hereby declares that the SIMATIC RF310R radio equipment types comply with the directives 2014/53/EU (RED) and 2011/65/EU (RoHS). In addition, the device variant with the article number "6GT2801-1BA10-0AX2" complies with the directive 2014/34/EU (ATEX). The complete text of the EU Declarations of Conformity is available at the following Internet address:

Link (https://support.industry.siemens.com/cs/ww/en/ps/15914/cert)

UK Declaration of Conformity

Siemens AG hereby declares that the SIMATIC RF310R radio equipment types comply with the directives Radio Equipment Regulations 2017 (SI 2017/1206) and related amendments and RoHS Regulations 2012 (SI 2012/3032) and related amendments. In addition, the device variant with the article number "6GT2801-1BA10-0AX2" complies with the UKEX Regulations (SI 2016/1107) and related amendments. The complete text of the UK Declarations of Conformity is available at the following Internet address:

Link (https://support.industry.siemens.com/cs/ww/en/ps/15914/cert)

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

5.1.11 Dimension drawing

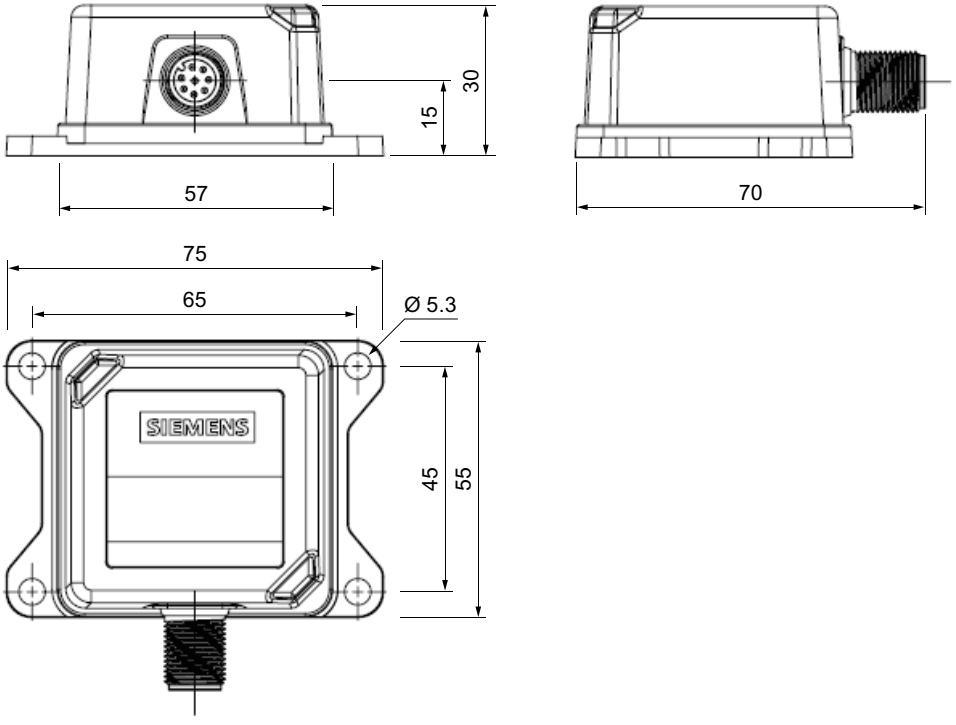


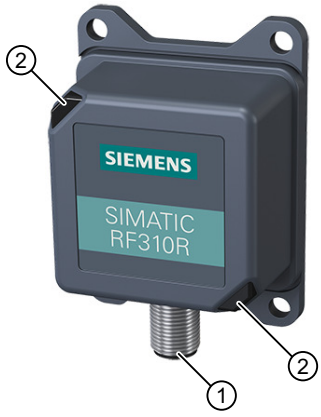
Figure 5-4 Dimension drawing for RF310R

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/view/109762012).

5.2.1 Features

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

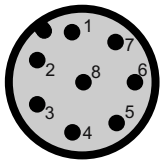
5.2.2 Ordering data

Table 5-5 Ordering data RF310R Scanmode

	Article number
RF310R Scanmode with RS422 interface	6GT2801-1BA20-0AX1

5.2.3 Pin assignment of the RS-422 interface

Table 5-6 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)

5.2.4 LED operating display

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

Table 5-7 LED operating display on the reader

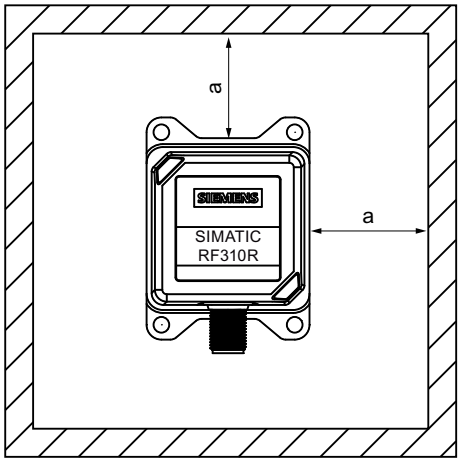
LED	Meaning
□	The reader is turned off.
■	The reader is switched on and ready for operation.
■	There is a transponder in the antenna field.
▣	There is an error. The number of flashes provides information about the current error. You will find more information on error messages in the section "System diagnostics (Page 461)".

5.2.5 Ensuring reliable data exchange

Note that the "center point" of the transponder must be in the area of the transmission window to ensure secure data exchange. You can find additional information on this in the section "Transmission window and read/write distance (Page 38)".

5.2.6 Metal-free area

The RF310R Scanmode can be flush-mounted in metal. Note that mounting in metal leads to a slight reduction of the field data. To keep the reduction of the field data as low as possible, we recommend observing the minimum distance "a".

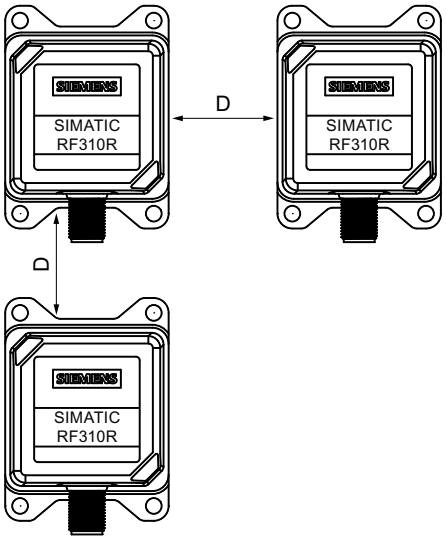


a ≥ 20 mm

Figure 5-5 Metal-free area for RF310R Scanmode

5.2.7 Minimum distance between several readers

RF310R Scanmode readers next to one another

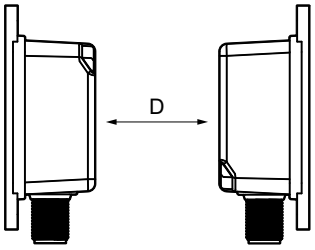


D ≥ 150 mm (with 2 readers)

≥ 200 mm (with more than 2 readers)

Figure 5-6 Minimum distance between several RF310R Scanmode readers

RF310R Scanmode face-to-face



D ≥ 300 mm

Figure 5-7 Face-to-face distance between two RF310R Scanmode readers

5.2.8 Technical specifications

Table 5-8 Technical specifications of the RF310R reader with Scanmode

	6GT2801-1BA20-0AX1	
Product type designation	SIMATIC RF310R Scanmode	
Radio frequencies		
Operating frequency, rated value	13.56 MHz	
Electrical data		
Output power (antenna input) [1]	≃ 0.3 W	
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 47)"	
Interfaces		
Electrical connector design	M12, 8-pin	
Standard for interfaces for communication	RS422 (Scanmode)	
Antenna	integrated	
Mechanical specifications		
Enclosure		
• Material	• Plastic PA 12	
• Color	• Anthracite	
Recommended distance to metal	Mounting on metal permitted	

	6GT2801-1BA20-0AX1
Supply voltage, current consumption, power loss	
Supply voltage	24 VDC
Typical current consumption	50 mA
Permitted ambient conditions	
Ambient temperature	
• During operation	• -25 ... +70 °C
• During transportation and storage	• -40 ... +85 °C
Degree of protection according to EN 60529	IP67
Shock-resistant acc. to EN 60721-3-7, Class 7 M2	500 m/s^2
Vibration-resistant acc. to EN 60721-3-7, Class 7 M2	200 m/s^2
Torsion and bending load	Not permitted
Design, dimensions and weight	
Dimensions (L x W x H)	79.6 x 55 x 30 mm
Weight	170 g
Type of mounting	4 x M5 screws; 1.5 Nm
Cable length with RS422 interface, maximum	1000 m (depending on the transmission speed)
LED display design	2 LEDs, 5 colors
Standards, specifications, approvals	
Proof of suitability	Radio according to RED and RER EN 300330, EN 301489, CE, FCC, UL/CSA
MTBF	170 years

[1] The output power of the readers at the antenna (antenna input) does not correspond to the transmit power or radiated power of the device.

5.2.9 Approvals

Declarations of Conformity

The Declaration of Conformity is available to all responsible authorities at:

Siemens AG
Digital Industries
Process Automation

DE-76181 Karlsruhe, Germany

EU Declaration of Conformity

Siemens AG hereby declares that the SIMATIC RF310R radio equipment types comply with the directives 2014/53/EU (RED) and 2011/65/EU (RoHS). The complete text of the EU Declarations of Conformity is available at the following Internet address:

Link (https://support.industry.siemens.com/cs/ww/en/ps/15914/cert)

UK Declaration of Conformity

Siemens AG hereby declares that the SIMATIC RF310R radio equipment types comply with the directives Radio Equipment Regulations 2017 (SI 2017/1206) and related amendments and RoHS Regulations 2012 (SI 2012/3032) and related amendments. The complete text of the UK Declarations of Conformity is available at the following Internet address:

Link (https://support.industry.siemens.com/cs/ww/en/ps/15914/cert)

FCC information

Siemens SIMATIC RF310R (MLFB 6GT2801-1BA20-0AX1); 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

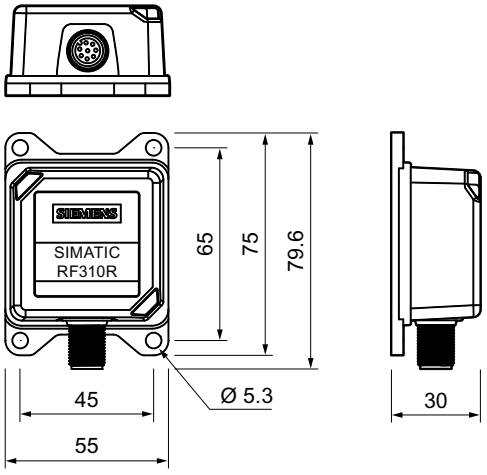


Figure 5-8 Dimension drawing RF310R Scanmode

Dimensions in mm

5.3 SIMATIC RF340R

5.3.1 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

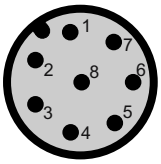
5.3.2 Ordering data

Table 5-9 Ordering data for RF340R

	Article number
RF340R with RS-422 interface (3964R)	6GT2801-2BA10
RF340R with RS422 interface (3964R) and ATEX, IECEx, UL HAZ. LOC approval	6GT2801-2BA10-0AX2

5.3.3 Pin assignment of the RS-422 interface

Table 5-10 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 5-11 Display elements

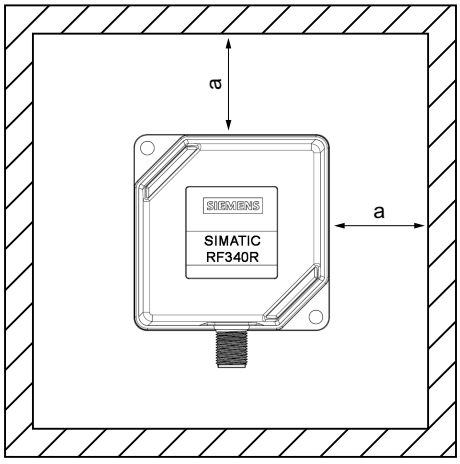
LED	Meaning
	The reader is turned off.
	The reader is turned on and is searching for transponders. The reader is in the "Setup" mode, in the "Search for transponders" status and has not yet received a "RESET" command and is not ready.
	There is a transponder in the antenna field. The reader is in the "Setup" mode, in the status "Show quality", has not yet received a "RESET" command and is not ready. Depending on the signal strength, the LED flickers or is lit permanently.
	The reader has received a "RESET" command.
	The reader is turned on, the antenna is turned off.
	• 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 461)".

5.3.5 Ensuring reliable data exchange

Note that the "center point" of the transponder must be in the area of the transmission window to ensure secure data exchange. You can find additional information on this in the section "Transmission window and read/write distance (Page 38)".

5.3.6 Metal-free area

The RF340R can be flush-mounted in metal. Note that mounting in metal leads to a slight reduction of the field data. To keep the reduction of the field data as low as possible, we recommend observing the minimum distance "a".

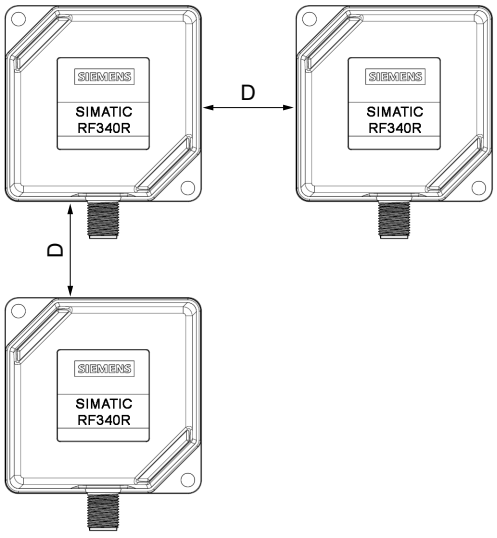


a ≥ 20 mm

Figure 5-9 Metal-free area for RF340R

5.3.7 Minimum distance between RF340R readers

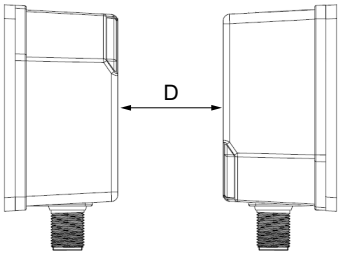
RF340R side by side



D ≥ ≥ 350 mm (with 2 readers)
≥ 500 mm (with more than 2 readers)

Figure 5-10 Minimum distance between RF340R readers

RF340R face-of-face



D ≥ 500 mm

Figure 5-11 Face-of-face distance between two RF340Rs

5.3.8 Using the readers in a hazardous area

WARNING

Risk of explosion

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

NOTICE
Issued approvals for the device The specified approvals apply only when the corresponding mark is printed on the product. You can check which of the following approvals have been granted for your product by the markings on the type plate.

ATEX / UKEX

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

Document	Title
EN IEC 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	Hazardous areas Part 31: Equipment dust ignition protection by enclosure "t"

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

ATEX mark

The identification of the electrical equipment is:

II 3 G Ex ec IIB T4 Gc
II 3 D Ex tc IIIC T80 °C Dc

-25 °C < Ta < +70 °C
IP64
U_n = 24 V DC, 60 mA

The equipment also has the following additional information:

XXXYYYZZZ	[= serial number, is assigned during production]
DEMKO 17 ATEX 1767 X	[= certificate number]

UKEX marking

The identification of the electrical equipment is:

II 3 G Ex ec IIB T4 Gc
II 3 D Ex tc IIIC T80 °C Dc

-25 °C < Ta < +70 °C

IP64
U_n = 24 V DC, 60 mA

The equipment also has the following additional information:

XXXYYYZZZ	[= serial number, is assigned during production]
UL21UKEX2054X	[= certificate number]

CCC-Ex

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

Document	Title
GB 3836.1	Hazardous areas Part 1: Equipment - General requirements
GB 3836.8	Hazardous areas Part 8: Equipment protection by type of protection "n"
GB 12476.1	Hazardous areas Part 1: Equipment dust ignition protection - General requirements
GB 12476.5	Hazardous areas Part 5: Equipment dust ignition protection - Protection by enclosure "tD"

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

CCC Ex marking

The identification of the electrical equipment is:

Ex nA IIB T4 Gc (not marked on device)
Ex tD A22 IP64 T80 °C (not marked on device)

-25 °C < Ta < +70 °C
IP64
U_n = 24 V DC, 60 mA

The equipment also has the following additional information:

XXXYYYZZZ	[= serial number, is assigned during production]

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	Hazardous areas 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

The identification of the electrical equipment is:

Ex ec IIB T4 Gc
Ex tc IIIC T80 °C Dc
-25 °C < Ta < +70 °C
IP64
U_n= 24 V DC, 60 mA

The equipment also has the following additional information:

XXXYYYZZZ [= serial number, is assigned during production]
IECEx ULD 17.0012 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	Hazardous areas 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

The identification of the electrical equipment is:

LISTED 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 Gc, Ex ec IIB T4 Gc X
AEx tc IIIC T80 °C Dc, Ex tc IIIC T80 °C Dc X

-25 °C < Tamb. < +70 °C

IP64

U_n= 24 V DC, 60 mA

The equipment also has the following additional information:

XXXYYYZZZ [= serial number, is assigned during production]

5.3.8.1 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 °C < Ta < +70 °C	T4

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.

5.3.8.2 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.

5.3.8.3 Installation and operating conditions for hazardous areas:

NOTICE

Risk of explosion

Risk of explosion of dust-air mixtures or gas-air mixtures. Observe the following conditions when installing and operating the device in a hazardous area in order to avoid a risk of explosion and damage to the device:

- 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 should only be cleaned with a damp cloth.
- The device must be set up and installed in such a way 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 removing the connections (antenna cable, signal/supply cable), the connectors must be checked for contamination and, if necessary, cleaned before being inserted again.

5.3.8.4 Extended installation and operating conditions for hazardous areas for applications according to UL Hazardous Location (USA and Canada)

In addition to the instructions listed in ordinary locations File E85972-D1005.

For Div. 2:

This equipment is suitable for use in Class I, Division 2, Groups C and D in HAZARDOUS LOCATIONS, OR NON-HAZARDOUS LOCATIONS ONLY.

⚠ WARNING
WARNING EXPLOSION HAZARD - DO NOT DISCONNECT EQUIPMENT WHILE THE CIRCUIT IS LIVE OR UNLESS THE AREA IS KNOWN TO BE FREE OF IGNITABLE CONCENTRATIONS.

These devices are open-type devices that are to be installed in an enclosure suitable for the environment.

For Zone 2 only:

This equipment is suitable for use in Class I, Division 2, Groups C and D, Class II Groups F and G, OR Zone 2, Group IIB, OR Zone 22, Group IIIC in HAZARDOUS LOCATIONS, OR non-hazardous locations only.

⚠ WARNING
WARNING EXPLOSION HAZARD - DO NOT DISCONNECT EQUIPMENT WHILE THE CIRCUIT IS LIVE OR UNLESS THE AREA IS KNOWN TO BE FREE OF IGNITABLE CONCENTRATIONS.

⚠ WARNING
WARNING WARNING – POTENTIAL ELECTROSTATIC CHARGING HAZARD.

All models must be mounted in an enclosure with a minimum ingress protection rating of at least IP54 and must be Class I, Zone 2 certified, and used in an environment of not more than pollution degree 2.

The device may only be operated so that there is adequate protection against ultraviolet light.

The device must not be operated in areas influenced by charge-producing processes.

The device must be set up and installed so that it is mechanically protected.

After disconnecting connections (signal/supply cable), before the connectors are plugged in again, the connectors must be checked for contamination and, if necessary, cleaned.

5.3.9 Technical specifications

Table 5-12 Technical specifications of the RF340R reader

	6GT2801-2BA10 **6GT2801-2BA10-0AX2**		
Product type designation	SIMATIC RF340R		
Radio frequencies			
Operating frequency, rated value	13.56 MHz		
Electrical data			
Output power (antenna input) [1]	≃ 0.4 W		
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 47)"		
Interfaces			
Electrical connector design	M12, 8-pin		
Standard for interfaces for communication	RS422 (3964R protocol)		
Antenna	integrated		
Mechanical specifications			
Enclosure			
• Material	• Plastic PA 12		
• Color	• TI-Grey		
Recommended distance to metal	Mounting on metal permitted		
Supply voltage, current consumption, power loss			
Supply voltage	24 VDC		
Typical current consumption	60 mA		
Permitted ambient conditions			
Ambient temperature			
• During operation	• -25 ... +70 °C		
• During transportation and storage	• -40 ... +85 °C		

	6GT2801-2BA10 6GT2801-2BA10-0AX2
Degree of protection according to EN 60529	IP67
Shock-resistant acc. to EN 60721-3-7, Class 7 M2	500 m/s²
Vibration-resistant acc. to EN 60721-3-7, Class 7 M2	200 m/s²
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 with RS422 interface, maximum	1000 m (depending on the transmission speed)
LED display design	2 LEDs, 5 colors
Standards, specifications, approvals	
Proof of suitability	Radio according to RED and RER EN 300330, EN 301489, CE, FCC, UL/CSA (IEC 61010), Ex approval (only 6GT2801-2BA10-0AX2)
MTBF	260 years

[1] The output power of the readers at the antenna (antenna input) does not correspond to the transmit power or radiated power of the device.

5.3.10 Approvals

Declarations of Conformity

The Declaration of Conformity is available to all responsible authorities at:

Siemens AG
Digital Industries
Process Automation

DE-76181 Karlsruhe, Germany

EU Declaration of Conformity

Siemens AG hereby declares that the SIMATIC RF340R radio equipment types comply with the directives 2014/53/EU (RED) and 2011/65/EU (RoHS). In addition, the device variant with the article number "6GT2801-2BA10-0AX2" complies with the directive 2014/34/EU (ATEX). The complete text of the EU Declarations of Conformity is available at the following Internet address:

Link (https://support.industry.siemens.com/cs/ww/en/ps/15914/cert)

UK Declaration of Conformity

Siemens AG hereby declares that the SIMATIC RF340R radio equipment types comply with the directives Radio Equipment Regulations 2017 (SI 2017/1206) and related amendments and RoHS Regulations 2012 (SI 2012/3032) and related amendments. In addition, the device variant with the article number "6GT2801-2BA10-0AX2" complies with the UKEX Regulations (SI 2016/1107) and related amendments. The complete text of the UK Declarations of Conformity is available at the following Internet address:

Link (https://support.industry.siemens.com/cs/ww/en/ps/15914/cert)

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

5.3.11 Dimension drawing

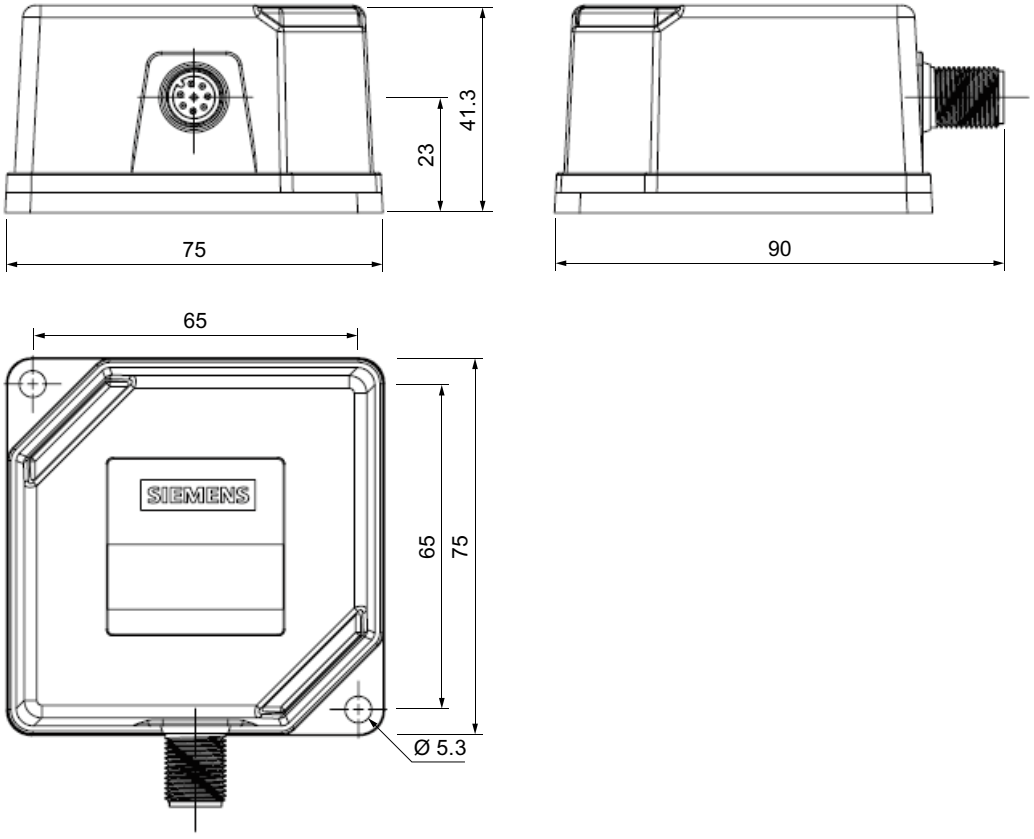


Figure 5-12 Dimension drawing for RF340R

Dimensions in mm

5.4 SIMATIC RF350R

5.4.1 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.

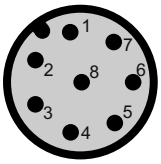
5.4.2 Ordering data

Table 5-13 Ordering data for RF350R

	Article number
RF350R with RS-422 interface (3964R)	6GT2801-4BA10
RF350R with RS422 interface (3964R) and ATEX, IECEx, UL HAZ. LOC approval	6GT2801-4BA10-0AX2

5.4.3 Pin assignment of the RS-422 interface

Table 5-14 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)

5.4.4 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 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 a transponder in the antenna field. The reader is in the "Setup" mode, in the status "Show quality", has not yet received a "RESET" command and is not ready. Depending on the signal strength, the LED flickers or is lit permanently.
	The reader has received a "RESET" command.
	The reader is turned on, the antenna is turned off.
	• 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 461)".

5.4.5 Ensuring reliable data exchange

Note that the "center point" of the transponder must be in the area of the transmission window to ensure secure data exchange. You can find additional information on this in the section "Transmission window and read/write distance (Page 38)".

5.4.6 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 217)".

5.4.7 Using the readers in hazardous areas

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

NOTICE
Issued approvals for the device The specified approvals apply only when the corresponding mark is printed on the product. You can check which of the following approvals have been granted for your product by the markings on the type plate.

ATEX / UKEX

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

Document	Title
EN IEC 60079-0	Hazardous areas Part 0: Equipment - General requirements
EN 60079-7	Hazardous areas Part 7: Equipment protection by increased safety "e"
EN 60079-11	Only the antenna connection: Hazardous areas Part 11: Equipment protection by intrinsic safety "i"
EN 60079-31	Hazardous areas Part 31: Equipment dust ignition protection by enclosure "t"

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

ATEX mark

The identification of the electrical equipment is:

II 3 GD
Ex ec [ic] IIB T4 Gc
Ex ec [ic IIIC Dc] IIB T4 Gc
Ex tc [ic IIB Gc] IIIC T80 °C Dc
Ex tc [ic] IIIC T80 °C Dc

-25 °C < Ta < +70 °C
IP64
U_n = 24 V DC, 60 mA
U_m = 28 V

The equipment also has the following additional information:

XXXYYYZZZ	[= serial number, is assigned during production]
DEMKO 17 ATEX 1767 X	[= certificate number]

UKEX marking

The identification of the electrical equipment is:

II 3 GD
Ex ec [ic] IIB T4 Gc
Ex ec [ic IIIC Dc] IIB T4 Gc
Ex tc [ic IIB Gc] IIIC T80 °C Dc
Ex tc [ic] IIIC T80 °C Dc

-25 °C < Ta < +70 °C
IP64
U_n = 24 V DC, 60 mA
U_m = 28 V

The equipment also has the following additional information:

XXXYYYZZZ	[= serial number, is assigned during production]
UL21UKEX2054X	[= certificate number]

CCC-Ex

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

Document	Title
GB 3836.1	Hazardous areas Part 1: Equipment - General requirements
GB 3836.4	Hazardous areas Part 4: Equipment protection by intrinsic safety "i"
GB 3836.8	Hazardous areas Part 8: Equipment protection by type of protection "n"
GB 12476.1	Hazardous areas Part 1: Equipment dust ignition protection - General requirements
GB 12476.5	Hazardous areas Part 5: Equipment dust ignition protection - Protection by enclosure "tD"

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

CCC Ex marking

The identification of the electrical equipment is:

Ex nA [ic] IIB T4 Gc (not marked on device)
Ex tD A22 [ic IIB Gc] IP64 T80 °C (not marked on device)

-25 °C < Ta < +70 °C

IP64

U_n = 24 V DC, 60 mA

U_m = 28 V

The equipment also has the following additional information:

XXXYYYZZZ [= serial number, is assigned during production]

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"

Document	Title
IEC 60079-11	Only the antenna connection: Hazardous areas Part 11: Equipment protection by intrinsic safety "i"
IEC 60079-31	Hazardous areas 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

The identification of the electrical equipment is:

Ex ec [ic] IIB T4 Gc
Ex ec [ic IIIC Dc] IIB T4 Gc
Ex tc [ic IIB Gc] IIIC T80 °C Dc
Ex tc [ic] IIIC T80 °C Dc
-25 °C < Ta < +70 °C
IP64
U_n= 24 V DC, 60 mA
U_m = 28 V

The equipment also has the following additional information:

XXXYYYZZZ [= serial number, is assigned during production]
IECEx ULD 17.0012 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 60079-11	Only the antenna connection: Hazardous areas Part 11: Equipment protection by intrinsic safety "i"
CSA C22.2 NO. 60079-11	
UL 60079-31	Hazardous areas 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

The identification of the electrical equipment is:

LISTED E223122
IND.CONT.EQ FOR HAZ.LOC.
CL.I, DIV.2, GP.C,D T4
CL.II, DIV.2, GP.F,G T80 °C
CLI, Zone2, AEx ec [ic] IIB T4 Gc
CLI, Zone2, AEx ec [ic IIIC Dc] IIB T4 Gc
CLII, Zone22, AEx tc [ic IIB Gc] IIIC T80 °C Dc
CLII, Zone22, AEx tc [ic] IIIC T80 °C Dc
CLI, Zone2, Ex ec [ic] IIB T4 Gc X
CLI, Zone2, Ex ec [ic IIIC Dc] IIB T4 Gc X
CLII, Zone22, Ex tc [ic IIB Gc] IIIC T80 °C Dc X
CLII, Zone22, Ex tc [ic] IIIC T80 °C Dc X

-25 °C < Tamb. < +70 °C

IP64

U_n= 24 V DC, 60 mA

The equipment also has the following additional information:

XXXYYYZZZ [= serial number, is assigned during production]

5.4.7.1 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 °C < Ta < +70 °C	T4

⚠ 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.

5.4.7.2 Using the corresponding antennas in hazardous areas for gases

While the readers stay in safe areas or in category 3 hazardous areas, the corresponding antennas can be operated as simple equipment in hazardous areas via the intrinsically safe antenna connection (ic).

Ambient temperature range	Temperature class
-25 °C < Ta < +70 °C	T4

WARNING

Ignitions of gas-air mixtures

When using the antenna, check that the temperature class is complied with in connection with the requirements of the area of application.

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

5.4.7.3 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.

5.4.7.4 Using the corresponding antennas in hazardous areas 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 antenna, check that the temperature class is complied with in connection with the requirements of the area of application.

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

5.4.7.5 Antenna portfolio for use as simple equipment for gases and dust

You can use the following antennas as simple equipment for gases and dust with the RF350R:

Antenna	Article number
ANT 1	6GT2398-1CB00
ANT 3	6GT2398-1CD40-0AX0
	6GT2398-1CD30-0AX0
ANT 3S	6GT2398-1CD50-0AX0
	6GT2398-1CD60-0AX0
ANT 8	6GT2398-1CF00
	6GT2398-1CF10
ANT 12	6GT2398-1CC00
	6GT2398-1CC10
	6GT2398-1DC00
	6GT2398-1DC10
ANT 18	6GT2398-1CA00
	6GT2398-1CA10
	6GT2398-1CA10-0AX0
	6GT2398-1DA00
	6GT2398-1DA10
ANT 30	6GT2398-1CC00
	6GT2398-1CD10-0AX0
	6GT2398-1DC00
	6GT2398-1DC10

5.4.7.6 Antenna values Ui, Ii, Pi, Ci, Li for installation in hazardous areas

Note

Read the document "A5E44647714"

Read the information in the document "Control Drawing A5E44647714" shipped with the reader for installation of the reader RF350R - 2nd generation in a hazardous area.

Table 5-16 Specific antenna values for the installation

Antenna	Version	Article number	Description	Ui [V]	Ii [A]	Pi [W]	Ci [pF]	Li [µH]
ANT 1	C	6GT2398-1CB00	With integrated cable 3 m	34.5	0.105	0.55	314	0.89
ANT 3	01	6GT2398-1CD30-0AX0	without cable	34.5	0.105	0.55	71.5	0.18
ANT 3S	01	6GT2398-1CD50-0AX0	without cable	34.5	0.105	0.55	71.5	0.18
ANT 8	03	6GT2398-1CF00	without cable	34.5	0.105	0.55	46.0	0.115
	03	6GT2398-1CF10	with cable 3 m	34.5	0.105	0.55	346.8	0.867
ANT 12	02	6GT2398-1CC10	With integrated cable 60 cm	34.5	0.105	0.55	108.2	0.271
	D	6GT2398-1CC10	With integrated cable 60 cm	34.5	0.105	0.55	73.5	0.184
	D	6GT2398-1CC00	With integrated cable 3 m	34.5	0.105	0.55	337	0.843
ANT 18	B	6GT2398-1CA10	With integrated cable 60 cm	34.5	0.105	0.55	95.4	0.239
	B	6GT2398-1CA10-0AX0	without cable	34.5	0.105	0.55	38.7	0.097
	C	6GT2398-1CA00	without cable	34.5	0.105	0.55	38.2	0.096
	C	6GT2398-1CA00	With integrated cable 3 m	34.5	0.105	0.55	344	0.86
ANT 30	B	6GT2398-1CD10-0AX0	without cable	34.5	0.105	0.55	43.2	0.108
	C	6GT2398-1CD00	With integrated cable 3 m	34.5	0.105	0.55	334	0.835

5.4.7.7 Installation and operating conditions for hazardous areas:

NOTICE

Risk of explosion

Risk of explosion of dust-air mixtures or gas-air mixtures. Observe the following conditions when installing and operating the device in a hazardous area in order to avoid a risk of explosion and damage to the device:

- 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 set up and installed in such a way 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 (communication / power supply cable and 8-pin connector).
- The device sockets incl. the metal parts of the connecting cable for the signal/supply line 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 removing the connections (signal/supply cable), the connectors must be checked for contamination and, if necessary, cleaned before being inserted again.

Note

Read the document "A5E44647714"

Read the information in the document "Control Drawing A5E44647714" shipped with the reader for installation of the reader RF350R - 2nd Generation in a hazardous area.

5.4.7.8 Installation and operating conditions of antennas for hazardous areas

NOTICE

Risk of explosion

Risk of explosion of dust-air mixtures or gas-air mixtures. Observe the following conditions when installing and operating the device in a hazardous area in order to avoid a risk of explosion and damage to the device:

- The maximum surface temperature of the antenna, corresponding to the simple equipment, applies only for operation without a cover of dust.
- The device may not be operated in areas influenced by processes that generate high electrostatic charges.
- The device (antenna) may only be operated with readers specified or supplied by the manufacturer.

5.4.7.9 Extended installation and operating conditions for hazardous areas for applications according to UL Hazardous Location (USA and Canada)

In addition to the instructions listed in ordinary locations File E85972-D1005.

For Div. 2:

This equipment is suitable for use in Class I, Division 2, Groups C and D in HAZARDOUS LOCATIONS, OR NON-HAZARDOUS LOCATIONS ONLY.

⚠ WARNING

WARNING

EXPLOSION HAZARD - DO NOT DISCONNECT EQUIPMENT WHILE THE CIRCUIT IS LIVE OR UNLESS THE AREA IS KNOWN TO BE FREE OF IGNITABLE CONCENTRATIONS.

These devices are open-type devices that are to be installed in an enclosure suitable for the environment.

For Zone 2 only:

This equipment is suitable for use in Class I, Division 2, Groups C and D, Class II Groups F and G, OR Zone 2, Group IIB, OR Zone 22, Group IIIC in HAZARDOUS LOCATIONS, OR non-hazardous locations only.

⚠ WARNING

WARNING

EXPLOSION HAZARD - DO NOT DISCONNECT EQUIPMENT WHILE THE CIRCUIT IS LIVE OR UNLESS THE AREA IS KNOWN TO BE FREE OF IGNITABLE CONCENTRATIONS.

⚠ WARNING

WARNING

WARNING – POTENTIAL ELECTROSTATIC CHARGING HAZARD.

All models must be mounted in an enclosure with a minimum ingress protection rating of at least IP54 and must be Class I, Zone 2 certified, and used in an environment of not more than pollution degree 2.

The device may only be operated so that there is adequate protection against ultraviolet light.

The device must not be operated in areas influenced by charge-producing processes.

The device must be set up and installed so that it is mechanically protected.

After disconnecting connections (signal/supply cable), before the connectors are plugged in again, the connectors must be checked for contamination and, if necessary, cleaned.

5.4.8 Technical specifications

Table 5-17 Technical specifications of the RF350R reader

		6GT2801-4BA10	
		6GT2801-4BA10-0AX2	
Product type designation	SIMATIC RF350R		
Radio frequencies			
Operating frequency, rated value	13.56 MHz		
Electrical data			
Output power (antenna input) [1]	≃ 0.4 W		
Maximum range			
• ANT 1	• 140 mm		
• ANT 3	• 50 mm		
• ANT 12	• 17 mm		
• ANT 18	• 35 mm		
• ANT 30	• 50 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		

	6GT2801-4BA10 **6GT2801-4BA10-0AX2**
Read/write distances of the reader	See section "Field data for transponders, readers and antennas (Page 47)"
Interfaces	
Electrical connector design	M12, 8-pin
Antenna connector design	M8, 4-pin
Standard for interfaces for communication	RS422 (3964R protocol)
Antenna	External, antennas ANT 1, ANT 3, ANT 12, ANT 18 or ANT 30
Mechanical specifications	
Enclosure	
• Material	• Plastic PA 12
• Color	• TI-Grey
Recommended distance to metal	Mounting on metal permitted
Supply voltage, current consumption, power loss	
Supply voltage	24 VDC
Typical current consumption	60 mA
Permitted ambient conditions	
Ambient temperature	
• During operation	• -25 ... +70 °C
• During transportation and storage	• -40 ... +85 °C
Degree of protection according to EN 60529	IP65
Shock-resistant acc. to EN 60721-3-7, Class 7 M2	500 m/s^2
Vibration-resistant acc. to EN 60721-3-7, Class 7 M2	200 m/s^2
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 with RS422 interface, maximum	1000 m (depending on the transmission speed)
LED display design	2 LEDs, 5 colors
Standards, specifications, approvals	

	6GT2801-4BA10 6GT2801-4BA10-0AX2
Proof of suitability	Radio according to RED and RER EN 300330, EN 301489, CE, FCC, UL/CSA (IEC 61010), Ex approval (only 6GT2801-4BA10-0AX2)
MTBF	260 years

[1] The output power of the readers at the antenna (antenna input) does not correspond to the transmit power or radiated power of the device.

5.4.9 Approvals

Declarations of Conformity

The Declaration of Conformity is available to all responsible authorities at:

Siemens AG
Digital Industries
Process Automation

DE-76181 Karlsruhe, Germany

EU Declaration of Conformity

Siemens AG hereby declares that the SIMATIC RF350R radio equipment types comply with the directives 2014/53/EU (RED) and 2011/65/EU (RoHS). In addition, the device variant with the article number "6GT2801-4BA10-0AX2" complies with the directive 2014/34/EU (ATEX). The complete text of the EU Declarations of Conformity is available at the following Internet address:

Link (https://support.industry.siemens.com/cs/ww/en/ps/15914/cert)

UK Declaration of Conformity

Siemens AG hereby declares that the SIMATIC RF350R radio equipment types comply with the directives Radio Equipment Regulations 2017 (SI 2017/1206) and related amendments and RoHS Regulations 2012 (SI 2012/3032) and related amendments. In addition, the device variant with the article number "6GT2801-4BA10-0AX2" complies with the UKEX Regulations (SI 2016/1107) and related amendments. The complete text of the UK Declarations of Conformity is available at the following Internet address:

Link (https://support.industry.siemens.com/cs/ww/en/ps/15914/cert)

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

5.4.10 Dimension drawing

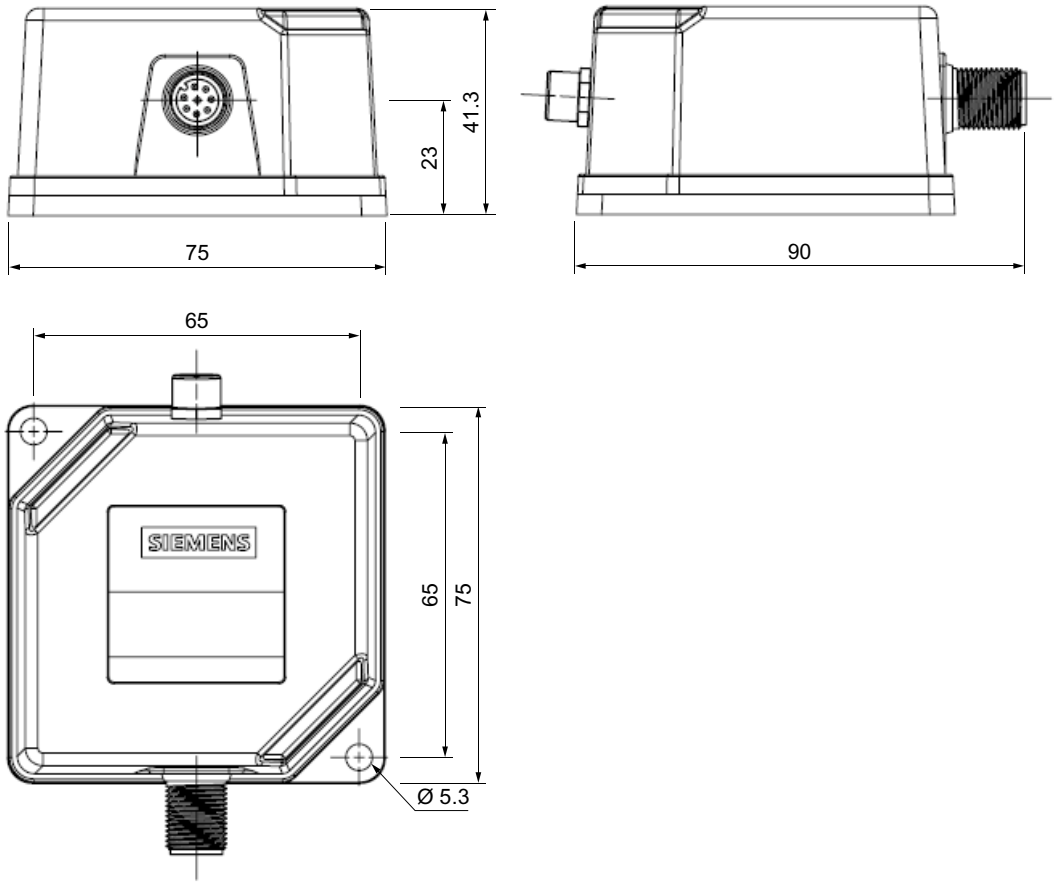


Figure 5-13 RF350R dimension drawing

Dimensions in mm

5.5 SIMATIC RF360R

5.5.1 Features

SIMATIC RF360R	Characteristics	
	Design	① Status LEDs (status display of the reader and PROFINET connection) ② Operation LEDs (operating states of the reader) ③ Interface for the power supply X80 (M12, 4-pin, L-coded) ④ Interface for PROFINET IO X1 P1R (M12, 4-pin, D-coded) ⑤ Interface for PROFINET IO X1 P2R (M12, 4-pin, D-coded) [1]
	Area of application	Identification tasks on assembly lines or AGV in industrial environments

[1] You can loop the PROFINET IO via the M12 round socket ⑤.

Note

Configuration Manual SIMATIC RF360R

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

5.5.2 Ordering data

Table 5-18 RF360R ordering data

	Article number
RF360R with Industrial Ethernet interface	6GT2801-5BA30

5.5.3 Connecting the reader to functional ground

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

Required tools

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

- Screwdriver
- Stripping tool
- Crimp tool

Accessories required

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

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

Mounting

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

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

NOTICE
Low-impedance connection Ensure a low impedance connection between the reader module and the functional ground. When attaching the grounding cable, ensure it is not on a coated surface. Ensure that the ground cable is routed as short as possible and routed vertically downwards, and that is does not contain any conductor loops.

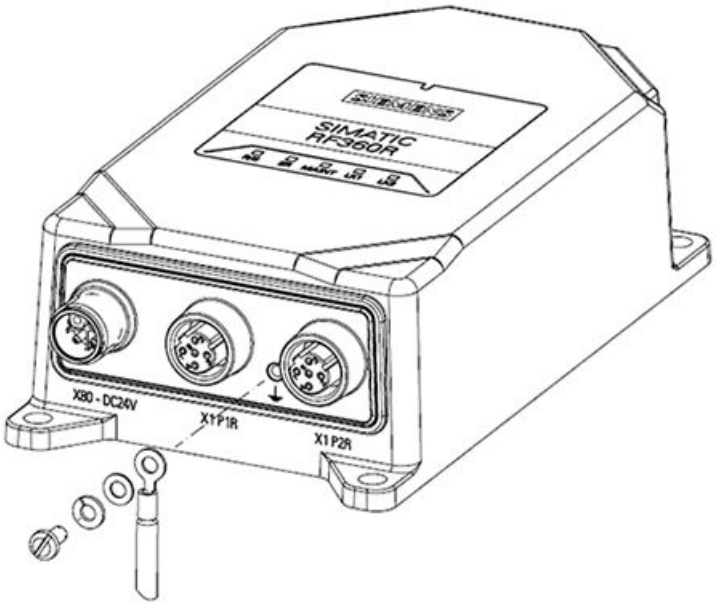


Figure 5-14 Connecting the grounding conductor

5.5.4 Connecting readers

Requirement

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

Required tools

When using preassembled cables, you need the following tool:

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

Note

Using preassembled cables

When connecting the supply voltage, we recommend the cables specified in the section "Ordering data (Page 498)" (4 x 1.5 mm^2 preassembled).

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

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

Accessories required

You need the following accessories:

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

You can find the associated article numbers in the section "Ordering data (Page 498)".

Connect the plug

Proceed as follows to connect the device:

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

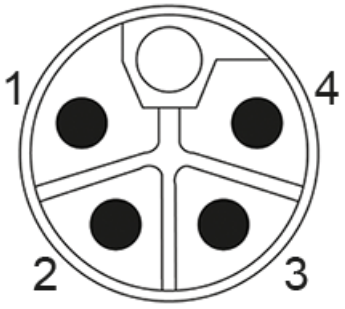
NOTICE
Ensuring the degree of protection You need to close all unused sockets with M12 sealing caps to ensure IP65 or IP67 degree of protection. You can find the order data of the sealing caps in the section "Ordering data (Page 498)".

NOTICE
Using only one PROFINET interface If only one PROFINET interface is required, it is essential to use the outer socket "X1 P2R" for reasons of interference immunity. Close the unused socket "X1 P1R" with a sealing cap.

5.5.5 Pin assignment of the interfaces

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

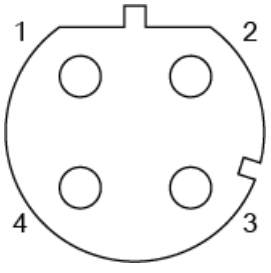
Table 5-19 Pin assignment power supply; M12 socket (4-pin, L-coded)

Pin	Assignment	View of M12 socket, 4-pin
1	24 V DC (brown)	
2	Unassigned (white)	
3	0 V DC (blue)	
4	Reset to factory (black) [1]	

[1] Observe the following note.

NOTICE
Only use pre-fabricated cables in connection with high-impedance loads When using pre-fabricated cables, ensure that the conductor (L2) that is or will be connected to pin 4 of the RF360R is only connected to high-impedance loads (> 22 Kilohm). If this cannot be ensured, the conductor may not be connected to pin 4 of the RF360R socket.

Table 5-20 Pin assignment PROFINET IO; M12 socket (4-pin, D-coded)

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

5.5.6 LED displays

Reader LED display

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

Table 5-21 Shows the operating states via the operation LED display

LEDs	Meaning
	The reader is turned off.
	The reader is turned on and is searching for transponders. The reader is in the "Setup" mode, in the "Search for transponders" status and has not yet received a "RESET" command and is not ready.
	There is a transponder in the antenna field. The reader is in the "Setup" mode, in the status "Show quality", has not yet received a "RESET" command and is not ready. Depending on the signal strength, the LED flickers or is lit permanently.
	The reader has received a "RESET" command.
	The reader is turned on, the antenna is turned off.
	• 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 can find more information on error messages in the section "System diagnostics (Page 461)".

Status LED display (including PROFINET/Ethernet LEDs)

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

Table 5-22 Shows the operating states via the status LED display

R/S	ER	MAINT	Meaning
			The reader is turned off.
			• LED test while the reader is starting up. • The reader is manually reset to factory settings. • A connected cable is defective.
			• No data exchange between the reader and user application takes place. The reader has not yet received a user command. • The connection to the user application has been closed.

R/S	ER	MAINT	Meaning
	--	--	Data exchange between the reader and user application takes place. The reader has received and executed a user command.
--	--		A firmware update is in progress.
--	--		The voltage at the reader is too low.
			• The flash test is performed for reader identification. At the same time, the LEDs of the reader and PROFINET/Ethernet LED display also flash. • The firmware is defective.
--		--	There is an error. You can find more information on error messages in the section "System diagnostics (Page 461)".

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

Table 5-23 Shows the PROFINET/Ethernet states via the PROFINET/Ethernet LED display

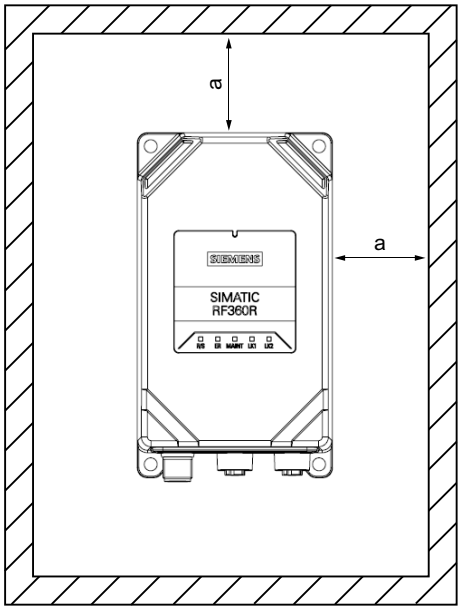
LK*	Meaning
	• No connection is available. • No cable has been connected.
	The flash test is performed for reader identification. At the same time, the LEDs of the operation and status LED display also flash.
	• LED test while the reader is starting up. • A connection is available.

5.5.7 Ensuring reliable data exchange

Note that the "center point" of the transponder must be in the area of the transmission window to ensure secure data exchange. You can find additional information on this in the section "Transmission window and read/write distance (Page 38)".

5.5.8 Metal-free area

The RF360R can be flush-mounted in metal. Note that mounting in metal leads to a slight reduction of the field data. To keep the reduction of the field data as low as possible, we recommend observing the minimum distance "a".

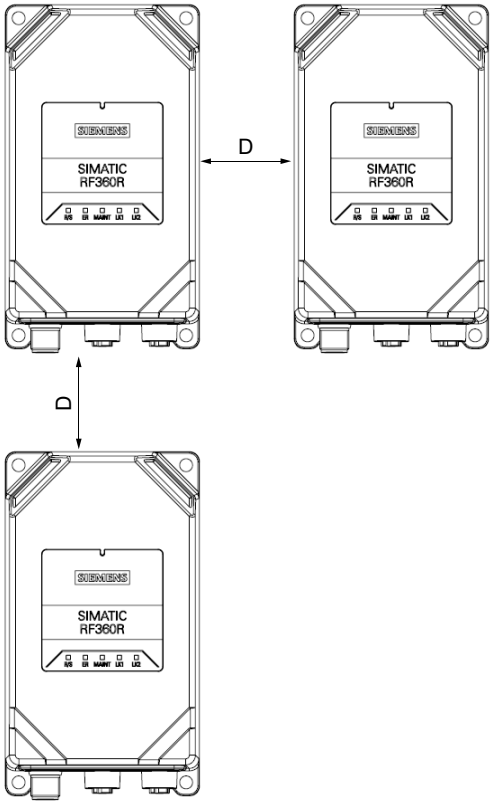


a ≥ 20 mm

Figure 5-15 Metal-free area for RF360R

5.5.9 Minimum distance between several RF360R readers

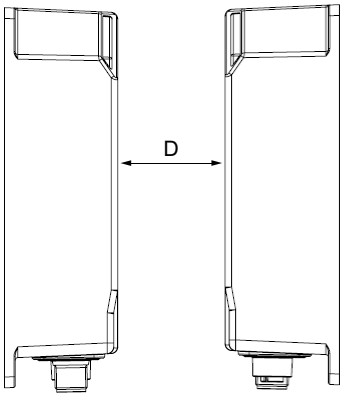
RF360R side-by-side



D ≥ ≥ 380 mm (with 2 readers)
≥ 500 mm (with more than 2 readers)

Figure 5-16 Minimum distance between several RF360R readers

RF360R face-to-face



D ≥ 500 mm

Figure 5-17 Face-to-face distance between two RF360R

5.5.10 Technical specifications

Table 5-24 Technical specifications of the RF360R reader

		6GT2801-5BA30
Product type designation	SIMATIC RF360R	
Radio frequencies		
Operating frequency, rated value	13.56 MHz	
Electrical data		
Output power (antenna input) [1]	≃ 0.4 W	
Maximum range	140 mm	
Maximum data transmission speed reader ↔ transponder	RF300 transponder	ISO transponder (MDS D)
• Read	• ≤ 8000 bytes/s	• ≤ 3300 bytes/s
• Write	• ≤ 8000 bytes/s	• ≤ 1700 bytes/s
Read/write distances of the reader	See section "Field data for transponders, readers and antennas (Page 47)"	
Interfaces		
Power supply	M12, 4-pin, D-coded	
Antenna	integrated	
Ethernet interface		

	6GT2801-5BA30
Connection type	PROFINET IO, EtherNet/IP, OPC UA, XML
Physical medium	Ethernet over 4-wire cable
Operating mode	100BaseX full duplex
Transmission speed	100 Mbps
Connector	2x M12 interface, 4-pin, D-coded
Max. cable length	100 m
Cable type	STP Cat 5
Autonegotation	Yes
Autocrossing	Yes
Switch function	Yes, internal
PROFINET RT	Yes
Vendor ID	0x002A
Device ID	0x0C09

Mechanical specifications	
Enclosure	
• Material	• Plastic PA 12
• Color	• TI-Grey
Recommended distance to metal	Mounting on metal permitted

Supply voltage, current consumption, power loss	
Supply voltage	24 VDC
Typical current consumption	150 mA

Permitted ambient conditions	
Ambient temperature	
• During operation	• 0 ... +55 °C
• During transportation and storage	• -40 ... +70 °C
Degree of protection according to EN 60529	IP67
Shock-resistant acc. to EN 60721-3-7, Class 7 M2	500 m/s^2
Vibration-resistant acc. to EN 60721-3-7, Class 7 M2	200 m/s^2
Torsion and bending load	Not permitted

Design, dimensions and weight	
Dimensions (L x W x H)	141 x 80 x 42 mm
Weight	410 g
Type of mounting	4 x M5 screws; 1.5 Nm
LED display design	
• Operation LED display	2 LEDs, 5 colors

	6GT2801-5BA30
• Status LED display	5 LEDs, 3 colors

Standards, specifications, approvals	
Proof of suitability	Radio according to RED and RER EN 300330, EN 301489, CE, FCC, UL/CSA (IEC 61010)
MTBF	65 years

[1] The output power of the readers at the antenna (antenna input) does not correspond to the transmit power or radiated power of the device.

5.5.11 Approvals

Declarations of Conformity

The Declaration of Conformity is available to all responsible authorities at:

Siemens AG
Digital Industries
Process Automation

DE-76181 Karlsruhe, Germany

EU Declaration of Conformity

Siemens AG hereby declares that the SIMATIC RF360R radio equipment types comply with the directives 2014/53/EU (RED) and 2011/65/EU (RoHS). The complete text of the EU Declarations of Conformity is available at the following Internet address:

Link (https://support.industry.siemens.com/cs/ww/en/ps/15914/cert)

UK Declaration of Conformity

Siemens AG hereby declares that the SIMATIC RF360R radio equipment types comply with the directives Radio Equipment Regulations 2017 (SI 2017/1206) and related amendments and RoHS Regulations 2012 (SI 2012/3032) and related amendments. The complete text of the UK Declarations of Conformity is available at the following Internet address:

Link (https://support.industry.siemens.com/cs/ww/en/ps/15914/cert)

FCC information

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

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

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

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

Caution

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

Note

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

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

IC information

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

(1) This device may not cause interference, and

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

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

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

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

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

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

- a) indoor use;
- b) altitude up to 2 000 m;
- c) temperature -0 °C to 55 °C;
- d) maximum relative humidity 80 % for temperature up to 31 °C decreasing linearly to 50 % relative humidity at 40 °C;
- e) TRANSIENT 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

ANATEL information

Este equipamento não tem direito à proteção contra interferência prejudicial e não pode causar interferência em sistemas devidamente autorizados. Para maiores informações, consulte o site da ANATEL – https://www.gov.br/anatel

NBTC notification

5.5.12 Dimension drawing

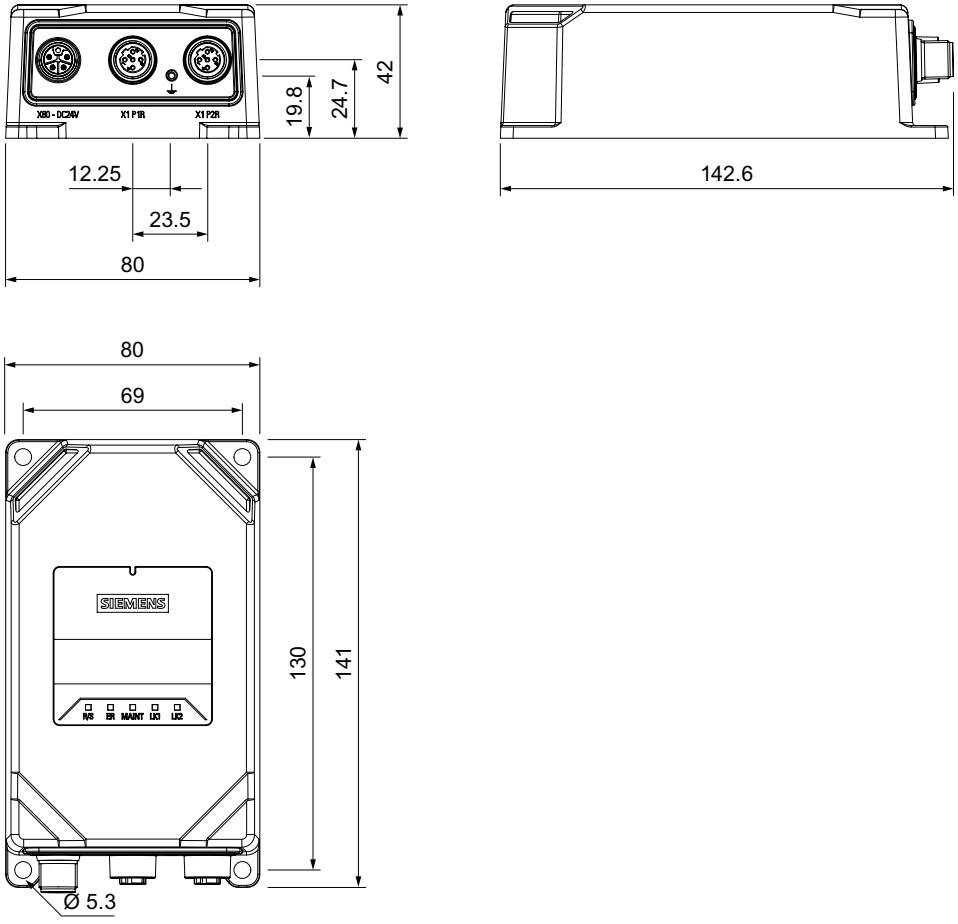
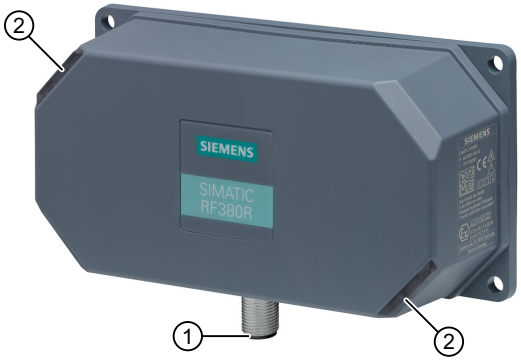


Figure 5-18 Dimension drawing RF360R

Dimensions in mm

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

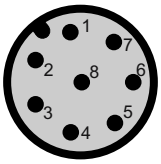
Table 5-25 RF380R ordering data

	Article number
RF380R with RS-232/RS-422 interface (3964R)	6GT2801-3BA10
RF380R with RS232/RS422 interface (3964R) and ATEX, IECEx, UL HAZ. LOC approval	6GT2801-3BA10-0AX2

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 two LEDs. The LEDs can adopt the colors white, green, red, yellow or blue and the statuses off, on, flashing:

Table 5-26 Display elements

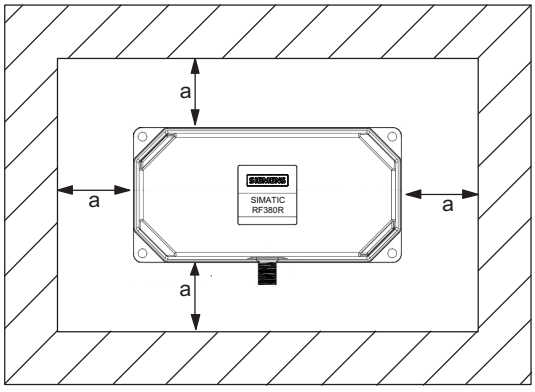
LED	Meaning
	The reader is turned off.
	The reader is turned on and is searching for transponders. The reader is in the "Setup" mode, in the "Search for transponders" status and has not yet received a "RESET" command and is not ready.
	There is a transponder in the antenna field. The reader is in the "Setup" mode, in the status "Show quality", has not yet received a "RESET" command and is not ready. Depending on the signal strength, the LED flickers or is lit permanently.
	The reader has received a "RESET" command.
	The reader is turned on, the antenna is turned off.
	• 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 461)".

5.6.5 Ensuring reliable data exchange

Note that the "center point" of the transponder must be in the area of the transmission window to ensure secure data exchange. You can find additional information on this in the section "Transmission window and read/write distance (Page 38)".

5.6.6 Metal-free area

The RF380R can be flush-mounted in metal. Note that mounting in metal leads to a slight reduction of the field data. To keep the reduction of the field data as low as possible, we recommend observing the minimum distance "a".

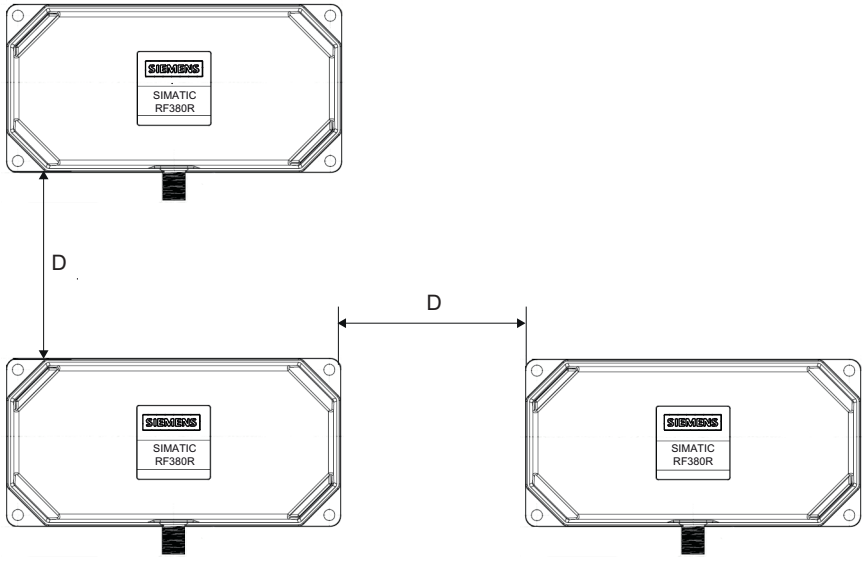


a ≥ 20 mm

Figure 5-19 Metal-free area for RF380R

5.6.7 Minimum distance between RF380R readers

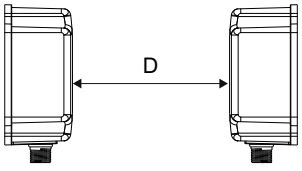
RF380R side by side



D ≥ 400 mm (with 2 readers)
≥ 500 mm (with more than 2 readers)

Figure 5-20 Minimum distance between several RF380R

RF380R face-to-face



D ≥ 800 mm

Figure 5-21 Face-to-face distance between two RF380R

5.6.8 Using the reader in hazardous area

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

NOTICE
Issued approvals for the device The specified approvals apply only when the corresponding mark is printed on the product. You can check which of the following approvals have been granted for your product by the markings on the type plate.

ATEX / UKEX

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

Document	Title
EN IEC 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	Hazardous areas Part 31: Equipment dust ignition protection by enclosure "t"

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

ATEX mark

The identification of the electrical equipment is:

II 3 G Ex ec IIB T4 Gc
II 3 D Ex tc IIIC T80 °C Dc

-25 °C < Ta < +70 °C
IP64
U_n = 24 V DC, 130 mA

The equipment also has the following additional information:

XXXYYYZZZ	[= serial number, is assigned during production]
DEMKO 17 ATEX 1767 X	[= certificate number]

UKEX marking

The identification of the electrical equipment is:

II 3 G Ex ec IIB T4 Gc
II 3 D Ex tc IIIC T80 °C Dc

-25 °C < Ta < +70 °C

IP64
U_n = 24 V DC, 130 mA

The equipment also has the following additional information:

XXXYYYZZZ	[= serial number, is assigned during production]
UL21UKEX2054X	[= certificate number]

CCC-Ex

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

Document	Title
GB 3836.1	Hazardous areas Part 1: Equipment - General requirements
GB 3836.8	Hazardous areas Part 8: Equipment protection by type of protection "n"
GB 12476.1	Hazardous areas Part 1: Equipment dust ignition protection - General requirements
GB 12476.5	Hazardous areas Part 5: Equipment dust ignition protection - Protection by enclosure "tD"

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

CCC Ex marking

The identification of the electrical equipment is:

Ex nA IIB T4 Gc (not marked on device)
Ex tD A22 IP64 T80 °C (not marked on device)

-25 °C < Ta < +70 °C
IP64
U_n = 24 V DC, 130 mA

The equipment also has the following additional information:

XXXYYYZZZ	[= serial number, is assigned during production]

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	Hazardous areas 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

The identification of the electrical equipment is:

Ex ec IIB T4 Gc
Ex tc IIIC T80 °C Dc
-25 °C < Ta < +70 °C
IP64
U_n= 24 V DC, 130 mA

The equipment also has the following additional information:

XXXYYYZZZ [= serial number, is assigned during production]
IECEx ULD 17.0012 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	Hazardous areas 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

The identification of the electrical equipment is:

LISTED 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 Gc, Ex ec IIB T4 Gc X
AEx tc IIIC T80 °C Dc, Ex tc IIIC T80 °C Dc X

-25 °C < Tamb. < +70 °C

IP64

U_n= 24 V DC, 130 mA

The equipment also has the following additional information:

XXXYYYZZZ [= serial number, is assigned during production]

5.6.8.1 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 °C < Ta < +70 °C	T4

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.

5.6.8.2 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.

5.6.8.3 Installation and operating conditions for hazardous areas:

NOTICE

Risk of explosion

Risk of explosion of dust-air mixtures or gas-air mixtures. Observe the following conditions when installing and operating the device in a hazardous area in order to avoid a risk of explosion and damage to the device:

- 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 should only be cleaned with a damp cloth.
- The device must be set up and installed in such a way 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 removing the connections (antenna cable, signal/supply cable), the connectors must be checked for contamination and, if necessary, cleaned before being inserted again.

5.6.8.4 Extended installation and operating conditions for hazardous areas for applications according to UL Hazardous Location (USA and Canada)

In addition to the instructions listed in ordinary locations File E85972-D1005.

For Div. 2:

This equipment is suitable for use in Class I, Division 2, Groups C and D in HAZARDOUS LOCATIONS, OR NON-HAZARDOUS LOCATIONS ONLY.

⚠ **WARNING**
WARNING EXPLOSION HAZARD - DO NOT DISCONNECT EQUIPMENT WHILE THE CIRCUIT IS LIVE OR UNLESS THE AREA IS KNOWN TO BE FREE OF IGNITABLE CONCENTRATIONS.

These devices are open-type devices that are to be installed in an enclosure suitable for the environment.

For Zone 2 only:

This equipment is suitable for use in Class I, Division 2, Groups C and D, Class II Groups F and G, OR Zone 2, Group IIB, OR Zone 22, Group IIIC in HAZARDOUS LOCATIONS, OR non-hazardous locations only.

⚠ **WARNING**
WARNING EXPLOSION HAZARD - DO NOT DISCONNECT EQUIPMENT WHILE THE CIRCUIT IS LIVE OR UNLESS THE AREA IS KNOWN TO BE FREE OF IGNITABLE CONCENTRATIONS.

⚠ **WARNING**
WARNING WARNING – POTENTIAL ELECTROSTATIC CHARGING HAZARD.

All models must be mounted in an enclosure with a minimum ingress protection rating of at least IP54 and must be Class I, Zone 2 certified, and used in an environment of not more than pollution degree 2.

The device may only be operated so that there is adequate protection against ultraviolet light.

The device must not be operated in areas influenced by charge-producing processes.

The device must be set up and installed so that it is mechanically protected.

After disconnecting connections (signal/supply cable), before the connectors are plugged in again, the connectors must be checked for contamination and, if necessary, cleaned.

5.6.9 Technical specifications

Table 5-27 Technical specifications of the RF380R reader

		6GT2801-3BA10	
		6GT2801-3BA10-0AX2	
Product type designation	SIMATIC RF380R		
Radio frequencies			
Operating frequency, rated value	13.56 MHz		
Electrical data			
Output power (antenna input) [1]	≃ 0.6 W		
Maximum range	230 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 47)"		
Interfaces			
Electrical connector design	M12, 8-pin		
Standard for interfaces for communication	RS232/RS422 (3964R protocol)		
Antenna	integrated		
Mechanical specifications			
Enclosure			
• Material	• Plastic PA 12		
• Color	• Anthracite		
Recommended distance to metal	Mounting on metal permitted		
Supply voltage, current consumption, power loss			
Supply voltage	24 VDC		
Typical current consumption	130 mA		
Permitted ambient conditions			
Ambient temperature			
• During operation	• -25 ... +70 °C		
• During transportation and storage	• -40 ... +85 °C		

	6GT2801-3BA10 6GT2801-3BA10-0AX2
Degree of protection according to EN 60529	IP67
Shock-resistant acc. to EN 60721-3-7, Class 7 M2	500 m/s²
Vibration-resistant acc. to EN 60721-3-7, Class 7 M2	200 m/s²
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, maximum	• RS422: 1000 m (depending on the transmission speed) • RS232: 30 m
LED display design	2 LEDs, 5 colors
Standards, specifications, approvals	
Proof of suitability	Radio according to RED and RER EN 300330, EN 301489, CE, FCC, UL/CSA, Ex: II 3G Ex nC IIB T4 (only 6GT2801-3BA10-0AX2)
MTBF	172.6 years

[1] The output power of the readers at the antenna (antenna input) does not correspond to the transmit power or radiated power of the device.

5.6.10 Approvals

Declarations of Conformity

The Declaration of Conformity is available to all responsible authorities at:

Siemens AG
Digital Industries
Process Automation

DE-76181 Karlsruhe, Germany

EU Declaration of Conformity

Siemens AG hereby declares that the SIMATIC RF380R radio equipment types comply with the directives 2014/53/EU (RED) and 2011/65/EU (RoHS). In addition, the device variant with the article number "6GT2801-3BA10-0AX2" complies with the directive 2014/34/EU (ATEX). The complete text of the EU Declarations of Conformity is available at the following Internet address:

Link (https://support.industry.siemens.com/cs/ww/en/ps/15914/cert)

UK Declaration of Conformity

Siemens AG hereby declares that the SIMATIC RF380R radio equipment types comply with the directives Radio Equipment Regulations 2017 (SI 2017/1206) and related amendments and RoHS Regulations 2012 (SI 2012/3032) and related amendments. In addition, the device variant with the article number "6GT2801-3BA10-0AX2" complies with the UKEX Regulations (SI 2016/1107) and related amendments. The complete text of the UK Declarations of Conformity is available at the following Internet address:

Link (https://support.industry.siemens.com/cs/ww/en/ps/15914/cert)

FCC information

Siemens SIMATIC RF380R (MLFB 6GT2801-3BA10); FCC ID NXW-RF380R02

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

5.6.11 Dimension drawing

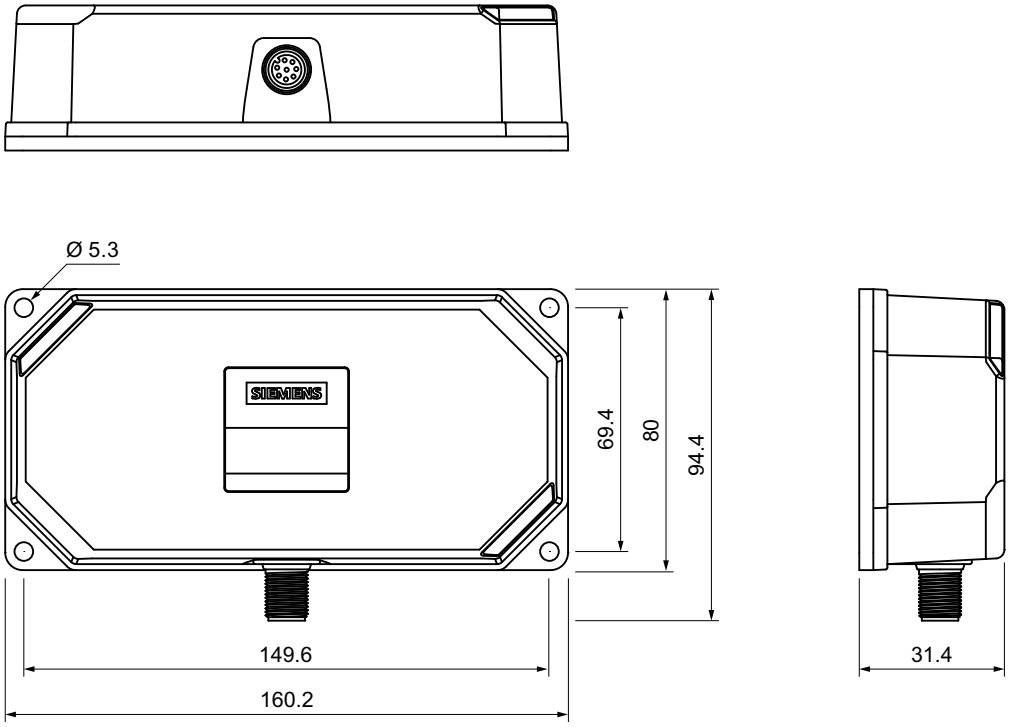


Figure 5-22 Dimension drawing RF380R

Dimensions in mm

5.7 SIMATIC RF382R with Scanmode - 1st generation

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

5.7.1 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

5.7.2 RF382R with Scanmode ordering data

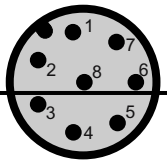
Table 5-28 RF382R Scanmode ordering data

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

5.7.3 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 108)") 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 Device end 8-pin M12	Assignment	
		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 the LEDs. The LED can adopt the colors green, red or yellow and the statuses off, on, flashing:

Table 5-30 LED operating display on the reader

LED	Meaning
	The reader is turned off.
	The reader is switched on and ready for operation.
	There is a transponder in the antenna field.
	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 461)".

5.7.5 Ensuring reliable data exchange

Note that the "center point" of the transponder must be in the area of the transmission window to ensure secure data exchange. You can find additional information on this in the section "Transmission window and read/write distance (Page 38)".

5.7.6 Mounting on metal

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

5.7.7 Minimum distance between several RF382R Scanmode readers

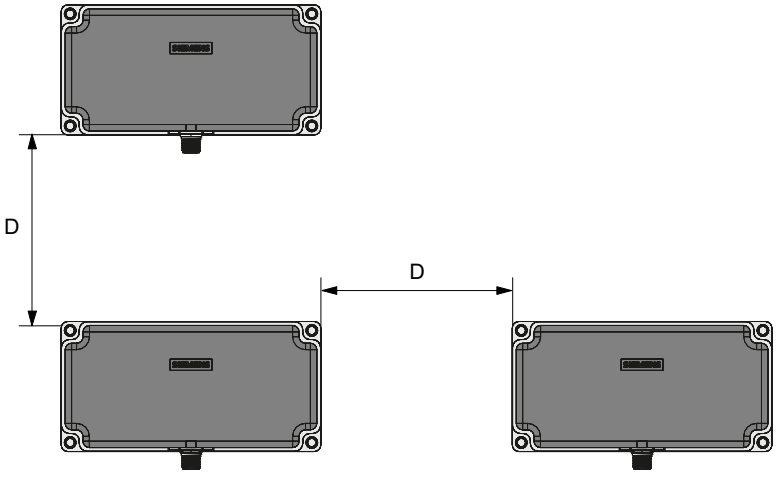


Figure 5-23 Minimum distance between several RF382R Scanmode readers

Minimum distance D from RF382R to RF382R	D ≥ 200 mm

5.7.8 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.

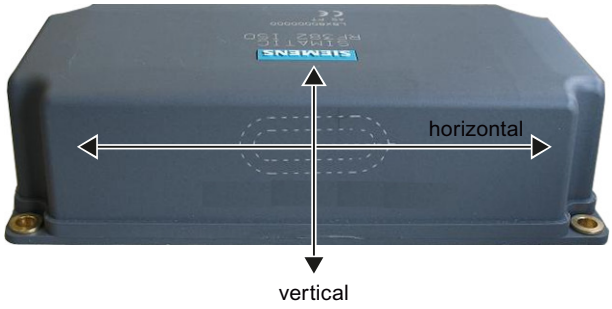


Figure 5-24 Definition of horizontal and vertical reader field

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 5-25 Line of maximum magnetic field strength

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

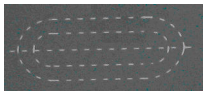


Figure 5-26 Laser labeling

Transmission window horizontal field

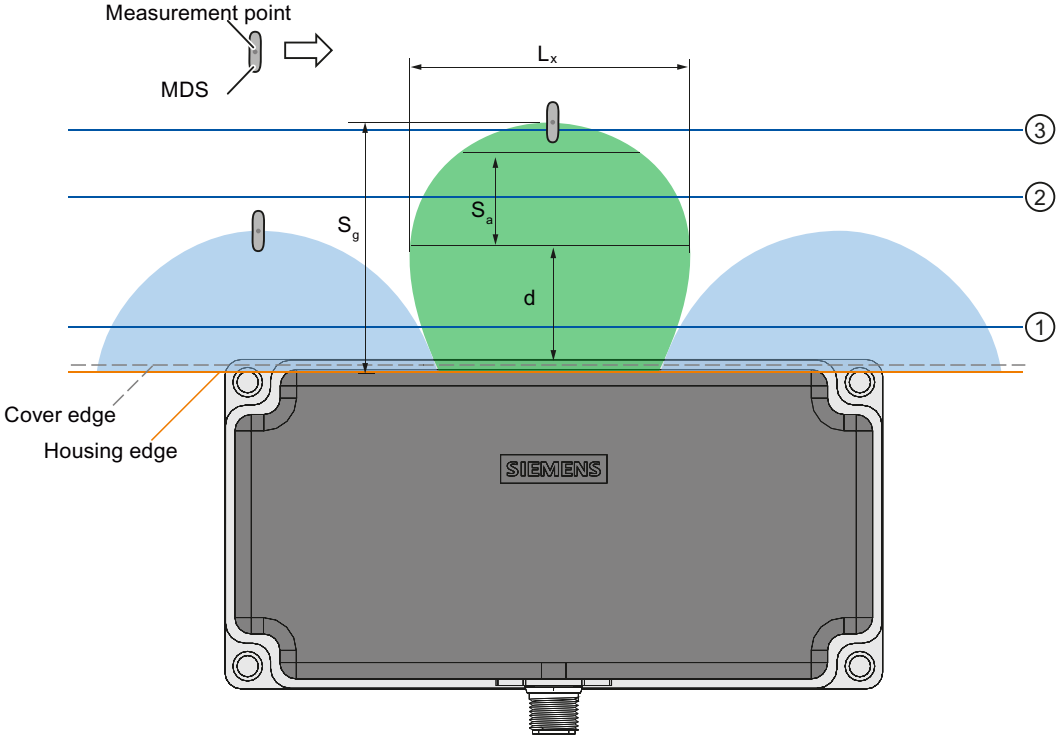


Figure 5-27 Distance definition horizontal field

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

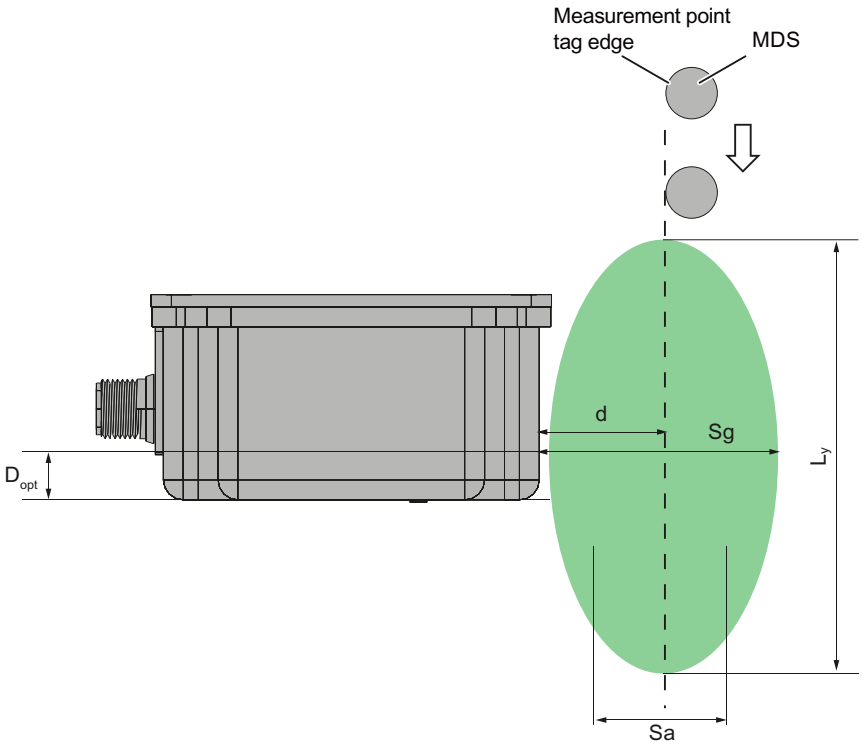


Figure 5-28 Distance definition vertical field

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

5.7.9 Technical specifications

Table 5-31 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	

	6GT2801-3AB20-0AX0
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 47)"
Interfaces	
Electrical connector design	M12, 8-pin
Standard for interfaces for communication	RS232 (factory setting, can be changed to RS422)
Antenna	integrated
Mechanical specifications	
Enclosure	
• Material	• Plastic PA 12
• Color	• Anthracite
Recommended distance to metal	Mounting on metal permitted
Supply voltage, current consumption, power loss	
Supply voltage	24 VDC
Typical current consumption	140 mA
Permitted ambient conditions	
Ambient temperature	
• During operation	• -25 ... +70 °C
• During transportation and storage	• -40 ... +85 °C
Degree of protection according to EN 60529	IP67
Shock-resistant acc. to EN 60721-3-7, Class 7 M2	500 m/s^2
Vibration-resistant acc. to EN 60721-3-7, Class 7 M2	200 m/s^2
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, maximum	• RS422: 1000 m (depending on the transmission speed) • RS232: 30 m
LED display design	3-color LED

	6GT2801-3AB20-0AX0
Standards, specifications, approvals	
Proof of suitability	Radio according to RED and RER EN 300330, EN 301489, CE, FCC, UL/CSA
MTBF	115 years

5.7.10 Approvals

Declarations of Conformity

The Declaration of Conformity is available to all responsible authorities at:

Siemens AG
Digital Industries
Process Automation

DE-76181 Karlsruhe, Germany

EU Declaration of Conformity

Siemens AG hereby declares that the SIMATIC RF382R radio equipment types comply with the directives 2014/53/EU (RED) and 2011/65/EU (RoHS). The complete text of the EU Declarations of Conformity is available at the following Internet address:

Link (https://support.industry.siemens.com/cs/ww/en/ps/15914/cert)

UK Declaration of Conformity

Siemens AG hereby declares that the SIMATIC RF382R radio equipment types comply with the directives Radio Equipment Regulations 2017 (SI 2017/1206) and related amendments and RoHS Regulations 2012 (SI 2012/3032) and related amendments. The complete text of the UK Declarations of Conformity is available at the following Internet address:

Link (https://support.industry.siemens.com/cs/ww/en/ps/15914/cert)

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)

5.7.11 Dimensional diagram

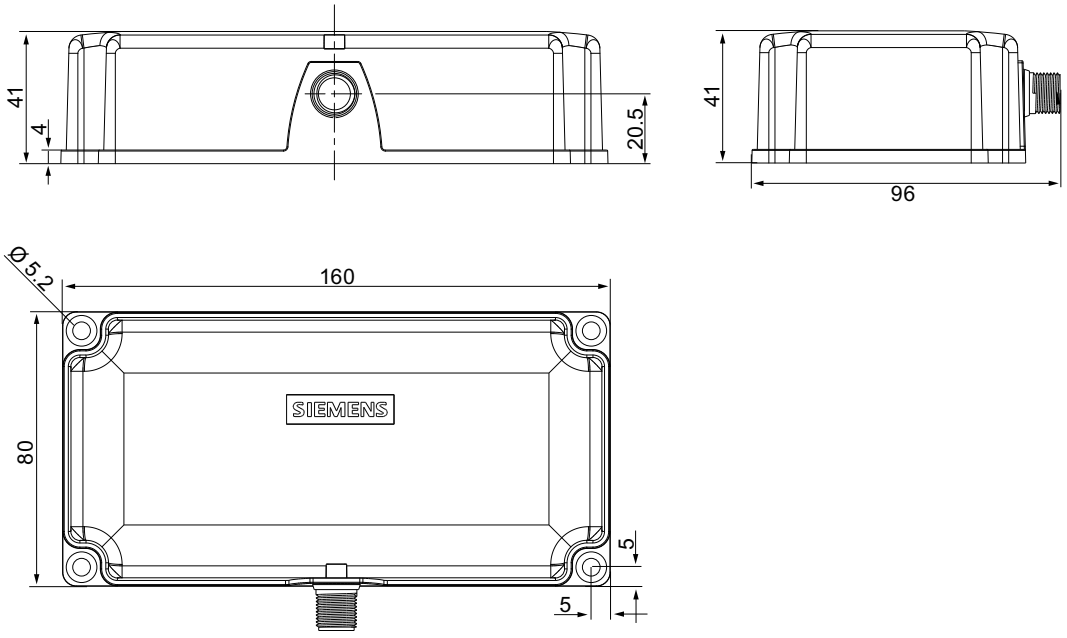


Figure 5-29 Dimension drawing

Antennas

6

Note

The readers RF350R and RF350M require external antennas.

Note that the readers RF350R and RF350M are designed for operation with external antennas.

6.1 ANT 1

6.1.1 Characteristics

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 plugged in.

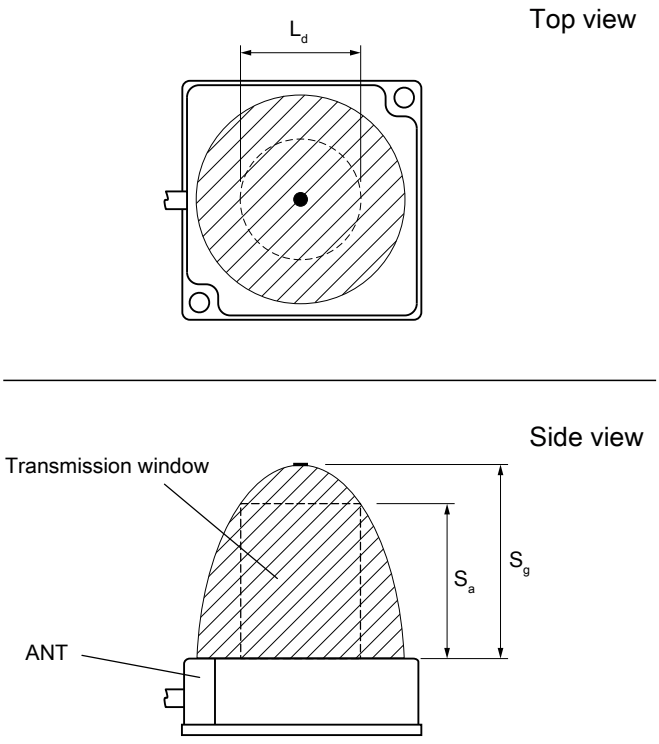
ANT 1	Characteristics	
	Area of application	Small assembly lines
	Read/write distance	up to 140 mm (depending on the transponder)
	Connecting cable	3 m (integrated antenna cable)
	Connectable readers	RF350R and RF350M:
	Degree of protection	IP67

6.1.2 Ordering data

Table 6-1 Ordering data ANT 1

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

6.1.3 Transmission window



L_d Length of the transmission window

S_a Operating distance between antenna and transponder

S_g Limit distance
(limit distance is the maximum clear distance between the upper surface of the antenna and the transponder at which the transmission can still function under normal conditions).

Figure 6-1 Transmission window ANT 1

Please note that the figure is an example representation. The values for L_d, S_a and S_g depend on the transponder type used and vary accordingly. You can find detailed information on this in the section "Field data for transponders, readers and antennas (Page 47)".

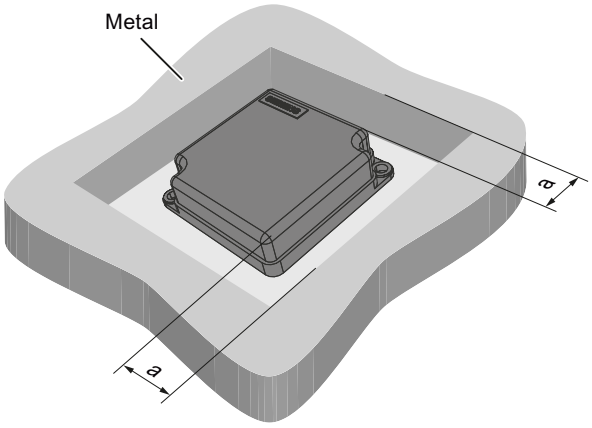
6.1.4 Flush-mounted in metal

The antenna ANT 1 can be flush-mounted in metal. Allow for a possible reduction in the field data. During installation, maintain the minimum distance a flush with the metal.

Note

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

At a value lower than a, the field data changes significantly, resulting in a reduction in the limit distance and operating distance. Therefore, maintain the minimum distance a flush with the metal during installation.



a = 40 mm

Figure 6-2 ANT 1 flush-mounted in metal

6.1.5 Minimum clearances

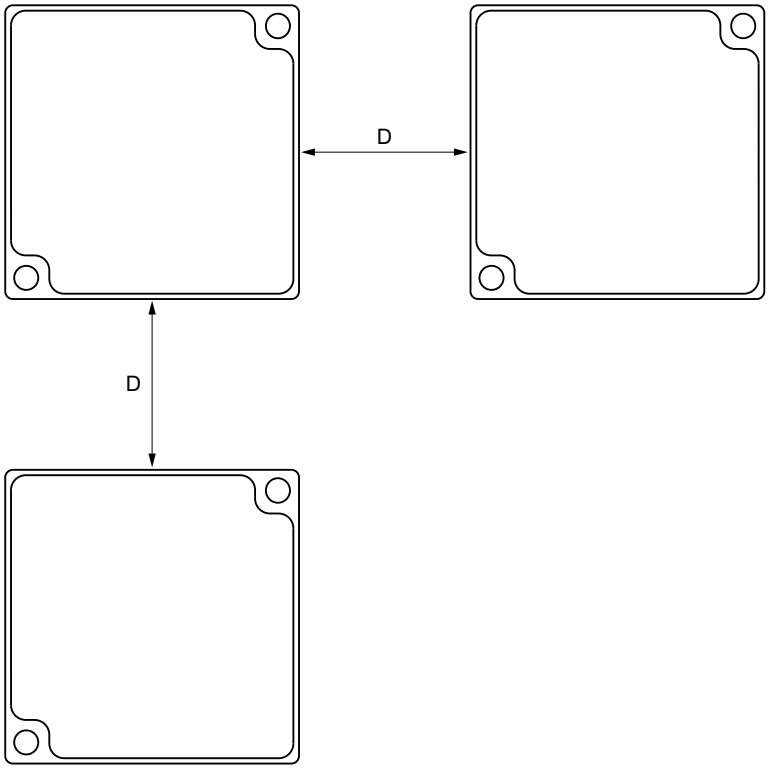
Note

Extension of the data transmission time if distance values are undershot

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

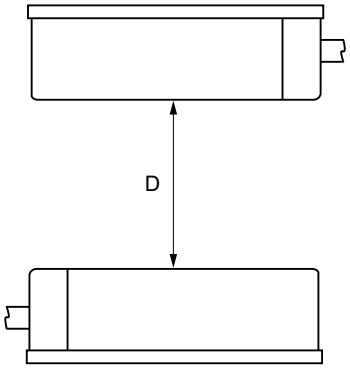
For this reason, please observe the values in the tables.

Minimum distances from antenna to antenna



D ≥ 300 mm

Figure 6-3 Minimum distance ANT 1



D ≥ 500 mm

Figure 6-4 Face-to-face minimum distance between two ANT 1

6.1.6 Technical specifications

		6GT2398-1CB00
Product type designation	ANT 1	
Electrical data		
Maximum write/read distance ANT ↔ Transponder (S_g)	140 mm	
Interfaces		
Plug connection	M8, 4-pin (male)	
Mechanical specifications		
Enclosure		
• Material	• Plastic PA 12	
• Color	• Anthracite	
Permitted ambient conditions		
Ambient temperature		
• During operation	• -25 ... +70 °C	
• During transportation and storage	• -40 ... +85 °C	
Degree of protection according to EN 60529	IP67	
Shock-resistant according to EN 60721-3-7 Class 7 M2 [1]	500 m/s^2	
Vibration-resistant according to EN 60721-3-7 Class 7 M2 [1]	200 m/s^2	
Design, dimensions and weight		
Dimensions (L × W × H)	75 x 75 x 20 mm	
Weight	225 g	
Type of mounting	2x screws; M5	
Cable length	3 m (plug-in antenna cable)	
Standards, specifications, approvals		
MTBF	4700 years	

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

6.1.7 Dimension drawing

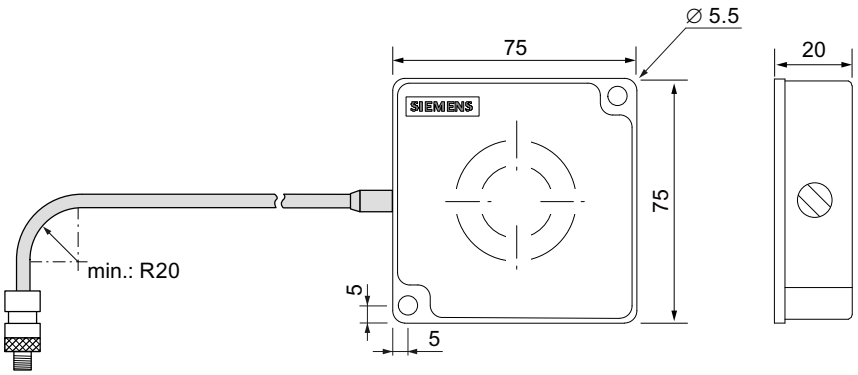


Figure 6-5 Dimensional drawing of ANT 1 (all values in mm)

6.2 ANT 3

6.2.1 Characteristics

The ANT 3 is designed for use in small assembly lines. The extremely compact design of the antenna allows extremely accurate positioning. The tuning of the ANT 3 antenna is optimized for mounting on metal. The antenna cable can be plugged in.

ANT 3	Characteristics	
	Area of application	Small assembly lines
	Read/write distance	up to 50 mm (depending on the transponder)
	Connecting cable	3 m (plug-in antenna cable)
	Connectable readers	RF350R and RF350M:
	Degree of protection	IP67

6.2.2 Ordering data

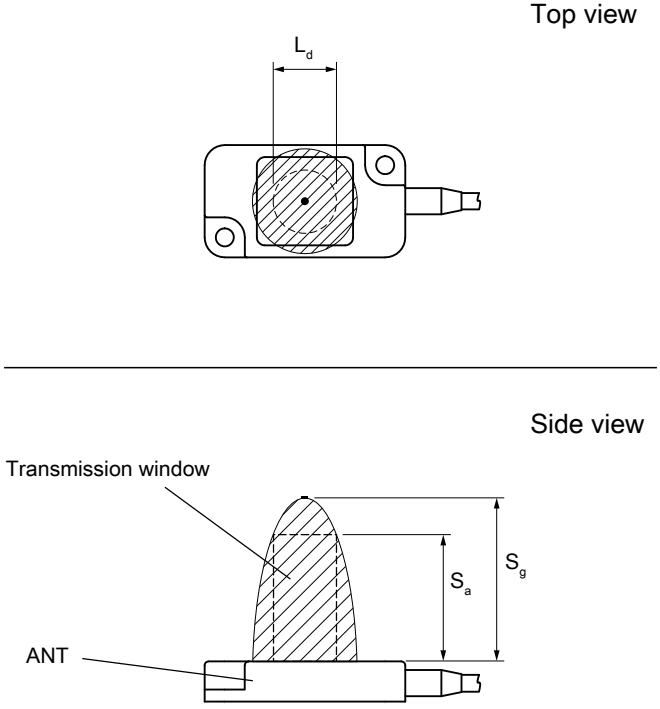
Table 6-2 Ordering data ANT 3

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

Table 6-3 Ordering data ANT 3 accessories

Accessories	Article number
Antenna connecting cable drag-capable, 3 m	6GT2391-0AH30

6.2.3 Transmission window



L_d Length of the transmission window

S_a Operating distance between antenna and transponder

S_g Limit distance
(limit distance is the maximum clear distance between the upper surface of the antenna and the transponder at which the transmission can still function under normal conditions).

Figure 6-6 Transmission window ANT 3

Please note that the figure is an example representation. The values for L_d, S_a and S_g depend on the transponder type used and vary accordingly. You can find detailed information on this in the section "Field data for transponders, readers and antennas (Page 47)".

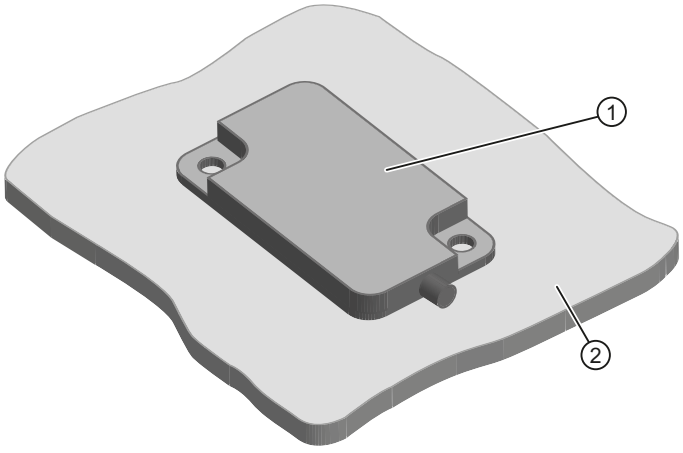
6.2.4 Mounting on/in metal

The antenna ANT 3 can be flush-mounted in metal. Allow for a possible reduction in the field data. During installation, maintain the minimum distance a on/flush with the metal.

Note

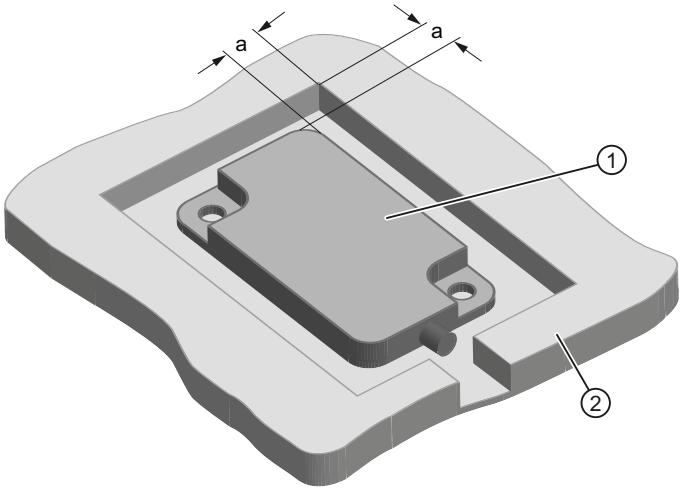
Reduction of range if the metal-free space is not maintained

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



① ANT 3
② Metal

Figure 6-7 ANT 3 mounted on metal



① ANT 3
② Metal
a = 10 mm

Figure 6-8 ANT 3 flush-mounted in metal

6.2.5 Minimum clearances

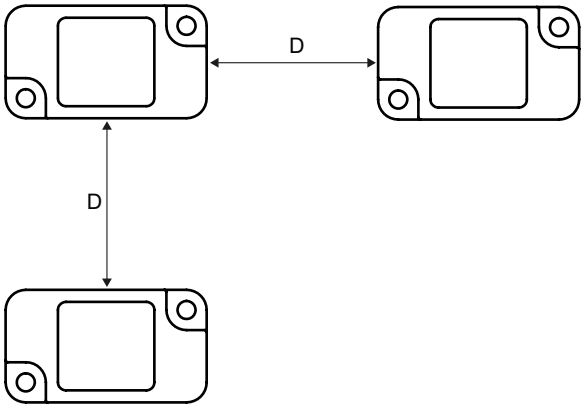
Note

Extension of the data transmission time if distance values are undershot

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

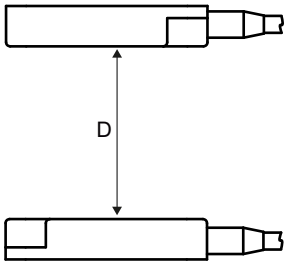
For this reason, please observe the values in the tables.

Minimum distances from antenna to antenna



D ≥ 150 mm

Figure 6-9 Minimum distance for ANT 3



D ≥ 200 mm

Figure 6-10 Face-to-face distance between two ANT 3

6.2.6 Technical specifications

		6GT2398-1CD30-0AX0 6GT2398-1CD40-0AX0
Product type designation	ANT 3	
Electrical data		
Maximum write/read distance ANT ↔ Transponder (S_g)	50 mm	
Interfaces		
Plug connection	M8, 4-pin (female)	
Mechanical specifications		
Enclosure		
• Material	• Plastic PA6-V0	
• Color	• Black	

		6GT2398-1CD30-0AX0 **6GT2398-1CD40-0AX0**
Permitted ambient conditions		
Ambient temperature		
• During operation	• -25 ... +70 °C	
• During transportation and storage	• -40 ... +85 °C	
Degree of protection according to EN 60529	IP67	
Shock-resistant according to EN 60721-3-7 Class 7 M2 [1]	500 m/s²	
Vibration-resistant according to EN 60721-3-7 Class 7 M2 [1]	200 m/s²	
Design, dimensions and weight		
Dimensions (L × W × H)		
• Housing without antenna connector	• 50 × 28 × 10 mm	
• Housing with antenna connector	• 240 × 28 × 10 mm	
Weight		
• Housing with antenna connector	• Approx. 35 g	
• Housing with antenna connector and antenna cable	• Approx. 160 g	
Type of mounting	2x screws; M4	
Cable length	3 m (plug-in antenna cable)	
Standards, specifications, approvals		
MTBF	13698 years	

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

6.2.7 Dimension drawing

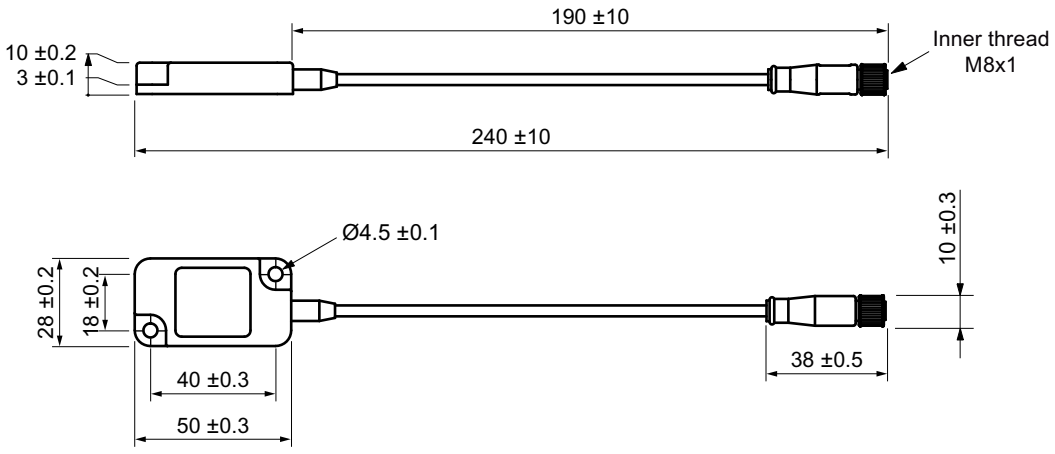


Figure 6-11 Dimension drawing ANT 3 (all values in mm)

6.3 ANT 3S

6.3.1 Characteristics

Due to its slimline and compact design, the ANT 3S can still be precisely positioned in cramped conditions. Areas of application are, for example, tool identification. The antenna cable can be plugged in.

ANT 3S	Characteristics	
	Area of application	Small assembly lines
	Read/write distance	up to 4 mm (depending on the transponder)
	Connecting cable	3 m (plug-in antenna cable)
	Connectable readers	RF350R and RF350M:
	Degree of protection	IP67

6.3.2 Ordering data

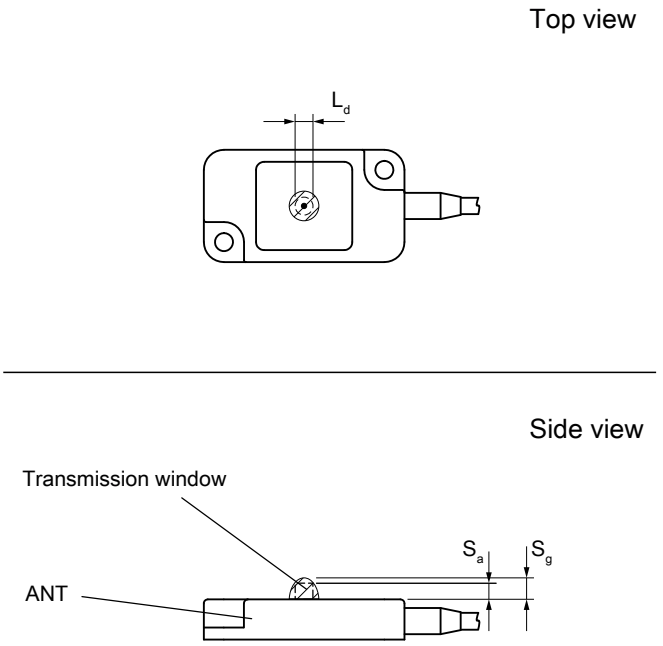
Table 6-4 Ordering data ANT 3S

Antenna	Article number
ANT 3S (without antenna connecting cable)	6GT2398-1CD50-0AX0
ANT 3S (incl. one plug-in antenna connecting cable 3 m)	6GT2398-1CD60-0AX0

Table 6-5 Ordering data ANT 3S accessories

Accessories	Article number
Antenna connecting cable drag-capable, 3 m	6GT2391-0AH30

6.3.3 Transmission window



L_d Length of the transmission window

S_a Operating distance between antenna and transponder

S_g Limit distance
(limit distance is the maximum clear distance between the upper surface of the antenna and the transponder at which the transmission can still function under normal conditions).

Figure 6-12 Transmission window ANT 3S

Please note that the figure is an example representation. The values for L_d, S_a and S_g depend on the transponder type used and vary accordingly. You can find detailed information on this in the section "Field data for transponders, readers and antennas (Page 47)".

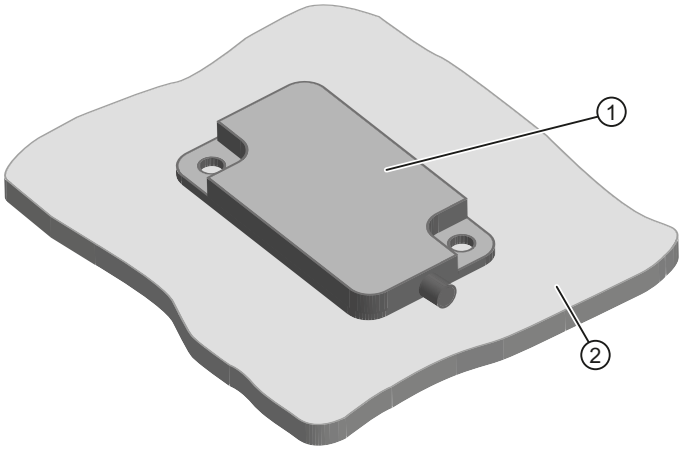
6.3.4 Mounting on/in metal

The antenna ANT 3S can be flush-mounted in metal. Allow for a possible reduction in the field data. During installation, maintain the minimum distance a on/flush with the metal.

Note

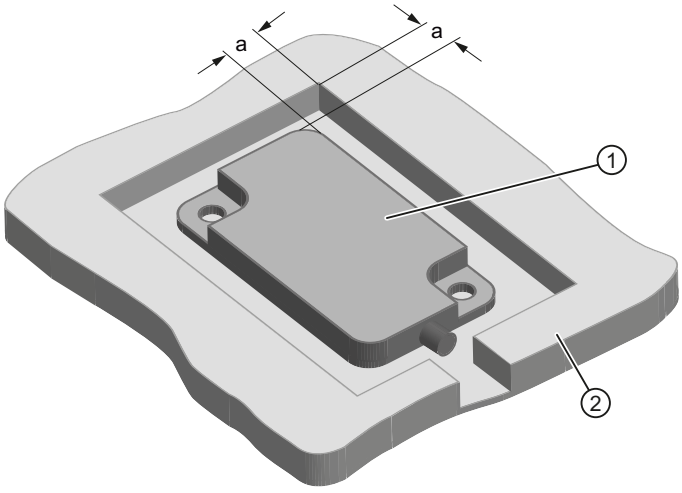
Reduction of range if the metal-free space is not maintained

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



① ANT 3S
② Metal

Figure 6-13 ANT 3S mounted on metal



① ANT 3S
② Metal
a = 10 mm

Figure 6-14 ANT 3S flush-mounted in metal

6.3.5 Minimum clearances

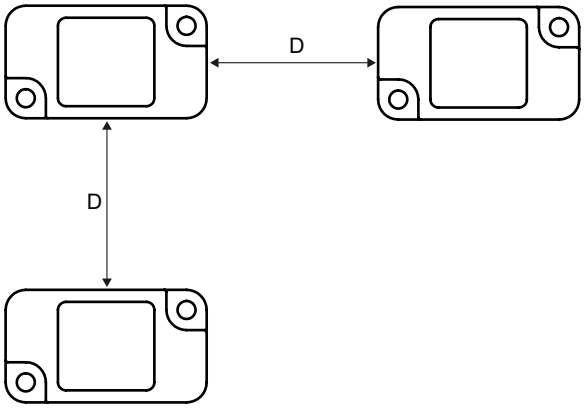
Note

Extension of the data transmission time if distance values are undershot

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

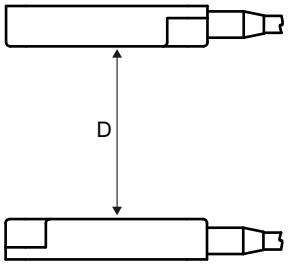
For this reason, please observe the values in the tables.

Minimum distances from antenna to antenna



D ≥ 20 mm

Figure 6-15 Minimum distance ANT 3S



D ≥ 50 mm

Figure 6-16 Face-to-face minimum distance between two ANT 3S

6.3.6 Technical specifications

	6GT2398-1CD60-0AX0 6GT2398-1CD50-0AX0
Product type designation	ANT 3S
Electrical data	
Maximum write/read distance ANT ↔ Transponder (Sg)	5 mm
Interfaces	
Plug connection	M8, 4-pin (female)
Mechanical specifications	
Enclosure	
• Material	• Plastic PA6-V0
• Color	• Black
Permitted ambient conditions	
Ambient temperature	
• During operation	• -25 ... +70 °C
• During transportation and storage	• -40 ... +85 °C
Degree of protection according to EN 60529	IP67
Shock-resistant according to EN 60721-3-7 Class 7 M2 [1)]	500 m/s^2
Vibration-resistant according to EN 60721-3-7 Class 7 M2 [1)]	200 m/s^2
Design, dimensions and weight	
Dimensions (L × W × H)	
• Housing without antenna connector	• 50 × 28 × 10 mm
• Housing with antenna connector	• 240 × 28 × 10 mm
Weight	
• Housing with antenna connector	• Approx. 35 g
• Housing with antenna connector and antenna cable	• Approx. 160 g
Type of mounting	2x screws; M4
Cable length	3 m (plug-in antenna cable)
Standards, specifications, approvals	
MTBF	13698 years

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

6.3.7 Dimension drawing

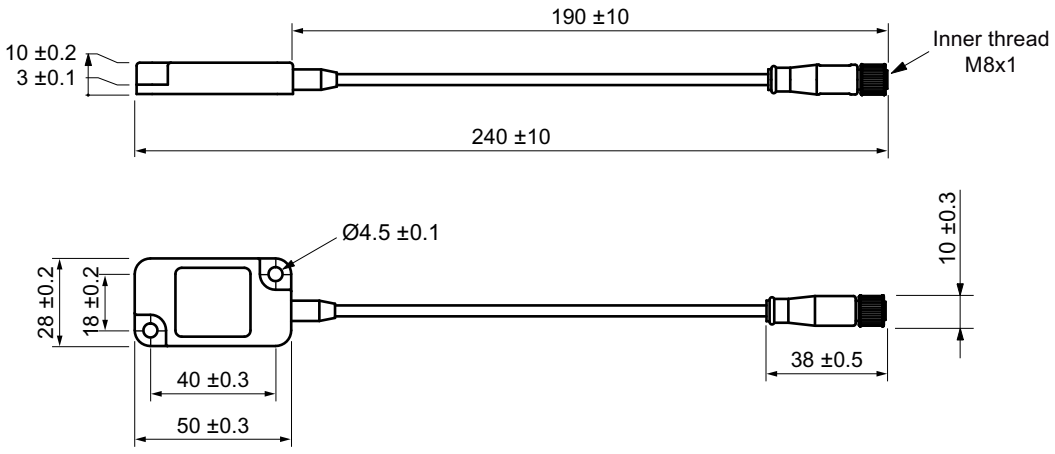


Figure 6-17 Dimension drawing ANT 3S (all values in mm)

6.4 ANT 8

6.4.1 Characteristics

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 ANT 8 antenna is currently only tested and approved for use in conjunction with the RF350M mobile reader and the RF350R reader (2nd generation).

ANT 8	Characteristics	
	Area of application	Tool identification
	Read/write distance	up to 4 mm (depending on the transponder)
	Connecting cable	3 m
	Connectable readers	RF350R and RF350M:
	Degree of protection	IP67

6.4.2 Ordering data

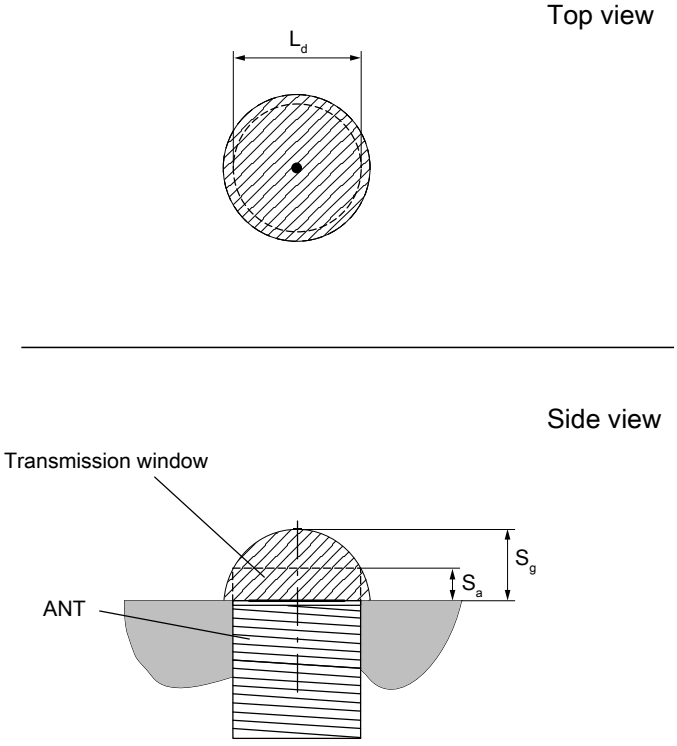
Table 6-6 Ordering data ANT 8

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

Table 6-7 Ordering data ANT 8 accessories

Accessories	Article number
Antenna connecting cable drag-capable, 3 m	6GT2391-0AH30

6.4.3 Transmission window



L_d Length of the transmission window

S_a Operating distance between antenna and transponder

S_g Limit distance
(limit distance is the maximum clear distance between the upper surface of the antenna and the transponder at which the transmission can still function under normal conditions).

Figure 6-18 Transmission window ANT 8

Please note that the figure is an example representation. The values for L_d, S_a and S_g depend on the transponder type used and vary accordingly. You can find detailed information on this in the section "Field data for transponders, readers and antennas (Page 47)".

6.4.4 Flush-mounted in metal

The antenna ANT 8 can be flush-mounted in metal. Allow for a possible reduction in the field data.

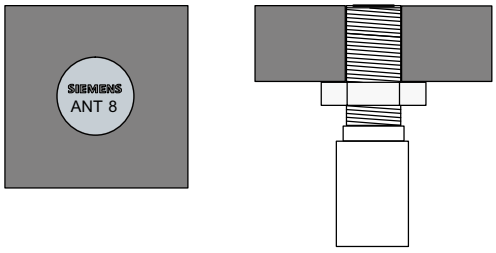


Figure 6-19 ANT 8 flush-mounted in metal

6.4.5 Minimum clearances

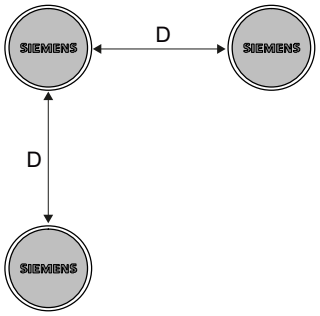
Note

Extension of the data transmission time if distance values are undershot

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

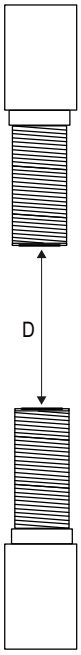
For this reason, please observe the values in the tables.

Minimum distances from antenna to antenna



D ≥ 50 mm

Figure 6-20 Minimum distance for ANT 8



D ≥ 50 mm

Figure 6-21 Face-to-face minimum distance between two ANT 8

6.4.6 Technical specifications

		6GT2398-1CF10 6GT2398-1CF00
Product type designation	ANT 8	
Electrical data		
Maximum write/read distance ANT ↔ Transponder (S_g).	5 mm	
Interfaces		
Plug connection	M8, 4-pin (male)	
Mechanical specifications		
Enclosure		
• Material	• Stainless steel V2A	
• Color	• silver	
Permitted ambient conditions		
Ambient temperature		
• During operation	• -25 ... +70 °C	

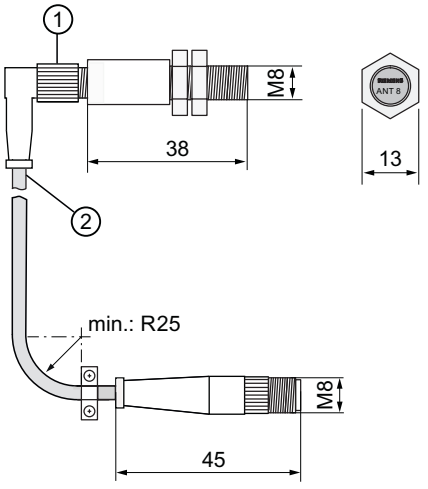
		6GT2398-1CF10 6GT2398-1CF00
• During transportation and storage	• -40 ... +85 °C	
Degree of protection according to EN 60529	IP67 (front)	
Shock-resistant according to EN 60721-3-7 Class 7 M2 [1]	500 m/s²	
Vibration-resistant according to EN 60721-3-7 Class 7 M2 [1]	200 m/s²	

Design, dimensions and weight	
Dimensions (∅ x thread x L)	M8 x 1 x 38 mm
Thread (∅ x thread x L)	M8 x 1 x 20 mm
Weight	
• without antenna cable	• 10 g
• with antenna cable	• 140 g
Type of mounting	2x stainless steel nuts; M8 x 1
Cable length	3 m

Standards, specifications, approvals	
MTBF	10000 years

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

6.4.7 Dimension drawing



① The antenna connector may only be tightened by hand.

② The cable must be secured in front of/behind the support sleeve so that no bending strain can be transferred to the antenna connector.

Figure 6-22 Dimension drawing ANT 8 (all values in mm)

6.5 ANT 12

6.5.1 Characteristics

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 plugged in.

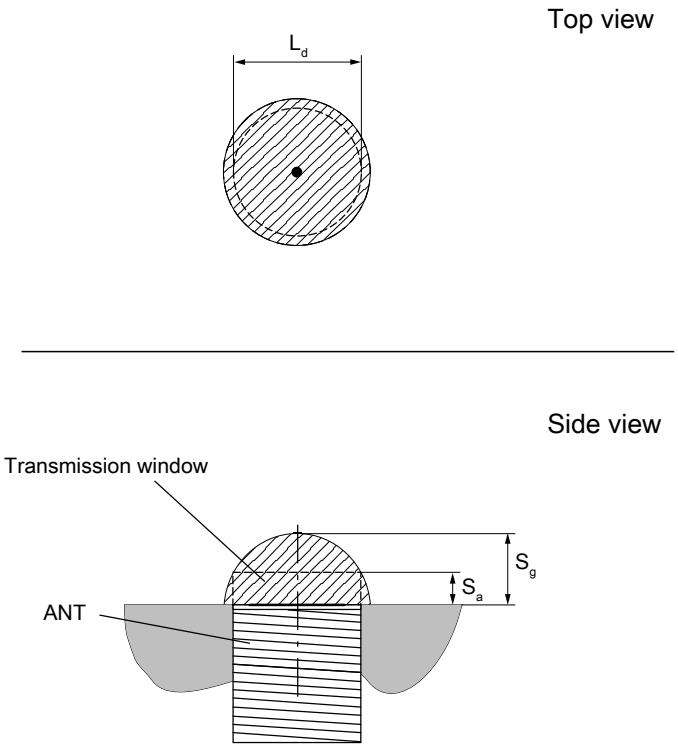
ANT 12	Characteristics	
	Area of application	Tool identification
	Read/write distance	Up to 16 mm (depending on the transponder)
	Connecting cable	3 m or 0.6 m
	Connectable readers	RF350R and RF350M:
	Degree of protection	IP67 (front)

6.5.2 Ordering data

Table 6-8 Ordering data ANT 12

Antenna	Article number
ANT 12 (incl. one integrated antenna connecting cable 0.6 m)	6GT2398-1CC10
ANT 12 (incl. one integrated, antenna connecting cable suitable for cable carriers 3 m)	6GT2398-1CC00

6.5.3 Transmission window



L_d Length of the transmission window

S_a Operating distance between antenna and transponder

S_g Limit distance
(limit distance is the maximum clear distance between the upper surface of the antenna and the transponder at which the transmission can still function under normal conditions).

Figure 6-23 Transmission window ANT 12

Please note that the figure is an example representation. The values for L_d, S_a and S_g depend on the transponder type used and vary accordingly. You can find detailed information on this in the section "Field data for transponders, readers and antennas (Page 47)".

6.5.4 Flush-mounted in metal

The antenna ANT 12 can be flush-mounted in metal. Allow for a possible reduction in the field data.

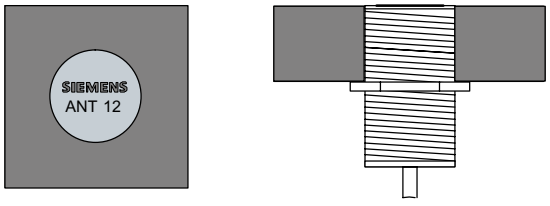


Figure 6-24 ANT 12 flush-mounted in metal

6.5.5 Minimum clearances

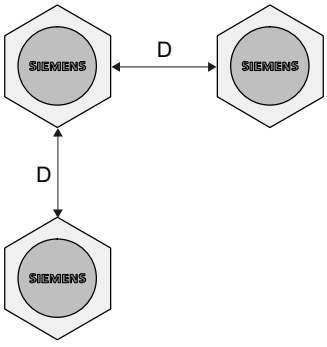
Note

Extension of the data transmission time if distance values are undershot

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

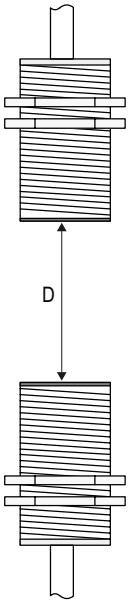
For this reason, please observe the values in the tables.

Minimum distances from antenna to antenna



D ≥ 70 mm

Figure 6-25 Minimum distance for ANT 12



D ≥ 100 mm

Figure 6-26 Face-to-face minimum distance between two ANT 12

6.5.6 Technical specifications

		6GT2398-1CC00 **6GT2398-1CC10**
Product type designation	ANT 12	
Electrical data		
Maximum write/read distance ANT ↔ Transponder (S_g).	17 mm	
Interfaces		
Plug connection	M8, 4-pin (male)	
Mechanical specifications		
Enclosure		
• Material	• Plastic Crastin	
• Color	• Pale turquoise	
Permitted ambient conditions		
Ambient temperature		
• During operation	• -25 ... +70 °C	
• During transportation and storage	• -40 ... +85 °C	
Degree of protection according to EN 60529	IP67 (front)	
Shock-resistant according to EN 60721-3-7 Class 7 M2 [1)]	500 m/s^2	
Vibration-resistant according to EN 60721-3-7 Class 7 M2 [1)]	200 m/s^2	
Design, dimensions and weight		
Dimensions (∅ x thread x L)	M12 x 1 x 40 mm	
Thread (∅ x thread x L)	M12 x 1 x 39 mm	
Weight	145 g	
Type of mounting	2x plastic nuts; M12 x 1	
Cable length	3 m or 0.6 m	
Standards, specifications, approvals		
MTBF	10000 years	

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

6.5.7 Dimension drawing

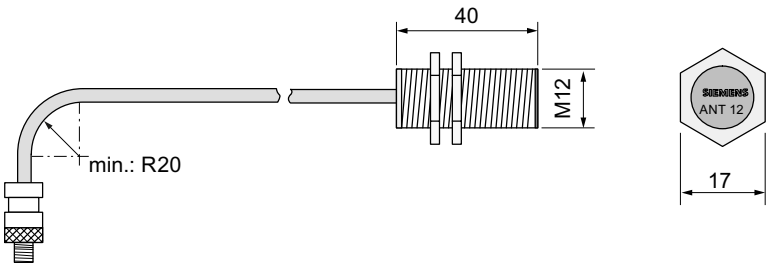


Figure 6-27 Dimension drawing ANT 12 (all values in mm)

6.6 ANT 18

6.6.1 Characteristics

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.

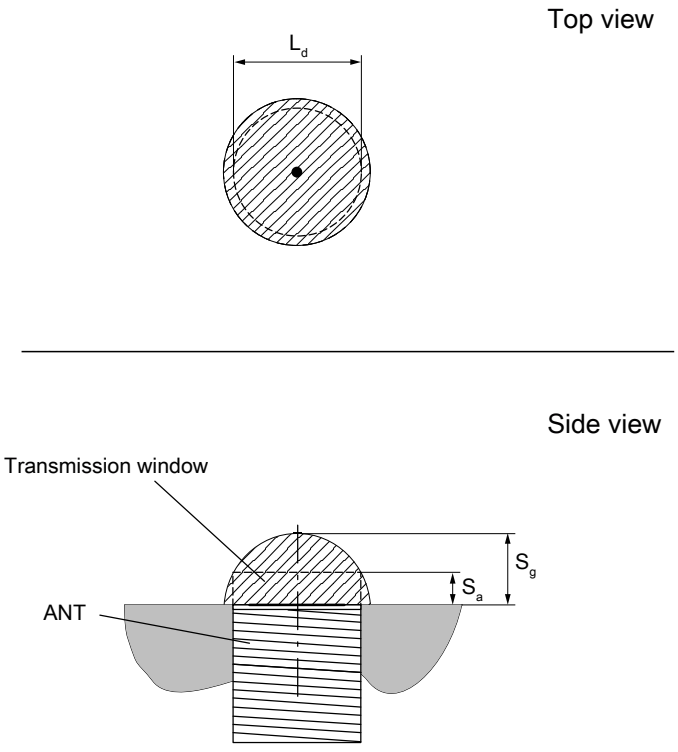
ANT 18	Characteristics	
	Area of application	Small assembly lines
	Read/write distance	up to 35 mm (depending on the transponder)
	Connecting cable	3 m or 0.6 m
	Connectable readers	RF350R and RF350M:
	Degree of protection	IP67 (front)

6.6.2 Ordering data

Table 6-9 Ordering data ANT 18

Antenna	Article number
ANT 18 (incl. one integrated antenna connecting cable 0.6 m)	6GT2398-1CA10
ANT 18 (including one integrated antenna connecting cable 3 m)	6GT2398-1CA00

6.6.3 Transmission window



L_d Length of the transmission window

S_a Operating distance between antenna and transponder

S_g Limit distance
(limit distance is the maximum clear distance between the upper surface of the antenna and the transponder at which the transmission can still function under normal conditions).

Figure 6-28 Transmission window ANT 18

Please note that the figure is an example representation. The values for L_d, S_a and S_g depend on the transponder type used and vary accordingly. You can find detailed information on this in the section "Field data for transponders, readers and antennas (Page 47)".

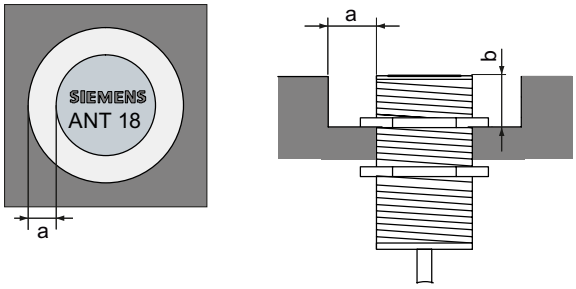
6.6.4 Flush-mounted in metal

The antenna ANT 18 can be flush-mounted in metal. Allow for a possible reduction in the field data. 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.



a = 10 mm

b = 10 mm

Figure 6-29 ANT 18 flush-mounted in metal

6.6.5 Minimum clearances

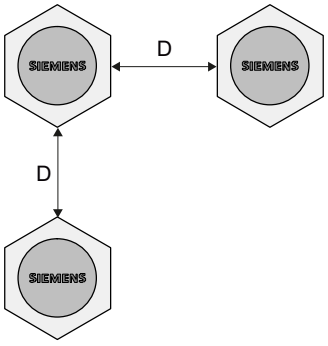
Note

Extension of the data transmission time if distance values are undershot

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

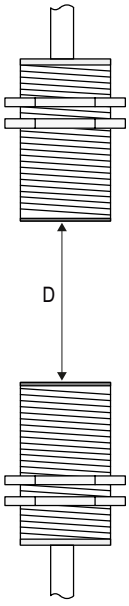
For this reason, please observe the values in the tables.

Minimum distances from antenna to antenna



D ≥ 100 mm

Figure 6-30 Minimum distance for ANT 18



D ≥ 100 mm

Figure 6-31 Face-to-face minimum distance between two ANT 18

6.6.6 Technical specifications

		6GT2398-1CA00 **6GT2398-1CA10**
Product type designation	ANT 18	
Electrical data		
Maximum write/read distance ANT ↔ Transponder (S_g).	35 mm	
Interfaces		
Plug connection	M8, 4-pin (male)	
Mechanical specifications		
Enclosure		
• Material	• Plastic Crastin	
• Color	• Pale turquoise	
Permitted ambient conditions		
Ambient temperature		
• During operation	• -25 ... +70 °C	
• During transportation and storage	• -40 ... +85 °C	
Degree of protection according to EN 60529	IP67 (front)	

		6GT2398-1CA00 6GT2398-1CA10
Shock-resistant according to EN 60721-3-7 Class 7 M2 [1]	500 m/s²	
Vibration-resistant according to EN 60721-3-7 Class 7 M2 [1]	200 m/s²	

Design, dimensions and weight	
Dimensions (∅ x thread x L)	M18 x 1 x 55 mm
Thread (∅ x thread x L)	M18 x 1 x 54 mm
Weight	130 g
Type of mounting	2x plastic nuts; M18 x 1
Cable length	3 m or 0.6 m

Standards, specifications, approvals	
MTBF	10000 years

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

6.6.7 Dimension drawing

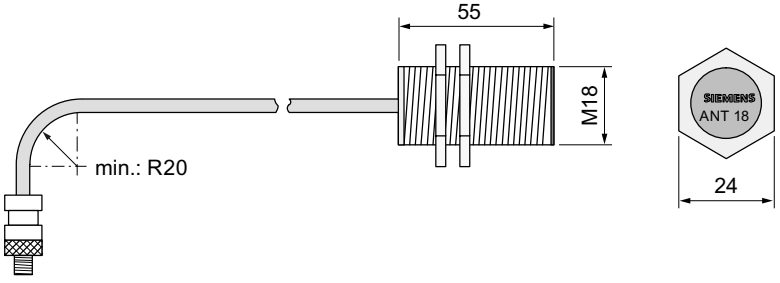


Figure 6-32 Dimension drawing ANT 18 (all values in mm)

6.7 ANT 30

6.7.1 Characteristics

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.

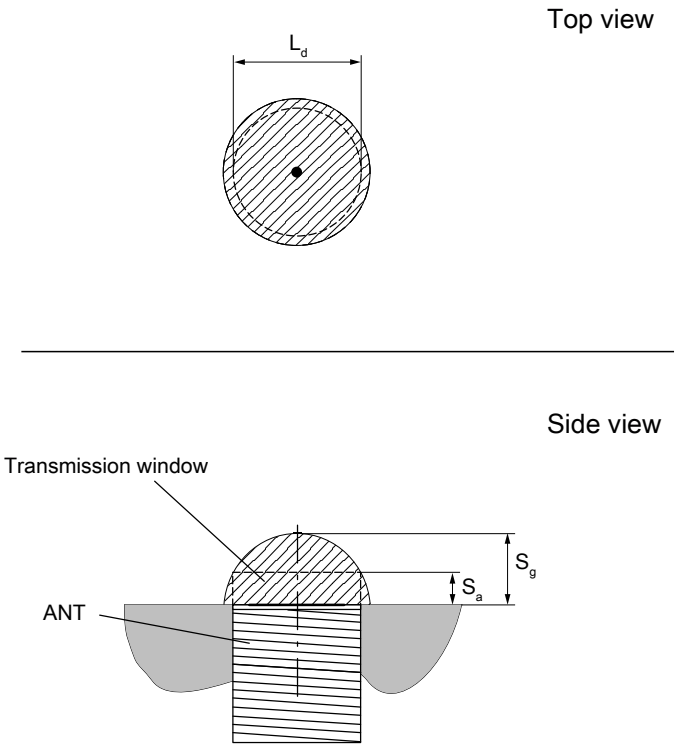
ANT 30	Characteristics	
	Area of application	Small assembly lines
	Read/write distance	up to 55 mm (depending on the transponder)
	Connecting cable	3 m
	Connectable readers	RF350R and RF350M:
	Degree of protection	IP67 (front)

6.7.2 Ordering data

Table 6-10 Ordering data ANT 30

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

6.7.3 Transmission window



L_d Length of the transmission window

S_a Operating distance between antenna and transponder

S_g Limit distance
(limit distance is the maximum clear distance between the upper surface of the antenna and the transponder at which the transmission can still function under normal conditions).

Figure 6-33 Transmission window ANT 30

Please note that the figure is an example representation. The values for L_d, S_a and S_g depend on the transponder type used and vary accordingly. You can find detailed information on this in the section "Field data for transponders, readers and antennas (Page 47)".

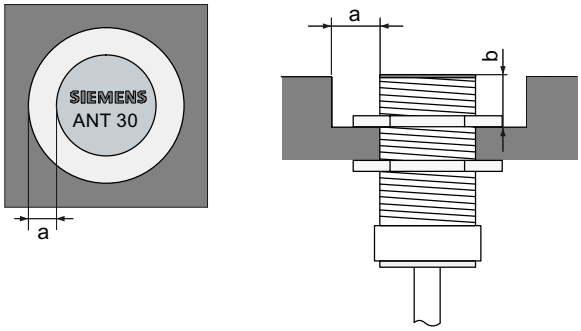
6.7.4 Flush-mounted in metal

The antenna ANT 30 can be flush-mounted in metal. Allow for a possible reduction in the field data. 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.



a = 20 mm

b = 20 mm

Figure 6-34 ANT 30 flush-mounted in metal

6.7.5 Minimum clearances

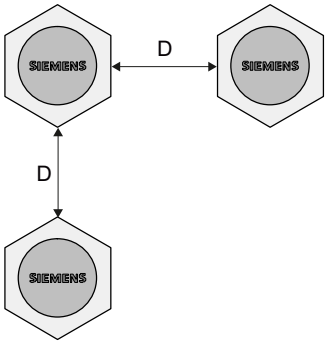
Note

Extension of the data transmission time if distance values are undershot

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

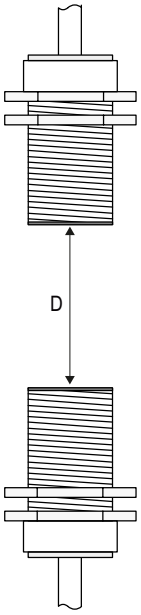
For this reason, please observe the values in the tables.

Minimum distance from antenna to antenna



D ≥ 100 mm

Figure 6-35 Minimum distance for ANT 30



D ≥ 200 mm

Figure 6-36 Face-to-face minimum distance between two ANT 30

6.7.6 Technical specifications

		6GT2398-1CD00
Product type designation	ANT 30	
Electrical data		
Maximum write/read distance ANT ↔ Transponder (S_g).	50 mm	
Interfaces		
Plug connection	M8, 4-pin (male)	
Mechanical specifications		
Enclosure		
• Material	• Plastic Crastin	
• Color	• Pale turquoise	
Permitted ambient conditions		
Ambient temperature		
• During operation	• -25 ... +70 °C	
• During transportation and storage	• -40 ... +85 °C	
Degree of protection according to EN 60529	IP67 (front)	

	6GT2398-1CD00
Shock-resistant according to EN 60721-3-7 Class 7 M2 [1]	500 m/s²
Vibration-resistant according to EN 60721-3-7 Class 7 M2 [1]	200 m/s²
Design, dimensions and weight	
Dimensions (Ø x thread x L)	M30 x 1.5 x 61 mm
Thread (Ø x thread x L)	M30 x 1.5 x 45 mm
Weight	180 g
Type of mounting	2x plastic nuts; M30 x 1.5
Cable length	3 m
Standards, specifications, approvals	
MTBF	10000 years

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

6.7.7 Dimension drawing

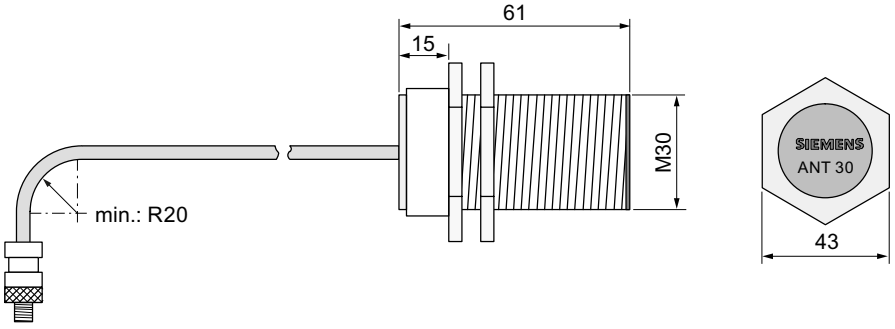


Figure 6-37 Dimension drawing ANT 30 (all values in mm)

6.8 ANT 12 (stainless steel variant)

6.8.1 Features

ANT 12 (stainless steel variant)	Characteristics	
	Area of application	Tool identification
	Writing/reading distance	Up to 16 mm (depending on the transponder)
	Connecting cable	Plug-in 3 m
	Connectable readers	RF350R
	Degree of protection	IP67 with inserted cable

6.8.2 Ordering data

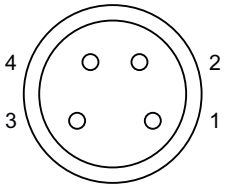
Table 6-11 Ordering data for ANT 12 (stainless steel variant)

Antenna	Article number
ANT 12 (without antenna cable)	6GT2398-1DC00
ANT 12 (including one plug-in antenna cable 3 m)	6GT2398-1DC10

Table 6-12 Ordering data ANT 12 accessories

Accessories	Article number
Antenna connecting cable drag-capable, 3 m	6GT2391-0AH30

6.8.3 Antenna connection



Pins 1 and 3 GND

Pins 2 and 4 Signal

⚠ CAUTION

Minimum requirements for the antenna connecting cable

We recommend that you use the antenna connecting cable "6GT2391-0AH30" from Siemens.

Pay attention to the following minimum requirements if you want to configure an antenna cable yourself:

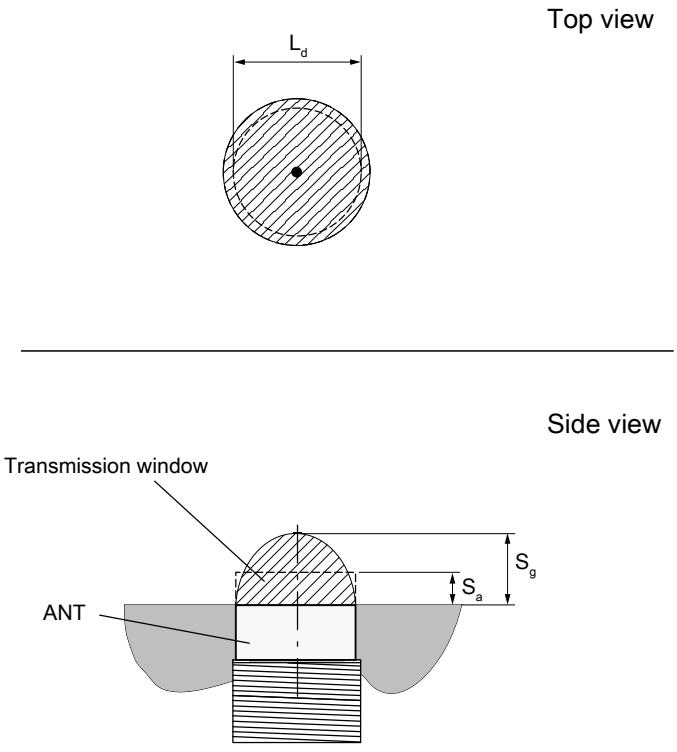
- Temperature: 80 ℃
- Conductor cross-section: AWG21

⚠ CAUTION

Check connections

The device could be damaged as a result of missing power supply. Therefore, check all connections prior to commissioning.

6.8.4 Transmission window



L_d Length of the transmission window

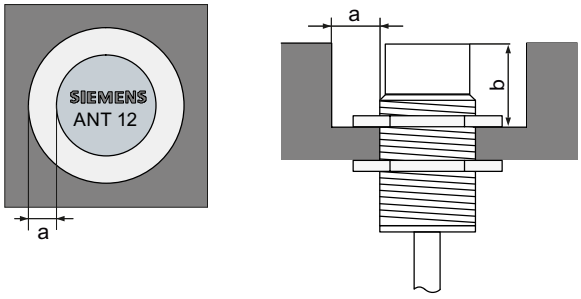
S_a Operating distance between antenna and transponder

S_g Limit distance
(limit distance is the maximum clear distance between the upper surface of the antenna and the transponder at which the transmission can still function under normal conditions).

Figure 6-38 Transmission window ANT 12 (stainless steel variant)

Please note that the figure is an example representation. The values for L_d, S_a and S_g depend on the transponder type used and vary accordingly. You can find detailed information on this in the section "Field data for transponders, readers and antennas (Page 47)".

6.8.5 Flush-mounted in metal



a = 10 mm

b = 10 mm

Figure 6-39 ANT 12 (stainless steel variant) flush-mounted in metal

6.8.6 Minimum spacing

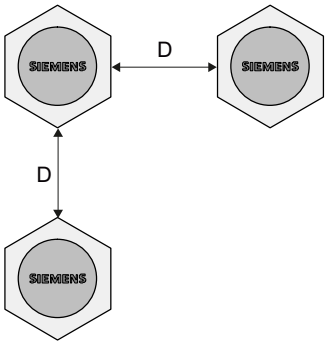
Note

Extension of the data transmission time if distance values are undershot

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

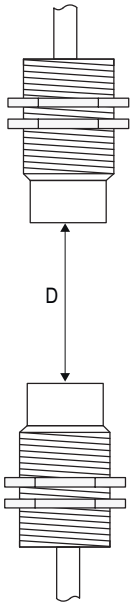
For this reason, please observe the values in the tables.

Minimum distances from antenna to antenna



D ≥ 70 mm

Figure 6-40 Minimum distance ANT 12 (stainless steel variant)



D ≥ 100 mm

Figure 6-41 Face-to-face minimum distance between two ANT 12 (stainless steel variant)

6.8.7 Technical data

		6GT2398-1DC00 [1] **6GT2398-1DC10**
Product type designation	ANT 12 (stainless steel variant)	
Electrical data		
Input voltage of the antenna [2]	max. 5 V AC (13.56 MHz)	
Input current of the antenna [2]	max. 85 mA AC (13.56 MHz)	
Maximum write/read distance ANT ↔ Transponder (S_g).	17 mm	
Interfaces		
Plug connection	4-pin (female)	
Mechanical specifications		
Enclosure		
• Material	• Stainless steel V2A / Pocan	
• Color	• Silver/pastel turquoise	
Permitted ambient conditions		
Ambient temperature		
• During operation	• -20 ... +70 °C	

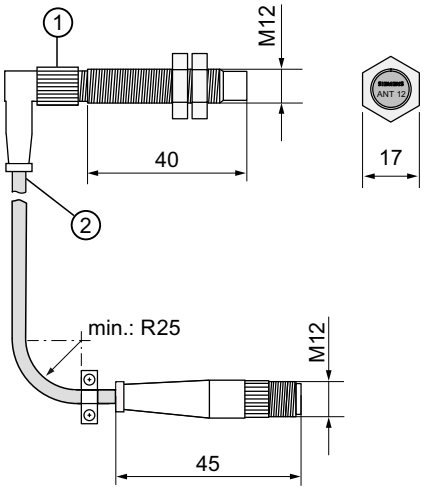
	6GT2398-1DC00 [1] 6GT2398-1DC10
• During transportation and storage	• -40 ... +85 °C
Ambient conditions regarding UL approval	• for indoor use only (dry location) • Degree of pollution 2 • Altitude < 2000 m • Overvoltage category 2 • Air humidity < 90 %
Degree of protection according to EN 60529	IP67 with inserted cable (IP-Rating is not investigated by UL)
Shock-resistant according to EN 60721-3-7 Class 7 M2 [3]	500 m/s²
Vibration-resistant according to EN 60721-3-7 Class 7 M2 [3]	200 m/s²
Design, dimensions and weight	
Dimensions (∅ x L)	12 x 40 mm
Thread (∅ x thread x L)	M12 x 1 x 30 mm
Weight	
• without antenna cable	• 15 g
• with antenna cable	• 180 g
Type of mounting	2x stainless steel nuts; M12 x 1
Standards, specifications, approvals	
MTBF	10000 years

[1] Investigated by UL
The products 6GT2398-1DC10 and 6GT2398-1DC00 are identical in structure and only differ in the antenna connecting cable included in the scope of delivery.

[2] The supply source and ext. circuits intended to be connected to this device shall be galv. separated from mains supply or hazardous live voltage by reinforced or double insulation and meet the requirements of SELV/PELV circuit of UL/IEC61010-2-201 and clause 9.4 Limited energy circuit of UL/IEC 61010-1 or Class 2 of NEC or LPS of UL/IEC 60950".

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

6.8.8 Dimension drawing



① The antenna connector may only be tightened by hand.

② The cable must be secured in front of/behind the support sleeve so that no bending strain can be transferred to the antenna connector.

Figure 6-42 Dimension drawing ANT 12 (stainless steel variant)

All dimensions in mm.

6.9 ANT 18 (stainless steel variant)

6.9.1 Features

ANT 18 (stainless steel variant)	Characteristics	
	Area of application	Small assembly lines
	Writing/reading distance	up to 35 mm (depending on the transponder)
	Connecting cable	Plug-in 3 m
	Connectable readers	RF350R
	Degree of protection	IP67 with inserted cable

6.9.2 Ordering data

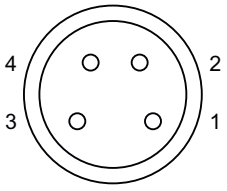
Table 6-13 Ordering data for ANT 18 (stainless steel variant)

Antenna	Article number
ANT 18 (without antenna cable)	6GT2398-1DA00
ANT 18 (including one plug-in antenna cable 3 m)	6GT2398-1DA10

Table 6-14 Ordering data ANT 18 accessories

Accessories	Article number
Antenna connecting cable drag-capable, 3 m	6GT2391-0AH30

6.9.3 Antenna connection



Pins 1 and 3 GND

Pins 2 and 4 Signal

CAUTION

Minimum requirements for the antenna connecting cable

We recommend that you use the antenna connecting cable "6GT2391-0AH30" from Siemens.

Pay attention to the following minimum requirements if you want to configure an antenna cable yourself:

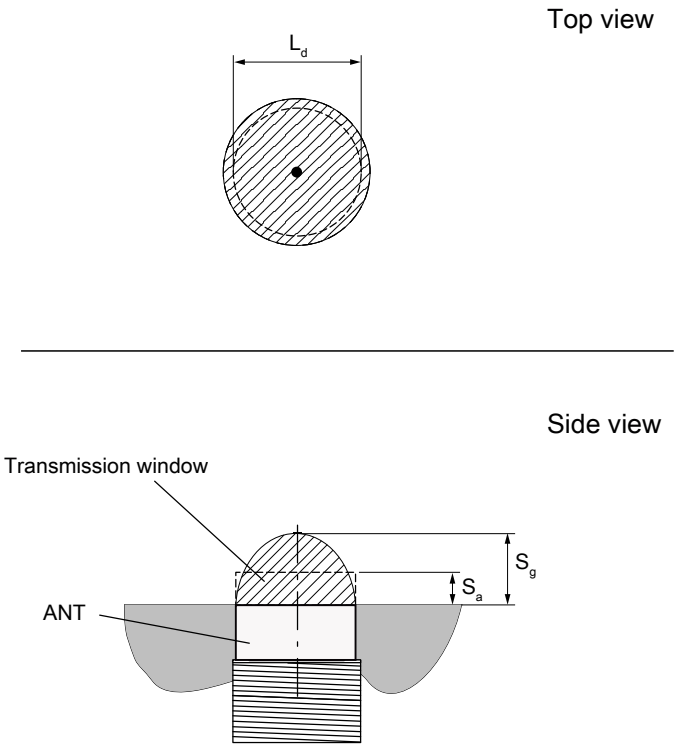
- Temperature: 80 ℃
- Conductor cross-section: AWG21

CAUTION

Check connections

The device could be damaged as a result of missing power supply. Therefore, check all connections prior to commissioning.

6.9.4 Transmission window



L_d Length of the transmission window

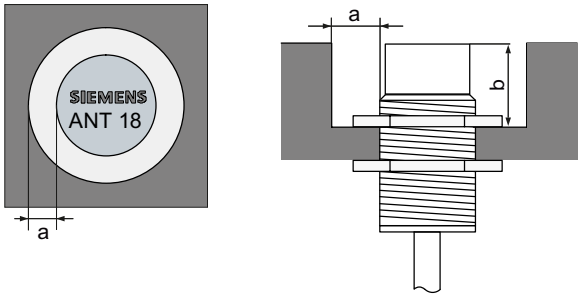
S_a Operating distance between antenna and transponder

S_g Limit distance
(limit distance is the maximum clear distance between the upper surface of the antenna and the transponder at which the transmission can still function under normal conditions).

Figure 6-43 Transmission window ANT 18 (stainless steel variant)

Please note that the figure is an example representation. The values for L_d, S_a and S_g depend on the transponder type used and vary accordingly. You can find detailed information on this in the section "Field data for transponders, readers and antennas (Page 47)".

6.9.5 Flush-mounted in metal



a = 10 mm

b = 10 mm

Figure 6-44 ANT 18 (stainless steel variant) flush-mounted in metal

6.9.6 Minimum spacing

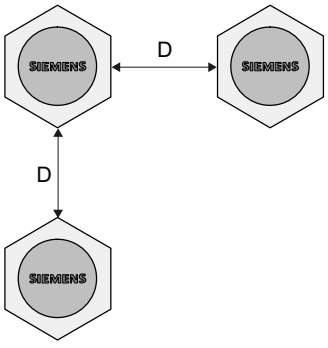
Note

Extension of the data transmission time if distance values are undershot

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

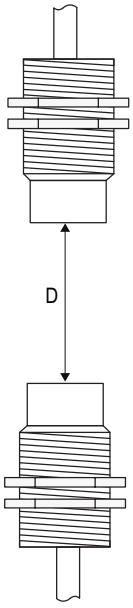
For this reason, please observe the values in the tables.

Minimum distances from antenna to antenna



D ≥ 100 mm

Figure 6-45 Minimum distance ANT 18 (stainless steel variant)



D ≥ 100 mm

Figure 6-46 Face-to-face minimum distance between two ANT 18 (stainless steel variant)

6.9.7 Technical data

		6GT2398-1DA00 [1] **6GT2398-1DA10**
Product type designation	ANT 18 (stainless steel variant)	
Electrical data		
Input voltage of the antenna [2]	max. 5 V AC (13.56 MHz)	
Input current of the antenna [2]	max. 85 mA AC (13.56 MHz)	
Maximum write/read distance ANT ↔ Transponder (S_g).	35 mm	
Interfaces		
Plug connection	4-pin (female)	
Mechanical specifications		
Enclosure		
• Material	• Stainless steel V2A / Pocan	
• Color	• Silver/pastel turquoise	
Permitted ambient conditions		
Ambient temperature		
• During operation	• -20 ... +70 °C	

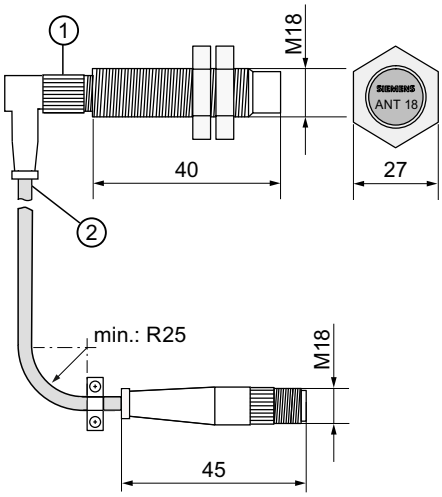
	6GT2398-1DA00 [1] **6GT2398-1DA10**
• During transportation and storage	• -40 ... +85 °C
Ambient conditions regarding UL approval	• for indoor use only (dry location) • Degree of pollution 2 • Altitude < 2000 m • Overvoltage category 2 • Air humidity < 90 %
Degree of protection according to EN 60529	IP67 with inserted cable (IP-Rating is not investigated by UL)
Shock-resistant according to EN 60721-3-7 Class 7 M2 [3]	500 m/s²
Vibration-resistant according to EN 60721-3-7 Class 7 M2 [3]	200 m/s²
Design, dimensions and weight	
Dimensions (∅ x L)	18 x 40 mm
Thread (∅ x thread x L)	M18 x 1 x 30 mm
Weight	40 g / 205 g
• without antenna cable	• 40 g
• with antenna cable	• 205 g
Type of mounting	2x stainless steel nuts; M18 x 1
Standards, specifications, approvals	
MTBF	10000 years

[1] Investigated by UL
The products 6GT2398-1DA10 and 6GT2398-1DA00 are identical in structure and only differ in the antenna connecting cable included in the scope of delivery.

[2] The supply source and ext. circuits intended to be connected to this device shall be galv. separated from mains supply or hazardous live voltage by reinforced or double insulation and meet the requirements of SELV/PELV circuit of UL/IEC61010-2-201 and clause 9.4 Limited energy circuit of UL/IEC 61010-1 or Class 2 of NEC or LPS of UL/IEC 60950".

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

6.9.8 Dimension drawing



① The antenna connector may only be tightened by hand.

② The cable must be secured in front of/behind the support sleeve so that no bending strain can be transferred to the antenna connector.

Figure 6-47 Dimension drawing ANT 18 (stainless steel variant)

All dimensions in mm.

6.10 ANT 30 (stainless steel variant)

6.10.1 Features

ANT 18 (stainless steel variant)	Characteristics	
	Area of application	Small assembly lines
	Writing/reading distance	up to 55 mm (depending on the transponder)
	Connecting cable	Plug-in 3 m
	Connectable readers	RF350R
	Degree of protection	IP67 with inserted cable

6.10.2 Ordering data

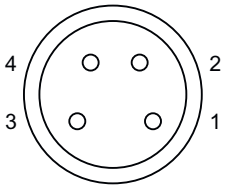
Table 6-15 Ordering data for ANT 30 (stainless steel variant)

Antenna	Article number
ANT 30 (without antenna cable)	6GT2398-1DD00
ANT 30 (including one plug-in antenna cable 3 m)	6GT2398-1DD10

Table 6-16 Ordering data ANT 30 accessories

Accessories	Article number
Antenna connecting cable drag-capable, 3 m	6GT2391-0AH30

6.10.3 Antenna connection



Pins 1 and 3 GND

Pins 2 and 4 Signal

CAUTION

Minimum requirements for the antenna connecting cable

We recommend that you use the antenna connecting cable "6GT2391-0AH30" from Siemens.

Pay attention to the following minimum requirements if you want to configure an antenna cable yourself:

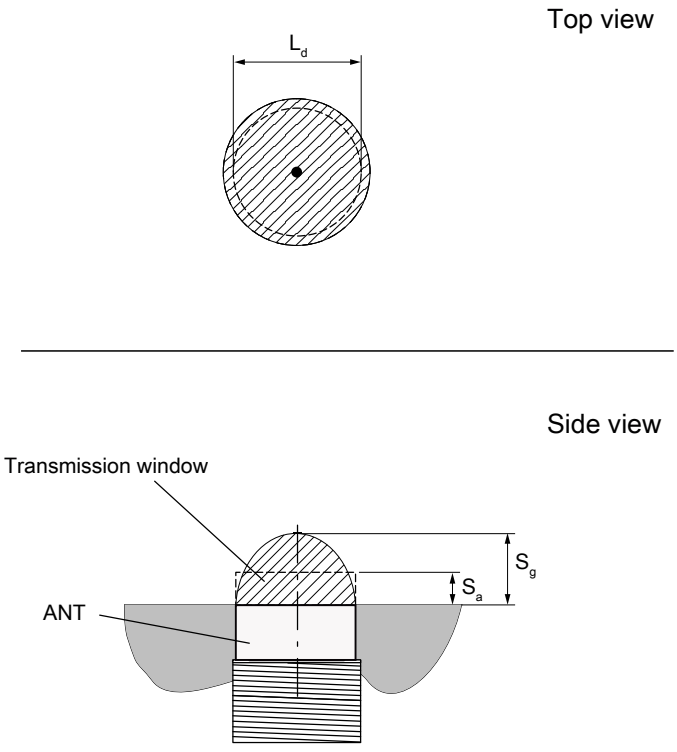
- Temperature: 80 ℃
- Conductor cross-section: AWG21

CAUTION

Check connections

The device could be damaged as a result of missing power supply. Therefore, check all connections prior to commissioning.

6.10.4 Transmission window



L_d Length of the transmission window

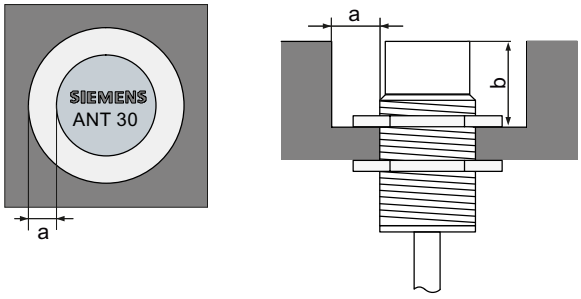
S_a Operating distance between antenna and transponder

S_g Limit distance
(limit distance is the maximum clear distance between the upper surface of the antenna and the transponder at which the transmission can still function under normal conditions).

Figure 6-48 Transmission window ANT 30 (stainless steel variant)

Please note that the figure is an example representation. The values for L_d, S_a and S_g depend on the transponder type used and vary accordingly. You can find detailed information on this in the section "Field data for transponders, readers and antennas (Page 47)".

6.10.5 Flush-mounted in metal



a = 20 mm

b = 20 mm

Figure 6-49 ANT 30 (stainless steel variant) flush-mounted in metal

6.10.6 Minimum spacing

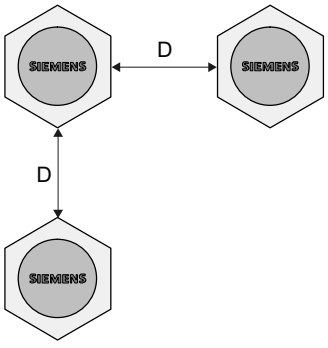
Note

Extension of the data transmission time if distance values are undershot

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

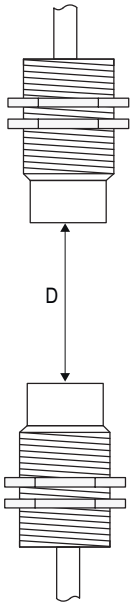
For this reason, please observe the values in the tables.

Minimum distances from antenna to antenna



D ≥ 100 mm

Figure 6-50 Minimum distance ANT 30 (stainless steel variant)



D ≥ 200 mm

Figure 6-51 Face-to-face minimum distance between two ANT 30 (stainless steel variant)

6.10.7 Technical data

		6GT2398-1DD00 [1] **6GT2398-1DD10**
Product type designation	ANT 30 (stainless steel variant)	
Electrical data		
Input voltage of the antenna [2]	max. 5 V AC (13.56 MHz)	
Input current of the antenna [2]	max. 85 mA AC (13.56 MHz)	
Maximum write/read distance ANT ↔ Transponder (S_g).	50 mm	
Interfaces		
Plug connection	4-pin (female)	
Mechanical specifications		
Enclosure		
• Material	• Stainless steel V2A / Pocan	
• Color	• Silver/pastel turquoise	
Permitted ambient conditions		
Ambient temperature		
• During operation	• -20 ... +70 °C	

		6GT2398-1DD00 [1] **6GT2398-1DD10**
• During transportation and storage	• -40 ... +85 °C	
Ambient conditions regarding UL approval	• for indoor use only (dry location) • Degree of pollution 2 • Altitude < 2000 m • Overvoltage category 2 • Air humidity < 90 %	
Degree of protection according to EN 60529	IP67 with inserted cable (IP-Rating is not investigated by UL)	
Shock-resistant according to EN 60721-3-7 Class 7 M2 [3]	500 m/s²	
Vibration-resistant according to EN 60721-3-7 Class 7 M2 [3]	200 m/s²	
Design, dimensions and weight		
Dimensions (∅ x L)	30 x 40 mm	
Thread (∅ x thread x L)	M30 x 1.5 x 30 mm	
Weight		
• without antenna cable	• 95 g	
• with antenna cable	• 260 g	
Type of mounting	2x stainless steel nuts; M30 x 1.5	
Standards, specifications, approvals		
MTBF	10000 years	

[1] Investigated by UL
The products 6GT2398-1DD10 and 6GT2398-1DD00 are identical in structure and only differ in the antenna connecting cable included in the scope of delivery.

[2] The supply source and ext. circuits intended to be connected to this device shall be galv. separated from mains supply or hazardous live voltage by reinforced or double insulation and meet the requirements of SELV/PELV circuit of UL/IEC61010-2-201 and clause 9.4 Limited energy circuit of UL/IEC 61010-1 or Class 2 of NEC or LPS of UL/IEC 60950".

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

6.10.8 Dimension drawing

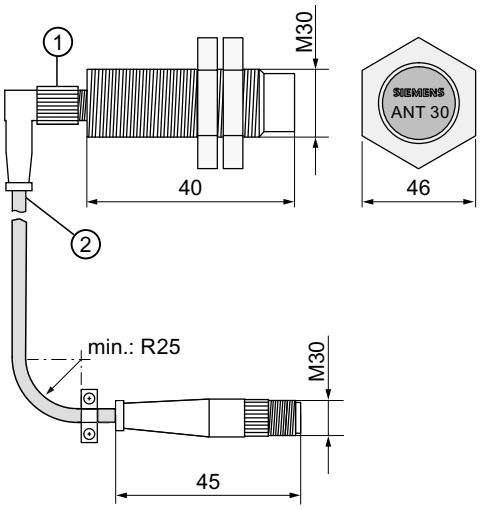


Figure 6-52 Dimension drawing ANT 30 (stainless steel variant)

All dimensions in mm.

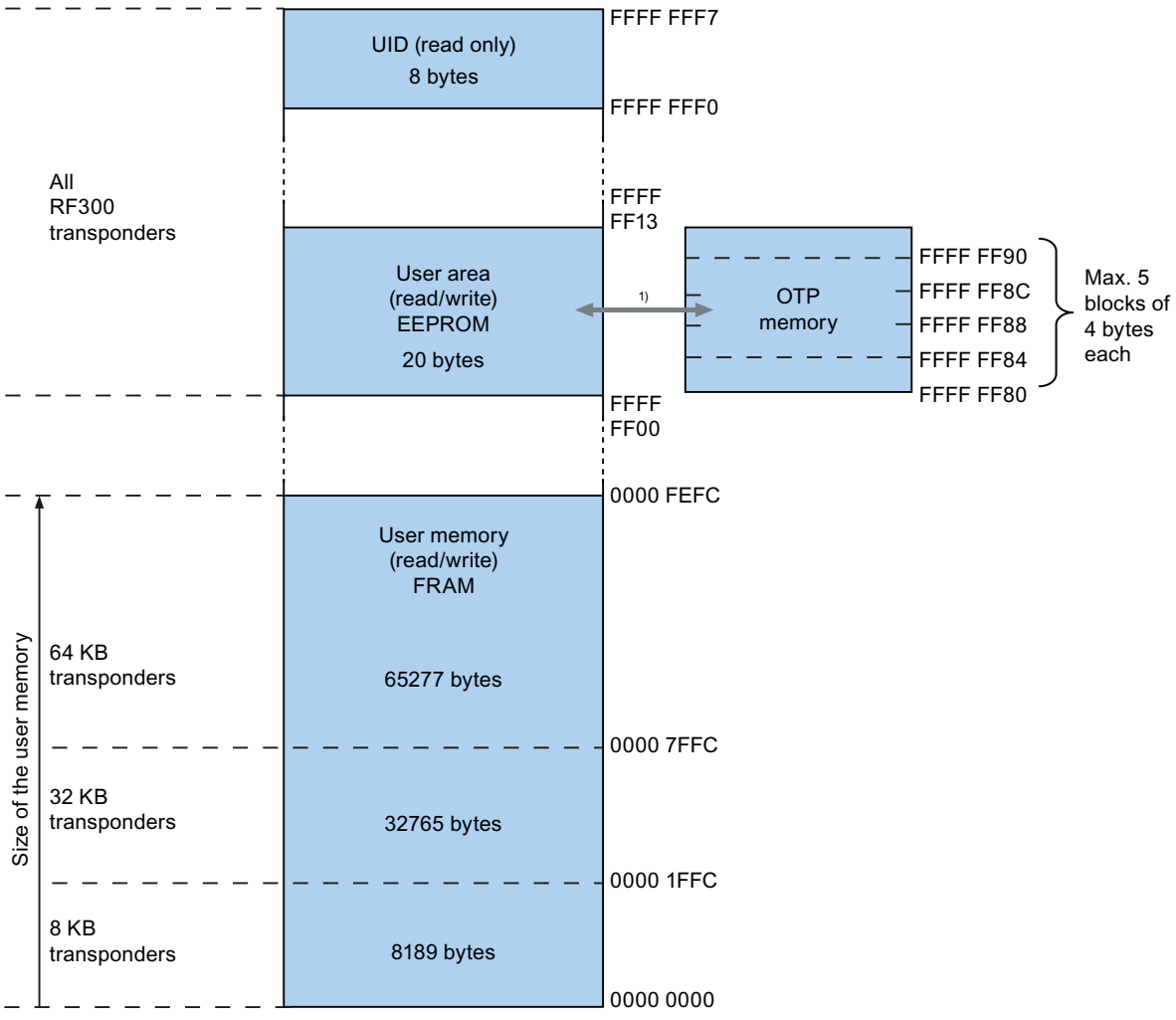
RF300 transponder

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 access

Write access operations with a length that is not divisible by four without a remainder are acknowledged with an address error.

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

Except for the RF320T, all RF300 transponders have a fast FRAM memory (8, 32, 64 or 256 KB).

In the case of RF300 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

Address error during write access

Write access operations with a length that is not divisible by four without a remainder are acknowledged with an address error.

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 48)"
	Mounting on metal	Yes, with spacer
	Degree of protection	IP67/IPx9K

7.2.2 Ordering data

Table 7-1 Ordering data RF320T

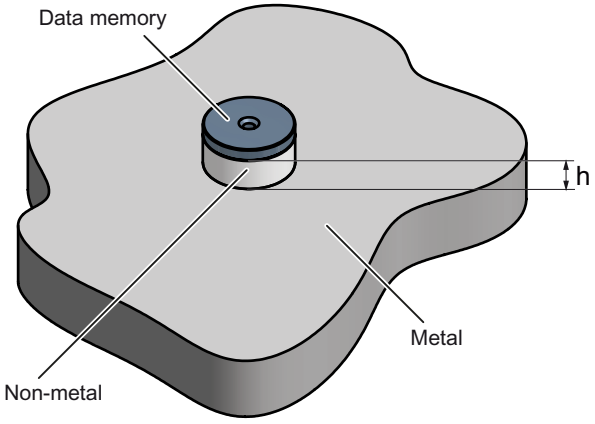
	Article number
RF320T	6GT2800-1CA00

Table 7-2 Ordering data for RF320T accessories

	Article number
Spacer	6GT2690-0AK00

7.2.3 Mounting on metal

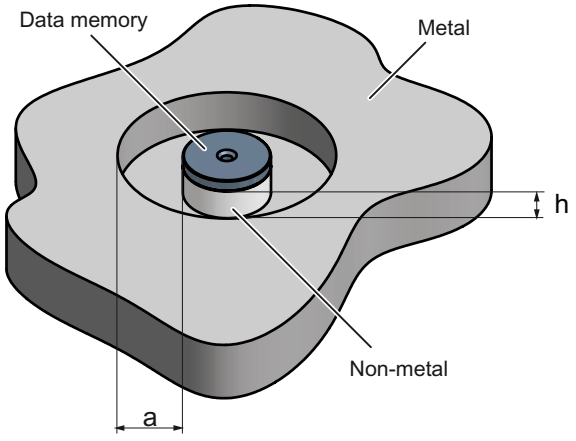
Mounting on metal



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
• OTP 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 48)"
Mechanical specifications	
Enclosure	
• 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 ... +125 °C
• outside the read/write field	• -40 ... +140 °C
• during storage	• -40 ... +140 °C
Degree of protection according to EN 60529	• IP67 • IPx9K
Shock-resistant according to EN 60721-3-7 Class 7 M3 [1)]	1000 m/s²
Vibration-resistant according to EN 60721-3-7 Class 7 M3 [1)]	200 m/s²
Torsion and bending load	Not permitted
Design, dimensions and weight	
Dimensions (Ø x H)	27 x 4 mm
Weight	5 g

		6GT2800-1CA00
Type of mounting	• 1 x M3 screw [2)] ≤ 1.0 Nm • Glued [3)]	

Standards, specifications, approvals	
MTBF	1800 years

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

[2]) To prevent it loosening during operation, secure the screw with screw locking varnish.

[3)] The processing instructions of the adhesive manufacturer must be observed.

7.2.5 Approvals

Declarations of Conformity

The Declaration of Conformity is available to all responsible authorities at:

Siemens AG
Digital Industries
Process Automation

DE-76181 Karlsruhe, Germany

EU Declaration of Conformity

Siemens AG hereby declares that the SIMATIC RF320T radio equipment types comply with the directives 2014/53/EU (RED) and 2011/65/EU (RoHS). The complete text of the EU Declarations of Conformity is available at the following Internet address:

Link (https://support.industry.siemens.com/cs/ww/en/ps/15914/cert)

UK Declaration of Conformity

Siemens AG hereby declares that the SIMATIC RF320T radio equipment types comply with the directives Radio Equipment Regulations 2017 (SI 2017/1206) and related amendments and RoHS Regulations 2012 (SI 2012/3032) and related amendments. The complete text of the UK Declarations of Conformity is available at the following Internet address:

Link (https://support.industry.siemens.com/cs/ww/en/ps/15914/cert)

7.2.6 Dimension drawing

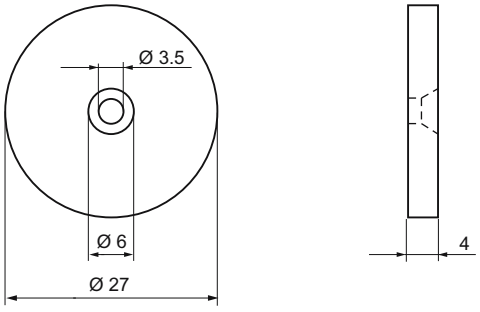


Figure 7-4 RF320T dimension drawing

Dimensions in mm

7.3 SIMATIC RF330T

7.3.1 Features

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 48)"
	Mounting on metal	Yes flush mounted on/in metal
	Degree of protection	IP68/IPx9K

7.3.2 Ordering data

Table 7-4 Ordering data RF330T

	Article number
RF330T	6GT2800-5BA00

Table 7-5 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

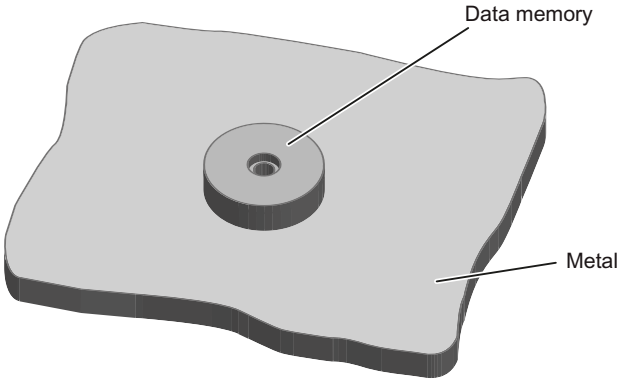
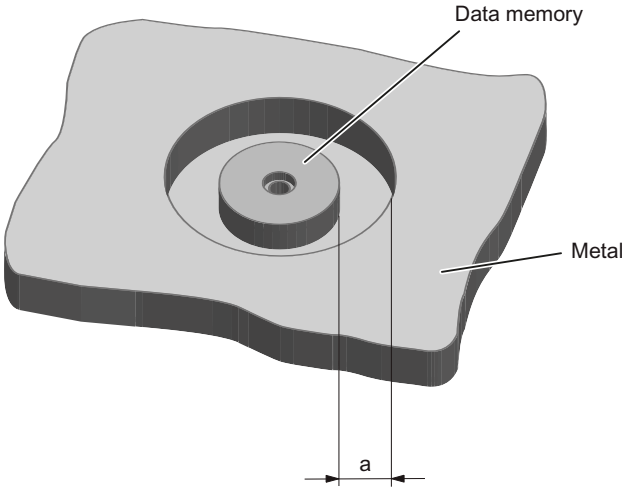


Figure 7-5 Mounting of the RF330T on metal

Flush-mounting of RF330T in metal



a ≥ 10 mm

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

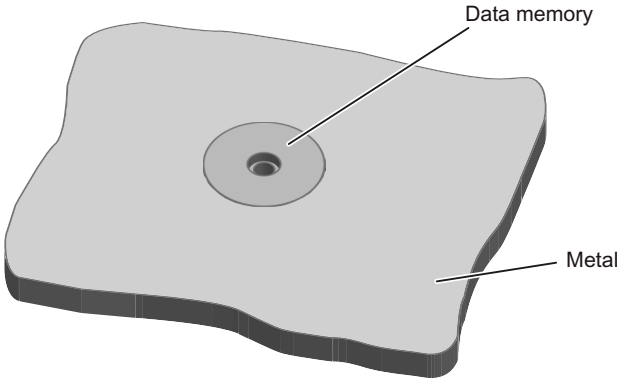


Figure 7-7 Mounting of the RF330T in metal without clearance

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 7-6 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
• OTP 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 48)"
Mechanical specifications	
Enclosure	
• Material	• Plastic PPS
• Color	• Black
Recommended distance to metal	≥ 0 mm

	6GT2800-5BA00
Power supply	Inductive, without battery
Permitted ambient conditions	
Ambient temperature	
• during write/read access	• -25 ... +85 °C
• outside the read/write field	• -40 ... +100 °C
• during storage	• -40 ... +100 °C
Degree of protection according 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 according to EN 60721-3-7 Class 7 M2 [1)]	500 m/s^2
Vibration-resistant according to EN 60721-3-7 Class 7 M2 [1)]	200 m/s^2
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
Standards, specifications, approvals	
MTBF	1200 years

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 Approvals

Declarations of Conformity

The Declaration of Conformity is available to all responsible authorities at:

Siemens AG
Digital Industries
Process Automation

DE-76181 Karlsruhe, Germany

EU Declaration of Conformity

Siemens AG hereby declares that the SIMATIC RF330T radio equipment types comply with the directives 2014/53/EU (RED) and 2011/65/EU (RoHS). The complete text of the EU Declarations of Conformity is available at the following Internet address:

Link (https://support.industry.siemens.com/cs/ww/en/ps/15914/cert)

UK Declaration of Conformity

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Link (https://support.industry.siemens.com/cs/ww/en/ps/15914/cert)

7.3.6 Dimension drawing

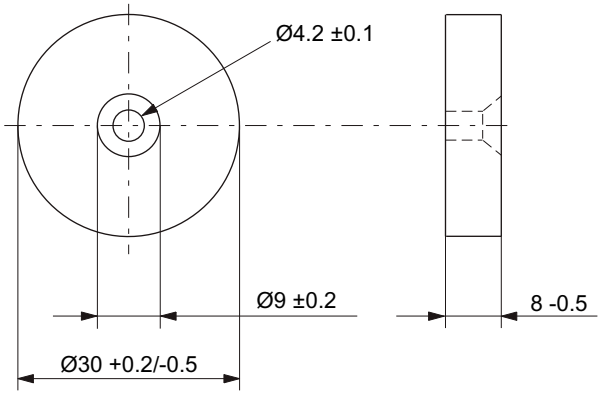

Figure 7-8 RF330T dimension drawing

Dimensions in mm

7.4 SIMATIC RF340T

7.4.1 Features

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 48)"
	Mounting on metal	Yes
	Degree of protection	IP68/IPx9K

7.4.2 Ordering data

Table 7-7 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

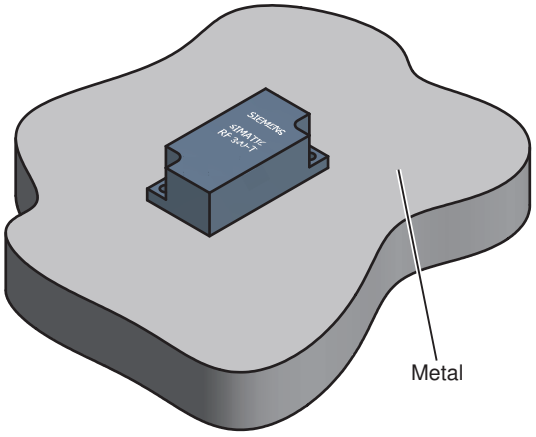

Figure 7-9 Mounting of RF340T on metal

Flush-mounting of RF340T in metal:

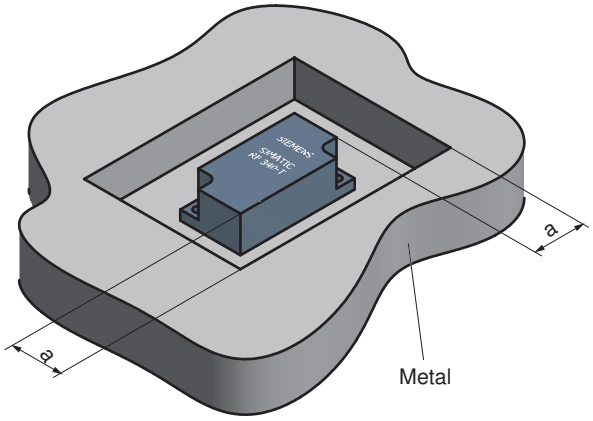

Figure 7-10 Flush-mounting of RF340T in metal

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 7-8 Technical specifications for RF340T

		6GT2800-4BB00 **6GT2800-5BB00**
Product type designation	SIMATIC RF340T	
Memory		
Memory organization	in bytes	
Memory configuration		
• UID	• 4 bytes EEPROM	
• User memory	• 8 KB FRAM / 32 KB FRAM	
• OTP 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 48)"	
Mechanical specifications		
Enclosure		
• 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 ... +85 °C	
• outside the read/write field	• -40 ... +85 °C	
• during storage	• -40 ... +85 °C	
Degree of protection according to EN 60529	• IP68 • IPx9K	
Shock-resistant according to EN 60721-3-7 Class 7 M2 [1)]	500 m/s²	
Vibration-resistant according to EN 60721-3-7 Class 7 M2 [1)]	200 m/s²	
Torsion and bending load	Not permitted	
Design, dimensions and weight		
Dimensions (L x W x H)	47.5 x 25 x 15.4 mm	
Weight	25 g	

		6GT2800-4BB00 **6GT2800-5BB00**
Type of mounting	2 x M3 screws ≤ 1.0 Nm	

Standards, specifications, approvals	
MTBF	1200 years

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

7.4.5 Approvals

Declarations of Conformity

The Declaration of Conformity is available to all responsible authorities at:

Siemens AG
Digital Industries
Process Automation

DE-76181 Karlsruhe, Germany

EU Declaration of Conformity

Siemens AG hereby declares that the SIMATIC RF340T radio equipment types comply with the directives 2014/53/EU (RED) and 2011/65/EU (RoHS). The complete text of the EU Declarations of Conformity is available at the following Internet address:

Link (https://support.industry.siemens.com/cs/ww/en/ps/15914/cert)

UK Declaration of Conformity

Siemens AG hereby declares that the SIMATIC RF340T radio equipment types comply with the directives Radio Equipment Regulations 2017 (SI 2017/1206) and related amendments and RoHS Regulations 2012 (SI 2012/3032) and related amendments. The complete text of the UK Declarations of Conformity is available at the following Internet address:

Link (https://support.industry.siemens.com/cs/ww/en/ps/15914/cert)

7.4.6 Dimension drawing

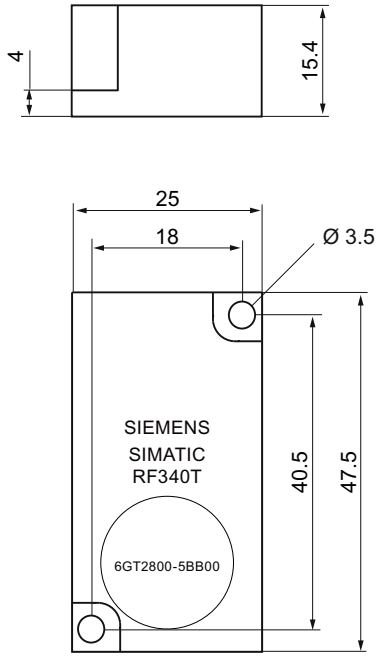

Figure 7-11 Dimension drawing RF340T

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 48)"
	Mounting on metal	Yes
	Degree of protection	IP68

7.5.2 Ordering data

Table 7-9 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

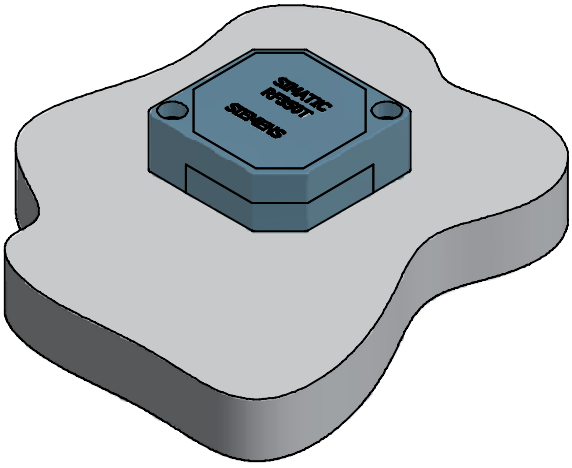

Figure 7-12 Mounting of RF350T on metal

Flush-mounting of RF350T in metal:

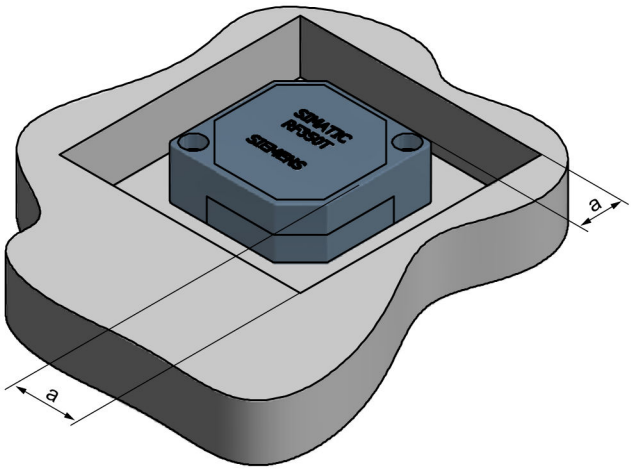

Figure 7-13 RF350T flush-mounted in metal

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:

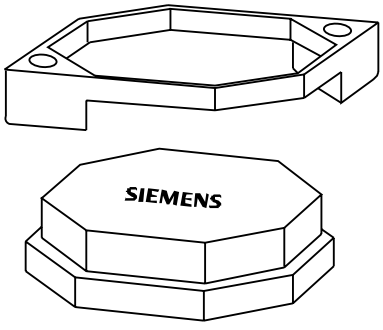

Figure 7-14 Installation diagram

Dimensions of the fixing frame

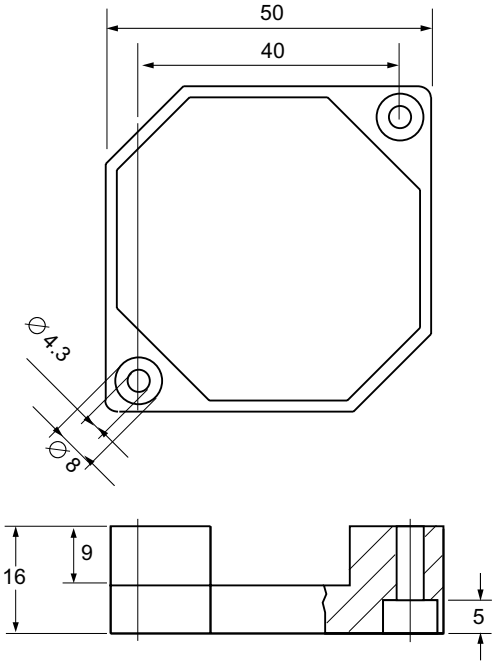

Figure 7-15 RF350T fixing frame

7.5.5 Technical data

Table 7-10 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
• OTP 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 48)"
Mechanical specifications	
Enclosure	

		6GT2800-5BD00
• 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 ... +85 °C
• outside the read/write field	• -40 ... +85 °C
• during storage	• -40 ... +85 °C
Degree of protection according to EN 60529	IP68
Shock-resistant according to EN 60721-3-7 Class 7 M2 [1)]	500 m/s^2
Vibration-resistant according to EN 60721-3-7 Class 7 M2 [1)]	200 m/s^2
Torsion and bending load	Not permitted

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

Standards, specifications, approvals	
MTBF	1200 years

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

7.5.6 Approvals

Declarations of Conformity

The Declaration of Conformity is available to all responsible authorities at:

Siemens AG
Digital Industries
Process Automation

DE-76181 Karlsruhe, Germany

EU Declaration of Conformity

Siemens AG hereby declares that the SIMATIC RF350T radio equipment types comply with the directives 2014/53/EU (RED) and 2011/65/EU (RoHS). The complete text of the EU Declarations of Conformity is available at the following Internet address:

Link (https://support.industry.siemens.com/cs/ww/en/ps/15914/cert)

UK Declaration of Conformity

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Link (https://support.industry.siemens.com/cs/ww/en/ps/15914/cert)

7.5.7 Dimension drawing

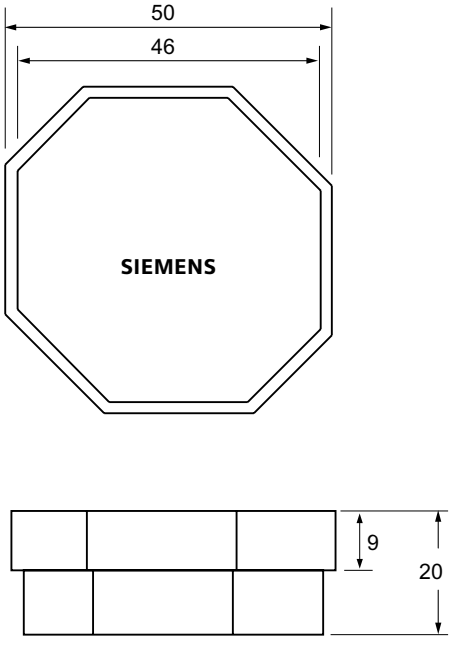


Figure 7-16 RF350T dimension drawing

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 48)"
	Mounting on metal	Yes, with spacer
	Degree of protection	IP67

7.6.2 Ordering data

Table 7-11 Ordering data RF360T

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

Table 7-12 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

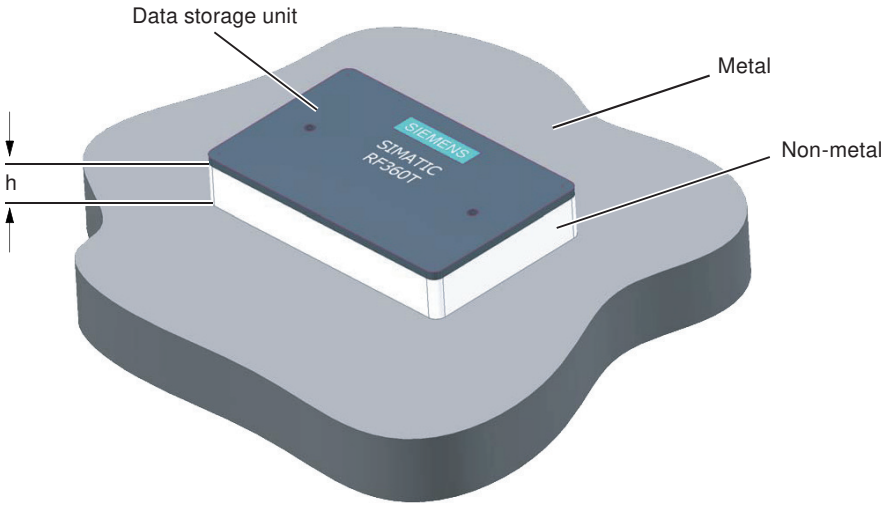


Figure 7-17 Mounting of RF360T with spacer

The standard value for h is ≥ 20 mm.

Flush-mounting of RF360T in metal:

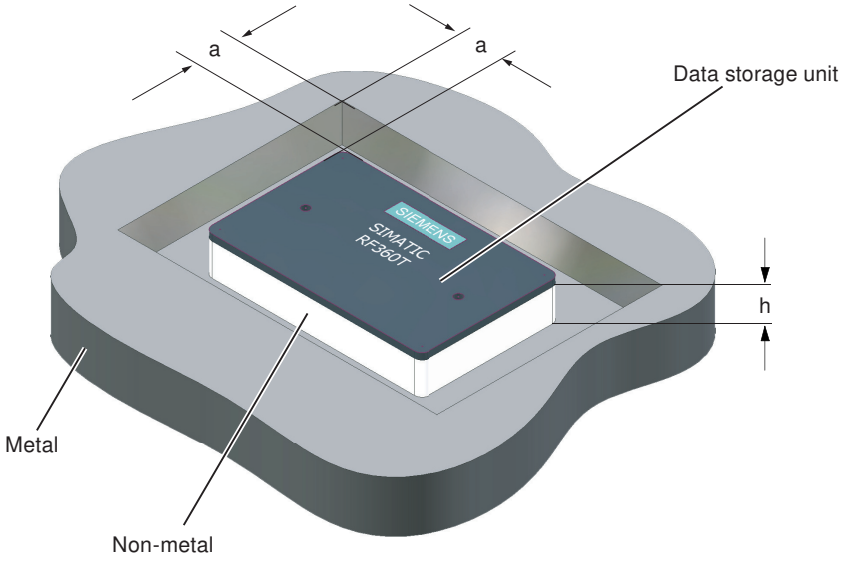


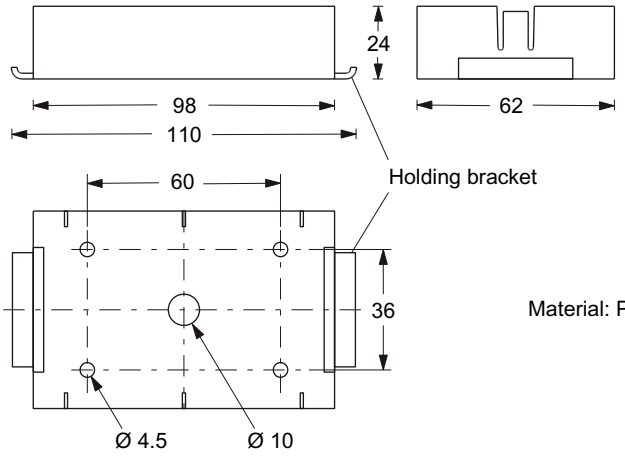
Figure 7-18 Flush-mounting of RF360T with spacer

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

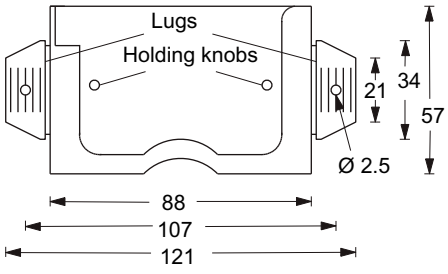
Dimensions of spacer and fixing pocket for RF360T

Dimension sketch

Spacers: 6GT2190-0AA00



Mounting bracket: 6GT2190-0AB00

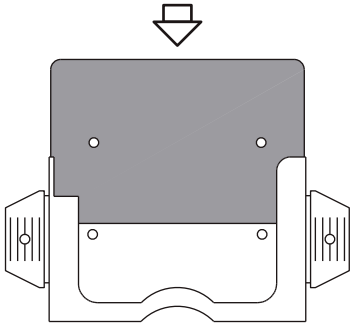


Material: PA 6

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

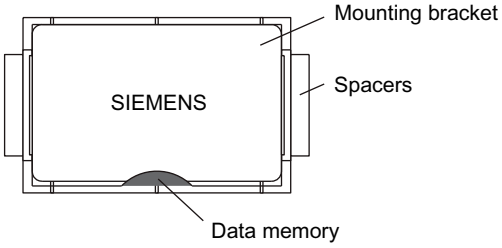


The transponder is pushed into the mounting bracket. Locking takes place with holding knobs in the mounting bracket.w

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 7-13 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 / 32 KB FRAM
• OTP 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 48)"
Mechanical specifications	
Enclosure	
• 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 ... +75 °C
• outside the read/write field	• -40 ... +85 °C
• during storage	• -40 ... +85 °C
Degree of protection according to EN 60529	IP67
Shock-resistant acc. to EN 60721-3-7, Class 7 M2	500 m/s^2
Vibration-resistant acc. to EN 60721-3-7, Class 7 M2	200 m/s^2
Torsion and bending load	Not permitted
Design, dimensions and weight	
Dimensions (L x W x H)	86 x 55 x 2.5 mm
Weight	25 g

		6GT2800-4AC00 **6GT2800-5AC00**
Type of mounting	• 2 x M3 screws ≤ 1.0 Nm • Fixing pocket (6GT2190-0AB00)	

Standards, specifications, approvals	
MTBF	1200 years

7.6.5 Approvals

Declarations of Conformity

The Declaration of Conformity is available to all responsible authorities at:

Siemens AG
Digital Industries
Process Automation

DE-76181 Karlsruhe, Germany

EU Declaration of Conformity

Siemens AG hereby declares that the SIMATIC RF360T radio equipment types comply with the directives 2014/53/EU (RED) and 2011/65/EU (RoHS). The complete text of the EU Declarations of Conformity is available at the following Internet address:

Link (https://support.industry.siemens.com/cs/ww/en/ps/15914/cert)

UK Declaration of Conformity

Siemens AG hereby declares that the SIMATIC RF360T radio equipment types comply with the directives Radio Equipment Regulations 2017 (SI 2017/1206) and related amendments and RoHS Regulations 2012 (SI 2012/3032) and related amendments. The complete text of the UK Declarations of Conformity is available at the following Internet address:

Link (https://support.industry.siemens.com/cs/ww/en/ps/15914/cert)

7.6.6 Dimension drawing

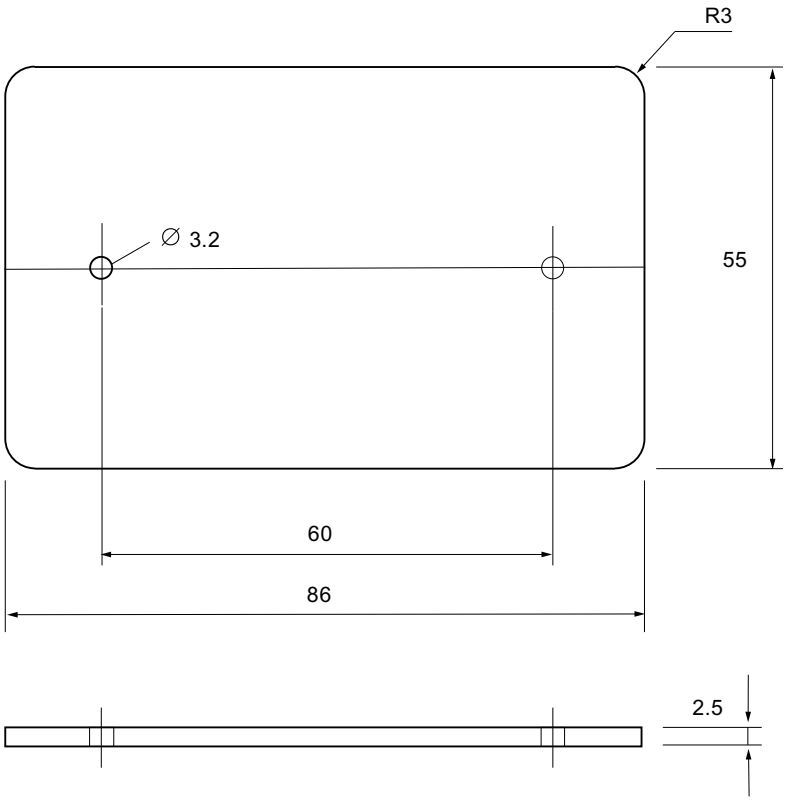


Figure 7-20 RF360T dimension drawing

Dimensions in mm

7.7 SIMATIC RF370T

7.7.1 Features

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 48)"
	Mounting on metal	Yes
	Degree of protection	IP68/IPx9K

7.7.2 Ordering data

Table 7-14 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

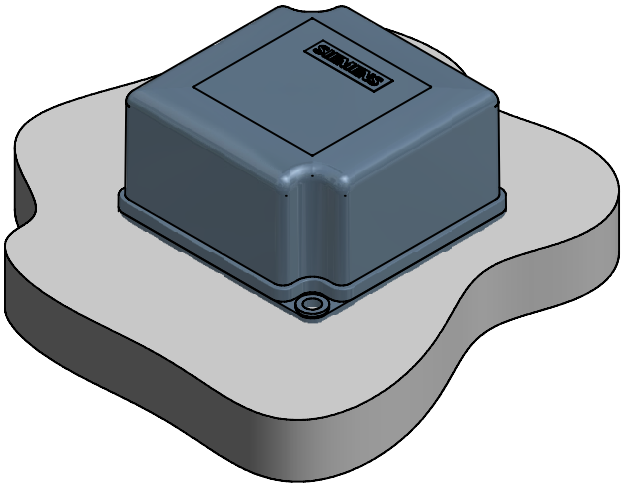


Figure 7-21 Mounting of RF370T on metal

Flush-mounting of RF370T in metal:

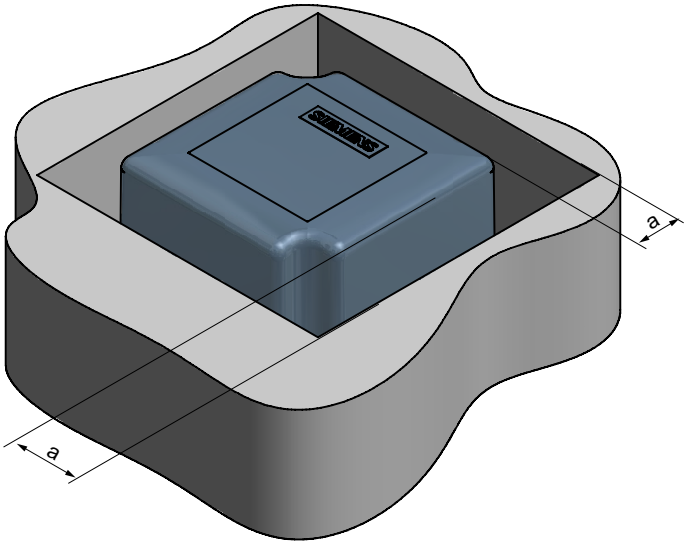


Figure 7-22 RF370T flush-mounted in metal

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 7-15 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 KB FRAM / 64 KB FRAM	
• OTP 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 48)"	
Mechanical specifications		
Enclosure		
• 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 ... +85 °C	
• outside the read/write field	• -40 ... +85 °C	
• during storage	• -40 ... +85 °C	
Degree of protection according to EN 60529	IPx9K	
Shock-resistant according to EN 60721-3-7 Class 7 M2 [1)]	500 m/s²	

		6GT2800-5BE00 6GT2800-6BE00
Vibration-resistant according to EN 60721-3-7 Class 7 M2 [1]	200 m/s²	
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

Standards, specifications, approvals	
MTBF	1200 years

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

7.7.6 Approvals

Declarations of Conformity

The Declaration of Conformity is available to all responsible authorities at:

Siemens AG
Digital Industries
Process Automation

DE-76181 Karlsruhe, Germany

EU Declaration of Conformity

Siemens AG hereby declares that the SIMATIC RF370T radio equipment types comply with the directives 2014/53/EU (RED) and 2011/65/EU (RoHS). The complete text of the EU Declarations of Conformity is available at the following Internet address:

Link (https://support.industry.siemens.com/cs/ww/en/ps/15914/cert)

UK Declaration of Conformity

Siemens AG hereby declares that the SIMATIC RF370T radio equipment types comply with the directives Radio Equipment Regulations 2017 (SI 2017/1206) and related amendments and RoHS Regulations 2012 (SI 2012/3032) and related amendments. The complete text of the UK Declarations of Conformity is available at the following Internet address:

Link (https://support.industry.siemens.com/cs/ww/en/ps/15914/cert)

7.7.7 Dimensional drawing

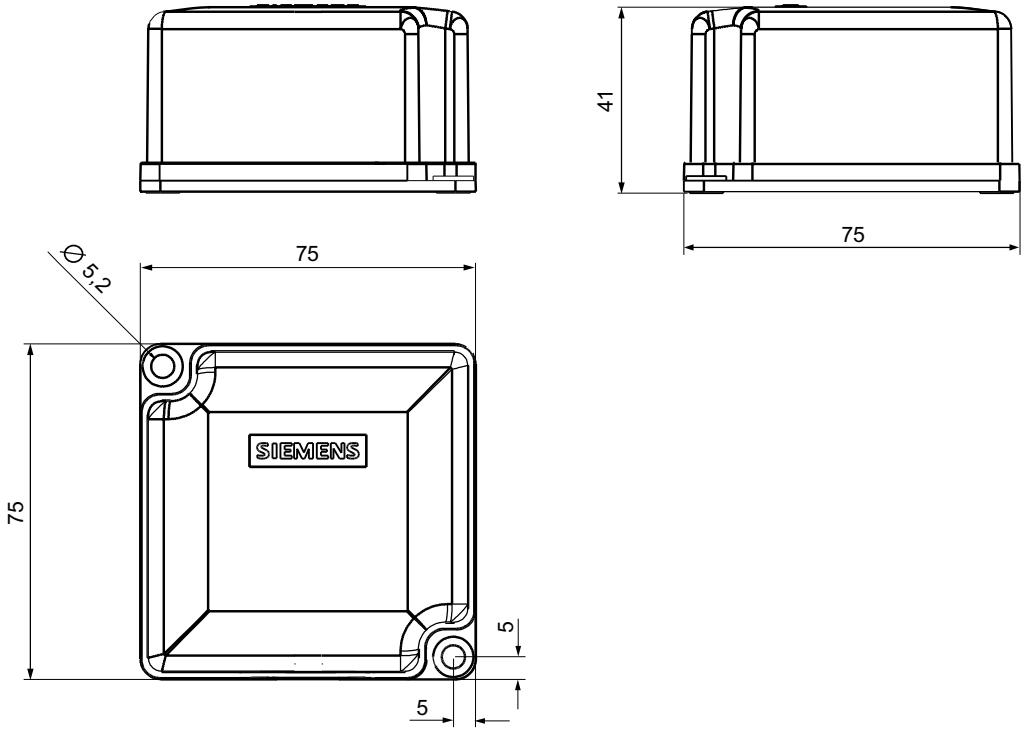


Figure 7-23 RF370T dimension drawing

Dimensions in mm

7.8 SIMATIC RF380T

7.8.1 Features

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 48)"
	Mounting on metal	Yes, flush-mounted in metal
	Degree of protection	IP68

7.8.2 Ordering data

Table 7-16 Ordering data RF380T

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

Table 7-17 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.

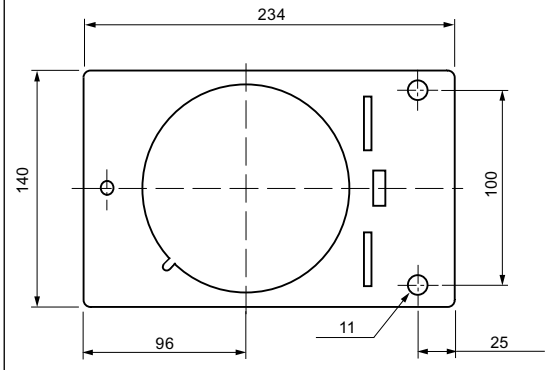
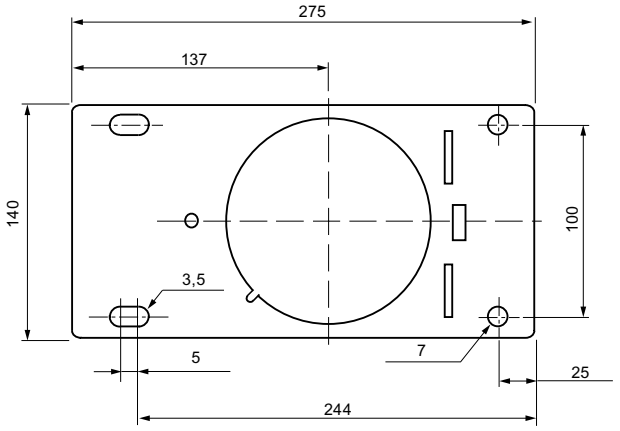
7.8.3.1 Mounting instructions

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

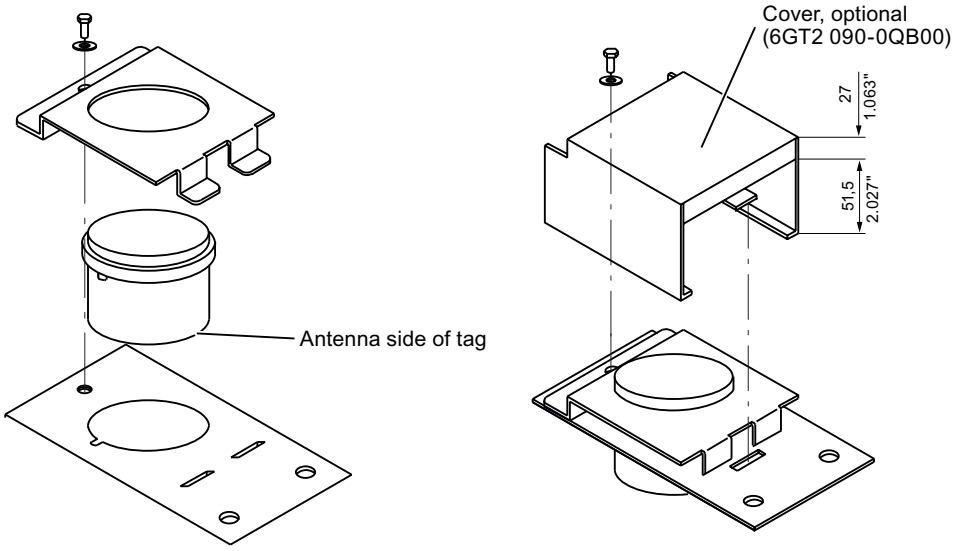


Figure 7-24 Assembly of tag with holder

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

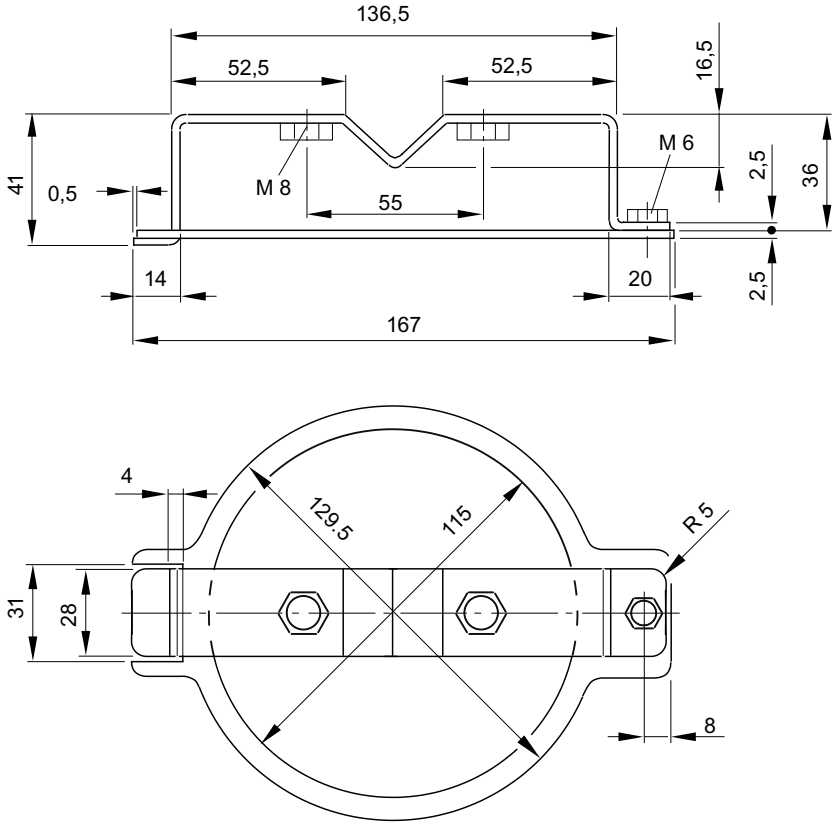


Figure 7-25 Universal holder 6GT2590-0QA00

7.8.3.2 Metal-free area

Direct mounting of the RF380T on metal is permitted.

Mounting of RF380T on metal

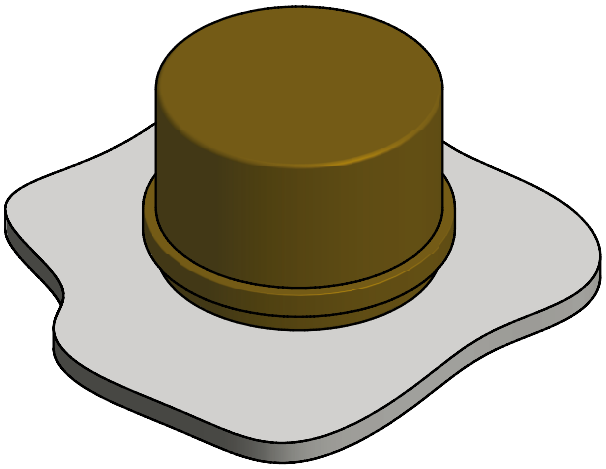


Figure 7-26 Mounting of RF380T on metal

Flush-mounting of RF380T in metal:

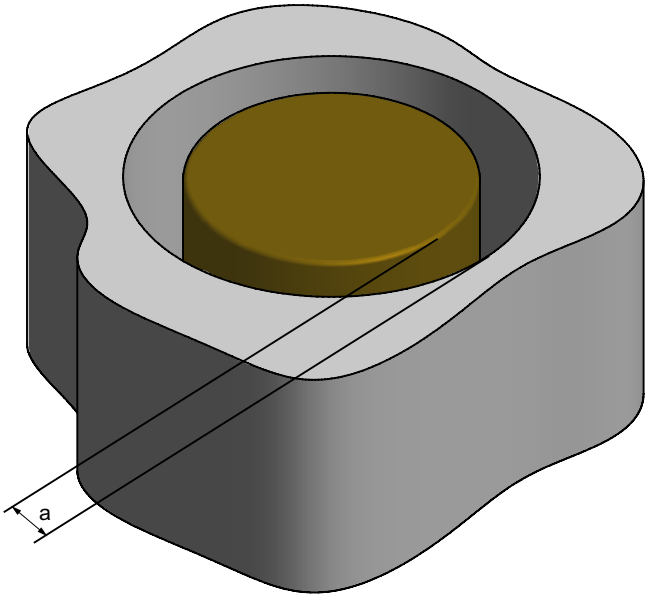


Figure 7-27 RF380T flush-mounted in metal

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.

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 7-18 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.

Example of a cyclic sequence

Table 7-19 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

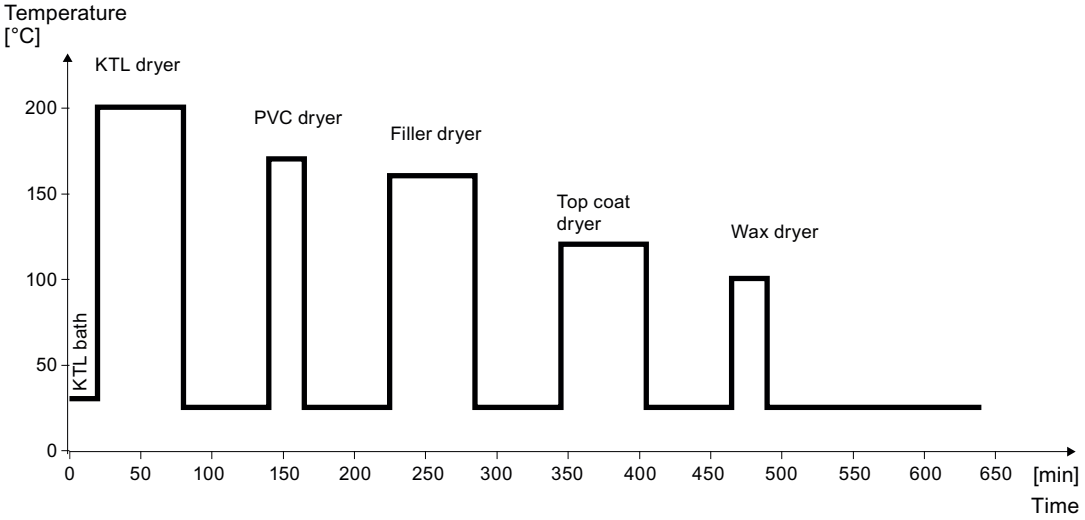


Figure 7-28 Graphic trend of temperature profile from above table

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.

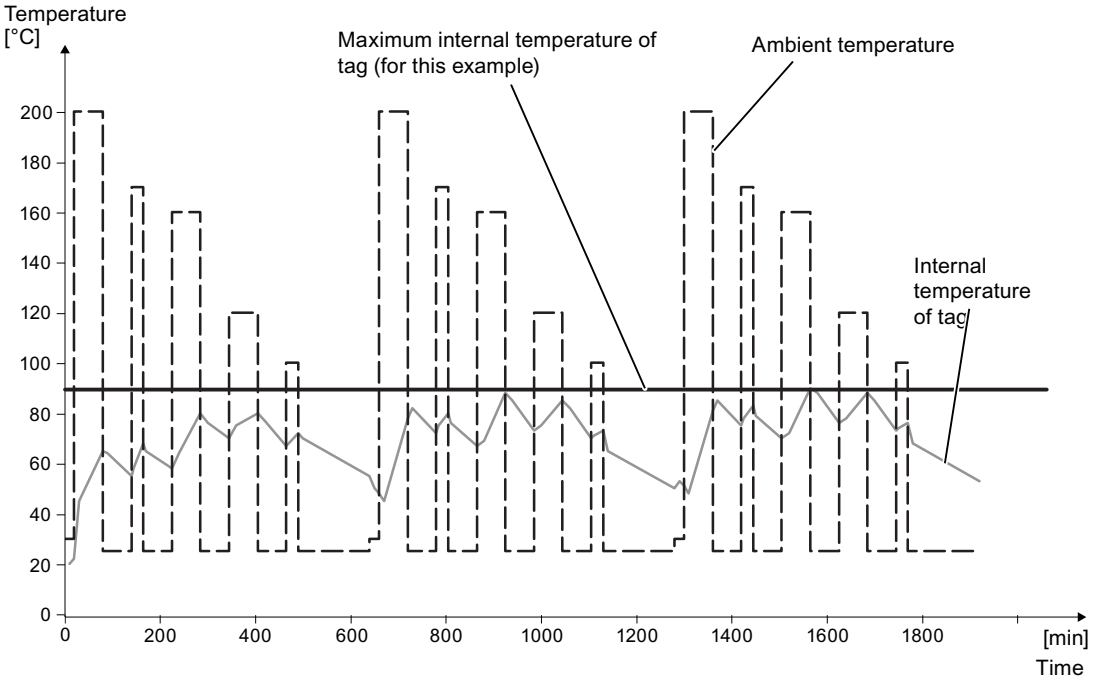


Figure 7-29 Complete temperature response due to simulation

7.8.5 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 readers and transponders (Page 95).

7.8.6 Operation in hazardous areas

7.8.6.1 Operation in hazardous areas

Note that the following warning must be clearly visible next to the device or mounting accessories. Its visibility must be ensured for the entire life cycle of the device:

⚠ WARNING

Danger of electrostatic charge – see instructions

7.8.6.2 Conditions for safe areas

The following instructions and safety notes must be observed during the entire service life of a transponder, i.e. during transport, installation, operation, storage, cleaning, maintenance and removal, until the transponder has been disposed of in a safe environment.

⚠ WARNING

Special conditions of use

Precautions required to reduce risk from electrostatic discharge

When using the transponder for a Group III (dust) application and at a low relative air humidity of < 30%, the surface of the enclosure may store an electrostatic charge and become a source of ignition, even if the surface is relatively free of surface contaminants such as dirt, dust or oil.

Guidance on protection against the risk of ignition due to electrostatic discharge can be found in the standard IEC TS60079-32-1.
The surface should only be cleaned with a damp cloth.

Determining the applicable ambient temperature

The applicable ambient temperature must be determined with the upmost precision. Read the manual carefully to learn more on this.
The applicable ambient temperature must be maintained taking into account the permissible power "Pi" fed in depending on the number and distance of the radio sources (external radio sources or the permissible RF reader type) and the assigned temperature class and surface temperature.

⚠ WARNING

Risk of explosion through dust-air or gas-air mixtures

To avoid the risk of explosion and damage to the device, observe the following conditions for safe areas if the device will be used in a hazardous area (Zone 2 or 22) in the future:

- The device must be operated and stored in such a way that adequate protection against UV light is ensured at all times.
- To clean the device, only products that are suitable for the chemical resistance of the housing material can be used.
- The device must be set up and installed in such a way that mechanical protection is guaranteed.
- Throughout the entire service life of the device in a plant (installation, operation, storage, removal) adequate clearance room, including all mechanical tolerances, to avoid collisions must be present between the device and possible obstacles.
- Sufficient grounding of the metallic mounting surface (e.g. V2A sheet steel bracket, optional cover and/or universal bracket) must be ensured.
- The device may only be operated with accessories approved or supplied by the manufacturer.

⚠ WARNING

Risk of explosion through dust-air or gas-air mixtures

Note the following conditions to retain the integrity of the transponder housing:

- Do not use any mechanical means (e.g. knives, screwdrivers, hammers etc.) to remove foreign material (e.g. paint residue) from the transponder surface.
- Foreseeable misuse: Do not use the transponder for purposes other than what it is intended for (e.g. as a buffer stop).
- Do not apply too high of a torque when installing the device.
- Do not expose the device to excessive mechanical load, e.g. impacts or vibrations.
- Do not clean by sandblasting or with a high-pressure water jet, as these types of cleaning will damage the transponder.

7.8.6.3 Conditions in hazardous areas

The following instructions must be observed during the entire service life of a transponder, i.e. during transport, installation, operation, storage, cleaning, maintenance and removal, until the transponder has been disposed of in a safe environment.

⚠ WARNING

Special conditions of use

Precautions required to reduce risk from electrostatic discharge

When using the transponder for a Group III (dust) application and at a low relative air humidity of < 30%, the surface of the enclosure may store an electrostatic charge and become a source of ignition, even if the surface is relatively free of surface contaminants such as dirt, dust or oil.

Guidance on protection against the risk of ignition due to electrostatic discharge can be found in the standard IEC TS60079-32-1.
The surface should only be cleaned with a damp cloth.

Determining the applicable ambient temperature

The applicable ambient temperature must be determined with the upmost precision. Read the manual carefully to learn more on this.
The applicable ambient temperature must be maintained taking into account the permissible power "Pi" fed in depending on the number and distance of the radio sources (external radio sources or the permissible RF reader type) and the assigned temperature class and surface temperature.

⚠ WARNING

Risk of explosion through dust-air or gas-air mixtures

To avoid the risk of explosion and damage to the device, observe the following conditions for operation of the device in a hazardous area (Zone 2 or 22):

- If the operating temperature exceeds 85 °C, the reader RF380R (1st and 2nd generation) has to maintain a minimum distance of 45 mm to the RF380T.

⚠ WARNING

Risk of explosion through dust-air or gas-air mixtures

To avoid the risk of explosion and damage to the device, observe the following conditions during installation, mounting, maintenance, cleaning, storage and removal of the device in a hazardous area (Zone 2 or 22):

- External radio equipment/sources (except RF300 readers for transponder access) either need to be evaluated based on the maximum permissible temperature rise or need to stay under a specific limit value to guarantee a power transmission of 1 µW (negligible) up to maximum 1 mW
- The maximum ambient temperatures of the transponders with respect to the hazardous environment must be adhered to before transponder access via an RF300 reader.
- The maximum surface temperature, corresponding to the marking, applies only for operation without a cover of dust.
- The device must be operated and stored in such a way that adequate protection against UV light is ensured.
- The device cannot be operated in areas that are affected by processes causing high electrostatic charges.
- The device (incl. mounting accessories) should only be cleaned with a damp cloth.
- To clean the device, only products that are suitable for the chemical resistance of the housing material can be used.
- The device must be set up and installed in such a way that mechanical protection is guaranteed.
- Throughout the entire service life of the device in a plant (installation, operation, storage, removal) adequate clearance room, including all mechanical tolerances, to avoid collisions must be present between the device and possible obstacles.
- Sufficient grounding of the metallic mounting surface (e.g. V2A sheet steel bracket, optional cover and/or universal bracket) must be ensured.
- The device may only be operated with accessories approved or supplied by the manufacturer.

⚠ WARNING

Risk of explosion through dust-air or gas-air mixtures

Note the following conditions to retain the integrity of the transponder housing:

- Do not use any mechanical means (e.g. knives, screwdrivers, hammers etc.) to remove foreign material (e.g. paint residue) from the transponder surface.
- Foreseeable misuse: Do not use the transponder for purposes other than what it is intended for (e.g. as a buffer stop).
- Do not apply too high of a torque when installing the device.
- Do not expose the device to excessive mechanical load, e.g. impacts or vibrations.

7.8.6.4 Conditions in hazardous areas with gases, outside of transponder operation

This section is relevant for transponders that are in hazardous areas with gases (Zone 2 or 22), but are not in operation or in active use. This applies to transponders that are not in the antenna field of a reader and only need to be stored, for example.

⚠ WARNING

Ignition of gas-air mixtures

When storing or using the transponders, ensure that the temperature class is adhered to by observing the requirements on the operating range.

Combinations of RF300 readers or HF-RFID readers and the RF380T other than those specified below are not permitted.

Failure to observe the permissible minimum distances between RF380T and other external devices, including the RF300 readers, when storing the transponder can result in ignition of gas-air mixtures.

Failure to observe the permissible temperature ranges when storing or using the transponder can result in ignition of gas-air mixtures.

Temperature classes and ambient temperature range

The temperature class of the transponders for hazardous areas depends on the ambient temperature range during storage and on the electromagnetic environment. Even if no readers access the transponder, the electromagnetic environment can still cause a risk due to the power transmitted to the transponder.

The following tables provide you with an overview of the effects of a temperature rise of the transponder on the ambient temperature range, depending on the temperature class. These values are valid for the transponders that are approved for storage in hazardous areas with gases (Zone 2 or 22).

Table 7-20 Assignment of the ambient temperature range to the temperature class

Ambient temperature range (Ta, max)	Temperature class (T2 ... T6)
-40 °C ≤ Ta. ≤ Ta max (Ta, max [°C] storage)	See following table

⚠ CAUTION

Configuring instructions

When selecting the temperature class, take special care to observe the temperature conditions described in section "Configuring instructions (Page 311)".

Table 7-21 Effects of a temperature rise of the RF380T transponder on the ambient temperature range depending on the temperature class (long-term)

Temperature rise	**Ta, max [°C] storage (Ord. Loc.)**	**Temperature class & Ta, max [°C] storage (HazLoc)**				
		T2	**T3**	**T4**	**T5**	**T6**
		300 °C	**200 °C**	**135 °C**	**100 °C**	**85 °C**
≤ 0.1 °C	110	110	110	110	90	75
≤ 5 °C	110	110	110	110	90	75
≤ 10 °C	110	110	110	110	85	70
≤ 15 °C	110	110	110	110	80	65
≤ 20 °C	110	110	110	110	75	60
≤ 25 °C	110	110	110	105	70	55
≤ 30 °C	110	110	110	100	65	50
≤ 35 °C	110	110	110	95	60	45
≤ 40 °C	110	110	110	90	55	40

Table 7-22 Effects of a temperature rise of the RF380T transponder on the ambient temperature range depending on the temperature class (short-term)

Temperature rise	**Ta, max [°C] short-term storage (Ord. Loc.)**	**Temperature class & Ta, max [°C] short-term storage (HazLoc)**				
		T2	**T3**	**T4**	**T5**	**T6**
		300 °C	**200 °C**	**135 °C**	**100 °C**	**85 °C**
≤ 0.1 °C	220	220	190	125	90	75
≤ 5 °C	220	220	190	125	90	75
≤ 10 °C	220	220	185	120	85	70
≤ 15 °C	220	220	180	115	80	65
≤ 20 °C	220	220	175	110	75	60
≤ 25 °C	220	220	170	105	70	55
≤ 30 °C	220	220	165	100	65	50
≤ 35 °C	220	220	160	95	60	45
≤ 40 °C	220	220	155	90	55	40

7.8.6.5 Conditions in hazardous areas with gases, during transponder operation

This section is relevant for transponders that are in hazardous areas with gases (Zone 2 or 22), and are in operation or in active use. This applies to transponders that are in the antenna field of a reader.

⚠ WARNING

Ignition of gas-air mixtures

When storing or using the transponders, ensure that the temperature class is adhered to by observing the requirements on the operating range.

Combinations of RF300 readers or HF-RFID readers and the RF380T other than those specified below are not permitted.

Failure to observe the permissible minimum distances between RF380T and other external devices, including the RF300 readers, when storing the transponder can result in ignition of gas-air mixtures.

Failure to observe the permissible temperature ranges when storing or using the transponder can result in ignition of gas-air mixtures.

Temperature classes and ambient temperature range

The temperature class of the transponders for hazardous areas depends on the ambient temperature range, the readers that affect the transponders and the electromagnetic environment. Consider that multiple devices (RF300 readers and radio equipment/sources) may have an impact on the transponders here:

- All radio equipment/sources within a distance in which they can contribute to an induced power of 1 mW.
- All RF300 readers that affect the transponder.

The following tables provide you with an overview of the temperature classes and the permissible ambient temperature range of the transponders, depending on the temperature class and the acting RF300 reader. These values are valid for the transponders that are approved for operation in hazardous areas with gases (Zone 2 or 22).

Table 7-23 Assignment of the ambient temperature range to the temperature class

Ambient temperature range (Ta, max)	Temperature class (T2 ... T6)
-25 °C ≤ Ta. ≤ Ta max (Ta, max [°C] operation)	See following table

⚠ CAUTION

Configuring instructions

When selecting the temperature class, take special care to observe the temperature conditions described in section "Configuring instructions (Page 311)".

Table 7-24 Temperature class and maximum permissible ambient temperature range of the RF380T transponders, depending on the acting RF300 reader

Reader	Temperature class & Ta, max [°C] operation (HazLoc)					
	Temperature class of Group II 3G EPL Gc	T2	T3	T4	T5	T6
	Max. surface temperature of Group III 3D EPL Dc	300 °C	200 °C	135 °C	100 °C	85 °C
RF310R	--	--	--	--	--	--
RF340R	--	220	175	110	75	60
RF350R with ANT1	--	220	180	110	83	68
RF350R with ANT3, ANT12, ANT18, ANT30	--	--	--	--	--	--
RF380R (2nd generation)	--	220	165	101	66	51
RF380R (1st generation)	--	220	150	87	52	37

7.8.6.6 Conditions in hazardous areas with dusts, outside of transponder operation

This section is relevant for transponders that are in hazardous areas with dusts (Zone 2 or 22), but are not in operation or in active use. This applies to transponders that are not in the antenna field of a reader and only need to be stored, for example.

⚠ WARNING

Ignition of dust-air mixtures

When storing or using the transponders, ensure that the temperature class is adhered to by observing the requirements on the operating range.

Combinations of RF300 readers or HF-RFID readers and the RF380T other than those specified below are not permitted.

Failure to observe the permissible minimum distances between RF380T and other external devices, including the RF300 readers, when storing the transponder can result in ignition of dust-air mixtures.

Failure to observe the permissible temperature ranges when storing or using the transponder can result in ignition of dust-air mixtures.

Temperature value and ambient temperature range

The temperature value of the transponders for hazardous areas depends on the ambient temperature range during storage and on the electromagnetic environment. Even if no readers access the transponder, the electromagnetic environment can still cause a risk due to the power transmitted to the transponder.

The equipment is suitable for dust with a dust layer ≤ 5 mm if the ignition temperatures are higher than the specified temperature values (smoldering temperature).

The following tables provide you with an overview of the effects of a temperature rise of the transponder on the permissible temperature value, depending on the ambient temperature range. These values are valid for the transponders that are approved for storage in hazardous areas with dusts (Zone 2 or 22).

CAUTION

Configuring instructions

When selecting the temperature value, take special care to observe the temperature conditions described in section "Configuring instructions (Page 311)".

Table 7-25 Effects of a temperature rise of the RF380T transponder on the temperature value depending on the ambient temperature range

Temperature rise	Ambient temperature range	Temperature value
≤ 0.1 °C	-40 °C ≤ Ta. ≤ +110 °C	T115 °C (Ta, max [°C] + 5 °C)
≤ 5 °C	-40 °C ≤ Ta. ≤ +110 °C	T120 °C (Ta, max [°C] + 10 °C)
≤ 10 °C	-40 °C ≤ Ta. ≤ +110 °C	T125 °C (Ta, max [°C] + 15 °C)
≤ 15 °C	-40 °C ≤ Ta. ≤ +110 °C	T130 °C (Ta, max [°C] + 20 °C)
≤ 20 °C	-40 °C ≤ Ta. ≤ +110 °C	T135 °C (Ta, max [°C] + 25 °C)
≤ 25 °C	-40 °C ≤ Ta. ≤ +110 °C	T140 °C (Ta, max [°C] + 30 °C)
≤ 30 °C	-40 °C ≤ Ta. ≤ +110 °C	T145 °C (Ta, max [°C] + 35 °C)
≤ 35 °C	-40 °C ≤ Ta. ≤ +110 °C	T150 °C (Ta, max [°C] + 40 °C)
≤ 40 °C	-40 °C ≤ Ta. ≤ +110 °C	T155 °C (Ta, max [°C] + 45 °C)

7.8.6.7 Conditions in hazardous areas with dusts, during transponder operation

This section is relevant for transponders that are in hazardous areas with dusts (Zone 2 or 22), and are in operation or in active use. This applies to transponders that are in the antenna field of a reader.

⚠ WARNING

Ignition of dust-air mixtures

When storing or using the transponders, ensure that the temperature class is adhered to by observing the requirements on the operating range.

Combinations of RF300 readers or HF-RFID readers and the RF380T other than those specified below are not permitted.

Failure to observe the permissible minimum distances between RF380T and other external devices, including the RF300 readers, when storing the transponder can result in ignition of gas-air mixtures.

Failure to observe the permissible temperature ranges when storing or using the transponder can result in ignition of gas-air mixtures.

Temperature value and ambient temperature range

The temperature value of the transponders for hazardous areas depends on the ambient temperature range, the readers that affect the transponders and the electromagnetic environment.

The equipment is suitable for dust with a dust layer ≤ 5 mm if the ignition temperatures are higher than the specified temperature values (smoldering temperature).

Consider that multiple devices (RF300 readers and radio equipment/sources) may have an impact on the transponders here:

- All radio equipment/sources within a distance in which they can contribute to an induced power of 1 mW.
- All RF300 readers that affect the transponder.

The following tables provide you with an overview of the permissible temperature values, depending on the ambient temperature range of the transponders and the acting RF300 reader. These values are valid for the transponders that are approved for operation in hazardous areas with dusts (Zone 2 or 22).

⚠ CAUTION

Configuring instructions

When selecting the temperature value, take special care to observe the temperature conditions described in section "Configuring instructions (Page 311)".

Table 7-26 Temperature value and permissible ambient temperature range of the RF380T transponders, depending on the acting RF300 reader

Ambient temperature range	Temperature value					
	RF310R	RF340R	RF350R with ANT 1	RF350R with ANT 3, ANT 12, ANT 18, ANT 30	RF380R (2nd gen.)	RF380R (1st gen.)
-25 °C ≤ Ta. ≤ +40 °C	--	T60 °C	T55 °C	--	T70 °C	T85 °C
-25 °C ≤ Ta. ≤ +70 °C	--	T90 °C	T85 °C	--	T100 °C	T115 °C

7.8.6.8 Minimum distances to RF380T

The following tables provide you with an overview of the minimum distances that RF300 readers and other radio equipment/sources need to maintain to an RF380T transponder to avoid a temperature rise of the transponder surface temperature.

WARNING

Risk of explosion through dust-air or gas-air mixtures

To avoid the risk of explosion and damage to the device, observe the following conditions during installation, mounting, maintenance, cleaning, storage and removal of the device in a hazardous area (Zone 2 or 22):

- The minimum distances between RF300 readers or other radio equipment/sources and an RF380T as specified below must be observed.
- Note that the induced power is added up if there are multiple RF300 readers or other radio equipment/sources that affect a transponder.

Minimum distances to be maintained for RF300 readers

Table 7-27 Minimum distances in meter [m] to be maintained between RF300 readers and an RF380T

	Minimum distance (r) with 1 mW	Minimum distance (r) with 1 µW
RF310R	0.49	1.56
RF340R	0.61	1.93
RF350R with ANT1	0.61	1.92
RF350R with ANT3	0.61	1.92
RF350R with ANT12	0.61	1.92
RF350R with ANT18	0.61	1.92
RF350R with ANT30	0.61	1.92
RF380R (2nd generation)	0.83	2.61
RF380R (1st generation)	1.29	4.09

Minimum distances to be maintained for radio equipment/sources

The minimum distances to be maintained between radio equipment/sources and an RF380T, as well as between the radio equipment/sources to one another, depend on the frequency range in which the radio equipment/sources transmit.

Table 7-28 Minimum distances in meter [m] to be maintained between the radio equipment/sources and an RF380T, depending on the wireless range of the radio equipment/sources

Induced power	Wireless range	Minimum distance (r)	Temperature rise
1 mW	6.78 MHz	0.52	≤ 0.1 °C
	13.56 MHz	4.19	
	27.12 MHz	0.53	
	All other frequencies between 10 kHz ...100 MHz	0.22	
1 µW	6.78 MHz	1.64	≤ 0.1 °C
	13.56 MHz	13.25	
	27.12 MHz	1.66	
	All other frequencies between 10 kHz ...100 MHz	0.71	

If the minimum distance between radio equipment sources and transponders or between the radio equipment/sources to one another is reduced further, so that they induce more than 1 mW power to the transponder, this leads to a temperature rise of the transponder surface temperature.

Table 7-29 Temperature rise when the minimum distance in meter [m] between the radio equipment/sources and an RF380T is undershot

Induced power	Frequency range	Minimum distance (r)	Temperature rise
> 1 mW	13.56 MHz	2.12	≤ 5 °C
		1.89	≤ 10 °C
		1.77	≤ 15 °C
		1.68	≤ 20 °C
		1.62	≤ 25 °C
		1.57	≤ 30 °C
		1.53	≤ 35 °C
		1.50	≤ 40 °C

7.8.6.9 Extended installation and operating conditions for hazardous areas for applications according to UL Hazardous Location

In addition to the instructions in "File E85972-D1005" for non-hazardous areas, the following provisions apply:

- **For Div. 1:**
  This equipment is suitable for operation ONLY IN HAZARDOUS AREAS OR NON-HAZARDOUS AREAS of Class I, Division 1, Groups A, B, C, and D OR Class II, Division 1, Groups E, F and G.
- **Only for Zone 0 or 20:**
  This equipment is suitable for operation only in HAZARDOUS AREAS OR NON-HAZARDOUS AREAS of Class I, Division 1, Groups A, B, C, and D OR Class II, Division 1, Groups E, F and G OR Zone 0, Group IIC, OR Zone 20, Group IIIC.

WARNING

WARNING

RISK OF ELECTROSTATIC DISCHARGE.

WARNING

Risk of explosion through dust-air or gas-air mixtures

To avoid the risk of explosion and damage to the device, observe the following conditions during installation, mounting, maintenance, cleaning, storage and removal of the device in a hazardous area (Zone 2 or 22):

- External radio equipment/sources (except RF300 readers for transponder access) either need to be evaluated based on the maximum permissible temperature rise or need to stay under a specific limit value to guarantee a power transmission of 1 µW (negligible) up to maximum 1 mW
- The maximum ambient temperatures of the transponders with respect to the hazardous environment must be adhered to before transponder access via an RF300 reader.
- The maximum surface temperature, corresponding to the marking, applies only for operation without a cover of dust.
- The device must be operated and stored in such a way that adequate protection against UV light is ensured.
- The device cannot be operated in areas that are affected by processes causing high electrostatic charges.
- The device including mounting accessories should only be cleaned with a damp cloth.
- To clean the device, only products that are suitable for the chemical resistance of the housing material can be used.
- The device must be set up and installed in such a way that mechanical protection is guaranteed.
- Grounding of the metal mounting surface must be ensured if the device is insulated but is connected with metal devices (V2A sheet steel bracket, optional cover and/or universal bracket).
- The device may only be operated with accessories approved or supplied by the manufacturer.

7.8.6.10 Certificates & approvals

Note

Issued approvals for the device

The specified approvals apply only when the corresponding mark is printed on the product. You can check which of the following approvals have been granted for your product by the markings on the type plate.

Note

Type of protection of the device

The devices are approved for various types of protection. You can find the type of protection of your device and the ATEX-/IECEx-/UKEX-/UL Ord. Loc.-/UL HazLoc certificate number on the type plate.

Declarations of Conformity

The Declaration of Conformity is available to all responsible authorities at:

Siemens AG
Digital Industries
Process Automation

DE-76181 Karlsruhe, Germany

Manufacturer's address - distributor

Siemens AG

DE-76181 Karlsruhe, Germany

Manufacturer's address - factory

Siemens AG

DE-90766 Fürth, Germany

EU Declaration of Conformity

Siemens AG hereby declares that the SIMATIC RF380T radio equipment types comply with the directives 2014/34/EU (ATEX), 2014/53/EU (RED) and 2011/65/EU (RoHS). The complete text of the EU Declarations of Conformity is available at the following Internet address:

Link (https://support.industry.siemens.com/cs/ww/en/ps/15914/cert)

The prototype test certificate for the RF380T, which is approved for operation in Zone 2 and Zone 22 hazardous areas, was confirmed by UL 22 ATEX 2613X. Based on this certificate, the EU Declaration of Conformity was created by the manufacturer in accordance with Directive 2014/34/EU.

UK Declaration of Conformity

Siemens AG hereby declares that the SIMATIC RF380T radio equipment types comply with the directives UKEX Regulations (SI 2016/1107) and related amendments, Radio Equipment Regulations 2017 (SI 2017/1206) and related amendments and RoHS Regulations 2012 (SI 2012/3032) and related amendments. The complete text of the UK Declarations of Conformity is available at the following Internet address:

Link (https://support.industry.siemens.com/cs/ww/en/ps/15914/cert)

IECEx conformity certificate

The IECEx Certificate of Conformity for the RF380T, which is approved for operation in Zone 2 and Zone 22 hazardous areas, was confirmed according to IECEx ULD 22.0015X.

The manufacturing plant of the transponder has an IECEx quality assurance system, which was recognized by the notified body DEKRA Certification B.V. with the report number "DE/BVS/QAR08.0005/aa" (current version: aa = 00, 01, 02, ...).

ATEX/IECEx

UL International Demko A/S as notified body No. 0539 according to Article 18 of the European Union Directive dated 26 February 2014 (2014/34/EU) has confirmed adherence to the main health and safety requirements for the design of equipment and protective systems for use in hazardous areas according to Appendix II of the directive.

The main health and safety requirements according to the following standards are met.

This allows the transponder to be used in hazardous areas with gases for the device category 3G and gas group IIC or, alternatively, in hazardous areas with dusts for the device category 3D and group IIIC.

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

Table 7-30 Fulfilled requirements of the standards

Document	Title
EN IEC 60079-0 IEC 60079-0	Hazardous areas Part 0: Equipment - General requirements
EN 60079-11 IEC 60079-11	Hazardous areas Part 11: Equipment protection by intrinsic safety "i"

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

ATEX-/IECEx marking

The electrical equipment has the following marking:

II 3 G Ex ic IIC T2...T6 Gc
II 3 D Ex ic IIIC T* °C Dc
UL 22 ATEX 2613X
IECEx ULD 22.0015X

The equipment also has the following additional information:

[&&][A][B][CDEFGH] [= serial number, is assigned during production]

UKEX

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

Table 7-31 Fulfilled requirements of the standards

Document	Title
BS EN IEC 60079-0	Hazardous areas Part 0: Equipment - General requirements
BS EN 60079-11	Hazardous areas Part 11: Equipment protection by intrinsic safety "i"

You will find the current versions of the standards in the currently valid prototype test certificate.

UKEX marking

The electrical equipment has the following marking:

II 3 G Ex ic IIC T2...T6 Gc
II 3 D Ex ic IIIC T* °C Dc

The equipment also has the following additional information:

[&&][A][B][CDEFGH] [= serial number, is assigned during production]

UL Ord. Loc.

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

Table 7-32 Fulfilled requirements of the standards

Document	Title
UL 61010-2-201	Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use Part 2-201: Particular Requirements for Control Equipment
CAN/CSA-C22.2 No. 61010-2-201	

You will find the current versions of the standards in the currently valid UL Ord. Loc. certificates.

UL Ord. Loc. marking

The electrical equipment has the following marking:

LISTED E85972
IND.CONT.EQ

The equipment also has the following additional information:

[&&][A][B][CDEFGH] [= serial number, is assigned during production]

UL HazLoc

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

Table 7-33 Fulfilled requirements of the standards

Document	Title
UL 121201	Non-incendive Electrical Equipment for Use in
CAN/CSA C22.2 No. 213	Class I and II, Division 2 and Class III, Divisions 1 and 2 Hazardous (Classified) Locations
UL 60079-0	Hazardous areas
CSA C22.2 No. 60079-0	Part 0: Equipment - General requirements
UL 60079-11	Hazardous areas
CSA C22.2 No. 60079-11	Part 11: Equipment protection by intrinsic safety "i"

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

UL HazLoc. marking

The electrical equipment has the following marking:

LISTED E223122
IND.CONT.EQ FOR HAZ.LOC.
CL.I, DIV.2, GP.A,B,C,D T2...T6
CL.II, DIV.2, GP.E,F,G T*
CLI, Zone2, AEx ic IIC T2...T6 Gc, Ex ic IIC T2...T6 Gc X
CLI, Zone22, AEx ic IIIC T* °C Dc, Ex ic IIIC T* °C Dc X

The equipment also has the following additional information:

[&&][A][B][CDEFGH] [= serial number, is assigned during production]

Breakdown of the serial number

Serial number		Explanation
[&&][A][B][CDEFGH]		Serial number including encrypted specification of the year of manufacture
	[&&]	Code of manufacturing factory
	[A]	Year produced
	[B]	Month produced
	[CDEFGH]	Sequential number (000001 ... 999999)

7.8.7 Technical specifications

Table 7-34 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
• OTP 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 48)"
Mechanical specifications	
Enclosure	
• 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 ... +110 °C
Degree of protection according to EN 60529	IP68
Shock-resistant acc. to EN 60721-3-7, Class 7 M2 [1)2)]	500 m/s²
Vibration-resistant according to EN 60721-3-7 Class 7 M2 [2)]	50 m/s²
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)

	6GT2800-5DA00
Standards, specifications, approvals	
MTBF	1177 years

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

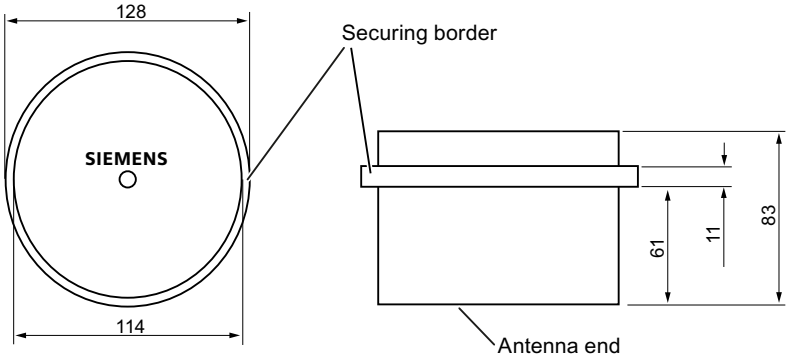


Figure 7-30 Dimension drawing RF380T

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)".

The SIMATIC RF300 readers can also describe and read ISO 14443 transponders (MIFARE Classic and MOBY E).

8.1 Memory configuration of ISO the transponders

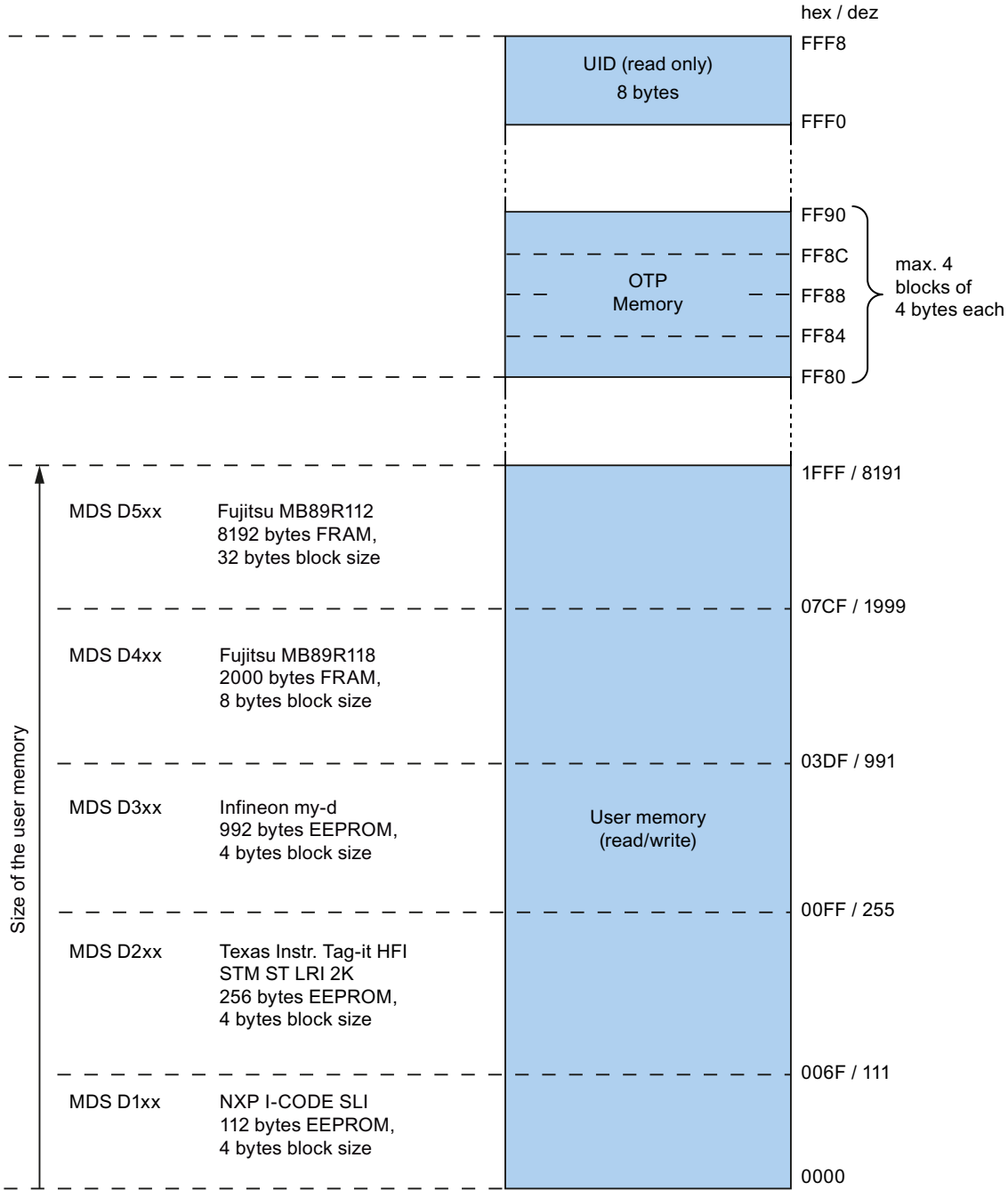


Figure 8-1 Memory configuration of ISO the transponders

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.

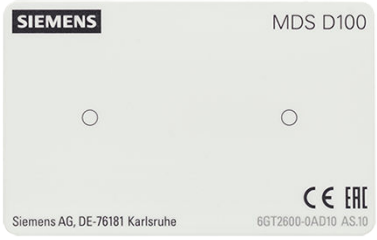
Note

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

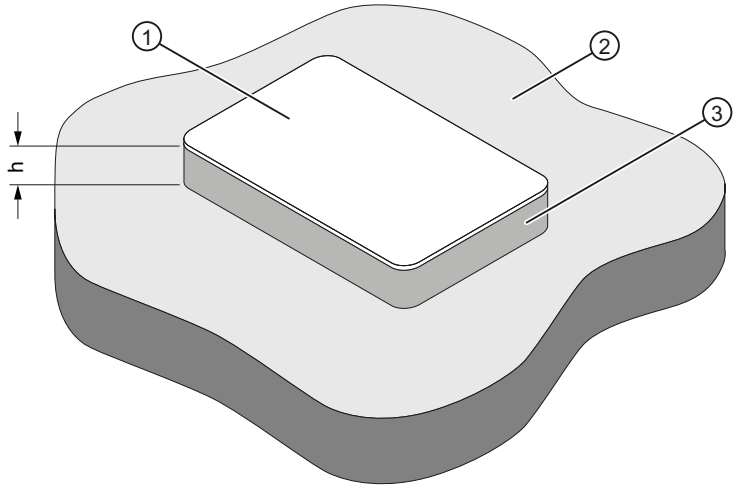
	Article number
Spacer (in conjunction with fixing pocket 6GT2190-0AB00)	6GT2190-0AA00
Fixing pocket (in conjunction with spacer 6GT2190-0AA00)	6GT2190-0AB00
Fixing pocket (not suitable for fixing directly onto metal)	6GT2390-0AA00

8.2.3 Metal-free area

Direct mounting of the transponder on metal is not permitted. A distance of ≥ 20 mm is recommended to avoid a reduced read/write range and a reduction of the field data. This can be accomplished, for example, by installing a spacer.

Note that if the distances (a and h) are not observed, this may result in a reduction of the field data as well as a reduced write/read range.

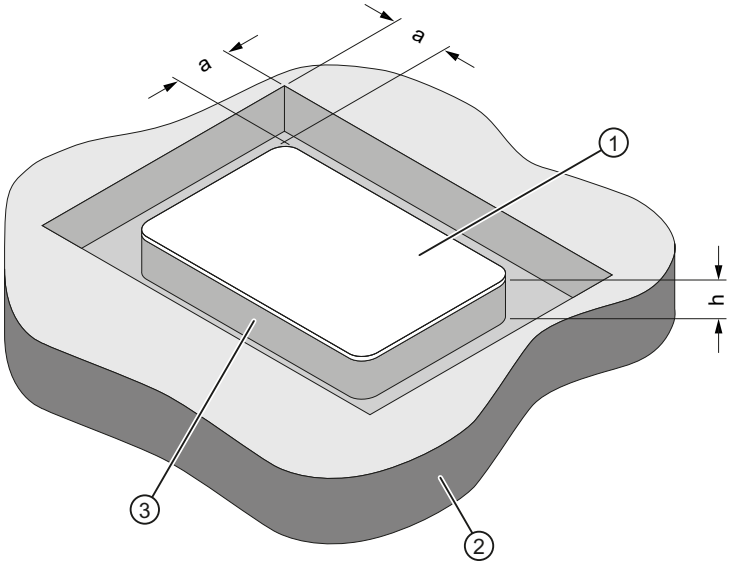
Mounting on metal



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

Figure 8-2 Mounting the MDS D100 / D200 / D400 on metal with spacer

Flush-mounting



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

Figure 8-3 Flush installation of the MDS D100 / D200 / D400 in metal with spacer

8.2.4 Technical data

Table 8-3 Technical specifications for MDS D100

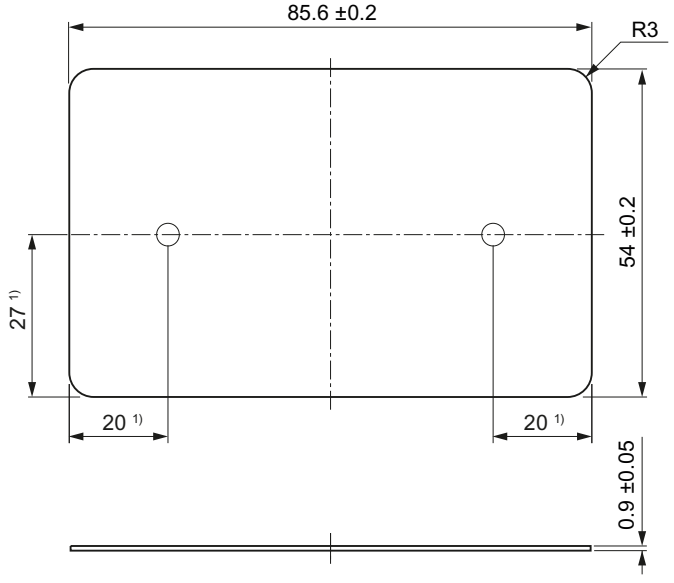
	6GT2600-0AD10
Product type designation	SIMATIC MDS D100
Memory	
Memory configuration	
• UID	• 8 bytes
• User memory	• 112 bytes EEPROM
• OTP memory	• 16 bytes (EEPROM)
Read cycles (at < 40 °C)	> 10^{14}
Write cycles (at < 40 °C)	> 10^{6}
Data retention time (at < 40 °C)	> 10 years
Write/read distance (S_g)	Dependent on the reader used, see section "Field data of ISO transponders (MDS D) (Page 51)"
Mechanical specifications	
Enclosure	
• Material	• PET
• Color	• White/black
Recommended distance to metal	≥ 20 mm
Power supply	Inductive, without battery
Permitted ambient conditions	
Ambient temperature	
• during write/read access	• -25 ... +80 °C
• outside the read/write field	• -25 ... +80 °C
• during storage	• -25 ... +80 °C
Degree of protection according to EN 60529	IP68
Shock-resistant acc. to EN 60721-3-7, Class 7M2	ISO 10373 / ISO 7810 [1)]
Vibration-resistant according to EN 60721-3-7 Class 7M2	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 [2)]

	6GT2600-0AD10
Standards, specifications, approvals	
MTBF	228 years

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

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

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

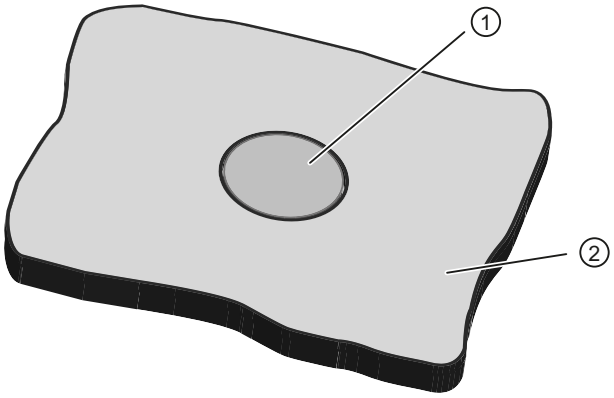
8.3.2 Ordering data

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

Figure 8-5 Flush-mounting of MDS D117 in metal without clearance

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	
• 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)"	
Mechanical specifications		
Enclosure		
• Material	• PPS	
• Color	• Black	
Recommended distance to metal	≥ 0 mm	

	6GT2600-0AG00
Power supply	Inductive, without battery
Permitted ambient conditions	
Ambient temperature	
• during write/read access	• -25 ... +85 °C
• outside the read/write field	• -40 ... +125 °C
• during storage	• -40 ... +125 °C
Degree of protection according to EN 60529	IP68 2 hours, 2 bar, +20 °C
Shock-resistant acc. to EN 60721-3-7, Class 7M2 [1]	1000 m/s²
Vibration-resistant acc. to EN 60721-3-7, Class 7M2 [1]	200 m/s²
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 [2]
Standards, specifications, approvals	
MTBF	228 years

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

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

8.3.5 Dimension drawing

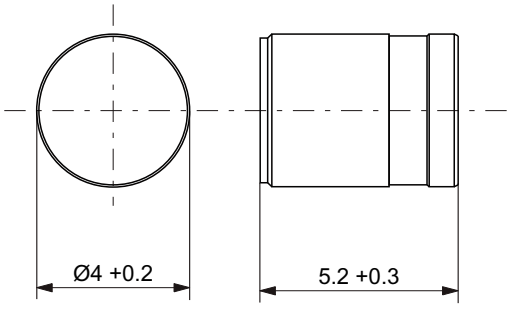


Figure 8-6 Dimensions in mm

8.4 MDS D124

8.4.1 Characteristics

MDS D124	Characteristics	
	Area of application	Areas of application in production automation Can also be used in harsh environments under extreme environmental conditions (e.g. temperature stress 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

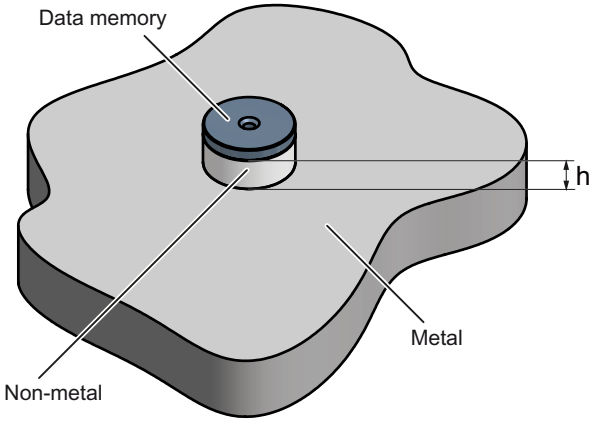
	Article number
Spacer	6GT2690-0AK00

8.4.3 Mounting on metal

Direct mounting of the transponder on metal is not permitted. A distance of ≥ 20 mm is recommended to avoid a reduced read/write range and a reduction of the field data. This can be accomplished, for example, by installing a spacer.

Note that if the distances (a and h) are not observed, this may result in a reduction of the field data as well as a reduced write/read range.

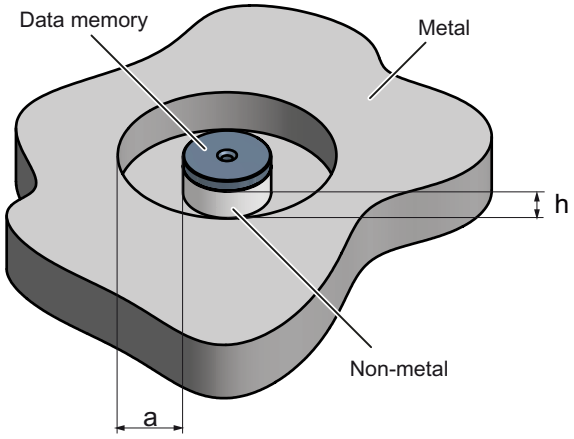
Mounting on metal



h ≥ 15 mm

Figure 8-7 Mounting the MDS D124 / D324 / D424 / D524 on metal with spacer

Flush-mounting



h ≥ 15 mm

a ≥ 25 mm

Figure 8-8 Flush installation of the MDS D124 / D324 / D424 / D524 in metal with spacer

8.4.4 Using the MDS D124 in hazardous areas

The transponder 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 2014/34/EU directive are met:

- EN IEC 60079-0:2012 + A11:2013
- EN 60079-11:2012

When used in hazardous areas, the MDS D124 must not be operated with transmit power greater than 2 W or magnetic field strengths > 5 A/m to avoid impermissible heating. Therefore, the MDS D124 can be operated with the readers RF210R, RF220R, RF240R, RF250R (incl. all released antennas), RF260R, RF310R, RF340R, RF350R and RF380R. The MDS D124 transponder is not released for operation with the RF290R reader.

Labeling and warning information

Since neither the Ex marking nor the safety marking can be applied to the MDS D124 for space reasons, these are supplied on a label. This must be affixed immediately next to the MDS D124 so that the label clearly relates to the device. The identification of the electrical equipment as an enclosed unit is:

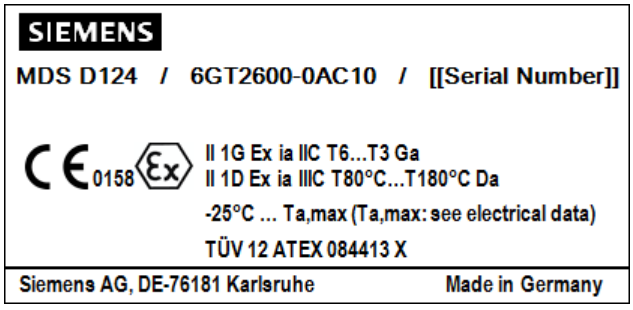


Figure 8-9 Identification label of MDS D124

[[Serial Number]]	Serial number of the transponder The serial number is structured as follows: LB[A][B][CDEFGH]
LB	Code of manufacturing factory see below
[A]	Year produced
[B]	Month produced
[CDEFGH]	Consecutive number = 000001...999999

WARNING

Installation and operating conditions for hazardous areas

- The device may not be used in areas influenced by processes that generate high electrostatic charges.
- The device must be installed in such a way that it is mechanically protected.
- The device must be mounted on a grounded conductive base.
- The device must only be cleaned with a damp cloth.
- The device is suitable for use in atmospheres containing dust, but not for full immersion in dust.

Electrical data

Table 8-8 Energy supply of the transponder (antenna field of the reader)

Date	Value
Operating frequency	13.56 MHz
Transmit power (P_{max})	2 W
Magnetic field strength (H_{max})	5 A/m

Thermal specifications

The temperature class of the MDS D124 transponder for hazardous areas for gases depends on the ambient temperature range:

Table 8-9 Temperature classes for hazardous areas for gases

Ambient temperature of the transponder		Temperature class
RF210R, RF220R, RF240R, RF250R (incl. all released antennas), RF260R, RF310R, RF340R, RF350R	**RF380R**	
-25 ℃ ... +175 ℃	-25 ℃ ... +130 ℃	T3
-25 ℃ ... +110 ℃	-25 ℃ ... +65 ℃	T4
-25 ℃ ... +75 ℃	-25 ℃ ... +30 ℃	T5
-25 ℃ ... +60 ℃	--	T6

The surface temperature of the MDS D124 transponder for hazardous areas for dust depends on the ambient temperature range:

Table 8-10 Temperature classes for hazardous areas for dust

Ambient temperature of the transponder		Permitted surface temperature
RF210R, RF220R, RF240R, RF250R (incl. all released antennas), RF260R, RF310R, RF340R, RF350R	**RF380R**	
-25 ℃ ... +155 ℃	-25 ℃ ... +110 ℃	T180 °C
-25 ℃ ... +105 ℃	-25 ℃ ... +60 ℃	T130 °C
-25 ℃ ... +80 ℃	--	T95 °C
-25 ℃ ... +55 ℃	--	T80 °C

8.4.5 Technical specifications

Table 8-11 Technical specifications for MDS D124

	6GT2600-0AC10
Product type designation	SIMATIC MDS D124
Memory	
Memory configuration	
• UID	• 8 bytes
• User memory	• 112 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)"
Mechanical specifications	
Enclosure	
• 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 ... +140 °C
	• from +125 °C: 20% reduction in the limit distance
• outside the read/write field	• -40 ... +180 °C
	• at +180 °C: Tested up to 5000 hours or 3000 cycles
• during storage	• -40 ... +125 °C
Degree of protection according 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 according to EN 60721-3-7 Class 7M3 [1)]	1000 m/s²
Vibration-resistant according to EN 60721-3-7 Class 7M3 [1)]	200 m/s²
Torsion and bending load	Not permitted

	6GT2600-0AC10
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 [3] • With spacer
Standards, specifications, approvals	
MTBF	228 years

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

[2]) To prevent it loosening during operation, secure the screw with screw locking varnish.

[3] The processing instructions of the adhesive manufacturer must be observed.

8.4.6 EC declaration of conformity according to directive 2014/34/EU MDS D124

The EC type-examination certificate for the MDS D124 transponder was substantiated by TÜV 12 ATEX 084413 X. Based on this certificate, the CE declaration was made by the manufacturer according to directive 2014/34/EU.

The manufacturing plant of the MDS D124 has an ATEX quality assurance system recognized by DEKRA EXAM GmbH with notification number "BVS 11 ATEX ZQS/E111".

Manufacturer's address - distributor
Siemens AG
DE – 76181 Karlsruhe, Germany

Manufacturer's address - factory
Siemens AG
Würzburger Str. 121
DE - 90766 Fürth, Germany

8.4.7 Dimension drawing

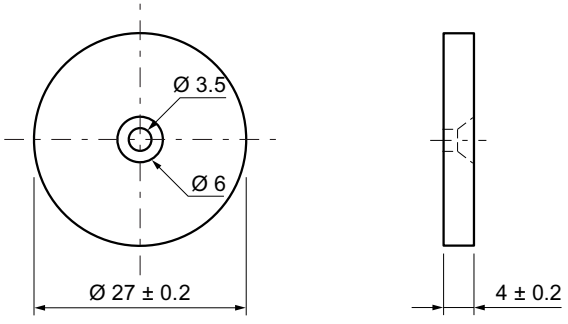


Figure 8-10 Dimension drawing of MDS D124

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 environmental 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 8-12 Ordering data for MDS D126

	Article number
MDS D126	6GT2600-0AE00

Table 8-13 Ordering data for MDS D126 accessories

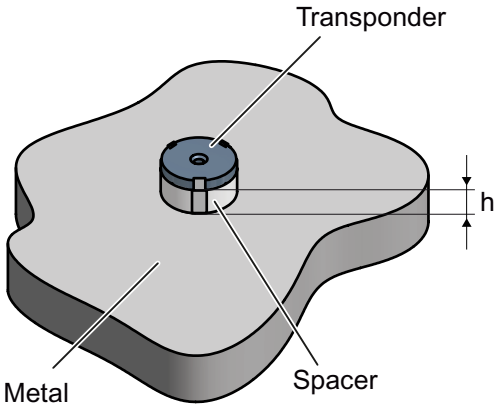
	Article number
Spacer	6GT2690-0AL00

8.5.3 Mounting on metal

Direct mounting of the transponder on metal is not permitted. A distance of ≥ 20 mm is recommended to avoid a reduced read/write range and a reduction of the field data. This can be accomplished, for example, by installing a spacer.

Note that if the distances (a and h) are not observed, this may result in a reduction of the field data as well as a reduced write/read range.

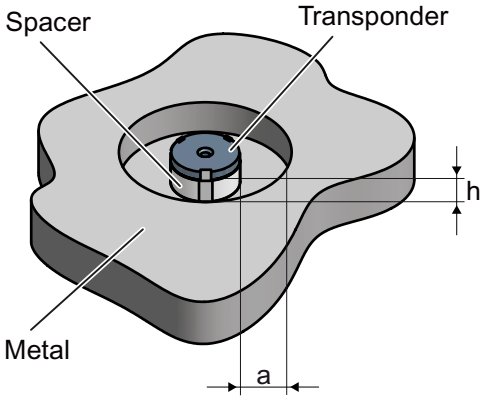
Mounting on metal



h ≥ 25 mm

Figure 8-11 Mounting the MDS D126 / D426 / D526 on metal with spacer

Flush-mounted in metal



h ≥ 25 mm

a ≥ 50 mm

Figure 8-12 Flush installation of the MDS D126 / D426 / D526 in metal with spacer

8.5.4 Technical specifications

Table 8-14 Technical specifications for the MDS D126

		6GT2600-0AE00
Product type designation	SIMATIC MDS D126	
Memory		
Memory configuration		
• UID	• 8 bytes	

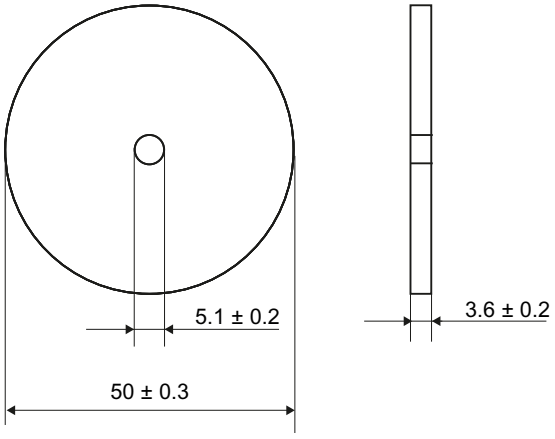
	6GT2600-0AE00
• User memory	• 112 bytes EEPROM
• OTP memory	• 16 bytes (EEPROM)
Read cycles (at < 40 °C)	> 10^{14}
Write cycles (at < 40 °C)	> 10^{6}
Data retention time (at < 40 °C)	> 10 years
Write/read distance (S_g)	Dependent on the reader used, see section "Field data of ISO transponders (MDS D) (Page 51)"
Mechanical specifications	
Enclosure	
• 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 ... +85 °C
• outside the read/write field	• -40 ... +100 °C
• during storage	• -40 ... +100 °C
Degree of protection according to EN 60529	IP68 2 hours, 2 bar, +20 °C
Shock-resistant acc. to EN 60721-3-7, Class 7M2 [1]	500 m/s²
Vibration-resistant acc. to EN 60721-3-7, Class 7M2 [1]	200 m/s²
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 • Glued [3]
Standards, specifications, approvals	
MTBF	228 years

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

[2]) To prevent it loosening during operation, secure the screw with screw locking varnish.

[3] The processing instructions of the adhesive manufacturer must be observed.

8.5.5 Dimension drawing



Dimensions in mm

Figure 8-13 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

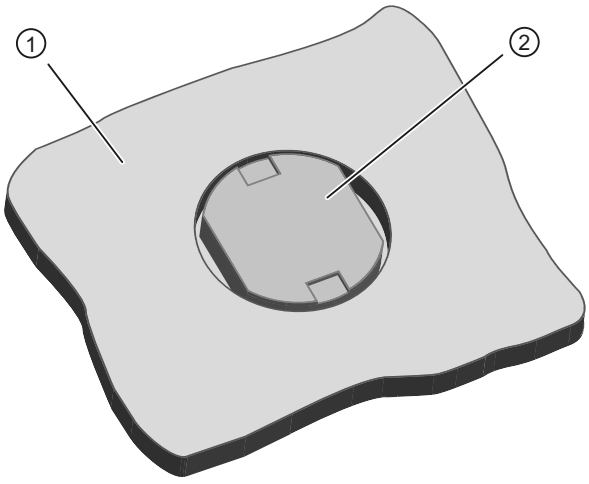
8.6.2 Ordering data

Table 8-15 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

Figure 8-14 Flush-mounting of MDS D127 in metal without clearance

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 8-15 Screw-in aid for mounting the MDS D127

8.6.4 Technical specifications

Table 8-16 Technical specifications for MDS D127

	6GT2600-0AF00
Product type designation	SIMATIC MDS D127
Memory	
Memory configuration	
• UID	• 8 bytes
• User memory	• 112 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)"
Mechanical specifications	
Enclosure	
• 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 ... +100 °C
• outside the read/write field	• -40 ... +125 °C
• during storage	• -40 ... +125 °C
Degree of protection according 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 acc. to EN 60721-3-7, Class 7M2 [1)]	1000 m/s²
Vibration-resistant acc. to EN 60721-3-7, Class 7M2 [1)]	200 m/s²
Torsion and bending load	Not permitted
Design, dimensions and weight	
Dimensions (Ø x H)	M6 x 5.8 mm
Weight	1 g

		6GT2600-0AF00
Type of mounting	• Glued [2] • 1 x M3 screw	

Standards, specifications, approvals	
MTBF	228 years

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

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

8.6.5 Dimension drawing

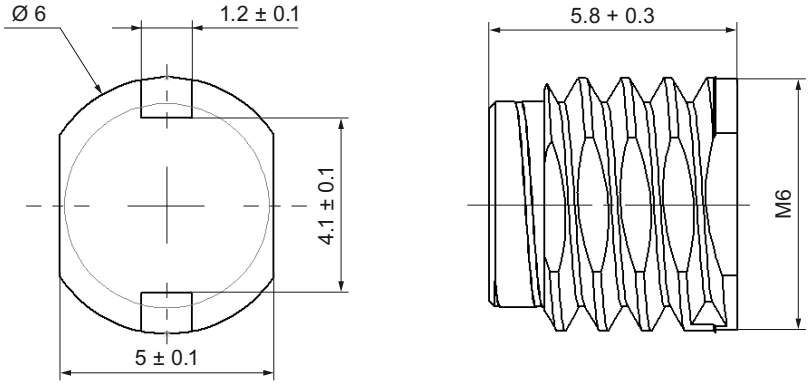


Figure 8-16 Dimensions in mm

8.7 MDS D139

8.7.1 Characteristics

MDS D139	Characteristics	
	Area of application	Applications in production automation and in assembly lines subject to thermal stress (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 8-17 Ordering data for MDS D139

	Article number
MDS D139	6GT2600-0AA10

Table 8-18 Ordering data for MDS D139 accessory

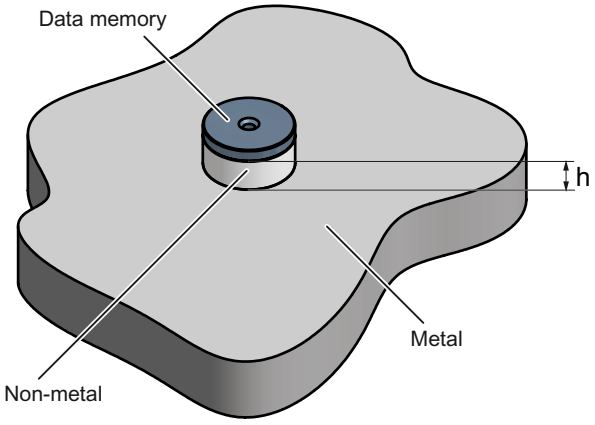
	Article number
Spacer	6GT2690-0AA00
Quick change holder (Ø x H): 22 x 60 mm	6GT2690-0AH00
Quick change holder (Ø x H): 22 x 47 mm	6GT2690-0AH10

8.7.3 Mounting on metal

Direct mounting of the transponder on metal is not permitted. A distance of ≥ 20 mm is recommended to avoid a reduced read/write range and a reduction of the field data. This can be accomplished, for example, by installing a spacer.

Note that if the distances (a and h) are not observed, this may result in a reduction of the field data as well as a reduced write/read range.

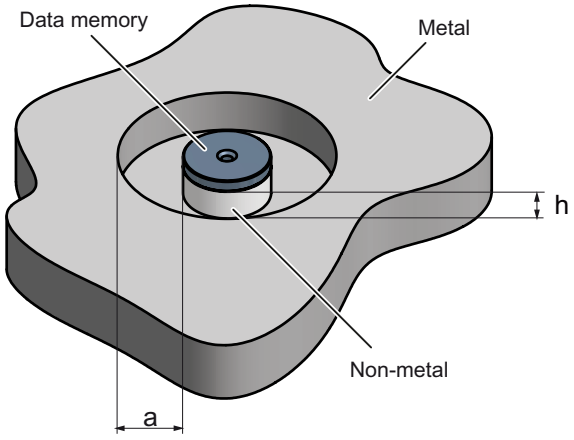
Mounting on metal



h ≥ 30 mm

Figure 8-17 Mounting the MDS D139 / D339 on metal with spacer

Flush-mounting



h ≥ 30 mm

a ≥ 100 mm

Figure 8-18 Flush installation of the MDS D139 / D339 in metal with spacer

Note

Reduction of the range with mounting in metal

It is possible to mount the MDS D139/D339 in metal. Note that with large antennas (e.g. ANT D5), this leads to reduced write/read ranges.

8.7.4 Cleaning the transponder

NOTICE
Cleaning the transponder in normal operation Do not clean the transponder with mechanical tools, sand-blasting or pressure hose. These cleaning methods result in damage to the transponder. Clean the transponder only with the chemical cleansing agents listed in the section "Chemical resistance of the readers and transponders (Page 95)". When using the transponder in hazardous areas, follow the cleaning instructions in section "Use in hazardous areas (Page 359)".

8.7.5 Use in hazardous areas

TÜV NORD CERT GmbH, appointed center no. 0044 as per Article 18 of the directive of the European Council of 26 February 2014 (2014/34/EU), 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 standards EN IEC 60079-0:2018 and EN 60079-11:2012.

This allows the transponder to be used in hazardous areas for gases, for the device category 1G and gas group IIC, or alternatively in hazardous areas for dusts, for the device category 1D and group IIIB.

⚠ WARNING

Gefahr durch elektrostatische Entladungen

Potential electrostatic charging hazard

Danger potentiel de charges électrostatiques

⚠ WARNING

Information to be observed during installation, commissioning, operation, cleaning and disassembly

Installations- und Betriebsbedingungen für den explosionsgefährdeten Bereich:

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.

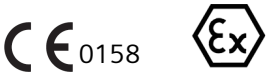
b) L'appareil doit être monté de manière à être protégé mécaniquement.

c) Le montage doit être effectué sur un socle conducteur mis à la terre.

d) Nettoyage uniquement avec un chiffon humide.

Identification

The identification is as follows:



II 1 G Ex ia IIC T6 ... T2 Ga
II 1 D Ex ia IIIB T100°C / T135°C / T185°C Da
TÜV 18 ATEX 232450 X

8.7.5.1 Use in hazardous areas for gasses

The temperature class of the transponder for gas explosion hazardous areas depends on the ambient temperature range as well as the existing reader power or the field strength at the antenna within the explosion hazardous area.

WARNING

Ignitions of gas-air mixtures

The transponder may only be operated in the ambient temperature range specified for it (see EC type examination certificate TÜV 18 ATEX 232450 X).

When using the transponder, check to ensure that the temperature class is complied with in connection with the requirements of the area of application.

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

WARNING

Ignitions of gas-air mixtures

The maximum transmit power of the transmitter used to operate the transponder must not exceed 2 W. The magnetic field strength at the reader antenna must not exceed 5 A/m.

Non-compliance with the permissible transmit power can lead to ignitions of gas-air mixtures.

Temperature class grading for gases and radiated power for 2 W und 5 A/m

If the radiated power of an antenna radiating into the hazardous area or located in the hazardous area and operating in the 13.56 MHz frequency band cannot exceed the value 2 W or 5 A/m, the temperature class grading is as follows:

Table 8-19 Temperature class grading for gases

Ambient temperature range	Temperature class
-25 °C ... +220 °C	T2
-25 °C ... +145 °C	T3
-25 °C ... +220 °C	T4
-25 °C ... +95 °C	T5
-25 °C ... +30 °C	T6

8.7.5.2 Use in hazardous areas for dusts

As intrinsically safe equipment, the transponder is suitable for complete dust covering. In this case, the ignition temperature specified here according to EN IEC 60079-0:2018 in accordance with ignition protection type ia refers to the maximum surface temperature of the transponder for flammable lint (ia IIIA) and non-conductive dusts (ia IIIB). The surface temperatures of the transponder can be taken from the following table depending on the ambient temperature range.

⚠ WARNING

Ignitions of dust-air mixtures

The transponder may only be operated in the ambient temperature range specified for it (see EC type examination certificate TÜV 18 ATEX 232450 X).

For applications at locations with an explosive dust atmosphere, the transponder must be protected from electrostatic charges (see EC type examination certificate TÜV 18 ATEX 232450 X).

When using the transponder, check to ensure that the temperature values are complied with in connection with the requirements of the area of application.

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

Temperature class grading for dusts and radiated power for 2 W and 5 A/m

If the radiated power of an antenna radiating into the hazardous area or located in the hazardous area and operating in the 13.56 MHz frequency band cannot exceed the value 2 W or 5 A/m, the temperature class grading is as follows:

Table 8-20 Temperature class grading for dusts

Ambient temperature range	Temperature class
-25 °C ≤ T_a ≤ +125 °C	T185 °C
-25 °C ≤ T_a ≤ +75 °C	T135 °C
-25 °C ≤ T_a ≤ +40 °C	T100 °C

8.7.6 Technical specifications

Table 8-21 Technical specifications for MDS D139

		6GT2600-0AA10
Product type designation	SIMATIC MDS D139	
Memory		
Memory configuration		
• UID	• 8 bytes	

	6GT2600-0AA10
• User memory	• 112 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)"
Mechanical specifications	
Enclosure	
• 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 ... +140 °C • from +125 °C: 20% reduction in the limit distance
• outside the read/write field	• -40 ... +220 °C • at +200 °C: Tested up to 5000 hours or 6000 cycles • at +220 °C: Tested up to 2000 hours or 2000 cycles
• during storage	• -40 ... +100 °C
Degree of protection according 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 acc. to EN 60721-3-7, Class 7M2 [1]	500 m/s²
Vibration-resistant acc. to EN 60721-3-7, Class 7M2 [1]	200 m/s²
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

	6GT2600-0AA10
Standards, specifications, approvals	
MTBF	228 years

1) The values for shock and vibration are maximum values and must not be applied continuously. A combination of high application temperatures together with high shock or vibration values is not possible.

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

8.7.7 Dimension drawings

Dimensional drawing of MDS D139

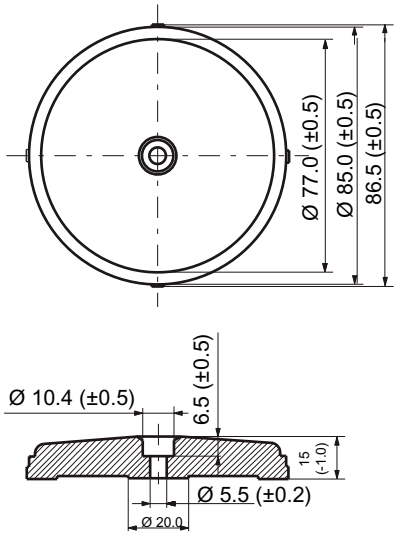


Figure 8-19 Dimensional drawing of MDS D139

Dimensions in mm

8.8 MDS D160

8.8.1 Characteristics

MDS D160	Characteristics	
	Area of application	The transponder can also be deployed under extreme environmental conditions without problems due to its rugged design. 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 8-22 Ordering data for MDS D160

	Article number
MDS D160	6GT2600-0AB10

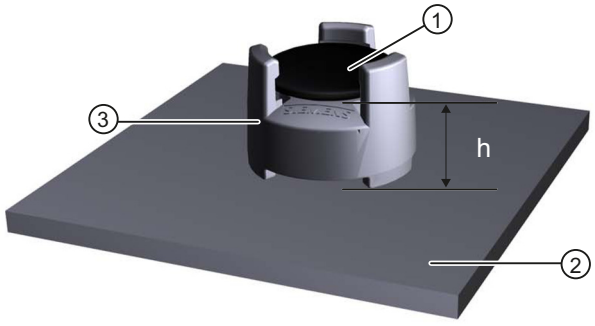
Table 8-23 Ordering data for MDS D160 accessories

	Article number
Spacer	6GT2690-0AG00
Corner mounting bracket	6GT2690-0AN00

8.8.4 Mounting on metal

Note that if the distance (h) is not observed, this may result in a reduction of the field data as well as a reduced write/read range.

Mounting on metal



① Transponder
② Metal carrier
③ Spacer
h ≥ 10 mm

Figure 8-20 Mounting the MDS D160 / D460 / D560 on metal with spacer

8.8.5 Technical specifications

Table 8-24 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
• OTP memory	• 16 bytes (EEPROM)
Read cycles (at < 40 °C)	> 10^{14}
Write cycles (at < 40 °C)	> 10^{6}

	6GT2600-0AB10
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)"
Mechanical specifications	
Enclosure	
• 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
• outside the read/write field	• -40 ... +175 °C
	• from +125 °C: for 1000 hours, 20% reduction of the limit distance
	• at +175 °C: 100 washing cycles tested
	• at +220 °C: Tested once for up to 30 seconds
• during storage	• -25 ... +100 °C
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
Service life	At least 100 wash cycles
Degree of protection	• IP68 24 hours, 2 bar, +20 °C • IPx9K
Shock-resistant according to IEC 68-2-27 [1]	400 m/s² 18 ms; 6 axes; 2000 repetitions/h
Vibration-resistant according to IEC 68-2-6 [1]	100 m/s² 10 ... 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 [2]

		6GT2600-0AB10
Standards, specifications, approvals		
MTBF	228 years	

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

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

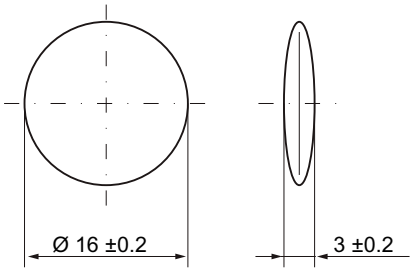
Note

Regeneration time between washing cycles

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

8.8.6 Dimension drawings

Dimensional drawing of MDS D160



Dimensions in mm

Figure 8-21 Dimensional drawing of MDS D160

8.9 MDS D165

8.9.1 Features

MDS D165	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 8-25 Ordering data for MDS D165

	Article number
MDS D165	6GT2600-1AB00-0AX0

Type of delivery

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

8.9.3 Technical data

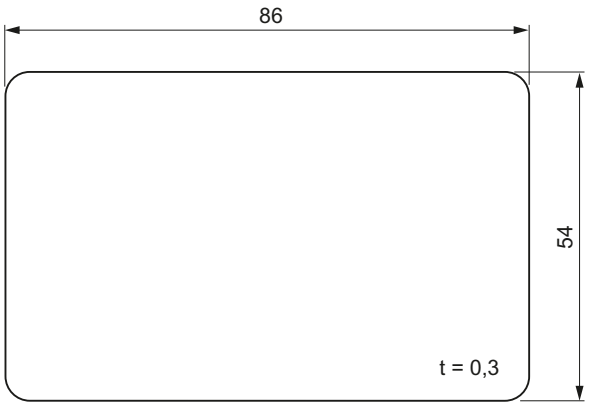
Table 8-26 Technical specifications for MDS D165

	6GT2600-1AB00-0AX0
Product type designation	SIMATIC MDS D165
Memory	
Memory configuration	
• UID	• 8 bytes
• User memory	• 112 bytes EEPROM

	6GT2600-1AB00-0AX0
• 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)"
Mechanical specifications	
Enclosure	
• Material	• Top: PET (label material) • Inlay: PET (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 ... +80 °C
• outside the read/write field	• -25 ... +80 °C
• during storage	• +20 to +30 °C Can be stored for 2 years, determined by the durability of the adhesive.
Degree of protection	IP65
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 [1)]
Standards, specifications, approvals	
MTBF	228 years

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

8.9.4 Dimension drawing



Dimensions in mm

Figure 8-22 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	ISO 15693
	Degree of protection	IP67

8.10.2 Ordering data

Table 8-27 Ordering data for MDS D200

	Article number
MDS D200	6GT2600-1AD00-0AX0

Table 8-28 Ordering data for MDS D200 accessories

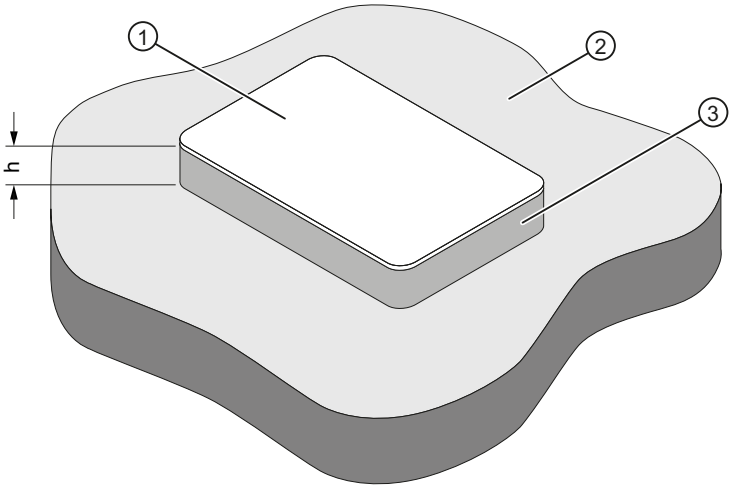
	Article number
Spacer (in conjunction with fixing pocket 6GT2190-0AB00)	6GT2190-0AA00
Fixing pocket (in conjunction with spacer 6GT2190-0AA00)	6GT2190-0AB00
Fixing pocket (not suitable for fixing directly onto metal)	6GT2390-0AA00

8.10.3 Metal-free area

Direct mounting of the transponder on metal is not permitted. A distance of ≥ 20 mm is recommended to avoid a reduced read/write range and a reduction of the field data. This can be accomplished, for example, by installing a spacer.

Note that if the distances (a and h) are not observed, this may result in a reduction of the field data as well as a reduced write/read range.

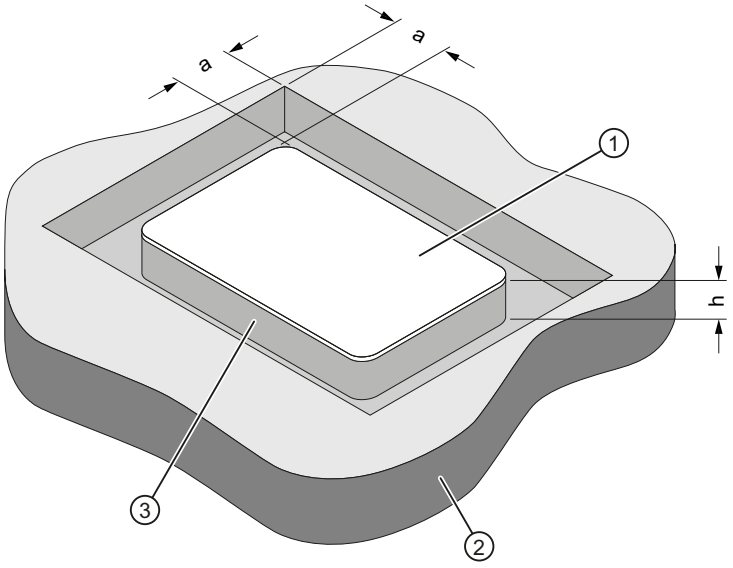
Mounting on metal



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

Figure 8-23 Mounting the MDS D100 / D200 / D400 on metal with spacer

Flush-mounting



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

Figure 8-24 Flush installation of the MDS D100 / D200 / D400 in metal with spacer

8.10.4 Technical data

Table 8-29 Technical specifications for MDS D200

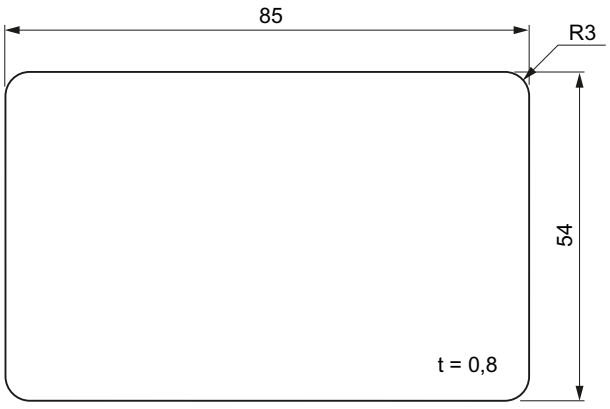
	6GT2600-1AD00-0AX0
Product type designation	SIMATIC MDS D200
Memory	
Memory configuration	
• UID	• 8 bytes
• User memory	• 256 bytes EEPROM
• OTP memory	• 16 bytes (EEPROM)
Read cycles (at < 25 °C)	> 10^{14}
Write cycles (at < 25 °C)	> 10^{6}
Data retention time (at < 25 °C)	> 10 years
Write/read distance (S_g)	Dependent on the reader used, see section "Field data of ISO transponders (MDS D) (Page 51)"
Mechanical specifications	

	6GT2600-1AD00-0AX0
Enclosure	
• 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 ... +60 °C
• outside the read/write field	• -20 ... +60 °C
• during storage	• -20 ... +60 °C
Degree of protection according to EN 60529	IP67
Shock-resistant acc. to EN 60721-3-7, Class 7M2	ISO 10373 / ISO 7810 [1]
Vibration-resistant according to EN 60721-3-7 Class 7M2	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 [2]
Standards, specifications, approvals	
MTBF	228 years

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

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

8.10.5 Dimension drawing



Dimensions in mm

Figure 8-25 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 8-30 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

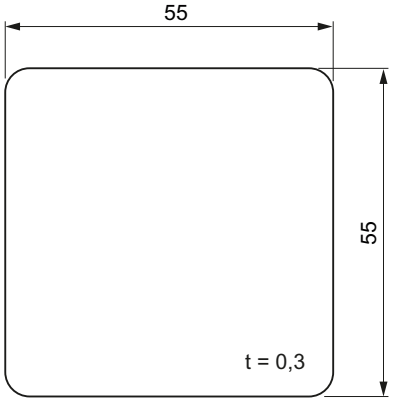
Table 8-31 Technical specifications of MDS D261

	6GT2600-1AA01-0AX0
Product type designation	SIMATIC MDS D261
Memory	
Memory configuration	
• UID	• 8 bytes
• 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)"
Mechanical specifications	
Enclosure	
• Material	• Top: PET (label material)
	• Inlay: PET (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	• -20 ... +60 °C
• outside the read/write field	• -20 ... +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	

	6GT2600-1AA01-0AX0
Dimensions (L x W x H)	55 x 55 x 0.3 mm
Weight	1 g
Type of mounting	Glued with self-adhesive label [1]
Standards, specifications, approvals	
MTBF	228 years

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

8.11.4 Dimension drawing



Dimensions in mm

Figure 8-26 Dimension drawing of MDS D261

8.12 MDS D324

8.12.1 Characteristics

MDS D324	Characteristics	
	Area of application	Areas of application in production automation and product identification Can also be used in harsh environments under extreme environmental conditions (e.g. temperature stress up to +125 °C).
	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 8-32 Ordering data MDS D324

	Article number
MDS D324	6GT2600-3AC00

Table 8-33 Ordering data MDS D324 accessories

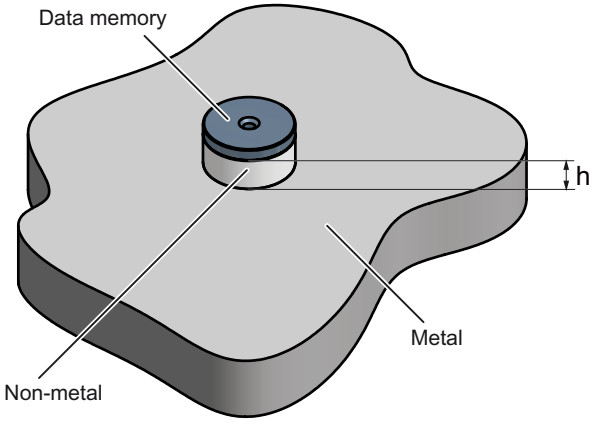
	Article number
Spacer	6GT2690-0AK00

8.12.3 Mounting on metal

Direct mounting of the transponder on metal is not permitted. A distance of ≥ 20 mm is recommended to avoid a reduced read/write range and a reduction of the field data. This can be accomplished, for example, by installing a spacer.

Note that if the distances (a and h) are not observed, this may result in a reduction of the field data as well as a reduced write/read range.

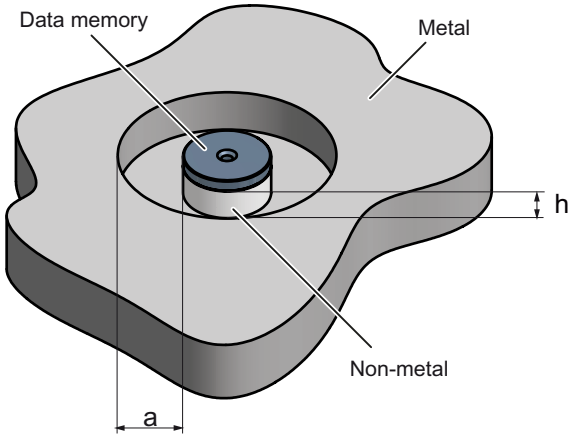
Mounting on metal



h ≥ 15 mm

Figure 8-27 Mounting the MDS D124 / D324 / D424 / D524 on metal with spacer

Flush-mounting



h ≥ 15 mm

a ≥ 25 mm

Figure 8-28 Flush installation of the MDS D124 / D324 / D424 / D524 in metal with spacer

8.12.4 Technical specifications

Table 8-34 Technical specifications of MDS D324

		6GT2600-3AC00
Product type designation	SIMATIC MDS D324	
Memory		
Memory configuration		

		6GT2600-3AC00
• UID	• 8 bytes	
• User memory	• 992 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)"	
Mechanical specifications		
Enclosure		
• 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 ... +125 °C	
• outside the read/write field	• -40 ... +140 °C	
• during storage	• -40 ... +140 °C	
Degree of protection according to EN 60529	• IP67 • IPx9K	
Shock-resistant according to EN 60721-3-7 Class 7M3 [1]	1000 m/s²	
Vibration-resistant according to EN 60721-3-7 Class 7M3 [1]	200 m/s²	
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 [3]	
Standards, specifications, approvals		
MTBF	228 years	

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

[2]) To prevent it loosening during operation, secure the screw with screw locking varnish.

[3] The processing instructions of the adhesive manufacturer must be observed.

8.12.5 Dimension drawing

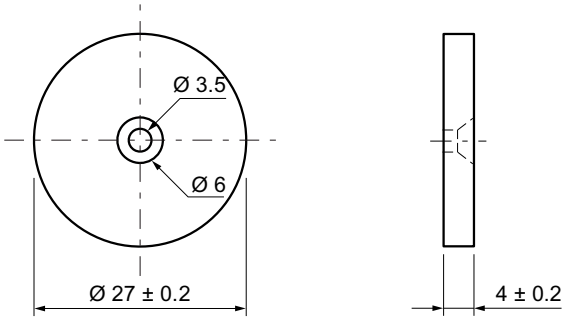


Figure 8-29 Dimension drawing of MDS D324

All dimensions in mm

8.13 MDS D339

8.13.1 Characteristics

MDS D339	Characteristics	
	Area of application	Applications in production automation and in assembly lines subject to thermal stress (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 8-35 Ordering data for MDS D339

	Article number
MDS D339	6GT2600-3AA10

Table 8-36 Ordering data for MDS D339 accessories

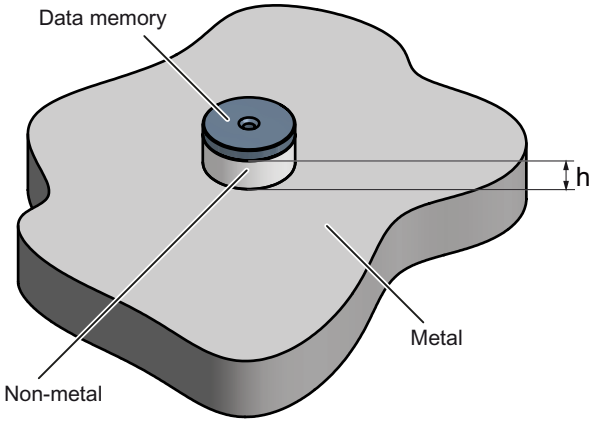
	Article number
Spacer	6GT2690-0AA00
Quick change holder (Ø x H): 22 x 60 mm	6GT2690-0AH00
Quick change holder (Ø x H): 22 x 47 mm	6GT2690-0AH10

8.13.3 Mounting on metal

Direct mounting of the transponder on metal is not permitted. A distance of ≥ 20 mm is recommended to avoid a reduced read/write range and a reduction of the field data. This can be accomplished, for example, by installing a spacer.

Note that if the distances (a and h) are not observed, this may result in a reduction of the field data as well as a reduced write/read range.

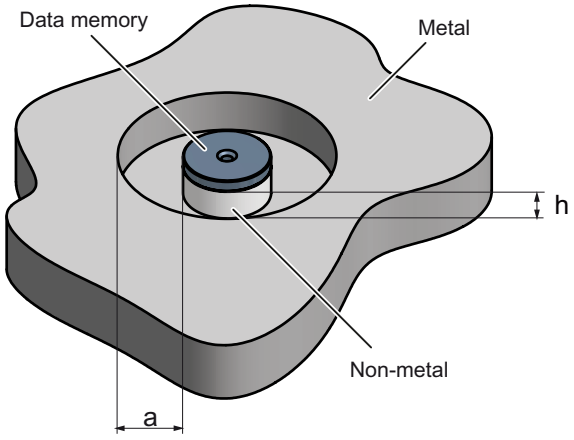
Mounting on metal



h ≥ 30 mm

Figure 8-30 Mounting the MDS D139 / D339 on metal with spacer

Flush-mounting



h ≥ 30 mm

a ≥ 100 mm

Figure 8-31 Flush installation of the MDS D139 / D339 in metal with spacer

Note

Reduction of the range with mounting in metal

It is possible to mount the MDS D139/D339 in metal. Note that with large antennas (e.g. ANT D5), this leads to reduced write/read ranges.

8.13.4 Cleaning the transponder

NOTICE
Cleaning the transponder in normal operation Do not clean the transponder with mechanical tools, sand-blasting or pressure hose. These cleaning methods result in damage to the transponder. Clean the transponder only with the chemical cleansing agents listed in the section "Chemical resistance of the readers and transponders (Page 95)". When using the transponder in hazardous areas, follow the cleaning instructions in section "Use in hazardous areas (Page 383)".

8.13.5 Use in hazardous areas

TÜV NORD CERT GmbH, appointed center no. 0044 as per Article 18 of the directive of the European Council of 26 February 2014 (2014/34/EU), 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 standards EN IEC 60079-0:2018 and EN 60079-11:2012.

This allows the transponder to be used in hazardous areas for gases, for the device category 1G and gas group IIC, or alternatively in hazardous areas for dusts, for the device category 1D and group IIIB.

⚠ WARNING

Gefahr durch elektrostatische Entladungen

Potential electrostatic charging hazard

Danger potentiel de charges électrostatiques

⚠ WARNING

Information to be observed during installation, commissioning, operation, cleaning and disassembly

Installations- und Betriebsbedingungen für den explosionsgefährdeten Bereich:

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.

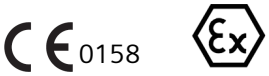
b) L'appareil doit être monté de manière à être protégé mécaniquement.

c) Le montage doit être effectué sur un socle conducteur mis à la terre.

d) Nettoyage uniquement avec un chiffon humide.

Identification

The identification is as follows:



II 1 G Ex ia IIC T6 ... T2 Ga
II 1 D Ex ia IIIB T100°C / T135°C / T185°C Da
TÜV 18 ATEX 232450 X

8.13.5.1 Use in hazardous areas for gasses

The temperature class of the transponder for gas explosion hazardous areas depends on the ambient temperature range as well as the existing reader power or the field strength at the antenna within the explosion hazardous area.

WARNING

Ignitions of gas-air mixtures

The transponder may only be operated in the ambient temperature range specified for it (see EC type examination certificate TÜV 18 ATEX 232450 X).

When using the transponder, check to ensure that the temperature class is complied with in connection with the requirements of the area of application.

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

WARNING

Ignitions of gas-air mixtures

The maximum transmit power of the transmitter used to operate the transponder must not exceed 2 W. The magnetic field strength at the reader antenna must not exceed 5 A/m.

Non-compliance with the permissible transmit power can lead to ignitions of gas-air mixtures.

Temperature class grading for gases and radiated power for 2 W und 5 A/m

If the radiated power of an antenna radiating into the hazardous area or located in the hazardous area and operating in the 13.56 MHz frequency band cannot exceed the value 2 W or 5 A/m, the temperature class grading is as follows:

Table 8-37 Temperature class grading for gases

Ambient temperature range	Temperature class
-25 °C ... +220 °C	T2
-25 °C ... +145 °C	T3
-25 °C ... +220 °C	T4
-25 °C ... +95 °C	T5
-25 °C ... +30 °C	T6

8.13.5.2 Use in hazardous areas for dusts

As intrinsically safe equipment, the transponder is suitable for complete dust covering. In this case, the ignition temperature specified here according to EN IEC 60079-0:2018 in accordance with ignition protection type ia refers to the maximum surface temperature of the transponder for flammable lint (ia IIIA) and non-conductive dusts (ia IIIB). The surface temperatures of the transponder can be taken from the following table depending on the ambient temperature range.

⚠ WARNING

Ignitions of dust-air mixtures

The transponder may only be operated in the ambient temperature range specified for it (see EC type examination certificate TÜV 18 ATEX 232450 X).

For applications at locations with an explosive dust atmosphere, the transponder must be protected from electrostatic charges (see EC type examination certificate TÜV 18 ATEX 232450 X).

When using the transponder, check to ensure that the temperature values are complied with in connection with the requirements of the area of application.

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

Temperature class grading for dusts and radiated power for 2 W and 5 A/m

If the radiated power of an antenna radiating into the hazardous area or located in the hazardous area and operating in the 13.56 MHz frequency band cannot exceed the value 2 W or 5 A/m, the temperature class grading is as follows:

Table 8-38 Temperature class grading for dusts

Ambient temperature range	Temperature class
-25 °C ≤ T_a ≤ +125 °C	T185 °C
-25 °C ≤ T_a ≤ +75 °C	T135 °C
-25 °C ≤ T_a ≤ +40 °C	T100 °C

8.13.6 Technical specifications

Table 8-39 Technical specifications of MDS D339

		6GT2600-3AA10
Product type designation	SIMATIC MDS D339	
Memory		
Memory configuration		
• UID	• 8 bytes	

	6GT2600-3AA10
• User memory	• 992 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)"
Mechanical specifications	
Enclosure	
• 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 ... +100 °C
• outside the read/write field	• -40 ... +220 °C
	• from +125 °C: 20% reduction in the limit distance
	• at +200 °C: Tested up to 5000 hours or 6000 cycles
	• at +220 °C: Tested up to 2000 hours or 2000 cycles
• during storage	• -40 ... +100 °C
Degree of protection according 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 according to EN 60721-3-7 Class 7M3 [1]	500 m/s²
Vibration-resistant according to EN 60721-3-7 Class 7M3 [1]	200 m/s²
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

	6GT2600-3AA10
Standards, specifications, approvals	
MTBF	228 years

1) The values for shock and vibration are maximum values and must not be applied continuously. A combination of high application temperatures together with high shock or vibration values is not possible.

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

8.13.7 Dimensional drawing

MDS D339

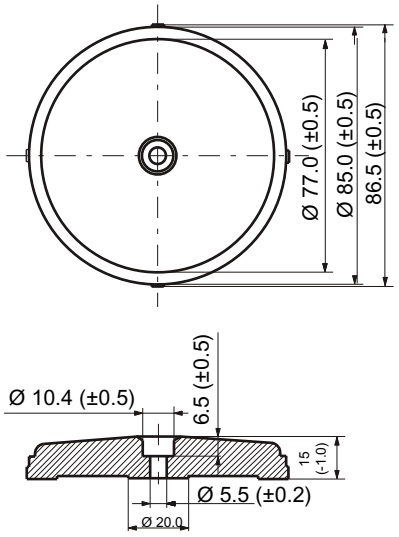


Figure 8-32 Dimension drawing of the MDS D339

Dimensions in mm

8.14 MDS D400

8.14.1 Features

MDS D400	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	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 8-40 Ordering data of MDS D400

	Article number
MDS D400	6GT2600-4AD00

Table 8-41 Ordering data of MDS D400 accessories

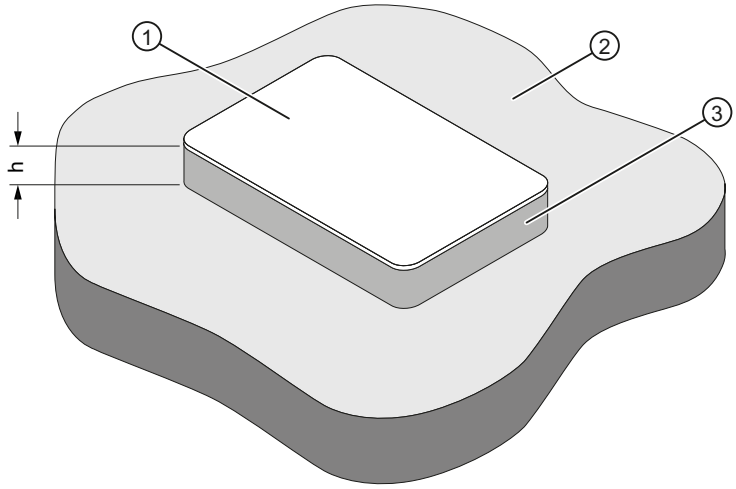
	Article number
Spacer (in conjunction with fixing pocket 6GT2190-0AB00)	6GT2190-0AA00
Fixing pocket (in conjunction with spacer 6GT2190-0AA00)	6GT2190-0AB00
Fixing pocket (not suitable for fixing directly onto metal)	6GT2390-0AA00

8.14.3 Metal-free area

Direct mounting of the transponder on metal is not permitted. A distance of ≥ 20 mm is recommended to avoid a reduced read/write range and a reduction of the field data. This can be accomplished, for example, by installing a spacer.

Note that if the distances (a and h) are not observed, this may result in a reduction of the field data as well as a reduced write/read range.

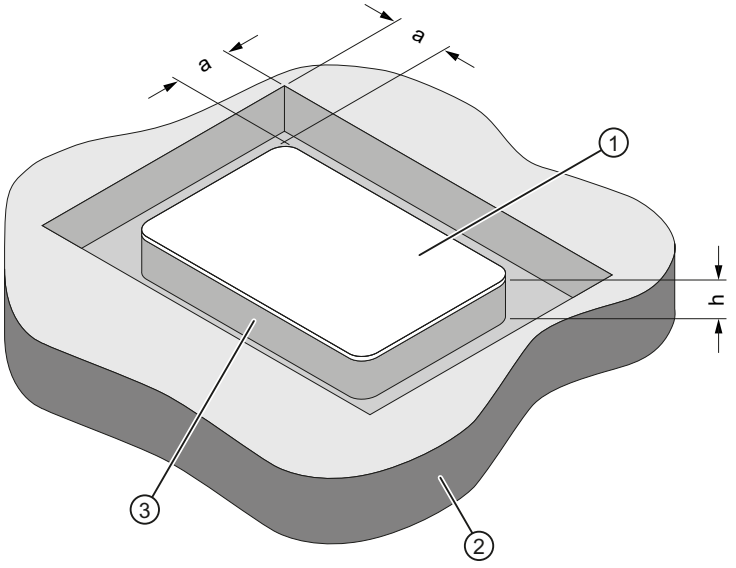
Mounting on metal



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

Figure 8-33 Mounting the MDS D100 / D200 / D400 on metal with spacer

Flush-mounting



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

Figure 8-34 Flush installation of the MDS D100 / D200 / D400 in metal with spacer

8.14.4 Technical specifications

Table 8-42 Technical specifications for MDS D400

	6GT2600-4AD00
Product type designation	SIMATIC MDS D400
Memory	
Memory configuration	
• UID	• 8 bytes
• User memory	• 2000 bytes FRAM
• OTP 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)"
Mechanical specifications	
Enclosure	
• 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 ... +60 °C
• outside the read/write field	• -20 ... +60 °C
• during storage	• -20 ... +60 °C
Degree of protection according to EN 60529	IP67
Shock-resistant acc. to EN 60721-3-7, Class 7M2	ISO 10373 / ISO 7810 [1)]
Vibration-resistant according to EN 60721-3-7 Class 7M2	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 [2)]

	6GT2600-4AD00
Standards, specifications, approvals	
MTBF	228 years

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

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

8.14.5 Dimension drawing

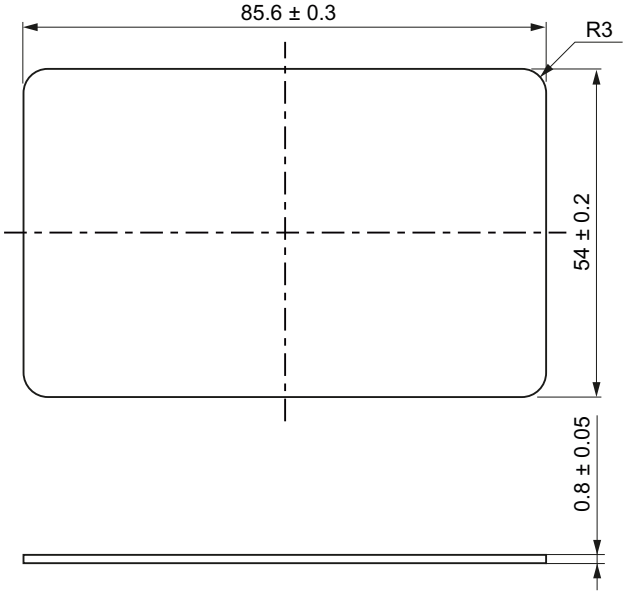


Figure 8-35 Dimensional drawing MDS D400 (dimensions in mm)

8.15 MDS D421

8.15.1 Characteristics

MDS D421	Characteristics	
	Area of application	Constructed for tool coding according to DIN 69873. It can be used wherever small data storage media and exact positioning are required, e.g. tool identification, workpiece holders. The rugged enclosure of the transponder 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 8-43 Ordering data of MDS D421

	Article number
MDS D421	6GT2600-4AE00

8.15.3 Mounting on metal

Mounting on metal

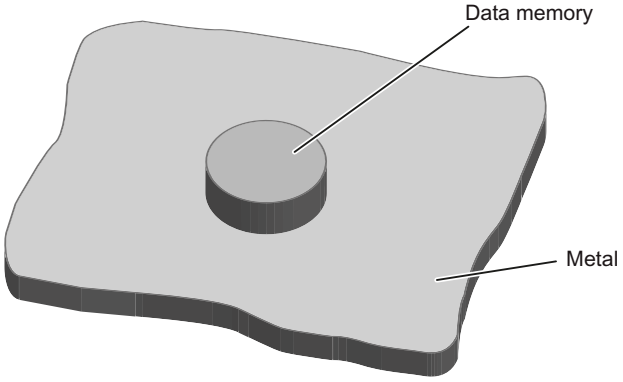


Figure 8-36 Mounting of MDS D421 / D521 on metal

Flush-mounting

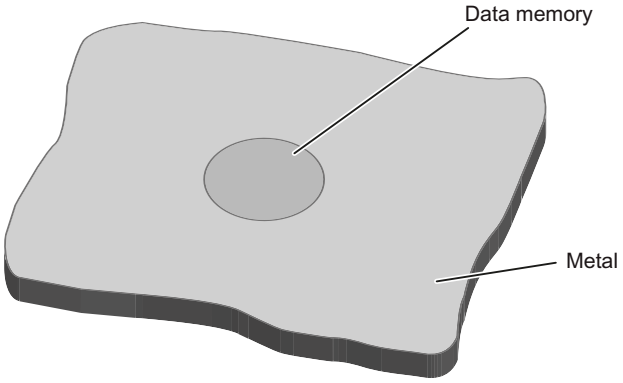
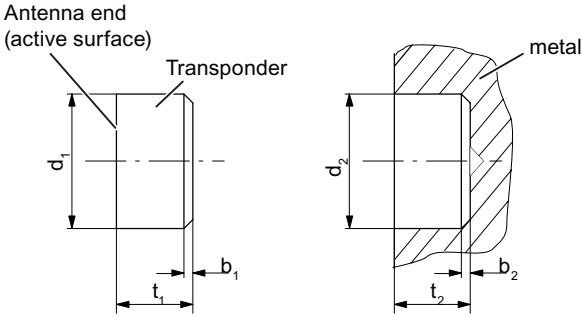


Figure 8-37 Flush-mounting of MDS D421 / D521 in metal without clearance

Flush-mounting of the MDS 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)

Figure 8-38 Flush-mounting of MDS D421 / D521 in metal with tools; 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 by hand, with antenna side outwards (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

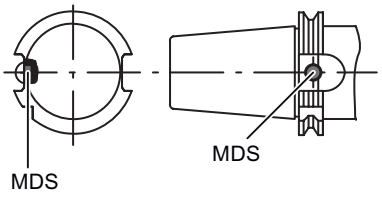


Figure 8-39 Installation example of MDS D421/D521/E623 in a steep cone

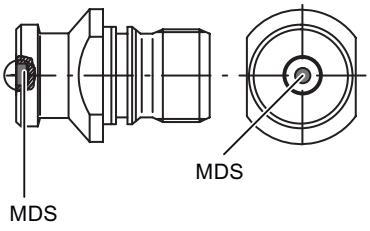


Figure 8-40 Installation example of MDS D421/D521/E623 in a stud bolt

8.15.4 Technical specifications

Table 8-44 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
• OTP memory	• 16 bytes FRAM
Read cycles (at < 40 °C)	> 10^{12}
Write cycles (at < 40 °C)	> 10^{12}
Data retention time (at < 40 °C)	> 10 years
Write/read distance (S_g)	Dependent on the reader used, see section "Field data of ISO transponders (MDS D) (Page 51)"
Mechanical specifications	
Enclosure	

		6GT2600-4AE00
• Material	• Epoxy resin	
• Color	• Black	
Recommended distance to metal	≥ 0 mm	
Power supply	Inductive, without battery	

Permitted ambient conditions	
Ambient temperature	
• during write/read access	• -25 ... +85 °C
• outside the read/write field	• -40 ... +100 °C
• during storage	• -40 ... +100 °C
Degree of protection according to EN 60529	• IP67 • IPx9K steam jet: 150 mm; 10 to 15 l/min; 100 bar; 75 °C
Shock-resistant acc. to EN 60721-3-7, Class 7M2 [1]	1000 m/s^2
Vibration-resistant acc. to EN 60721-3-7, Class 7M2 [1]	200 m/s^2
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]

Standards, specifications, approvals	
MTBF	228 years

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

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

8.15.5 Dimension drawing

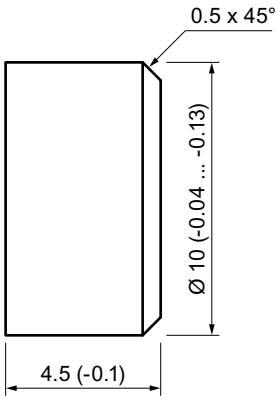


Figure 8-41 Dimension drawing of MDS D421

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 8-45 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

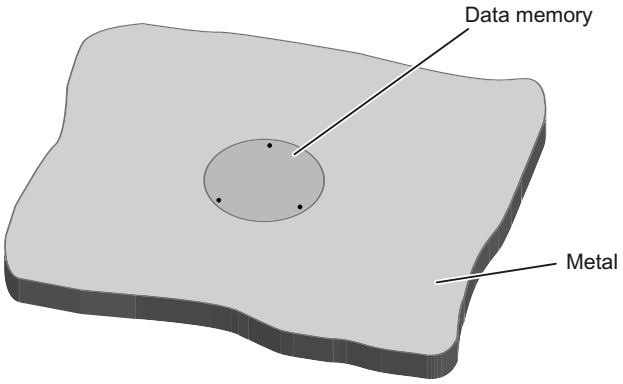


Figure 8-42 Flush-mounting of MDS D422 / D522 in metal without clearance

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 / 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 D422 / D522 in metal with tools

8.16.4 Technical specifications

Table 8-46 Technical specifications for the MDS D422

		6GT2600-4AF00
Product type designation	SIMATIC MDS D422	
Memory		
Memory configuration		
• UID	• 8 bytes	
• User memory	• 2000 bytes FRAM	

	6GT2600-4AF00
• OTP memory	• 16 bytes FRAM
Read cycles (at < 40 °C)	> 10^{12}
Write cycles (at < 40 °C)	> 10^{12}
Data retention time (at < 40 °C)	> 10 years
Write/read distance (S_g)	Dependent on the reader used, see section "Field data of ISO transponders (MDS D) (Page 51)"

Mechanical specifications	
Enclosure	
• 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 ... +85 °C
• outside the read/write field	• -40 ... +100 °C
• during storage	• -40 ... +100 °C
Degree of protection according to EN 60529	IP68 2 hours, 2 bar, +20 °C
Shock-resistant acc. to EN 60721-3-7, Class 7M2 [1]	500 m/s²
Vibration-resistant acc. to EN 60721-3-7, Class 7M2 [1]	200 m/s²
Torsion and bending load	Not permitted

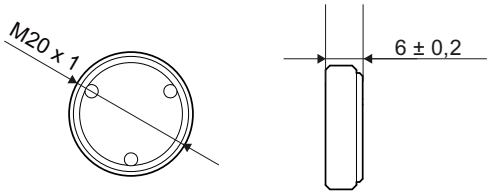
Design, dimensions and weight	
Dimensions (Ø x H)	20 x 6 mm
Weight	13 g
Type of mounting	• Glued [2] • 1 x transponder thread M20 ≤ 1 Nm

Standards, specifications, approvals	
MTBF	285 years

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

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

8.16.5 Dimension drawing



Dimensions in mm

Figure 8-43 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 8-47 Ordering data of MDS D423

	Article number
MDS D423	6GT2600-4AA00

Table 8-48 Ordering data of MDS D423 accessories

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

8.17.3 Mounting on metal

Note that if the distance (a) is not observed, this may result in a reduction of the field data as well as a reduced write/read range.

Mounting on metal

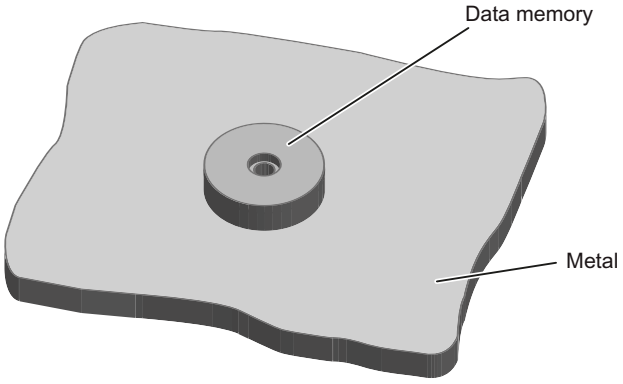
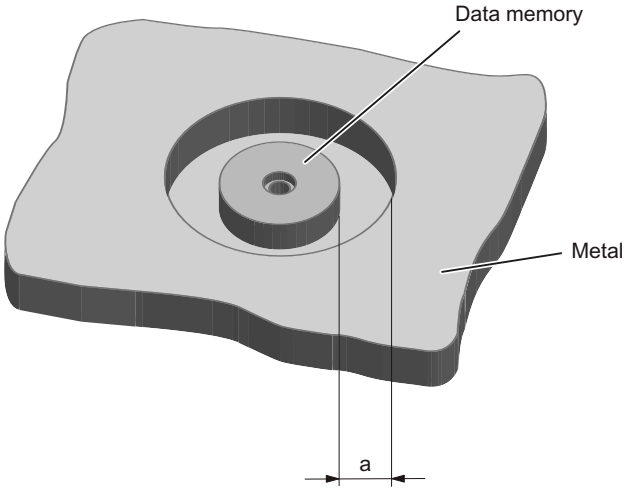


Figure 8-44 Mounting the MDS D423 on metal

Mounting in metal



a ≥ 10 mm

Figure 8-45 Flush-mounting of the MDS D423 in metal clearance

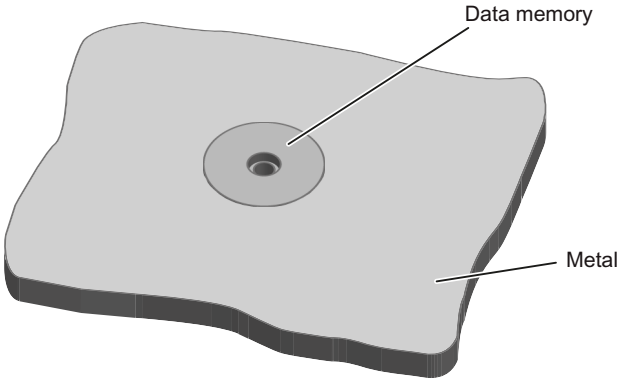


Figure 8-46 Flush-mounting of the MDS D423 in metal without clearance

Note

Reduction of the write/read range

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

8.17.4 Technical specifications

Table 8-49 Technical specifications of MDS D423

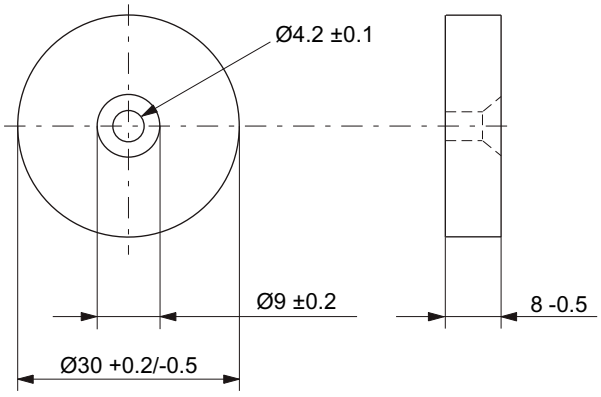
	6GT2600-4AA00
Product type designation	SIMATIC MDS D423
Memory	
Memory configuration	
• UID	• 8 bytes
• User memory	• 2000 bytes FRAM
• OTP memory	• 16 bytes FRAM
Read cycles (at < 40 °C)	> 10^{12}
Write cycles (at < 40 °C)	> 10^{12}
Data retention time (at < 40 °C)	> 10 years
Write/read distance (S_g)	Dependent on the reader used, see section "Field data of ISO transponders (MDS D) (Page 51)"
Mechanical specifications	
Enclosure	
• Material	• Plastic PPS
• Color	• Black
Recommended distance to metal	≥ 0 mm
Power supply	Inductive, without battery

	6GT2600-4AA00
Permitted ambient conditions	
Ambient temperature	
• during write/read access	• -25 ... +85 °C
• outside the read/write field	• -40 ... +100 °C
• during storage	• -40 ... +100 °C
Degree of protection according 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 acc. to EN 60721-3-7, Class 7M2 [1]	500 m/s²
Vibration-resistant acc. to EN 60721-3-7, Class 7M2 [1]	200 m/s²
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
Standards, specifications, approvals	
MTBF	228 years

[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 8-47 Dimension drawing for MDS D423

8.18 MDS D424

8.18.1 Characteristics

MDS D424	Characteristics	
	Area of application	Production automation as well use in assembly and manufacturing lines
	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 8-50 Ordering data of MDS D424

	Article number
MDS D424	6GT2600-4AC00

Table 8-51 Ordering data of MDS D424 accessories

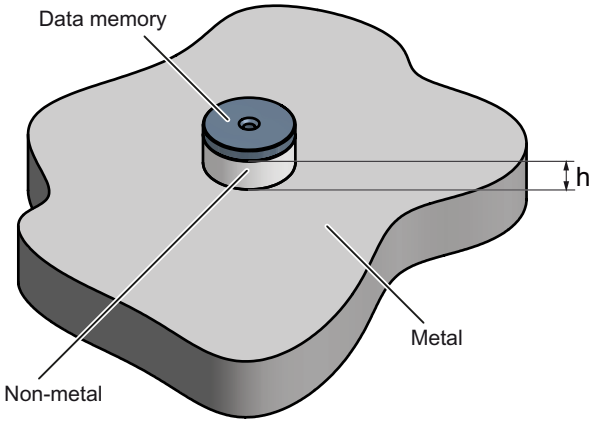
	Article number
Spacer	6GT2690-0AK00

8.18.3 Mounting on metal

Direct mounting of the transponder on metal is not permitted. A distance of ≥ 20 mm is recommended to avoid a reduced read/write range and a reduction of the field data. This can be accomplished, for example, by installing a spacer.

Note that if the distances (a and h) are not observed, this may result in a reduction of the field data as well as a reduced write/read range.

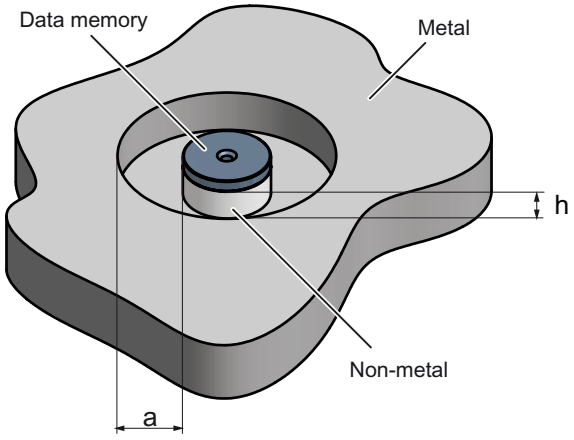
Mounting on metal



h ≥ 15 mm

Figure 8-48 Mounting the MDS D124 / D324 / D424 / D524 on metal with spacer

Flush-mounting



h ≥ 15 mm

a ≥ 25 mm

Figure 8-49 Flush installation of the MDS D124 / D324 / D424 / D524 in metal with spacer

8.18.4 Technical specifications

Table 8-52 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
• OTP memory	• 16 bytes FRAM
Read cycles (at < 40 °C)	> 10^{12}
Write cycles (at < 40 °C)	> 10^{12}
Data retention time (at < 40 °C)	> 10 years
Write/read distance (S_g)	Dependent on the reader used, see section "Field data of ISO transponders (MDS D) (Page 51)"
Mechanical specifications	
Enclosure	
• Material	• Epoxy resin
• Color	• Black
Recommended distance to metal	≥ 15 mm
Power supply	Inductive, without battery

	6GT2600-4AC00
Permitted ambient conditions	
Ambient temperature	
• during write/read access	• -25 ... +85 °C
• outside the read/write field	• -40 ... +100 °C
• during storage	• -40 ... +100 °C
Degree of protection according to EN 60529	• IP67 • IPx9K
Shock-resistant according to EN 60721-3-7 Class 7M3 [1]	1000 m/s²
Vibration-resistant according to EN 60721-3-7 Class 7M3 [1]	200 m/s²
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 [2] • 1x screw M3 [3] ≤ 1 Nm
Standards, specifications, approvals	
MTBF	228 years

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

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

3) To prevent it loosening during operation, secure the screw with screw-locking varnish.

8.18.5 Dimension drawing

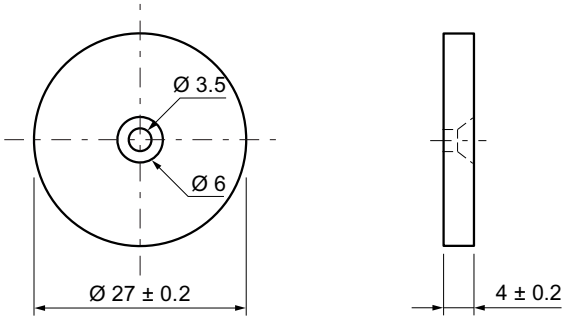


Figure 8-50 Dimension drawing of MDS D424

All dimensions in mm

8.19 MDS D425

8.19.1 Characteristics

MDS D425	Characteristics	
	Area of application	Compact and rugged ISO transponder for screw mounting Use in assembly and production lines in the powertrain sector; ideal for mounting on motors, gearboxes, and workpiece holders Can also be deployed under extreme environmental conditions without problems due to the rugged design.
	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 8-53 Ordering data of MDS D425

	Article number
MDS D425	6GT2600-4AG00

8.19.3 Application example

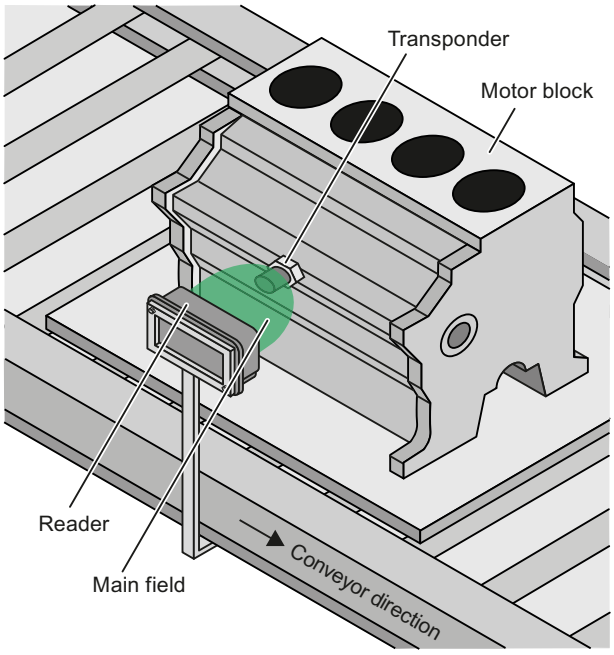


Figure 8-51 Application example

8.19.4 Technical specifications

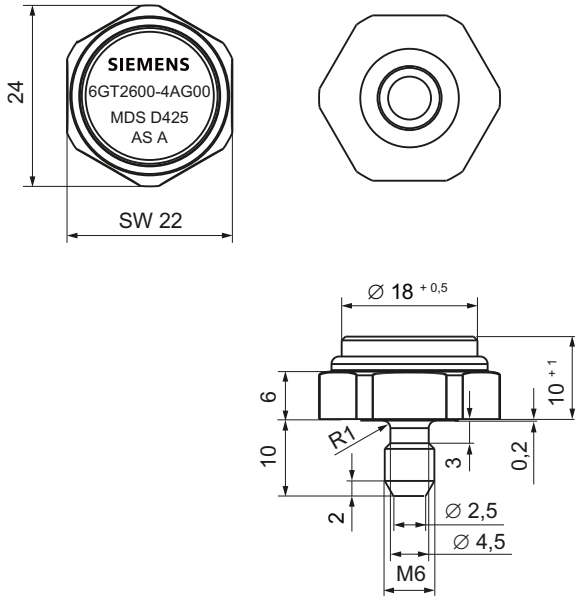
Table 8-54 Technical specifications for the MDS D425

	6GT2600-4AG00
Product type designation	SIMATIC MDS D425
Memory	
Memory configuration	
• UID	• 8 bytes
• User memory	• 2000 bytes FRAM
• OTP memory	• 16 bytes FRAM
Read cycles (at < 40 °C)	> 10^{12}
Write cycles (at < 40 °C)	> 10^{12}
Data retention time (at < 40 °C)	> 10 years
Write/read distance (S_g)	Dependent on the reader used, see section "Field data of ISO transponders (MDS D) (Page 51)"
Mechanical specifications	
Enclosure	
• Material	• Plastic PA 6.6 GF

	6GT2600-4AG00
• Color	• Black
Recommended distance to metal	≥ 0 mm
Power supply	Inductive, without battery
Permitted ambient conditions	
Ambient temperature	
• during write/read access	• -25 ... +85 °C
• outside the read/write field	• -40 ... +125 °C
• during storage	• -40 ... +125 °C
Degree of protection according 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 according to IEC 68-2-27 [1)]	500 m/s²
Vibration-resistant according to IEC 68-2-6 [1)]	200 m/s²
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
Standards, specifications, approvals	
MTBF	228 years

[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 8-52 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 environmental 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 8-55 Ordering data of MDS D426

	Article number
MDS D426	6GT2600-4AH00

Table 8-56 Ordering data of MDS D426 accessories

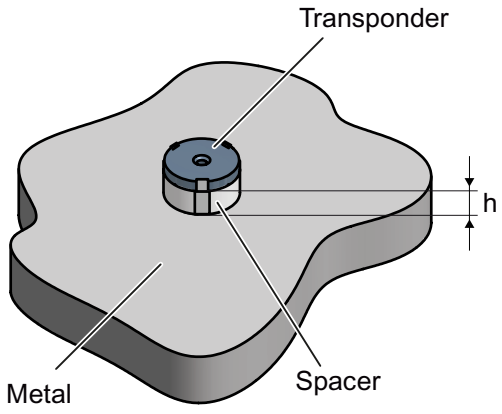
	Article number
Spacer	6GT2690-0AL00

8.20.3 Mounting on metal

Direct mounting of the transponder on metal is not permitted. A distance of ≥ 20 mm is recommended to avoid a reduced read/write range and a reduction of the field data. This can be accomplished, for example, by installing a spacer.

Note that if the distances (a and h) are not observed, this may result in a reduction of the field data as well as a reduced write/read range.

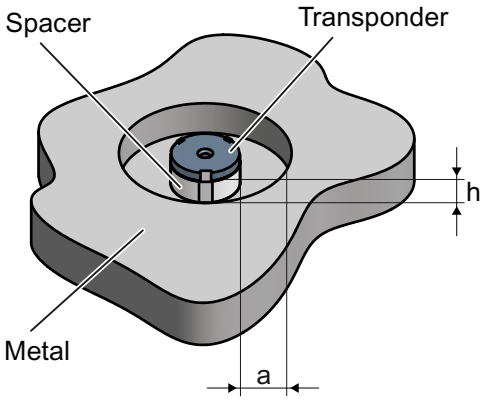
Mounting on metal



h ≥ 25 mm

Figure 8-53 Mounting the MDS D126 / D426 / D526 on metal with spacer

Flush-mounted in metal



h ≥ 25 mm

a ≥ 50 mm

Figure 8-54 Flush installation of the MDS D126 / D426 / D526 in metal with spacer

8.20.4 Technical specifications

Table 8-57 Technical specifications for the MDS D426

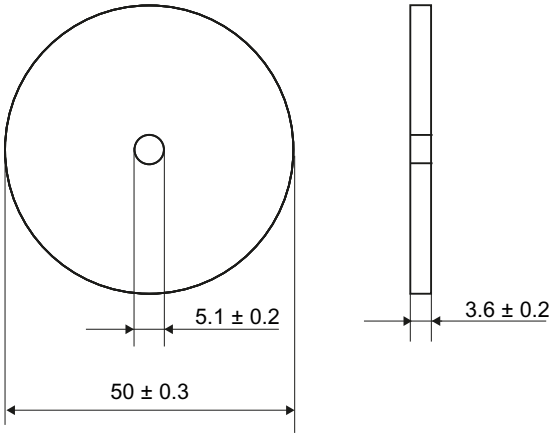
	6GT2600-4AH00
Product type designation	SIMATIC MDS D426
Memory	
Memory configuration	
• UID	• 8 bytes
• User memory	• 2000 bytes FRAM
• OTP memory	• 16 bytes FRAM
Read cycles (at < 40 °C)	> 10^{12}
Write cycles (at < 40 °C)	> 10^{12}
Data retention time (at < 40 °C)	> 10 years
Write/read distance (S_g)	Dependent on the reader used, see section "Field data of ISO transponders (MDS D) (Page 51)"
Mechanical specifications	
Enclosure	
• Material	• Plastic PA 6.6 GF
• Color	• Black
Recommended distance to metal	≥ 25 mm
Power supply	Inductive, without battery
Permitted ambient conditions	

		6GT2600-4AH00
Ambient temperature		
• during write/read access	• -25 ... +85 °C	
• outside the read/write field	• -40 ... +100 °C	
• during storage	• -40 ... +100 °C	
Degree of protection according to EN 60529	IP68 2 hours, 2 bar, +20 °C	
Shock-resistant according to IEC 68-2-27 [1)]	50 m/s²	
Vibration-resistant according to IEC 68-2-6 [1)]	20 m/s²	
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	
Standards, specifications, approvals		
MTBF	228 years	

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 8-55 Dimension drawing of MDS D426

8.21 MDS D428

8.21.1 Characteristics

MDS D428	Characteristics	
	Area of application	Compact and rugged ISO transponder for screw mounting Use in assembly and production lines in the powertrain sector Can also be deployed under extreme environmental conditions without problems due to the rugged design.
	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 8-58 Ordering data of MDS D428

	Article number
MDS D428	6GT2600-4AK00-0AX0

8.21.3 Application example

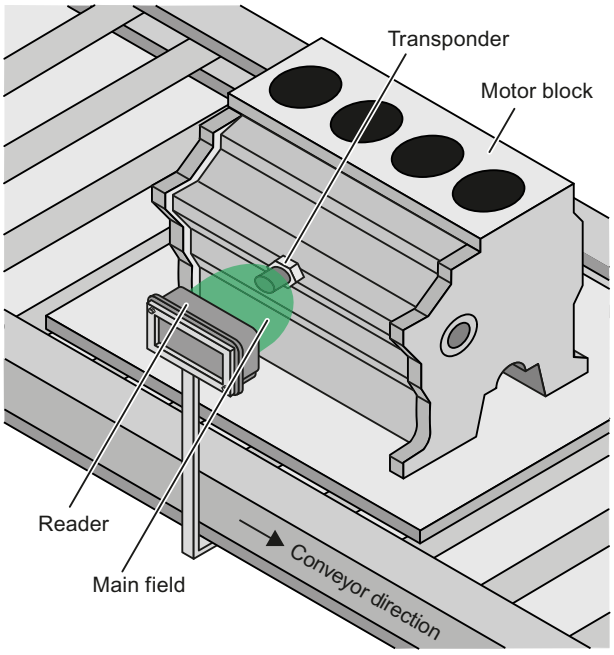


Figure 8-56 Application example

8.21.4 Technical specifications

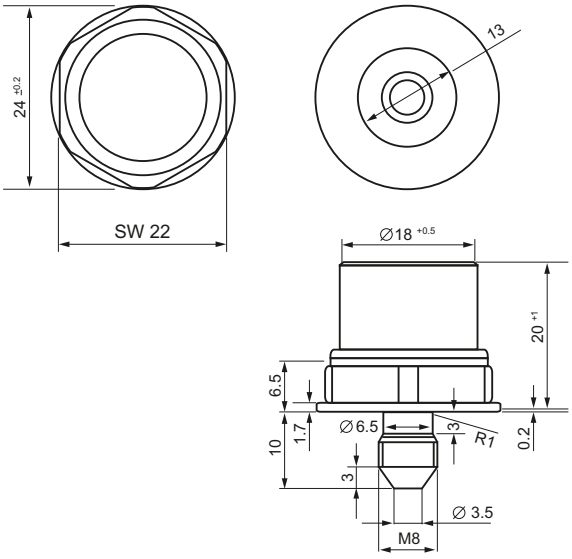
Table 8-59 Technical specifications for the MDS D428

	6GT2600-4AK00
Product type designation	SIMATIC MDS D428
Memory	
Memory configuration	
• UID	• 8 bytes
• User memory	• 2000 bytes FRAM
• OTP memory	• 16 bytes FRAM
Read cycles (at < 40 °C)	> 10^{12}
Write cycles (at < 40 °C)	> 10^{12}
Data retention time (at < 40 °C)	> 10 years
Write/read distance (S_g)	Dependent on the reader used, see section "Field data of ISO transponders (MDS D) (Page 51)"
Mechanical specifications	
Enclosure	
• Material	• Plastic PA 6.6 GF

	6GT2600-4AK00
• Color	• Black
Recommended distance to metal	≥ 0 mm
Power supply	Inductive, without battery
Permitted ambient conditions	
Ambient temperature	
• during write/read access	• -25 ... +85 °C
• outside the read/write field	• -40 ... +125 °C
• during storage	• -40 ... +125 °C
Degree of protection according 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 according to IEC 68-2-27 [1)]	500 m/s²
Vibration-resistant according to IEC 68-2-6 [1)]	200 m/s²
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
Standards, specifications, approvals	
MTBF	228 years

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 8-57 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 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

8.22.2 Ordering data

Table 8-60 Ordering data of MDS D460

	Article number
MDS D460	6GT2600-4AB00

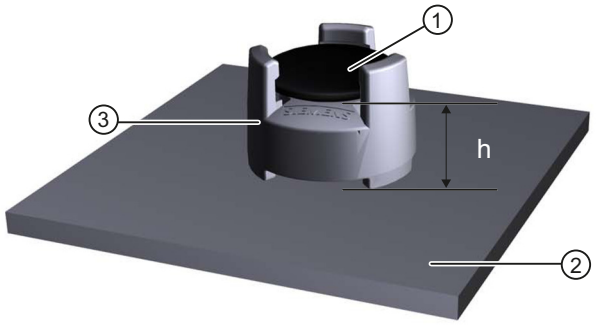
Table 8-61 Ordering data of MDS D460 accessories

	Article number
Spacer	6GT2690-0AG00
Corner mounting bracket	6GT2690-0AN00

8.22.3 Mounting on metal

Note that if the distance (h) is not observed, this may result in a reduction of the field data as well as a reduced write/read range.

Mounting on metal



① Transponder
② Metal carrier
③ Spacer
h ≥ 10 mm

Figure 8-58 Mounting the MDS D160 / D460 / D560 on metal with spacer

8.22.4 Technical specifications

Table 8-62 Technical specifications for MDS D460

	6GT2600-4AB00
Product type designation	SIMATIC MDS D460
Memory	
Memory configuration	
• UID	• 8 bytes
• User memory	• 2000 bytes FRAM
• OTP memory	• 16 bytes FRAM
Read cycles (at < 40 °C)	> 10^{12}
Write cycles (at < 40 °C)	> 10^{12}
Data retention time (at < 40 °C)	> 10 years
Write/read distance (S_g)	Dependent on the reader used, see section "Field data of ISO transponders (MDS D) (Page 51)"
Mechanical specifications	
Enclosure	
• 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 ... +85 °C
• outside the read/write field	• -40 ... +100 °C
• during storage	• -40 ... +100 °C
Degree of protection according to EN 60529	• IP67 • IPx9K steam jet: 150 mm; 10 to 15 l/min; 100 bar; 75 °C
Shock-resistant according to IEC 68-2-27 [1)]	500 m/s²
Vibration-resistant according to IEC 68-2-6 [1)]	200 m/s²
Torsion and bending load	Not permitted
Design, dimensions and weight	
Dimensions (Ø x H)	16 x 3 mm
Weight	3 g
Type of mounting	• Glued [2)] • With spacer

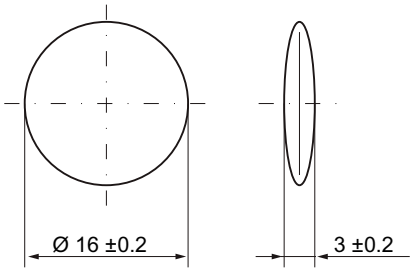
	6GT2600-4AB00
Standards, specifications, approvals	
MTBF	228 years

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

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

8.22.5 Dimension drawings

Dimensional drawing of MDS D460



Dimensions in mm

Figure 8-59 Dimensional drawing of MDS D460

8.23 MDS D521

8.23.1 Characteristics

MDS D521	Characteristics	
	Area of application	Constructed for tool coding according to DIN 69873. It can be used wherever small data storage media and exact positioning are required, e.g. tool identification, workpiece holders. The rugged enclosure of the transponder 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 8-63 Ordering data for MDS D521

	Article number
MDS D521	6GT2600-5AE00

8.23.3 Mounting on metal

Mounting on metal

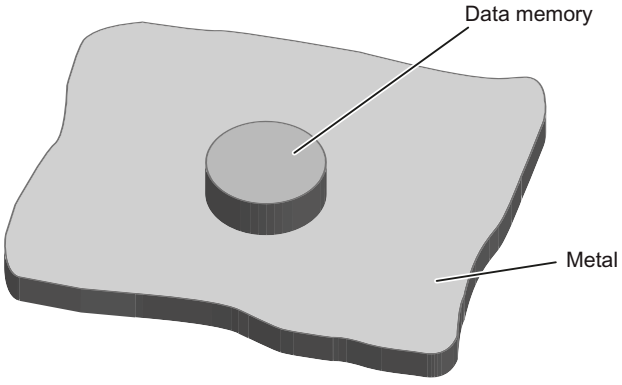


Figure 8-60 Mounting of MDS D421 / D521 on metal

Flush-mounting

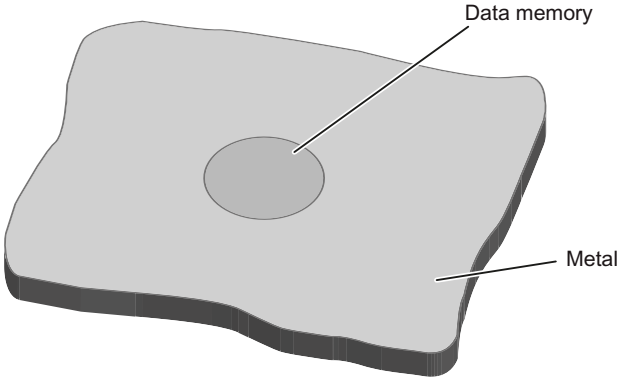
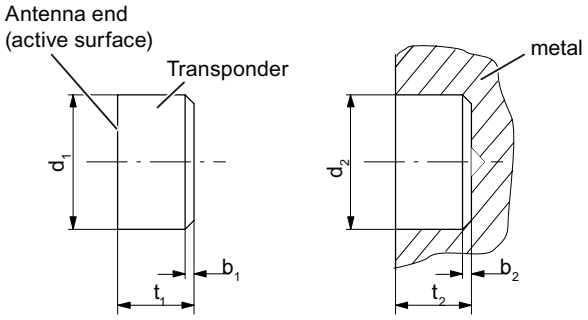


Figure 8-61 Flush-mounting of MDS D421 / D521 in metal without clearance

Flush-mounting of the MDS 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)

Figure 8-62 Flush-mounting of MDS D421 / D521 in metal with tools; 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 by hand, with antenna side outwards (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

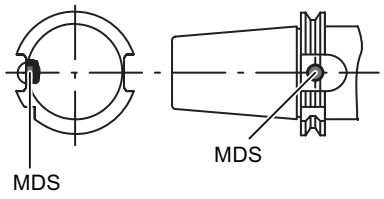


Figure 8-63 Installation example of MDS D421/D521/E623 in a steep cone

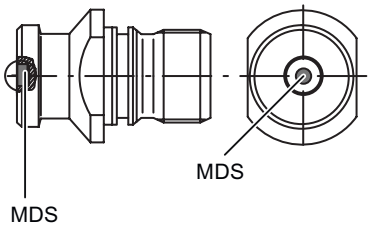


Figure 8-64 Installation example of MDS D421/D521/E623 in a stud bolt

8.23.4 Technical specifications

Table 8-64 Technical specifications for MDS D521

		6GT2600-5AE00
Product type designation	SIMATIC MDS D521	
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)"	
Mechanical specifications		
Enclosure		
• Material	• Epoxy resin	
• Color	• Black	
Recommended distance to metal	≥ 0 mm	
Power supply	Inductive, without battery	
Permitted ambient conditions		
Ambient temperature		
• during write/read access	• -25 ... +85 °C	
• outside the read/write field	• -40 ... +100 °C	
• during storage	• -40 ... +100 °C	
Degree of protection according to EN 60529	• IP67 • IPx9K steam jet: 150 mm; 10 to 15 l/min; 100 bar; 75 °C	
Shock-resistant acc. to EN 60721-3-7, Class 7M2 [1)]	1000 m/s²	

		6GT2600-5AE00
Vibration-resistant acc. to EN 60721-3-7, Class 7M2 [1]	200 m/s²	
Torsion and bending load	Not permitted	
Design, dimensions and weight		
Dimensions (Ø x H)	10 x 4.5 mm	
Weight	1 g	
Type of mounting	Glued [2]	
Standards, specifications, approvals		
MTBF	228 years	

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

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

8.23.5 Dimension drawing

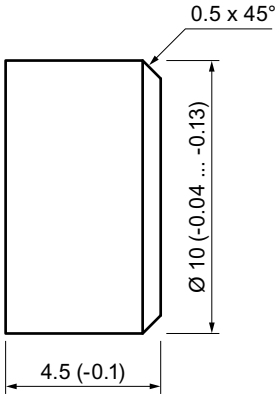


Figure 8-65 Dimension drawing of MDS D521

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 8-65 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

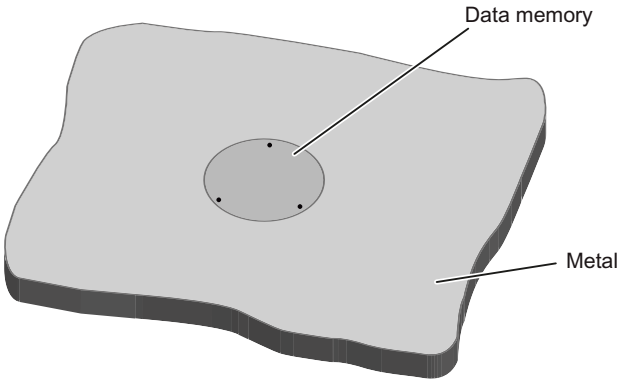


Figure 8-66 Flush-mounting of MDS D422 / D522 in metal without clearance

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 / 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 D422 / D522 in metal with tools

8.24.4 Technical specifications

Table 8-66 Technical specifications for MDS D522

	6GT2600-5AF00
Product type designation	SIMATIC MDS D522
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)"
Mechanical specifications	
Enclosure	
• 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 ... +85 °C

		6GT2600-5AF00
• outside the read/write field	• -40 ... +100 °C	
• during storage	• -40 ... +100 °C	
Degree of protection according to EN 60529	IP68 2 hours, 2 bar, +20 °C	
Shock-resistant acc. to EN 60721-3-7, Class 7M2 [1]	500 m/s²	
Vibration-resistant acc. to EN 60721-3-7, Class 7M2 [1]	200 m/s²	
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 [2] • 1 x transponder thread M20 ≤ 1 Nm

Standards, specifications, approvals	
MTBF	285 years

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

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

8.24.5 Dimension drawing

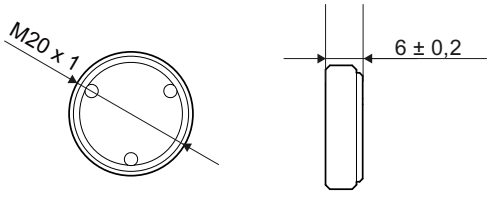


Figure 8-67 Dimensional drawing of MDS D522

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 8-67 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

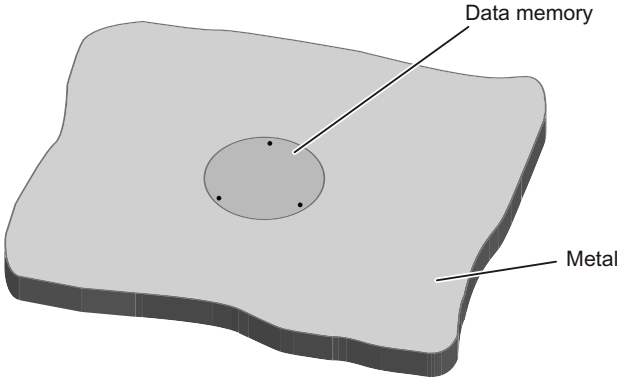


Figure 8-68 Flush installation of the MDS D522 special version in metal without clearance

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.

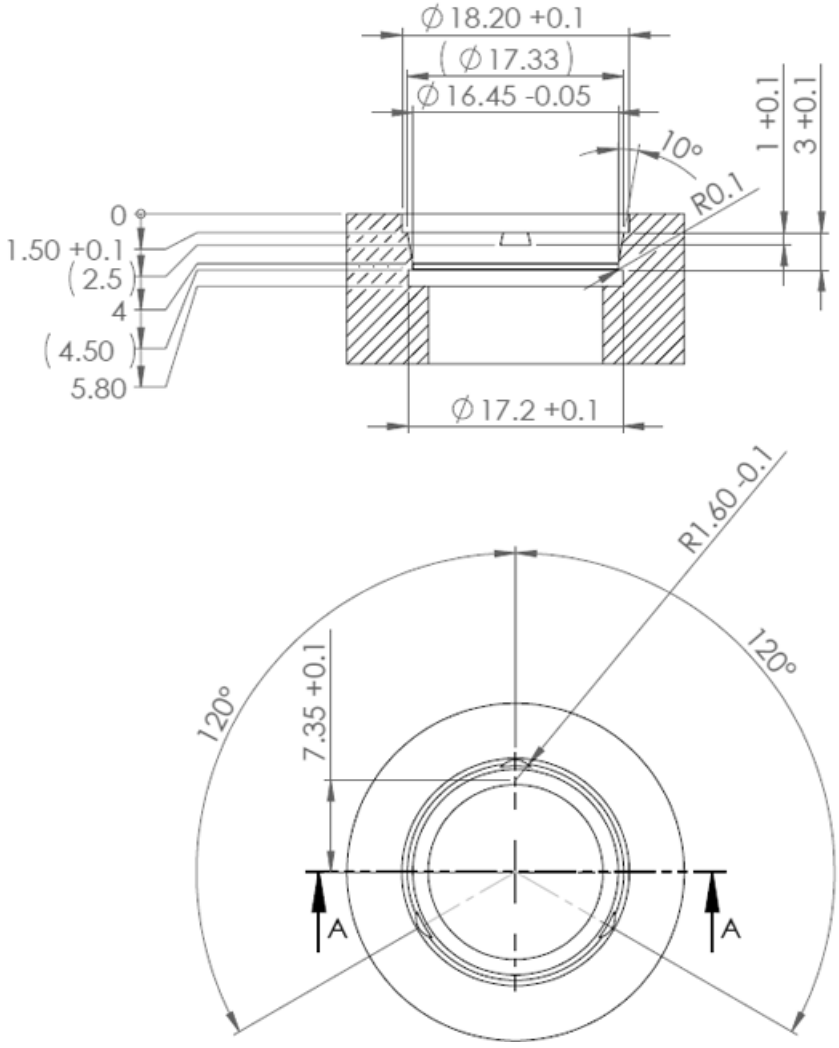


Figure 8-69 Dimension drawing: Workpiece drill hole for mounting the MDS D522 special version

8.25.4 Technical specifications

Table 8-68 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}
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)"
Mechanical specifications	
Enclosure	
• 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 ... +85 °C
• outside the read/write field	• -40 ... +100 °C
• during storage	• -40 ... +100 °C
Degree of protection according to EN 60529	IP68 2 hours, 2 bar, +20 °C
Shock-resistant acc. to EN 60721-3-7, Class 7M2 [1)]	500 m/s²
Vibration-resistant acc. to EN 60721-3-7, Class 7M2 [1)]	200 m/s²
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)
Standards, specifications, approvals	
MTBF	228 years

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

8.25.5 Dimensional drawing

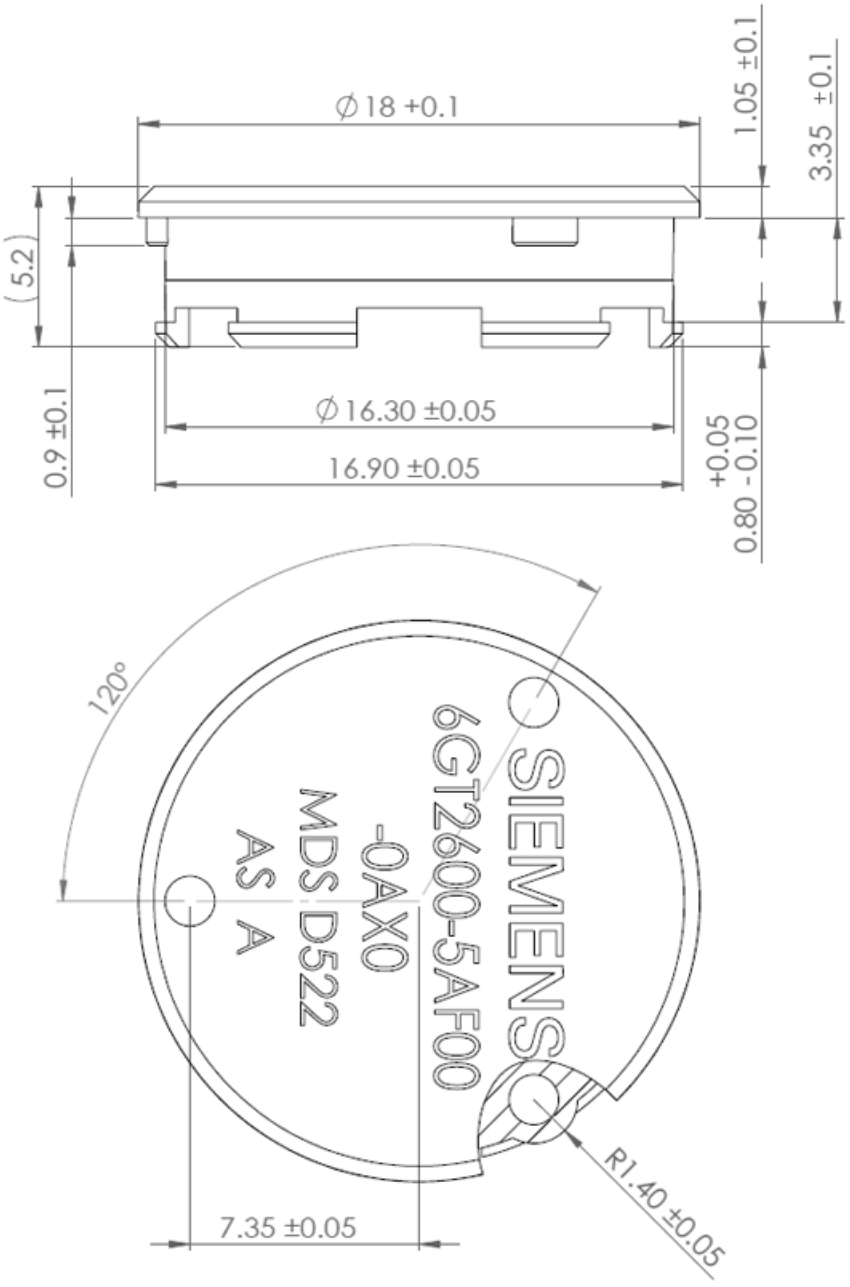


Figure 8-70 Dimension drawing MDS D522 special version

All dimensions in mm

8.26 MDS D524

8.26.1 Characteristics

MDS D524	Characteristics	
	Area of application	Production automation as well use in assembly and manufacturing lines
	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 8-69 Ordering data for MDS D524

	Article number
MDS D524	6GT2600-5AC00

Table 8-70 Ordering data of MDS D524 accessories

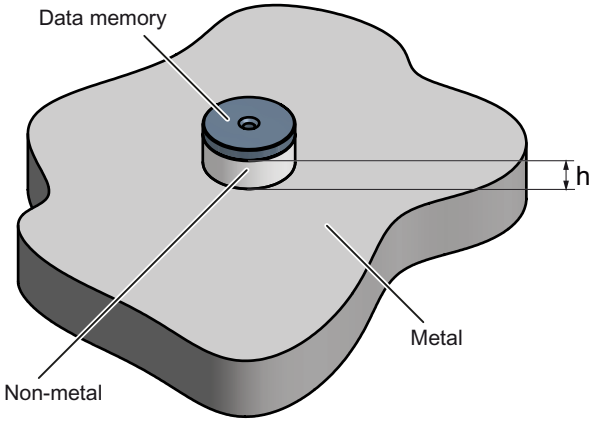
	Article number
Spacer	6GT2690-0AK00

8.26.3 Mounting on metal

Direct mounting of the transponder on metal is not permitted. A distance of ≥ 20 mm is recommended to avoid a reduced read/write range and a reduction of the field data. This can be accomplished, for example, by installing a spacer.

Note that if the distances (a and h) are not observed, this may result in a reduction of the field data as well as a reduced write/read range.

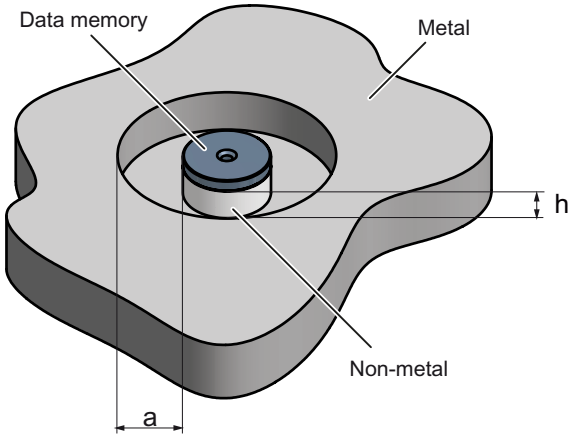
Mounting on metal



h ≥ 15 mm

Figure 8-71 Mounting the MDS D124 / D324 / D424 / D524 on metal with spacer

Flush-mounting



h ≥ 15 mm

a ≥ 25 mm

Figure 8-72 Flush installation of the MDS D124 / D324 / D424 / D524 in metal with spacer

8.26.4 Technical specifications

Table 8-71 Technical specifications for MDS D524

		6GT2600-5AC00
Product type designation	SIMATIC MDS D524	
Memory		
Memory configuration		

	6GT2600-5AC00
• 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)"
Mechanical specifications	
Enclosure	
• 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 ... +85 °C
• outside the read/write field	• -40 ... +100 °C
• during storage	• -40 ... +100 °C
Degree of protection according to EN 60529	• IP67 • IPx9K
Shock-resistant according to EN 60721-3-7 Class 7M3 [1]	1000 m/s²
Vibration-resistant according to EN 60721-3-7 Class 7M3 [1]	200 m/s²
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 [2] • 1x screw M3 [3] ≤ 1 Nm
Standards, specifications, approvals	
MTBF	228 years

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

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

[3]) To prevent it loosening during operation, secure the screw with screw-locking varnish.

8.26.5 Dimension drawing

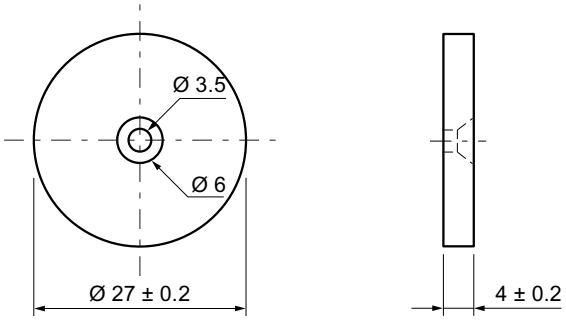


Figure 8-73 Dimensional drawing of MDS D524

All dimensions in mm

8.27 MDS D525

8.27.1 Characteristics

MDS D525	Characteristics	
	Area of application	Compact and rugged ISO transponder for screw mounting Use in assembly and production lines in the powertrain sector; ideal for mounting on motors, gearboxes, and workpiece holders Can also be deployed under extreme environmental conditions without problems due to the rugged design.
	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 8-72 Ordering data for MDS D525

	Article number
MDS D525	6GT2600-5AG00

8.27.3 Application example

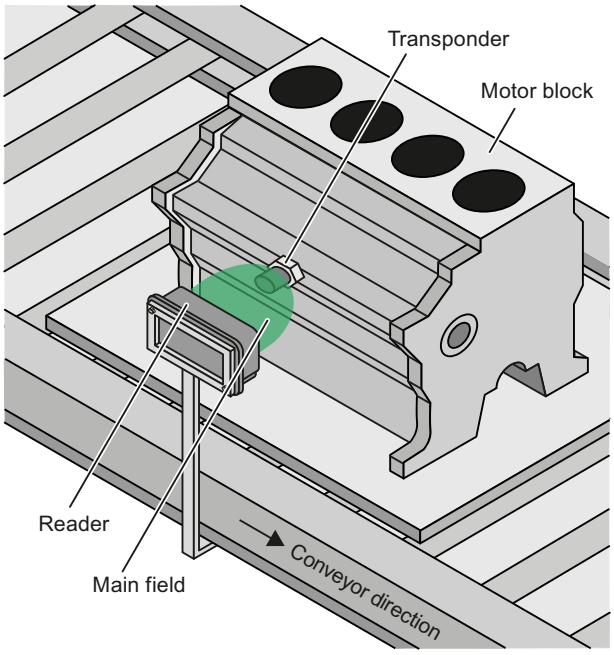


Figure 8-74 Application example

8.27.4 Technical specifications

Table 8-73 Technical specifications for MDS D525

	6GT2600-5AG00
Product type designation	SIMATIC MDS D525
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)"
Mechanical specifications	
Enclosure	
• Material	• Plastic PA 6.6 GF
• Color	• Black

	6GT2600-5AG00
Recommended distance to metal	> 0 mm
Power supply	Inductive, without battery
Permitted ambient conditions	
Ambient temperature	
• during write/read access	• -25 ... +85 °C
• outside the read/write field	• -40 ... +125 °C
• during storage	• -40 ... +125 °C
Degree of protection according 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 according to IEC 68-2-27 [1)]	500 m/s²
Vibration-resistant according to IEC 68-2-6 [1)]	200 m/s²
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
Standards, specifications, approvals	
MTBF	228 years

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

8.27.5 Dimension drawing

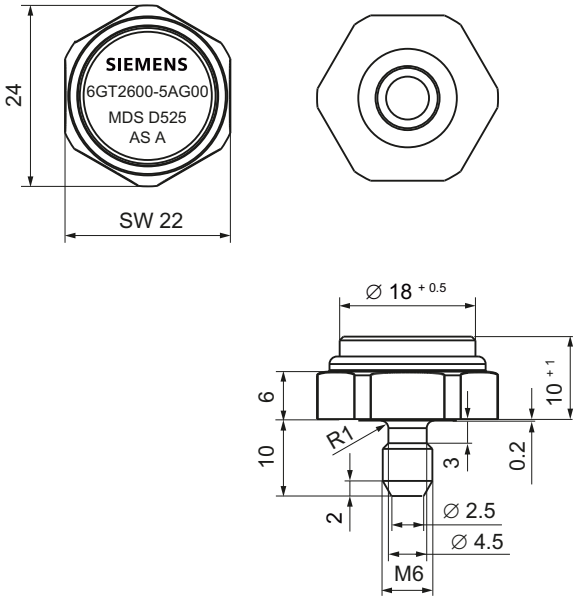


Figure 8-75 Dimensional drawing of MDS D525

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 environmental 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 8-74 Ordering data for MDS D526

	Article number
MDS D526	6GT2600-5AH00

Table 8-75 Ordering data for MDS D526 accessories

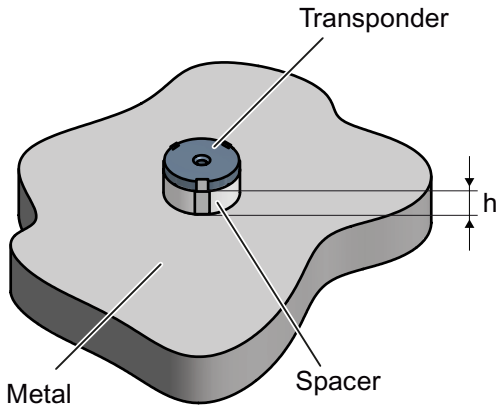
	Article number
Spacer	6GT2690-0AL00

8.28.3 Mounting on metal

Direct mounting of the transponder on metal is not permitted. A distance of ≥ 20 mm is recommended to avoid a reduced read/write range and a reduction of the field data. This can be accomplished, for example, by installing a spacer.

Note that if the distances (a and h) are not observed, this may result in a reduction of the field data as well as a reduced write/read range.

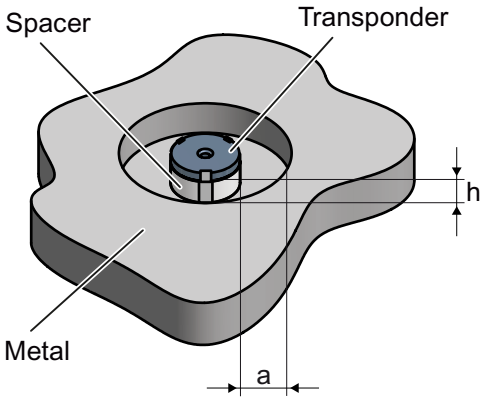
Mounting on metal



h ≥ 25 mm

Figure 8-76 Mounting the MDS D126 / D426 / D526 on metal with spacer

Flush-mounted in metal



h ≥ 25 mm

a ≥ 50 mm

Figure 8-77 Flush installation of the MDS D126 / D426 / D526 in metal with spacer

8.28.4 Technical specifications

Table 8-76 Technical specifications for MDS D526

	6GT2600-5AH00
Product type designation	SIMATIC MDS D526
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)"
Mechanical specifications	
Enclosure	
• Material	• Plastic PA 6.6 GF
• Color	• Black
Recommended distance to metal	≥ 25 mm
Power supply	Inductive, without battery
Permitted ambient conditions	
Ambient temperature	

		6GT2600-5AH00
• during write/read access	• -25 ... +85 °C	
• outside the read/write field	• -40 ... +100 °C	
• during storage	• -40 ... +100 °C	
Degree of protection according to EN 60529	IP68 2 hours, 2 bar, +20 °C	
Shock-resistant according to IEC 68-2-27 [1]	500 m/s²	
Vibration-resistant according to IEC 68-2-6 [1]	200 m/s²	
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

Standards, specifications, approvals	
MTBF	228 years

[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

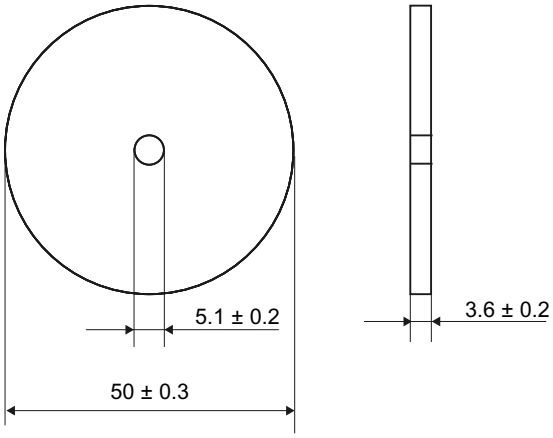


Figure 8-78 Dimensional drawing of MDS D526

All dimensions in mm

8.29 MDS D528

8.29.1 Characteristics

MDS D528	Characteristics	
	Area of application	Compact and rugged ISO transponder for screw mounting Use in assembly and production lines in the powertrain sector Can also be deployed under extreme environmental conditions without problems due to the rugged design.
	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 8-77 Ordering data for MDS D528

	Article number
MDS D528	6GT2600-5AK00

8.29.3 Application example

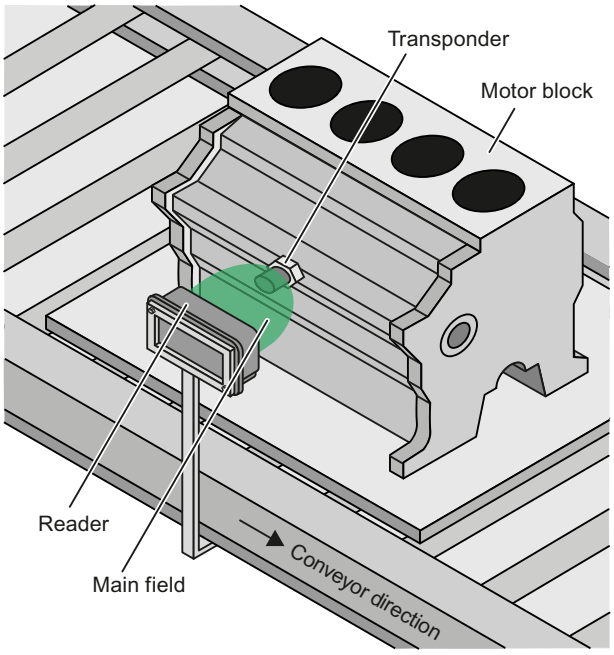


Figure 8-79 Application example

8.29.4 Technical specifications

Table 8-78 Technical specifications for MDS D528

	6GT2600-5AK00
Product type designation	SIMATIC MDS D528
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)"
Mechanical specifications	
Enclosure	
• Material	• Plastic PA 6.6 GF
• Color	• Black

	6GT2600-5AK00
Recommended distance to metal	≥ 0 mm
Power supply	Inductive, without battery
Permitted ambient conditions	
Ambient temperature	
• during write/read access	• -25 ... +85 °C
• outside the read/write field	• -40 ... +125 °C
• during storage	• -40 ... +125 °C
Degree of protection according 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 according to IEC 68-2-27 [1)]	500 m/s²
Vibration-resistant according to IEC 68-2-6 [1)]	200 m/s²
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
Standards, specifications, approvals	
MTBF	228 years

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

8.29.5 Dimension drawing

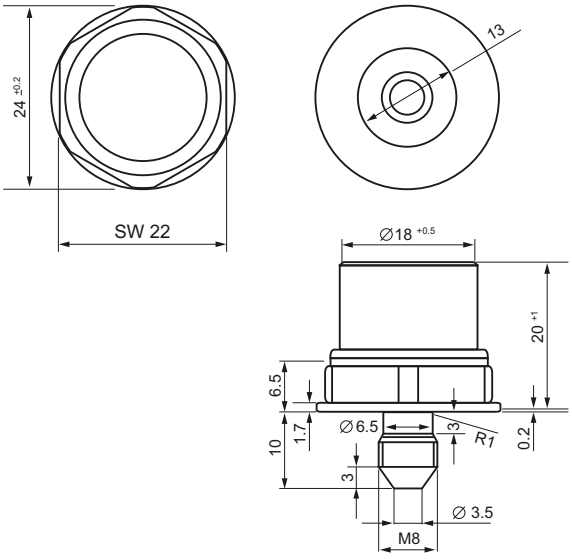


Figure 8-80 Dimensional drawing of MDS D528

All dimensions in mm

8.30 MDS D560

8.30.1 Characteristics

MDS D560	Characteristics	
	Area of application	Identification in small assembly 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

8.30.2 Ordering data

Table 8-79 Ordering data for MDS D560

	Article number
MDS D560	6GT2600-5AB00

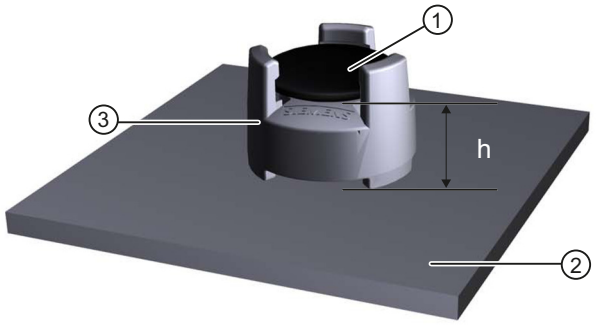
Table 8-80 Ordering data for MDS D560 accessories

	Article number
Spacer	6GT2690-0AG00
Corner mounting bracket	6GT2690-0AN00

8.30.3 Mounting on metal

Note that if the distance (h) is not observed, this may result in a reduction of the field data as well as a reduced write/read range.

Mounting on metal



① Transponder
② Metal carrier
③ Spacer
h ≥ 10 mm

Figure 8-81 Mounting the MDS D160 / D460 / D560 on metal with spacer

8.30.4 Technical specifications

Table 8-81 Technical specifications for MDS D560

	6GT2600-5AB00
Product type designation	SIMATIC MDS D560
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)"
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
• Outside the read/write field	• -40 ... +90 °C
• During storage	• -40 ... +90 °C
Degree of protection to EN 60529	• IP67 • IPx9K steam jet: 150 mm; 10 to 15 l/min; 100 bar; 75 °C
Shock according to IEC 68-2-27 [1)]	400 m/s²
Vibration according to IEC 68-2-6 [1)]	200 m/s²
Torsion and bending load	Not permitted
Design, dimensions and weight	
Dimensions (Ø x H)	16 x 3 mm
Weight	3 g
Type of mounting	• Glued [2)] • With spacer

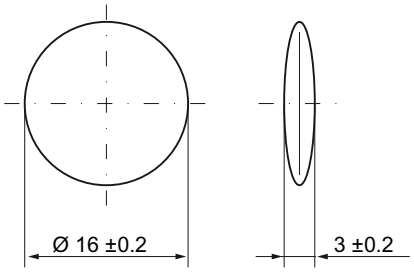
	6GT2600-5AB00
Standards, specifications, approvals	
MTBF	228 years

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

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

8.30.5 Dimension drawings

Dimension drawing of MDS D560



Dimensions in mm

Figure 8-82 Dimension drawing of MDS D560

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.

Connection to controllers

The readers are connected to the controller via the following communication modules:

- ASM 456
- ASM 475
- SIMATIC RF120C
- SIMATIC RF160C
- SIMATIC RF166C
- SIMATIC RF170C
- SIMATIC RF180C
- SIMATIC RF182C
- SIMATIC RF185C/RF186C/RF188C, RF186CI/RF188CI
- RFID 181EIP

You will find information on the communication modules on the Internet on the pages of the Siemens Industry Online Support (https://support.industry.siemens.com/cs/ww/en/ps/15105/man).

Function blocks, communication modules and readers

Function blocks are used for integration into the SIMATIC. They are used to transfer the input parameters to the reader using the "init_run" (RESET) command.

You will find information on the following blocks on the Internet on the pages of the Siemens Industry Online Support (https://support.industry.siemens.com/cs/ww/en/ps/14971/man).

- 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
- Communication module RF160C with FC 44

Configuration and parameter assignment by means of TIA Portal technology object

You can easily and quickly configure and parameterize the entire RF300 system in the TIA Portal (as of STEP 7 Basic / Professional V14 SP 1) with the help of the "SIMATIC Ident" technology object. You can find detailed information about the technology object in the TIA Portal help.

→ Search for: Technology object "SIMATIC Ident"

Communication modules and function blocks

The following table shows the most important features of the communication modules as well as the compatible function blocks.

Table 9-1 Overview table of communication modules

Communication 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 ... +55 °C	IP67
ASM 475	S7-300 (central), ET200M (PROFIBUS)	Via screw terminals in front connector	2	40 x 125 x 120 mm	0 ... +60 °C	IP20
SIMATIC RF120C	S7-1200 (central)	9-pin D-sub socket	1	30 x 100 x 75 mm	0 ... +55 °C	IP20
SIMATIC RF160C	PROFIBUS DP / DP-V0	2 x 8-pin connector socket, M12	2 (parallel)	60 x 210 x 30 mm	0 ... +55 °C	IP67
SIMATIC RF166C	PROFIBUS DP	2 x 8-pin connector socket, M12	2 (parallel)	60 x 165 x 45 mm	-25 ... +55° C	IP67
SIMATIC RF170C	PROFIBUS DP-V1 PROFINET IO	2 x 8-pin connector socket, M12	2 (parallel)	90 x 130 x 60 mm	-25 ... +55° C	IP67
SIMATIC RF180C	PROFINET IO	2 x 8-pin connector socket, M12	2 (parallel)	60 x 210 x 54 mm	0 ... +60° C	IP67
SIMATIC RF182C	TCP/IP	2 x 8-pin connector socket, M12	2 (parallel)	60 x 210 x 30 mm	0 ... +60 °C	IP67
SIMATIC RF185C/ RF186C/RF188C	PROFINET IO, OPC UA	1, 2 or 4 x 8-pin connector socket, M12	1, 2 or 4 (parallel)	60 x 165 x 45 mm	-25 ... +55° C	IP67
RFID 181EIP	Ethernet IP	2 x 8-pin connector socket, M12	2 (parallel)	60 x 210 x 54 mm	0 ... +60° C	IP67

The following table shows the program blocks compatible with the communication modules.

Table 9-2 Compatible program blocks

Communication 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 FC 56 Standard profile V1.19 Ident profile	FB 45 FB 55 FC 56 Ident profile Ident blocks	Ident profile Ident blocks
ASM 475	FB 45 FB 55	FB 45 FB 55	--
SIMATIC RF120C	--	--	Ident profile Ident blocks
SIMATIC RF160C	FC 44 Application blocks for RF160C	FC 44 Application blocks for RF160C	Application blocks for RF160C
SIMATIC RF166C	FB 45 FB 55 Standard profile V1.19 Ident profile	FB 45 FB 55 Ident profile Ident blocks	Ident profile Ident blocks
SIMATIC RF170C	FB 45 FB 55 Ident profile	FB 45 FB 55 Ident profile Ident blocks	Ident profile Ident blocks
SIMATIC RF180C	FB 45 FB 55 Standard profile V1.19 Ident profile	FB 45 FB 55 Ident profile Ident blocks	Ident profile Ident blocks
SIMATIC RF185C/ RF186C/ RF188C	FB 45 FB 55 Standard profile V1.19 Ident profile	FB 45 FB 55 Ident profile Ident blocks	Ident profile Ident blocks

9.1 ASM 475

9.1.1 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.

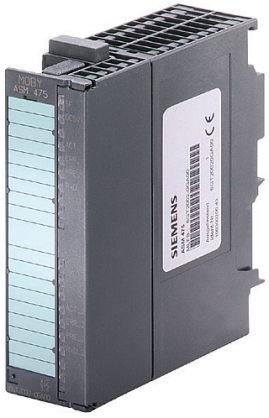


Figure 9-1 Interface module ASM 475

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.

9.1.2 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.

9.1.3 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 write/read devices must be connected to the ASM in accordance with the connection diagram.

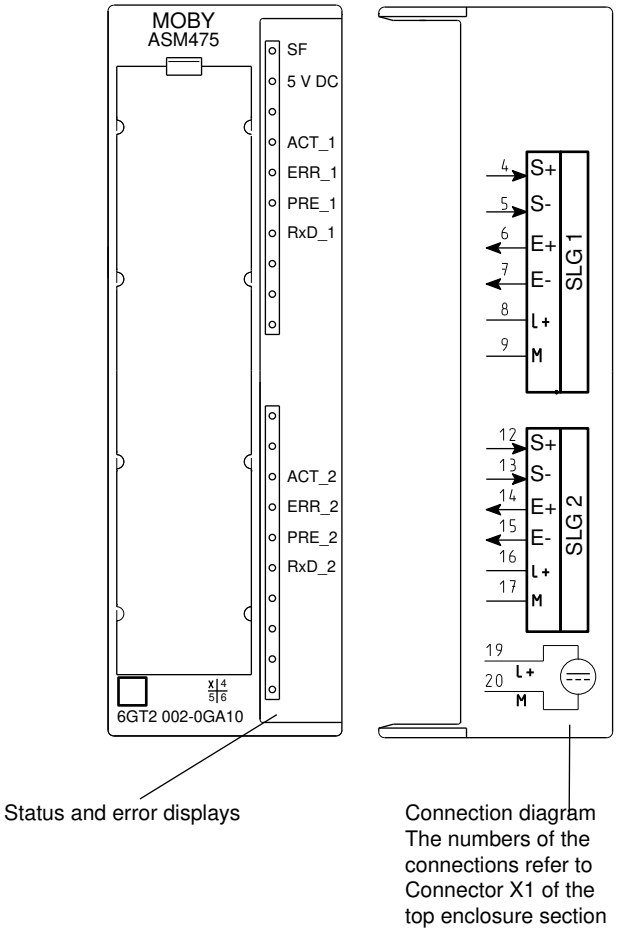


Figure 9-2 Bezel and inside of the front door of the ASM 475

Indicator elements on the ASM

Table 9-5 Function of the LEDs on the ASM 475

LED	Meaning
SF	System fault (hardware error on ASM)
DC 5V	24 V are connected to the ASM and the 5 V voltage on the 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.

LED	Meaning
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, ...)
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	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.

9.1.4 Configuration

Centralized configuration with SIMATIC S7-300

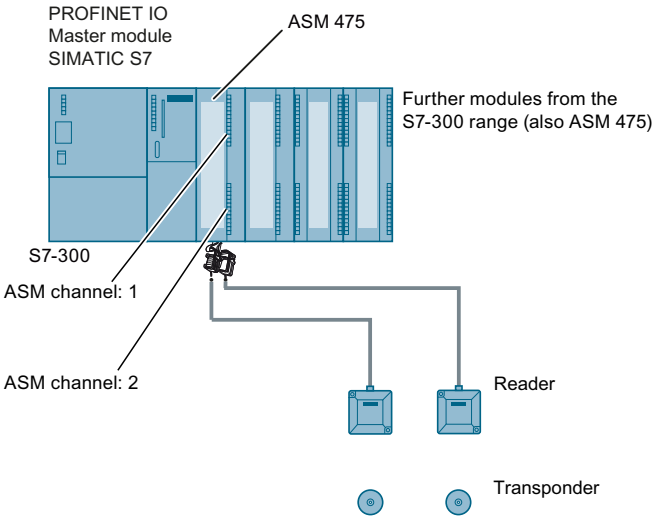


Figure 9-3 Configuration of ASM 475 central

Distributed configuration with ET200M

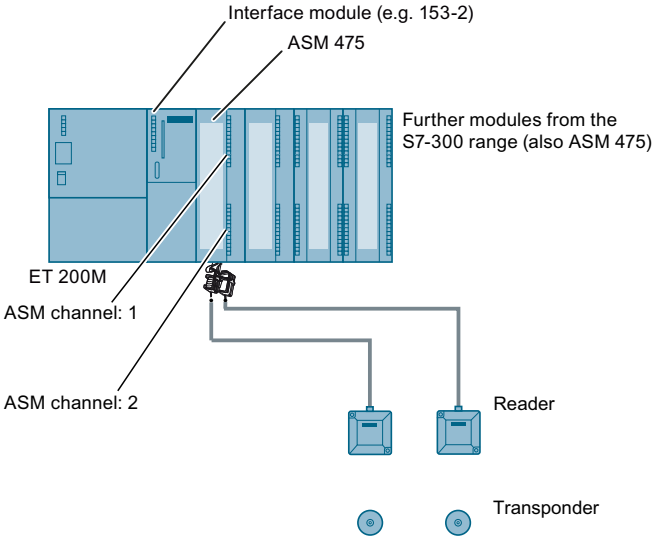


Figure 9-4 Configuration of ASM 475 distributed

Reader connection system

You will find more information on the reader connector technology in the section "Reader RF3xxR (RS422) with ASM 475 (Page 495)".

Cable installation

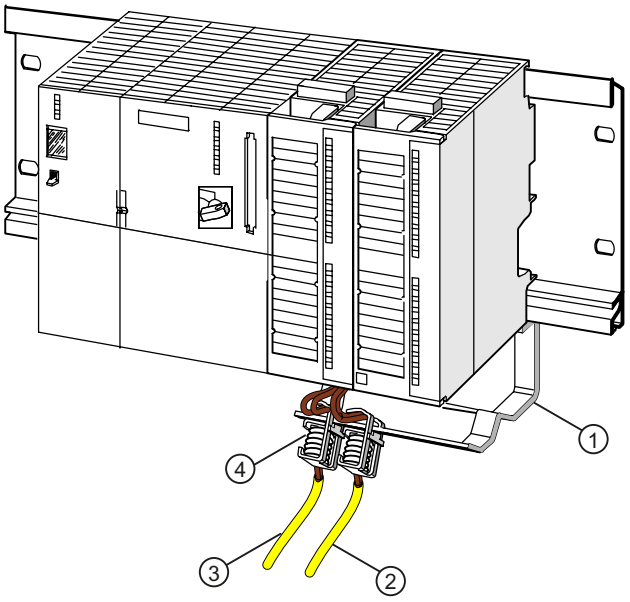
Table 9-7 Cable installation

Signal	Pin on M12 connector	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

9.1.5 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 9-5 Shield terminal ASM 475

9.1.6 Technical data

Table 9-8 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)
• Supply voltage	• Screw-type or spring-loaded terminals

	6GT2002-0GA10
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 ℃
• During operation (vertical installation)	0 ... +40 ℃
• During transportation and storage	-40 ... +70 ℃
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
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	

	6GT2002-0GA10
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

System diagnostics

10

10.1 Error codes of the RF300 readers

Error codes of the RF300 readers

Note

Validity of the error codes

The following error codes do not apply to RF300 Scanmode readers.

You have the following options to read out the error code:

- Directly on the reader/communication module by counting the flashing pattern of the red error LED
- With the Ident profile at the output variable "STATUS"
  You will find a detailed description of all errors in the manual "Ident Profile and Ident Blocks, Standard Function for Ident systems".
- with FB 45 / FB 55 variable "error_MOBY"

Table 10-1 Error codes of the readers

Flashing of the reader LED display	Error code (hex)	Error message (hex) Ident profile	Description
00	0x00	--	No error
02	0x01	0xE1FE0200	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	0x05	0xE6FE0100	Parameter assignment error, possible causes: • Unknown command • Incorrect parameter • Function not allowed
06	0x06	0xE2FE0100	Air interface faulty
11	0x0B	0xE1FE0700	The MDS E transponder could not be successfully authenticated.

Flashing of the reader LED display	Error code (hex)	Error message (hex) Ident profile	Description
12	0x0C	0xE1FE0100	The transponder memory cannot be written, possible causes: • Hardware fault (memory faulty) • Memory write-protected (corresponding OTP area has already been written)
13	0x0D	0xE1FE0300	Error in the specified memory address (access attempted to non-existent or non-accessible memory areas).
19	0x13	0xE4FE0400	Buffer overflow: Insufficient buffer available in the reader for saving the command
20	0x14	0xE4FE8D00	Major system fault (hardware fault)
21	0x15	0xE6FE0300	Parameter assignment error: Bad parameter in the "RESET" command
24	0x18	0xE6FE0500	Command was sent to a reader that has not yet been initialized
25	0x19	0xE5FE0800	Previous command is still active
28	0x1C	0xE4FE0300	Antenna is not identified Possible causes: • Antenna is not connected. • Antenna cable is defective.
30	0x1E	0xE6FE0300	Incorrect number of characters in frame
31	0x1F	0xE4FE8E00	Running command canceled by the "RESET" command

10.2 Diagnostics functions - STEP 7

10.2.1 Overview

Extended diagnostic functions with SIMATIC RF300

SIMATIC RF300 provides extended diagnostics functions with STEP 7 Classic / Basic / Professional, which simplify commissioning and maintenance.

As of STEP 7 Basic / Professional V16, the TIA Portal offers the technology object "SIMATIC Ident > TO_Ident", which contains extensive diagnostic functions. The new generation of communication modules (RF18xC/RF18xCI, RF166C) also offer additional diagnostic functions via WBM, XML and OPC UA, as well as integrated, configurable recording options of the interfaces to the reader and to the controller. You can also use the Ident profile and the Ident blocks to 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 with various attributes or modes (subcommands) for which corresponding data structures (UDTs) are defined.

Table 10-2 In RF300 mode

Command	Attributes (mode)	Meaning
Reader-Status (SLG-STATUS)	0x81 (01)	Hardware and firmware configuration, parameterization status
	0x86 (06)	Communication error counter, current command status
Tag-Status (MDS-STATUS)	0x81 (01)	Serial number of the transponder (UID), memory configuration. EEPROM write-protection status
	0x82 (02)	Serial number of the transponder (UID), HF field strength value, communication error counter, presence counter (duration)
	0x83 (03)	Serial number of the transponder (UID), transponder type identified in the antenna field (number = tag type, see Reset - "ftim" parameter), 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	Attributes	Meaning
Reader-Status (SLG-STATUS)	0x81 (01)	Hardware and firmware configuration, parameterization status
	0x86 (06)	Communication error counter, current command status
Tag-Status (MDS-STATUS)	0x83 (03)	Serial number of the transponder (UID), transponder type identified in the antenna field (number = tag type, see Reset - "ftim" parameter), 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".

Attributes "0x81" (mode 01), corresponds to UDT 110

Table 10-4 Input parameter

Name	Type	Possible Value (hex)	Comment
hardware	char		Type of hardware
		0x30 (0)	= RF310R, RF340R, RF350R
		0x31 (1)	= RF380R
		0x32 (2)	= RF310R (ISO)
		0x33 (3)	= RF380R (ISO)
		0x34 (4)	= RF340R (ISO), RF350R (ISO)
		0x35 (5)	= RF310R (ISO)
		0x41 (A)	= RF310R, 2nd generation
		0x42 (B)	= RF340R, 2nd generation
		0x43 (C)	= RF350R, 2nd generation
		0x44 (D)	= RF380R, 2nd generation
		0x47 (G)	= RF360R, 2nd generation
hardware_version	word		HW version
		0x00 ... 0xFF	= Version (high byte): unused (00)
			HW version
		0x00 ... 0xFF	= Version (low byte)
			47 = Readers of the 1st generation
			07 = Readers of the 1st generation
			11 = Readers of the 1st generation
			10 = Readers of the 2nd generation
			29 = Readers of the 2nd generation
			2B = Readers of the 2nd generation
			2C = Readers of the 2nd generation
			2D = Readers of the 2nd generation
loader_version	word		Version of loader
		0x00 ... 0xFF	= Version (high byte)
		0x00 ... 0xFF	= Version (low byte)
firmware	char	0x00 ... 0xFF	Type of firmware
			01, 02, 03 = Readers of the 1st generation
			F = Full version for readers of the 2nd generation
			P = Pilot version for readers of the 2nd generation
firmware_version	word		Firmware version
		0x00 ... 0xFF	= Version (high byte)
		0x00 ... 0xFF	= Version (low byte)
driver	char		Driver version 3964R
		0x31	= 3964R
		0x32	= ASCII
		0x33	= ASCII/ScanMode
		0x34	= RF300 fast protocol (3G)

Name	Type	Possible Value (hex)	Comment
driver_version	word		Version of driver
		0x00 ... 0xFF	= Version (high byte)
		0x00 ... 0xFF	= Version (low byte)
interface	byte		Interface type
		0x01	= RS422
		0x02	= RS232 (only RF380R)
baud	byte		Transmission speed
		0x01	= 19.2 kBd
		0x03	= 57.6 kBd
		0x05	= 115.2 kBd
		0x0D	= 921.6 kBd
distance_limiting_SLG	byte	--	Note: This parameter is intended for trained users. Siemens recommends that untrained users use the default value. The output line can be set in bit 0...3. This setting does not need to be manually performed for RF380R readers of the 2nd generation (6GT2801-3BAx0) because the power limits are optimized automatically depending on the reader-transponder distance. For reasons of compatibility this setting can nevertheless be made. Note that the values "02", "03" and "04" bring about a reduction of the power of approximately 50%. Settings outside the range (02 ... 08) have the effect of setting the default value (0.6 W). In this case, there is no error message for reasons of compatibility.
			Bit 4...7: Antenna type (RF350R readers of the 2nd generation) To improve communication stability. The following values are permitted: 0: Unspecified (default) 1: ANT 2: ANT 3 3: ANT 3S 4: ANT 8 5: ANT 12 6: ANT 12 (6GT2398-1CC10 with integrated antenna connecting cable 0.6 m) 7: ANT 18 8: ANT 18 (6GT2398-1CA10 with integrated antenna connecting cable 0.6 m) 9: ANT 30
multitag_SLG	byte		Number of transponders that can be processed in the antenna field
		0x01	= Single tag mode

Name	Type	Possible Value (hex)	Comment
field_ON_time_SLG	byte		Selection of the transponder types used
		0x00	= RF300 (RF3xxT)
		0x01	= ISO 15693 general
		0x03	= ISO 15693 (MDS D3xx; Infineon)
		0x04	= ISO 15693 (MDS D4xx; Fujitsu - 2 kB)
		0x05	= ISO 15693 (MDS D1xx; NXP)
		0x06	= ISO 15693 (MDS D2xx; TI)
		0x07	= ISO 15693 (MDS D261; STM)
		0x08	= ISO 15693 (MDS D5xx; Fujitsu - 8 kB)
		0x10	= RF300 (RF3xxT) [2]
		0x20	= ISO 14443 (MIFARE Classic, MOBY E, MDS E6xx) [2]
		0x2F	= ISO 14443 (MIFARE Classic, alternative key) [2]
		0x31	= General Mode [2]
		0x40	= P2P master [2]
		0x4F	= P2P slave [2]
		0xFF	= Setting via "scanning_time" and "fcon"
			[2] Only valid with readers of the 2nd generation
status_ant	byte		Status of the antenna
		0x01	= Antenna is switched on
		0x02	= Antenna is switched off
MDS_control	byte		Presence check
		0x00	= Operation without presence check Antenna is permanently switched on.
		0x01	= Operation with presence check Antenna is permanently switched on.
		0x02	= 2: Operation without presence check and with semaphore procedure (RF300, ISO 14443 [MIFARE Classic]) Antenna is permanently switched on.
		0x04	= Operation without presence check Antenna is switched off. The antenna is only switched on when one of the following commands is sent: Read, Write, Init, TagStatus
		0x06	= Operation without presence check and with semaphore procedure (RF300, ISO 14443 [MIFARE Classic]) Antenna is switched off. The antenna is only switched on when one of the following commands is sent. Read, Write, Init, TagStatus

Attributes "0x86" (mode 06), corresponds to UDT 280

Table 10-5 Error counter

Name	Type	Possible Values (hex)	Comment
FZP	byte	0x00 ... 0xFF	= 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 (CM/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 entering/leaving antenna field transponder on field boundary, multiple 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 attribute "0x86" (mode 06) is executed following receipt of the presence message to reset the error counters.

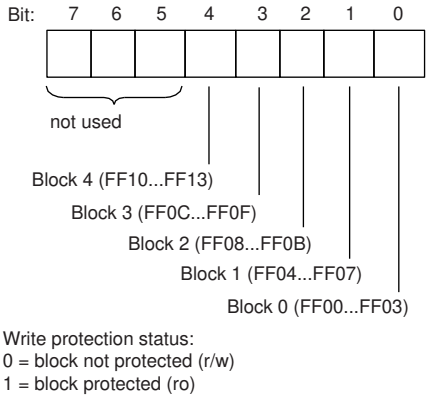
The protocol error counters are not mutually independent. If a code error (CFZ) occurs, this will cause a signature (SFZ) or CRC- (CRCFZ) error.

- "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 communication 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 Values (hex)	Comment
UID	array[1...8] byte	0x000000005555555 ... 0x00000000FFFFFFFF	Unique identifier = b0-31: 4 byte TAG ID, b32-63: 0
MDS_type	byte	0x01 0x02 0x03 0x04	Transponder memory configuration = Transponder without FRAM = Transponder with FRAM 8 KB = Transponder with FRAM 32 KB = Transponder with FRAM 64 KB
Lock_state	byte	0x00 ... 0xFF	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 Values (hex)	Comment
UID	array[1...8] byte	0x0000000055555555 ... 0x00000000FFFFFFFF	Unique identifier = b0-31: 4 byte TAG ID, b32-63: 0
LFD	byte	0x00 ... 0xFF	= Value for field strength determined in the transponder
FZP	byte	0x00 ... 0xFF	= Error counter (passive) ➙ errors during idle time
FZA	byte	0x00 ... 0xFF	= Error counter (active)
ANWZ	byte	0x00 ... 0xFF	= 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 or several transponders in antenna field) or external electromagnetic interference.
- "ANWZ" is the value for the time that the transponder remains in the antenna field before the "Tag-Status" (MDS STATUS) with attribute "0x82" (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 (hex)	Comment
UID	array[1...8] byte	0000000000000000 ... FFFFFFFFFFFFFFFF	Unique identifier =8 byte UID, MSB first
MDS_type	byte		Transponder type (vendor, identification)
		0x00	= ISO 15693 general
		0x03	= ISO 15693 (MDS D3xx; Infineon)
		0x04	= ISO 15693 (MDS D4xx; Fujitsu - 2 kB)
		0x05	= ISO 15693 (MDS D1xx; NXP)
		0x06	= ISO 15693 (MDS D2xx; TI)
		0x07	= ISO 15693 (MDS D261; STM)
		0x08	= ISO 15693 (MDS D5xx; Fujitsu - 8 kB)
		0x11	= RF300 transponder (0 kB)
		0x12	= RF300 transponder (8 kB)
		0x13	= RF300 transponder (32 kB)
		0x14	= RF300 transponder (64 kB)
		0x21	= ISO 14443 (MDS E; NXP, 1 kB)
		0x22	= ISO 14443 (MDS E; Infineon, 1 kB)
		0x23	= ISO 14443 (MDS E; NXP, 4 kB)
		0x41	= P2P RF310R, 2nd generation
		0x42	= P2P RF340R, 2nd generation
		0x43	= P2P RF350R, 2nd generation
		0x44	= P2P RF380R, 2nd generation
IC_version	byte	0x00 ... 0xFF	Chip version
size	word	0x00 ... 0xFFFF	Memory size in bytes depending on transponder type, e.g. MDS D3xx: 992 bytes

Name	Type	Possible Values (hex)	Comment
lock_state	byte	0x00 ... 0xFF	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 0xFF80 ... 0xFF83 is locked or 03 = Block 1 and 2 of address 0xFF80 ... 0xFF87 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 0x0000 ... 0x006F (total OTP area "0x0060 ... 0x006F"). In this memory, the locked area corresponds to the addresses 0x0060 ... 0x0063 or 0x0060 ... 0x0067
block_size	byte	0x00 ... 0xFF	Block size of the transponder depending on transponder type, e.g. MDS D3xx: 4 bytes
nr_of_blocks	byte	0x00 ... 0xFF	Number of blocks depending on transponder type, e.g. MDS D3xx: 248 bytes

Appendix

A

A.1 Certificates & approvals

All the latest RFID radio approvals are available on the Internet (https://support.industry.siemens.com/cs/ww/en/view/109773353).

Labeling	Description
CE	Conformity acc. to the RED EU directive

The following applies to the system described in this documentation:
The CE marking on a device indicates the corresponding approval:

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

If a device has one of the following marks, 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)
UL	UL recognition mark
SP	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)

Labeling	Description
	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...
	Importer UK: Siemens plc, Sir William Siemens House, Princess Road, Manchester M20 2UR
	EAC (Eurasian Conformity) Eurasian Economic Union of Republic of Armenia, the Republic of Belarus, the Republic of Kazakhstan, the Kyrgyz Republic and the Russian Federation Declaration of conformity according to the technical regulations of the customs union (TR CU)
	Brazil (ANATEL) Certificado de Homologação REPÚBLICA FEDERATIVA DO BRASIL AGÊNCIA NACIONAL DE TELECOMUNICAÇÕES Este equipamento não tem direito à proteção contra interferência prejudicial e não pode causar interferência em sistemas devidamente autorizados. Para maiores informações, consulte o site da ANATEL (www.anatel.gov.br). ANATEL-ID: XXXXX-YY-ZZZZZ
Mexico (COFETEL)	Mexico (COFETEL) Estados Unidos Mexicanos Comision Federal de Telecomunicaciones
	South Africa (ICASA) Independent Communications Authority of South Africa, Sandton Radio Equipment Type Approval Certificate
China (CMIIT)	China (CMIIT) Radio Transmission Equipment Type Approval Certificate In accordance with the provisions on the Radio Regulations of the People's Republic of China, the following radio transmission equipment, after examination, conforms to the provisions with its CMIIT ID. CMIIT ID: XXXXYYZZZZ

Labeling	Description
	South Korea (KCC) Korea Communications Commission Certificate of Broadcasting and Communication Equipments Republic of Korea
	Japan (MIC - Ministery of Internal Affairs and Communications)

A.2 Accessories

A.2.1 Wide-range power supply unit for SIMATIC RF systems

A.2.1.1 Features

The wide range power supply unit for SIMATIC RF systems is a primary switched device for supplying power and for use on single phase AC systems. The two DC outputs (sockets) are connected in parallel and protected by a built-in voltage limiting circuit against overload and short-circuits.

The device is vacuum-cast and prepared for Safety Class I applications. The EU and UK versions satisfy the low-voltage directive as well as the current EU standards for CE conformity. Furthermore, the US version has been UL-certified for the US and Canada.

Table A-1 Wide-range power supply unit for SIMATIC RF systems

	Characteristics	
	Area of application	Voltage supply for Siemens Ident devices
	Degree of protection	IP67
	Design features	• Mechanically and electrically rugged design • Short-circuit and no-load stability • Suitable for frame mounting
	Structure	① Network connector (PE) ② DC output 1 ③ DC output 2 ④ Ground connection

A.2.1.2 Scope of supply

- Wide-range power supply unit for SIMATIC RF systems
- Country-specific power cable (2 m)

- Protective cover for flange outlet
- Operating Instructions

A.2.1.3 Ordering data

Table A-2 Ordering data for the wide-range power supply unit for SIMATIC RF systems

	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 power cable/plug	EU: 6GT2898-0AC00
	UK: 6GT2898-0AC10
	US: 6GT2898-0AC20

Table A-3 Ordering data accessories for the wide-range power supply unit for SIMATIC RF systems

			Article number
24 V DC connecting cable for SIMATIC RF600 readers RF610R/RF615R/RF650R/ RF680R/RF685R			
	• With plug	5 m	6GT2891-0PH50
	• With open ends	2 m	6GT2891-4EH20
	• With open ends	5 m	6GT2891-4EH50
24 VDC connecting cable for readers of the SIMATIC product family MOBY D		5 m	6GT2491-1HH50
24 V DC connecting cable for SIMATIC RF200/RF300 readers with RS232		5 m	6GT2891-4KH50
24 V DC connecting cable for SIMATIC RF360R		5 m	6GT2091-0PH50
24 V DC connecting cable for SIMATIC RF200 / RF300 readers with RS-232 M8 plug at the 24 V end, reader plug angled		5 m	6GT2891-4KH50-0AX1
24 VDC connecting cable for SIMATIC RF200 / RF300 readers with open ends at the power supply unit end		5 m	6GT2891-4KH50-0AX0

A.2.1.4 Safety Information

⚠ WARNING

Danger to life

It is not permitted to open the device or to modify the device.

The following must also be taken into account:

- Failure to observe this requirement shall constitute a revocation of the CE approval, UL certification for the US and Canada as well as the manufacturer's warranty.
- For installation of the power supply, compliance with the DIN/VDE requirements or the country-specific regulations is essential.
- The area of application of the power supply unit is limited to "Information technology equipment" within the scope of validity of the EN 60950/VDE 0805 standard.
- When the equipment is installed, it must be ensured that the mains socket outlet is freely accessible.
- Within the operating temperature range of the power supply unit, above an ambient temperature of +25 °C, very high temperatures (max. approx. +81.5 °C at an ambient temperature of +70 °C) can occur on the housing due to the internal heating of the device. In this case, make sure that the housing is covered in order to protect people from coming into contact with the hot housing. Adequate ventilation of the power supply must be maintained under these conditions.

Note

Operating range und use of the wide-range power supply unit

The wide-range power supply unit must only be used for SIMATIC products in the specifically described operating range and for the documented intended use.

NOTICE

Liability

If the wide input range power supply for SIMATIC RF systems is connected to third-party products, the end user is responsible and liable for operation of the system or end product that includes the wide input range power supply for SIMATIC RF systems.

Note the conditions specified in the UL approval.

NOTICE

Restriction to the approval of the wide-range power supply

Alterations to the SIMATIC RFID modules and devices as well as the use of SIMATIC RFID components with third-party RFID devices are not permitted.

Failure to observe this requirement shall constitute a revocation of the radio equipment approvals, CE approval and manufacturer's warranty. Furthermore, the compliance to any salient safety specifications of VDE/DIN, IEC, EN, UL and CSA will not be guaranteed.

Safety notes for the US and Canada

The readers of the SIMATIC RF600 series may only be operated with the wide range power supply unit for SIMATIC RF systems - as an optional component – or with power supply units that are UL-listed in combination with the safety standards specified below:

- UL 60950-1 - Information Technology Equipment Safety - Part 1: General Requirements
- CSA C22.2 No. 60950 -1 - Safety of Information Technology Equipment

NOTICE
Warranty The compliance of the SIMATIC RFID systems to the safety standards mentioned above and the conditions in the UL approval will not be guaranteed if neither the wide-range power supply unit for SIMATIC RF systems nor power supplies listed according to the safety standards named are used.

A.2.1.5 Mounting & connecting

The wide-range power supply unit for SIMATIC RF systems is sold with a country-specific power cable for EU, UK and US.

Note

Country-specific adaptation of the connector

When necessary, the primary cable can be adapted to country-specific conditions. The connector can be replaced by a country-specific connector.

If you do this, make sure that the protective conductor is connected in the connector and that grounding is ensured. If the protective conductor cannot be connected through the plug, you must connect the grounding connection to the mounting hole ④ provided by the metal shoe.

Follow the steps below to mount and connect the wide-range power supply unit:

1. Mount the wide-range power supply using the 4x screws.
   Remember to make the grounding connection with the mounting hole ④ provided by the metal shoe.
   For detailed information on grounding and compliance with the EMC directives, refer to the "Grounding connection" section below.
2. Connect the reader to the outputs ② and ③ of the wide-range power supply unit.
3. Connect the power cable to the primary input (PE) ① of the wide-range power supply unit.
4. Connect the power cable of the wide-range power supply unit to the voltage supply.

NOTICE
Plugging/pulling the power supply cable Plugging or pulling the power cable of the wide-range power supply unit is only permitted when no voltage is applied (powered-down)

NOTICE
Strain on the power cable connector The power cable is attached to / removed from the power supply using the knurled nut integrated in the plug. Avoid twisting the plug once it is mounted. If high shock and vibration occurs, this stress must be absorbed by the power cable.

NOTICE
Restriction for maximum load If the readers are operated permanently at full load and the digital inputs/outputs are loaded with the maximum total current of 1.1 A, the maximum current consumption of a reader can reach 2 A. In this case, a maximum of one reader may be connected per wide-range power supply unit.

The wide-range power supply unit (protection class I, degree of protection IP67) has four mounting holes for securing the device.

Installation instructions

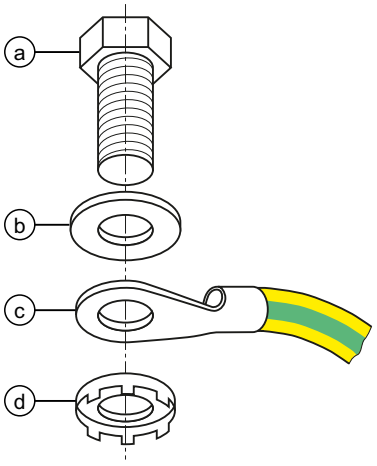
The power supply unit must be connected with the described connecting cables in the primary and secondary circuits. The connectors at the power supply unit end may only be removed or inserted when no voltage is applied. The degree of protection IP67 is only achieved with correctly connected and locked connectors. Adequate spacing around the power supply unit should be provided to ensure free convection. The connection of the voltage supply must be made taking into account the valid country-specific regulations. It must be possible to de-energize the power supply unit using a suitable device outside the voltage supply. The device is connected with connectors "L" to phase and "N" to the neutral conductor of the power network. The "PE" connector must be connected to the protective conductor (see dimensions and pin assignment). The power supply unit may only be operated with a connected protective conductor. The power supply unit is maintenance-free and contains no parts to be changed by the user. The power derating when operating at an ambient temperature of above 50 °C must be ensured by the user. The base area of the power supply unit is screwed onto the mounting plate or mounting wall using the four mounting holes (e.g. screw and washer M5). Optimum cooling by natural convection must be assured at the mounting location. When used where CSA C22.2 No 107.1-01 applies a separating element must be provided for the output circuit.

Grounding connection

For reasons of EMC, the device should also be grounded via the grounding connection ④, which is connected to the primary input (PE) ①. Ensure that this connection is as short as possible and has a cable cross-section of at least 10 mm². This will ensure that any faults occurring on the shielding can be dissipated as well as possible.

The grounding connection ④ must be electrically connected to the ground potential using a contact disc. Tighten the screw with a torque of ≃ 1.5 Nm.

Grounding connection



(a)	Hexagon-head screw (M5)
(b)	Flat washer
(c)	Cable lug
(d)	Contact washer: To make ground contact, use contact washers according to the Siemens standard: SN 70093-6-FStflNnnc- 480h, Siemens item no.: H70093-A60-Z3

Degree of protection

The wide-range power supply unit for SIMATIC RF systems meets degree of protection IP67.

- Dust-tight: No ingress of dust
- Protected against harm from temporary submersion in water: Water must not enter in amounts that can cause damage, if the housing is immersed in water 1 m deep for 30 minutes.

All information applies only when connected and locked. The assignment of degrees of protection is subject to standardized test methods. If no secondary cables are connected, close the secondary sockets with a protective cap.

A.2.1.6 Pin assignment of DC outputs and mains connection

Table A-4 Pin assignment of the DC outputs

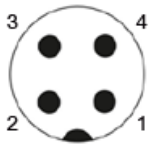
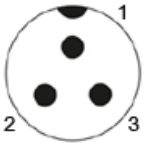
	Assignment	
	1	Ground (0 V)
	2	+24 VDC
	3	+24 VDC
	4	Ground (0 V)

Table A-5 Pin assignment of the mains connector

	Assignment	
	1	PE
	2	L (100 ... 240 VAC)
	3	N (100 ... 240 VAC)

A.2.1.7 Technical specifications

Table A-6 Technical specifications

	6GT2898-0ACx0
Product type designation	Wide-range power supply unit for SIMATIC RF systems
Electrical data	
Insulation strength (prim./sec.) $U_{isol\ p/s}$	AC 3.3 kV Primary- secondary side are galvanically isolated
Insulation resistance R_{ins}	> 1 GΩ
Leakage current I_{leak}	< 200 µA at U_{in} = 230 VAC, f = 50 Hz
Mains buffering t_h	≥ 50 ms at U_{in} = 230 VAC
Power supply unit classification	Level 3 acc. to CSA
Mechanical specifications	
Housing	

	6GT2898-0ACx0
• Material	• Polyamide, glass-fiber reinforced • Casting compound: Polyurethane
• Color	• Black
Housing classification	UL94-V0
MTBF in years	255

Permitted ambient conditions	
Ambient temperature	
• During operation	• -25 ... +70 °C
• During transportation and storage	• -40 ... +85 °C
Self-heating on full-load	max. 45 K
Surface temperature	Max. +81.5 ℃
Degree of protection to EN 60529	IP67
Protection class according to SELV/PELV	Separation of output voltage according to EN 60950-1 / EN 50178
Electrical safety	EN 60950 / UL 60950 / CAN/CSA 22.2 950, 3 Edition
Conducted interference	EN 61000-6-3 / EN 55011 Class B
Noise emission	EN 61000-6-3 / EN 55011 Class B
Noise immunity	
• ESD	• EN 61000-6-2 / EN 61000-4-2 Contact discharge: 4 kV (air discharge): 8 kV
• Burst	• EN 61000-6-2 / EN 61 000-4-4 Symmetrical: 2 kV Asymmetrical: 2 kV
• Surge	• EN 61000-6-5 / EN 61 000-4-5 Symmetrical: 1 kV asymmetrical 2 kV
• HF field	• EN 61000-6-2 / EN 61000-4-3 10 V, 3 V, 1 V (80 MHz ... 2.7 GHz)
HF coupling	EN 61000-6-2 / EN 61000-4-6 10 V_{eff}
Line interruption	EN 61000-6-2 / EN 61000-4-11

Design, dimensions and weights	
Dimensions (L × W × H)	
• Without plug	• 140 × 85 × 35 mm
• With plug	• 172.7 × 85 × 35 mm
Weight	720 g

Technical specifications of the input

	6GT2898-0ACx0
Rated input voltage U_{in}	100 to 240 VAC
Input frequency f_{in}	50/60 Hz
Radio interference level	EN 55011/B
Switching frequency f_{sw}	approx. 70 kHz typ.
Connector type	7/8", 2-pin + PE 6 ... 8 mm

Technical specifications of the outputs	
Output voltage tolerance ΔU_{out}	$U_{out\ nom} \leq +2$ % / -1 % at U_{in} = 230 VAC, f = 50 Hz
Overvoltage protection	$U_{out\ nom}$ +20 % typ.
Noise ΔU_{LF}	≤ 1 % U_{out} at U_{in} = min., BW: 1 MHz
Noise ΔU_{HF}	≤ 2 % U_{out} U_{in} = min., BW: 20 MHz
Regulation	
• Line regulation	• ≤ 1.0% at U_{in} = min./max.
• Load regulation	• ≤ 1.0% at I_{out} = 10...90...10%
Short-circuit current I_{max}	105 ... 130 % I_{nom} at I_{nom} = 3 A (+50 °C)
Settling time t_R load variations	< 5 ms at I_{out} = 10...90...10 %
Temperature coefficient ϵ	0.01 % / K at T_A = -25 °C ... +70 °C
Overload behavior P_{over}	Constant current
Short-circuit protection/ No-load response	Continuous/no-load stability
Derating	2 % / K at T_A > +50 °C ... +70 °C
Connector type	M12, 4-pin two sockets

Table A-7 Output configurations

Input	**Outputs** **U1 = U2**	**ILoad = I1 + I2**	**Efficiency (%)**	**Remarks**
110 VAC	24 VDC	0 A	--	No-load protection
110 VAC	24 VDC	3 A	≥ 88	--
220 VAC	24 VDC	0 A	--	No-load protection
220 VAC	24 VDC	3 A	≥ 90	--

All values are measured at full-load and at an ambient temperature of 25 °C (unless specified otherwise).

A.2.1.8 Dimension drawing

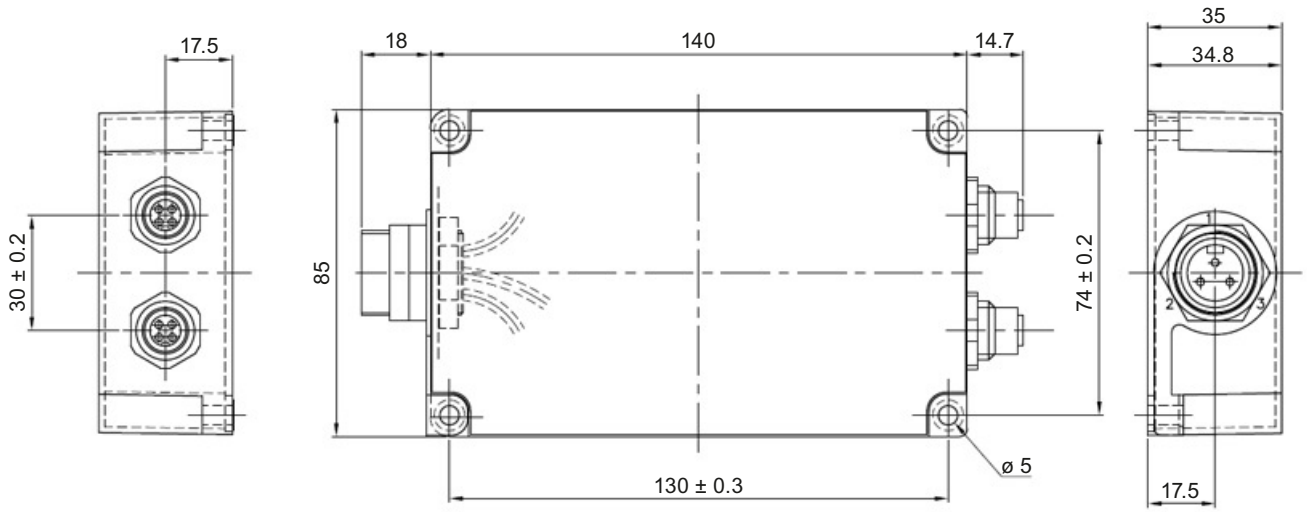


Figure A-1 Dimension drawing wide-range power supply unit for SIMATIC RF systems

All dimensions in mm

A.2.1.9 Certificates and approvals

Table A-8 Approvals for wide-range power supply unit for SIMATIC RF systems (Europe, UK): 6GT2898-0AC00, 6GT2898-0AC10

Marking	Description
CE	CE approval acc. to • 2004/108/EG - EMC • 2006/95/EG - Voltage directive
EAC	Radio approval for Russia, Belarus, Kazakhstan

Table A-9 Approvals for wide-range power supply unit for SIMATIC RF systems (USA): 6GT2898-0AC20

Marking	Description
c UL us	This product is UL-certified for the US and Canada. It meets the following safety standards: • UL 60950-1 Information Technology Equipment - Safety - Part 1: General Requirements • CAN/CSA C22.2 No. 60950-1-07 Safety of Information Technology Equipment. • cURus +CB - UL/IEC 60950-1 and Limited power source under UL 1310 • UL Report E 205089

Engineering Conditions of Acceptability

For use only in or with complete equipment where the acceptability of the combination is determined by ULLLC. When installed in an end-product, consideration must be given to the following:

- Reference temperatures on the unit enclosure were measured during heating test. The max obtained temperature with condition C at Enclosure I was 81.5 °C. See chapter "Technical specifications (Page 479)" Additional Information for normal load condition details.
- The unit is completely encapsulated. Potting improve mechanical and thermal properties of the unit.
- The following Production-Line tests are conducted for this product: Electric Strength, Earthing Continuity
- The end-product Electric Strength Test is to be based upon a maximum working voltage of: Primary-Earthed Dead Metal: 300 Vrms, 342 Vpk; Primary-SELV: 300 Vrms, 613 Vpk
- The following secondary output circuits are SELV: 24 Vdc output of the unit.
- The following secondary output circuits are at non-hazardous energy levels: 24 Vdc output.
- The following secondary output circuits are supplied by a Limited Power Source: 24 Vdc output.
- The following output terminals were referenced to earth during performance testing: Terminal P4 (-) during DETERMINATION OF WORKING VOLTAGE - WORKING VOLTAGE MEASUREMENT TEST.
- The maximum investigated branch circuit rating is: 20 A
- The investigated Pollution Degree is: 2
- Proper bonding to the end-product main protective earthing termination is: Required
- An investigation of the protective bonding terminals has: Been conducted
- The following input terminals/connectors must be connected to the end-product supply neutral:
Please see chapter "Mounting & connecting (Page 476)".

- The equipment is suitable for direct connection to: AC mains supply
- Output is supplied by circuit that complies with NEC Class 2 requirements (additional evaluation acc. UL1310 has been conducted during the product investigation).

A.2.2 Transponder holders

Table A-10 Overview of 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 • MDS E624	• 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
 6GT2690-0AL00	• MDS D126 • MDS D426 • MDS D526	• 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

Product photo	Insertable transponders	Characteristics
 6GT2690-0AG00	• MDS D160 • MDS D460 • MDS D560	• 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

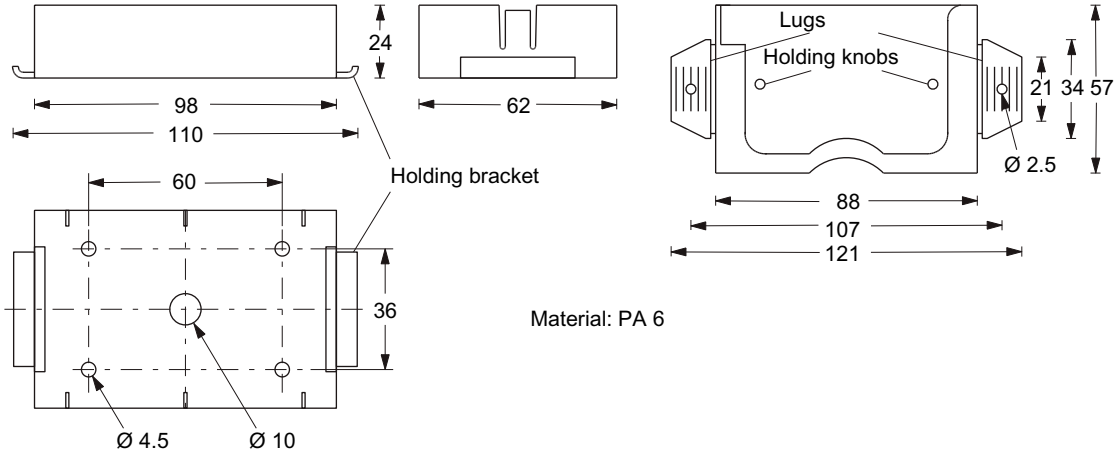


Figure A-2 Dimension drawing of spacer 6GT2190-0AA00 with fixing pocket 6GT2190-0AB00

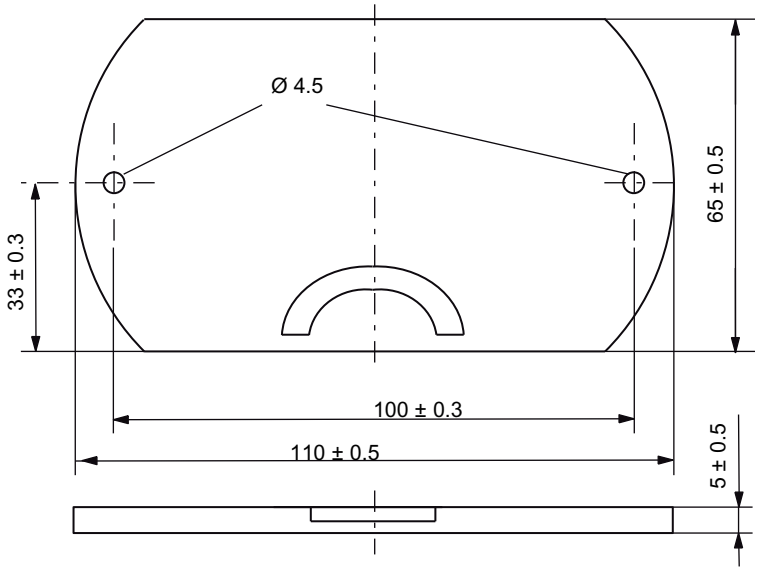


Figure A-3 Dimension drawing of fixing pocket 6GT2390-0AA00

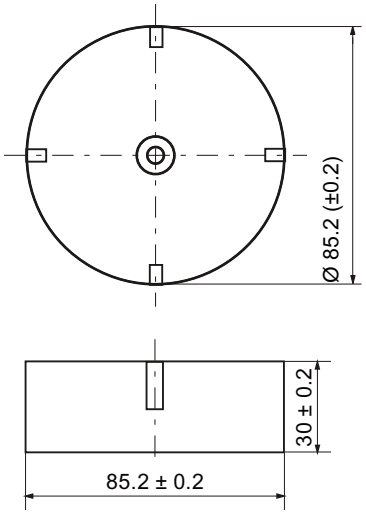


Figure A-4 Dimension drawing of spacer 6GT2690-0AA00

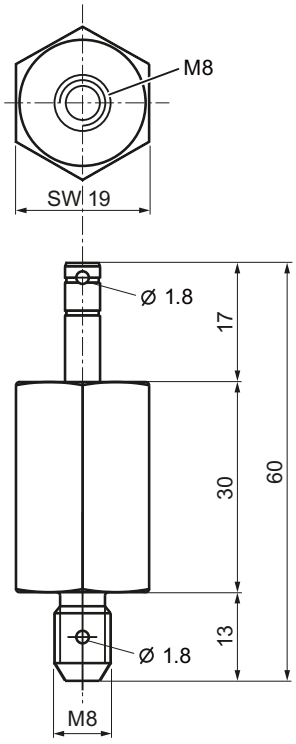


Figure A-5 Dimension drawing of quick change holder 6GT2690-0AH00

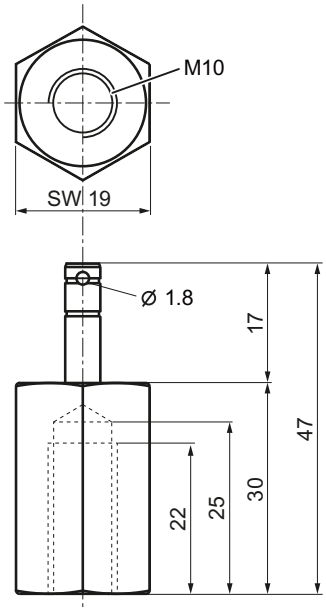


Figure A-6 Dimension drawing of quick change holder 6GT2690-0AH10

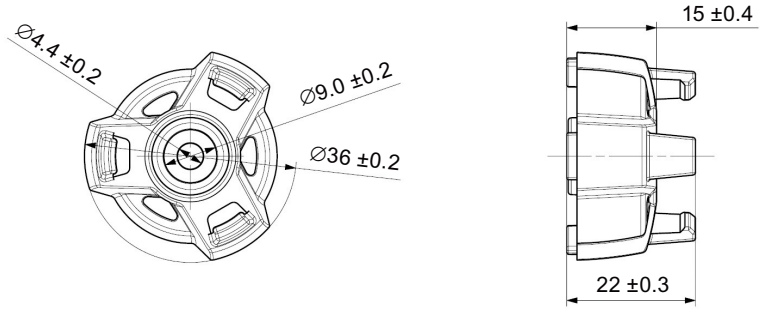


Figure A-7 Dimension drawing of spacer 6GT2690-0AK00

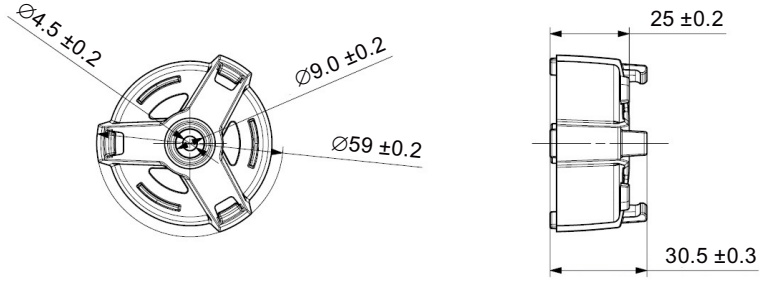


Figure A-8 Dimension drawing of spacer 6GT2690-0AL00

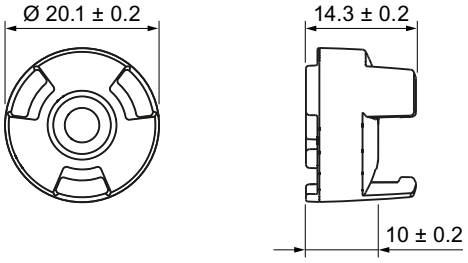


Figure A-9 Dimension drawing of spacer 6GT2690-0AG00

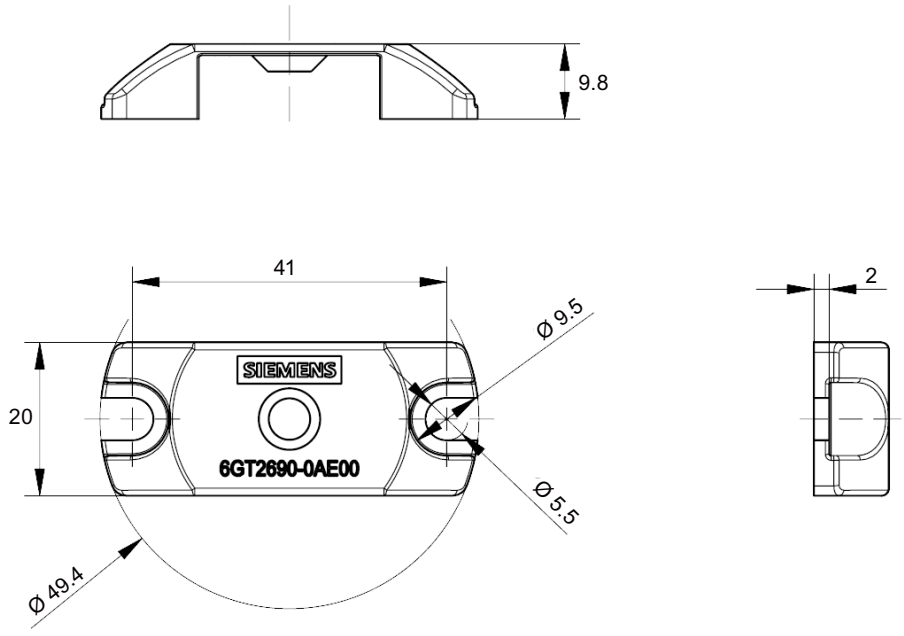


Figure A-10 Dimension drawing of fixing hood 6GT2690-0AE00

A.2.3 MOBY I migration

The RF300 readers of the 2nd 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 communication module with MOBY I capability, the reader automatically recognizes the serial protocol and sets the MOBY I protocol. As a communication module with MOBY I capability, all the communication modules sold for MOBY I count regardless of the mode in which the MOBY I communication 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.

NOTICE
Simultaneous editing of transponders not possible Note that transponders cannot be located in the antenna fields of both readers (RF300 and MOBY I) at the same time. A period of at least 2 seconds must elapse between a transponder leaving one antenna field and entering the other antenna field. Otherwise, the error "0x03" is reported.

Note

LED reaction of the readers in MOBY I mode

Errors are not displayed on the reader. These are only displayed via the connected CM.

In the "None present" mode, the LED of the reader stays blue until initial access (read/write/init) to the transponder takes place. While no other access is initiated, the LED flashes green.

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 communication 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	ASM TxD (X1)	Connector for the communication module; SLG plug, 6-pin acc. to EN 175201-804
②	Power (X4)	Optional 24 VDC supply voltage; M12 plug, 4-pin
③	MOBY I (X2)	Connector for the MOBY I-SLG; SLG socket (angled), 6-pin acc. to EN 175201-804; cable length: 2 m
④	SIMATIC RF300 (X3)	Connector for RF 300 reader; M12 socket, 8-pin, cable length: 2 m; max. 2 m cable extension permitted

Figure A-11 Connection graphic of the MOBY Y adapter for MOBY I

The operational statuses of the Y-adapter are displayed by four LEDs. The LEDs can adopt the colors yellow and green and the statuses off, on, flashing:

Labeling	LED	Description
ASM TxD (X1)		No communication module connected to the Y-adapter.
		A communication module is connected to the Y-adapter.
Power (X4)		The Y-adapter is switched off.
		The Y-adapter is switched on. All connected components are supplied with power.
		Flashes at 1:1 rate The following options are available: • Supply voltage at X4, but not at X1. • Supply voltage at X1, but not at X4. • No component is connected to either X2 or X3.
		Flashes at 1:10 rate; indicates an error. A transponder is installed on the MOBY I-SLG as well as on the RF300 reader. The user program displays the error "03".
MOBY I (X2)		No MOBY I-SLG connected to the Y-adapter or the MOBY I-SLG does not work.
		A ready MOBY I-SLG is connected to the Y-adapter. If the LED gets brighter, there is communication to a MOBY I transponder.
SIMATIC RF300 (X3)		No RF300 reader connected to the Y-adapter or the RF300 reader does not work.
		A ready RF300 reader is connected to the Y-adapter. If the LED gets brighter, there is communication to a RF300 transponder.

Optional supply voltage

Use the optional supply voltage under the following conditions:

- If the communication module (X1) cannot supply the current required for 2 readers and the Y-adapter.
- If long cables between the communication module (X1) and the MOBY I-SLG (X2) cause the voltage at the Y-adapter to drop below the minimum supply voltage of 20 V.

Note

Questions on migration

If you have questions about migration, please contact the Siemens Industry Online Support (section "Service & Support (Page 509)").

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.

The readers (RS232) connected to the communication module can be operated with a maximum cable length of 30 m. In some situations, longer connecting cables up to 1000 m are possible for connection via RS422. Please note that a transmission speed of 115.2 kBd can only be guaranteed for a max. cable length of 700 m and a transmission speed of 921.6 kBd only for a max. cable length of 100 m.

A.3.1 RF3xxR reader (RS422) with ASM 456, RF160C, RF166C, RF170C, RF180C, RF182C, RF18xC/RF18xCI

Connecting cable with straight connector

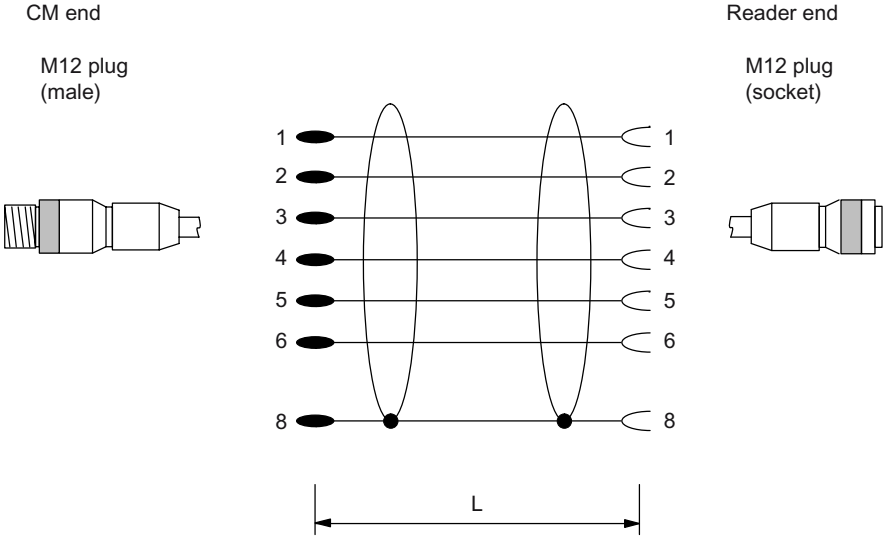


Figure A-12 Connecting cable between ASM 456, RF160C, RF170C, RF180C, RF182C, RF18xC/RF18xCI and RF3xxR reader (RS422)

Table A-11 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

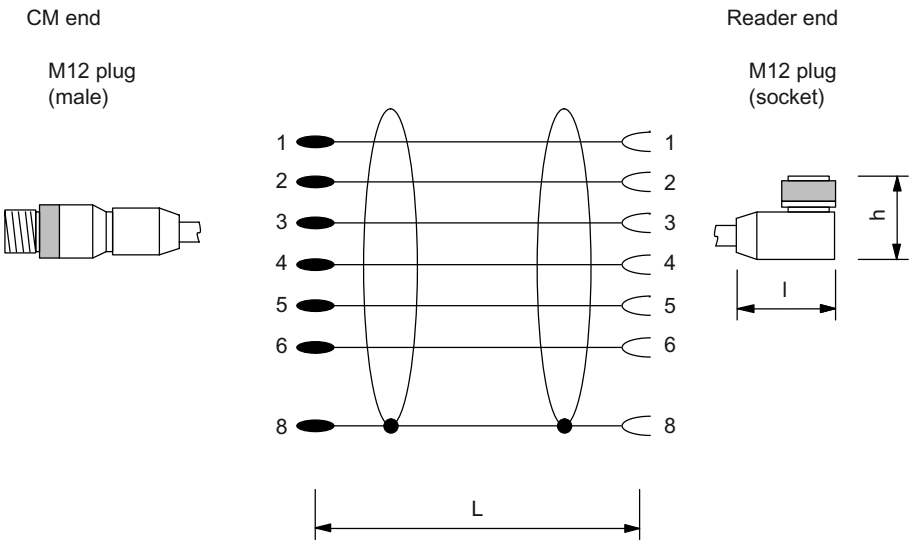


Figure A-13 Connecting cable between ASM 456, RF160C, RF170C, RF180C and RF3xxR reader (RS-422) with angled connector

Table A-12 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.

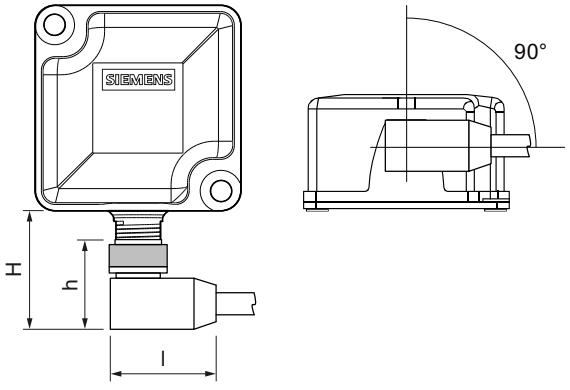


Figure A-14 Distance between connector edge and housing edge

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.

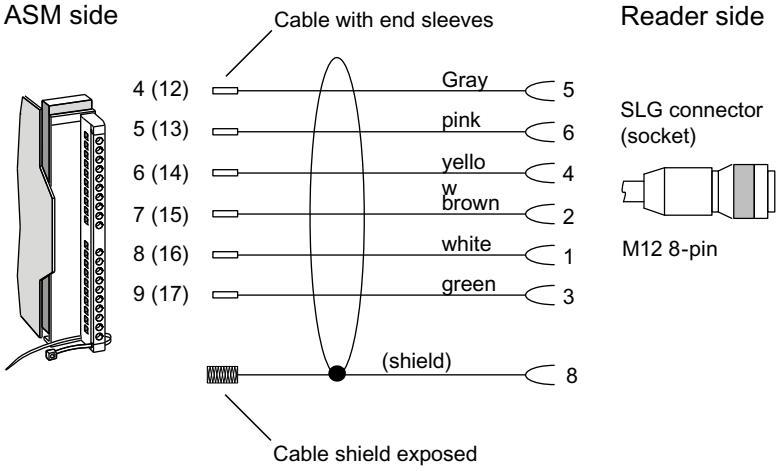


Figure A-15 Structure of the connecting cable between ASM 475 and RF3xx reader with RS-422

Table A-13 Ordering data

Length L	Article number
2 m	6GT2891-4EH20
5 m	6GT2891-4EH50

A.3.3 Reader RF3xxR (RS-422) with RF120C

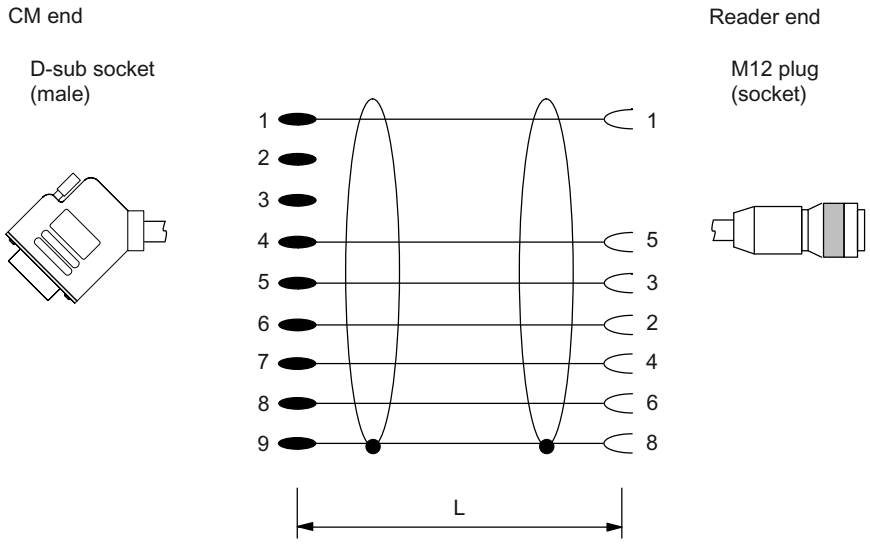


Figure A-16 Connecting cable between RF120C and RF3xxR reader (RS-422)

Table A-14 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

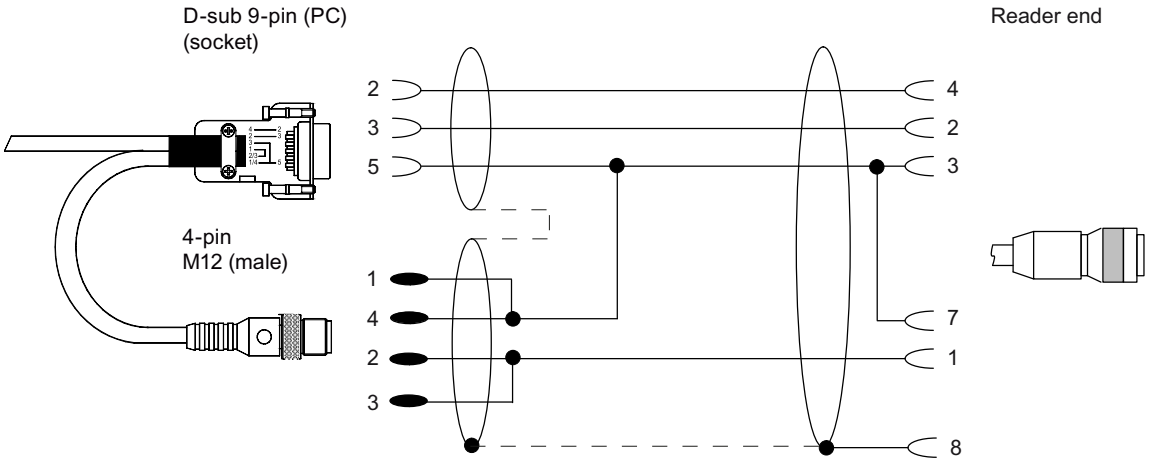


Figure A-17 Connecting cable between PC and RF380R (RS-232) with 4-pin power supply connector

Suitable power supply unit: e.g. wide-range power supply unit

With open ends for the power supply

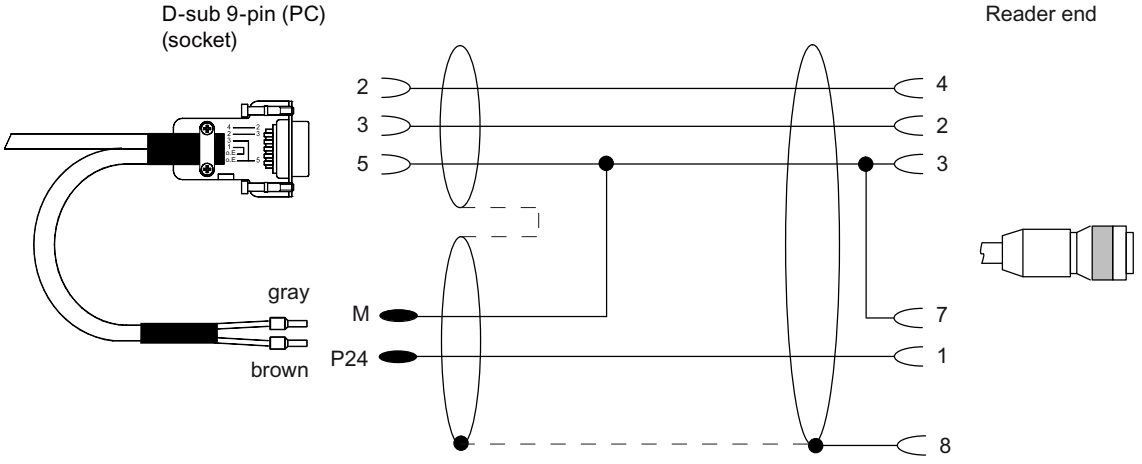


Figure A-18 Connecting cable between PC and RF380R (RS-232) with open ends for the power supply

Table A-15 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-16 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: 6GT2898-0AC00 UK: 6GT2898-0AC10 US: 6GT2898-0AC20

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-17 RF300 reader

Reader	Description	Article number
RF310R	• With RS422 interface (3964R) • IP67 • Operating temperature: -25 °C ... +70 °C • Dimensions (L x W x H): 75 x 55 x 30 mm • with integrated antenna • ISO 15693 compatible • ISO 14443 (MOBY E) compatible	6GT2801-1BA10
	Including ATEX approval	6GT2801-1BA10-0AX2
RF310R (Scanmode)	• with RS422 interface (Scanmode) • IP67 • Operating temperature: -25 °C ... +70 °C • Dimensions (L x W x H): 79.6 x 55 x 30 mm • with integrated antenna • ISO 15693 compatible	6GT2801-1BA20-0AX1
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 • ISO 14443 (MOBY E) compatible	6GT2801-2BA10
	Including ATEX approval	6GT2801-2BA10-0AX2

Reader	Description	Article number
RF350R	• 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 3S, ANT 8, ANT 12, ANT 18, ANT 30 • ISO 15693 compatible • ISO 14443 (MOBY E) compatible	6GT2801-4BA10
	Including ATEX approval	6GT2801-4BA10-0AX2
RF360R	• With Industrial Ethernet interface • IP67 • Operating temperature: 0 °C to +55 °C • Dimensions (L x W x H): 130 x 80 x 42 mm • with integrated antenna • ISO 15693 compatible	6GT2801-5BA30
RF380R	• with RS422 interface (3964R) and RS232 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	6GT2801-3BA10
	Including ATEX approval	6GT2801-3BA10-0AX2
RF382R (Scanmode) 1st generation	• with RS422 interface (Scanmode) and RS232 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
	• 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-18 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. one integrated antenna connecting 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 integrated antenna connecting cable 0.6 m	6GT2398-1CC10
	• incl. one integrated antenna connecting cable 3 m	6GT2398-1CC00
ANT 12 (stainless steel variant)	• IP67 • Operating temperature: -20 °C ... +70 °C • Dimensions (Ø x L): M12 x 40 mm • without antenna connecting cable	6GT2398-1DC00
	• incl. one plug-in antenna connecting cable 3 m	6GT2398-1DC10
ANT 18	• IP67 • Operating temperature: -25 °C ... +70 °C • Dimensions (Ø x L): M18 x 55 mm • incl. one integrated antenna connecting cable 0.6 m	6GT2398-1CA10
	• incl. one integrated antenna connecting cable 3 m	6GT2398-1CA00
	• Special variant with M8 antenna connector • without antenna connecting cable	6GT2398-1CA10-0AX0
	• Special variant with M8 antenna connector • incl. one integrated antenna connecting cable 3 m	6GT2398-1CA20-0AX0

Antenna	Description	Article number
ANT 18 (stainless steel variant)	• IP67 • Operating temperature: -20 °C ... +70 °C • Dimensions (Ø x L): M18 x 40 mm • without antenna connecting cable	6GT2398-1DA00
	• incl. one plug-in antenna connecting cable 3 m	6GT2398-1DA10
ANT 30	• IP67 • Operating temperature: -25 °C ... +70 °C • Dimensions (Ø x L): M30 x 58 mm • incl. one integrated antenna connecting cable 3 m	6GT2398-1CD00
	• Special variant with M8 antenna connector • without antenna connecting cable	6GT2398-1CD10-0AX0
	• Special variant with M8 antenna connector • incl. one integrated antenna connecting cable 3 m	6GT2398-1CD20-0AX0
ANT 30 (stainless steel variant)	• IP67 • Operating temperature: -20 °C ... +70 °C • Dimensions (Ø x L): M30 x 40 mm • without antenna connecting cable	6GT2398-1DD00
	• incl. one plug-in antenna connecting cable 3 m	6GT2398-1DD10

Table A-19 RF300 transponder, 1st generation

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	• Memory size: 8 KB FRAM user memory • Dimensions (L x W x H): 48 x 25 x 15 mm	6GT2800-4BB00
	• 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	• Memory size: 8 KB FRAM user memory • Dimensions (L x W x H): 85.8 x 54.8 x 2.5 mm	6GT2800-4AC00
	• Memory size: 32 KB FRAM user memory • Dimensions (L x W x H): 85.8 x 54.8 x 2.5 mm	6GT2800-5AC00

RF300 transponder	Description	Article number
RF370T	• Memory size: 32 KB FRAM user memory • Dimensions (L x W x H): 75 x 75 x 41 mm	6GT2800-5BE00
	• 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-20 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
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

ISO transponder	Description	Article number
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
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
MDS D560	• Memory size: 8192 bytes of FRAM user memory • Dimensions (Ø x H): 16 (±0.2) x 3 (±0.2) mm	6GT2600-5AB00

Table A-21 Communication modules

Communication 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 RS422 can be connected in parallel without a front connector	6GT2002-0GA10
RF120C	Communication module RF120C for SIMATIC S7-1200	6GT2002-0LA00
RF160C	Communication module RF160C for PROFIBUS DP V0 max. 2 readers connectable	6GT2002-0EF00
RF166C	Communication module RF166C for PROFIBUS DP max. 2 readers connectable	6GT2002-0EE20
RF170C	Communication module RF170C max. 2 readers connectable	6GT2002-0HD00
	RF170C connecting block	6GT2002-1HD00
RF180C	Communication module RF180C max. 2 readers connectable	6GT2002-0JD00
	Connecting block M12, 7/8" (5-pin)	6GT2002-1JD00
	Connecting block M12, 7/8" (4-pin)	6GT2002-4JD00
	Push-pull connecting block, RJ45	6GT2002-2JD00
RF182C	Communication module RF182C max. 2 readers connectable	6GT2002-0JD10
	Connecting block M12, 7/8" (5-pin)	6GT2002-1JD00
	Connecting block M12, 7/8" (4-pin)	6GT2002-4JD00
	Push-pull connecting block, RJ45	6GT2002-2JD00
RF185C	Communication module RF185C for PROFINET IO max. 1 reader connectable	6GT2002-0JE10
RF186C	Communication module RF186C for PROFINET IO max. 2 readers connectable	6GT2002-0JE20
RF188C	Communication module RF188C for PROFINET IO max. 4 readers connectable	6GT2002-0JE40
RF186CI	Communication module RF186CI for PROFINET IO with I/O interface; max. 2 readers connectable	6GT2002-0JE50
RF188CI	Communication module RF188CI for PROFINET IO with I/O interface; max. 4 readers connectable	6GT2002-0JE60
RFID 181EIP	Communication module RF181EIP max. 2 readers connectable	6GT2002-0JD20
	Connecting block M12, 7/8" (5-pin)	6GT2002-1JD00
	Connecting block M12, 7/8" (4-pin)	6GT2002-4JD00
	Push-pull connecting block, RJ45	6GT2002-2JD00

Accessories

Table A-22 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-23 ISO transponder accessories

Transponder	Accessories	Article number
MDS D100 / D200 / D400	Spacer	6GT2190-0AA00
	Fixing pocket	6GT2190-0AB00
	Securing pocket (cannot be mounted directly on metal)	6GT2390-0AA00
MDS D139 / D339	Spacer (Ø x H): 85 x 30 mm	6GT2690-0AA00
	Quick change holder (Ø x H): 22 x 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 / D560	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-24 Antenna accessories

Antennas	Accessories	Article number
ANT 3 / 3 S / 8 **ANT 12 / 18 / 30**	Antenna connecting cable M8-180 ↔ M8-90, trailing, 3 m	6GT2391-0AH30
	Antenna connecting cable M8-180 ↔ M8-90, trailing, 60 cm	6GT2391-0AE60

Table A-25 Accessories - connecting cable reader ↔ PC

Reader	Accessories	Article number
RF380R and PC	Connecting cable RS232 D-sub ↔ M12-180 (8-pin) and M12-180 (4-pin), 5 m	6GT2891-4KH50
	Connecting cable RS232 D-sub ↔ M12-180 (8-pin) and open ends, 5 m	6GT2891-4KH50-0AX0
	Connecting cable RS232 D-sub ↔ M12-90 (8-pin) and M8-180 (3-pin), 5 m	6GT2891-4KH50-0AX1

Table A-26 RF360R accessories

		Article number
Power supply cable L-coded, 4-pin M12-180 ↔ M12-180	0.5 m	6XV1801-6DE50
	1.0 m	6XV1801-6DH10
	1.5 m	6XV1801-6DH15
	2.0 m	6XV1801-6DH20
	3.0 m	6XV1801-6DH30
	5.0 m	6XV1801-6DH50
	10 m	6XV1801-6DN10
	15 m	6XV1801-6DN15
Power supply cable L-coded, 4-pin M12-90 ↔ M12-90	0.5 m	6XV1801-6GE50
	1.0 m	6XV1801-6GH10
	1.5 m	6XV1801-6GH15
	2.0 m	6XV1801-6GH20
	3.0 m	6XV1801-6GH30
	5.0 m	6XV1801-6GH50
	10 m	6XV1801-6GN10
	15 m	6XV1801-6GN15
Power supply cable L-coded M12-180, 4-pin ↔ M12-180, 5-pin	5 m	6GT2091-0PH50-0PH50
Power supply cable sold by the meter 4 x 1.5 mm^2		6XV1801-2B
Field-fabricated connector for power supply cable [1] socket (female)		6GK1906-0EB00
Field-fabricated connector for power supply cable [1] plug (male)		6GK1906-0EA00

		Article number
Industrial Ethernet cable D-coded M12-180 ↔ M12-180	0.3 m	6XV1870-8AE30
	0.5 m	6XV1870-8AE50
	1.0 m	6XV1870-8AH10
	1.5 m	6XV1870-8AH15
	2.0 m	6XV1870-8AH20
	3.0 m	6XV1870-8AH30
	5.0 m	6XV1870-8AH50
	10 m	6XV1870-8AN10
	15 m	6XV1870-8AN15
Industrial Ethernet cable D-coded M12-90 ↔ M12-90	0.3 m	6XV1870-8GE30
	0.5 m	6XV1870-8GE50
	1.0 m	6XV1870-8GH10
	1.5 m	6XV1870-8GH15
	2.0 m	6XV1870-8GH20
	3.0 m	6XV1870-8GH30
	5.0 m	6XV1870-8GH50
	10 m	6XV1870-8GN10
	15 m	6XV1870-8GN15
Industrial Ethernet cable D-coded M12-180 ↔ IE FC RJ45	2.0 m	6XV1871-5TH20
	3.0 m	6XV1871-5TH30
	5.0 m	6XV1871-5TH50
	10 m	6XV1871-5TN10
	15 m	6XV1871-5TN15
Connecting cable for wide-range power supply L-coded, 4-pin / A-coded, 4-pin M12-180 ↔ M12-180	5 m	6GT2091-0PH50
M12 sealing caps for unused connections (10 units) Usable as of product version "02"		3RX9802-0AA00

[1] The connectors are designed for mechanical vibration up to max. 4 g.

Table A-27 Accessories connecting cable communication module ↔ reader

Connecting cable	Description Length	Article number
ASM 456 / RF160C / RF166C / RF170C / RF180C / RF18xC/RF18xCI and reader RF3xxR (RS422)	2 m	6GT2891-4FH20
	5 m	6GT2891-4FH50
	10 m	6GT2891-4FN10
	20 m	6GT2891-4FN20
	50 m	6GT2891-4FN50

Connecting cable	Description Length	Article number
ASM 456 / RF160C / RF170C / RF180C and RF3xxR reader (RS422) 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-28 RFID accessories, general

RFID general	Article number
24 V connecting cable, 5 m	6GT2491-1HH50
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
Connecting cable for wide-range power supply L-coded, 4-pin / A-coded, 4-pin M12-180 ↔ M12-180	6GT2091-0PH50
M12 connector, 4-pin for wide range power supply unit, pack of 3	6GK1907-0DB10-6AA3

Service & Support

B

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