SIEMENS

SIMATIC Ident

RFID systems
SIMATIC RF200 IO-Link

Operating Instructions

10/2015
C79000-G8976-C276-04

Legal information

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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.

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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.

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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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Introduction

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Purpose of this system manual

The information provided in this system manual enables you to commission the IO Link reader.

Basic knowledge required

This system manual assumes general knowledge of automation engineering and identification systems.

Validity of the manual

The system manual is valid for the IO-Link reader.

Position in the overall information structure

In addition to this system manual, you require the operating instructions for the IO Link master you are using.

Conventions

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

- Reader, reading device, SLG
- Tag, transponder, mobile data memory, data carrier, MDS

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Guide

This system manual describes hardware and programming of the IO-Link reader. They comprise introductory chapters and reference chapters (e.g. technical specifications).

The system manual covers the following topics:

- Introduction to IO-Link
- Connecting the reader
- Assigning reader parameters
- Commissioning
- Diagnostics
- Technical specifications
- Ordering data

Additional documentation

The following documents contain information on the IO-Link masters ET 200S and ET 200eco and may contain further information that is relevant for you:

- Distributed I/O system ET 200S
  (https://support.industry.siemens.com/cs/ww/en/view/1144348)
- S7-1200 distributed I/O system
  (https://support.industry.siemens.com/cs/ww/en/view/91696622)
- Distributed I/O device ET 200eco PN
  (https://support.industry.siemens.com/cs/ww/en/view/29999018)
- ET 200SP distributed I/O
  (https://support.industry.siemens.com/cs/ww/en/view/58649293)

Recycling and disposal

- Since RF200 IO-Link readers only contain low levels of harmful substances, they are suitable for recycling.
- For ecologically compatible recycling and disposal of your old device, contact a certified disposal service for electronic scrap.

Description

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2.1 Area of application of the RF200 IO-Link reader

SIMATIC RF200 IO-Link is an inductive identification system that is compatible with the ISO 15693 standard and was specially designed for use in industrial production for the control and optimization of material flow. With the IO-Link communications interface, readers can be used below the fieldbus level.

SIMATIC RF200 IO-Link is an alternative to SIMATIC RF300 and represents a simple and cost-effective option for RFID applications.

2.2 IO-Link basics

The system components

IO-Link is a specified point-to-point communications interface for sensors/actuators and consists of the following system components:

- IO-Link master,
- IO-Link device (e.g. sensors, actuators, RFID readers),
- Unshielded 3-wire standard cable.

The master / the port operating modes

A master has one or more ports and one device can be connected to each port.

The port can basically be set to two different operating modes:

- SIO mode (Standard Input Output mode)

  In this mode, the device can be used like a digital input module.

- IO-Link mode (SDCI: Single-Drop digital Communication Interface, data communication)

  In this mode, the master communicates with the device and process data and service data can be transferred.

The types of communication

During communication at the IO-Link level, the following types of data are distinguished:

- Cyclic process data (input/output data)

  The data is always transferred with a previously specified length.

- Acyclic service data (parameters, on-request data)

  The data to be written or read is transferred only on request. Since a fixed area is reserved for this in the communication cycle, the acyclic data transfer does not influence the transfer of the cyclic process data.

- Events (errors, warnings, notifications)

  This works in the same way as with acyclic service data, the only difference being that the transfer is triggered by the device due to events.

The data types

While the cyclic process data is exchanged via a defined fixed area, the acyclic service data is selected and addressed using an index or subindex. The indexes available for the RF200 IO-Link reader can be found in the section "Commissioning and parameter assignment (Page 47)".

To allow system integration, each device type has an IODD file available that contains the following information:

- Representation of the communications properties
- Representation of accessible device data
- Identification, process and diagnostics data
- Menu layout
- Textual descriptions in various languages
- Image of the device
- Logo of the manufacturer

2.3 Characteristics of the RF200 IO-Link reader

The IO-Link reader reads out either the UID or user-specific data of a transponder and maps this to cyclically updated process data. User-specific data can also be written.

This data can be read out via the IO-Link master by a PC or a PLC.

The IO-Link reader has the following characteristics:

- Point-to-point communication, the address of the IO-Link device does not need to be set
- Supports IO-Link according to specification V1.0
- IO-Link baud rate 38.4 kBd, cycle time 12 ms
- Transfer of service data parallel to process data
- SIO mode (reader indicates the presence of a transponder on the data line (C/Q))
- IODD file for support of parameter assignment, diagnostics and data access.
- System integration (STEP 7 (TIA Portal)) using Port Configuration Tool (PCT)
- Degree of protection IP67
- RFID 13.56 MHz complying with ISO 15693

2.4 System integration

The readers are IO-Link device modules intended for operation with an IO-Link master. Depending on the category of the IO-Link master, this can be connected to various controllers or fieldbus systems.

The number of devices or readers that can be connected to an IO-Link master differs depending on the master type. The master type and the number of available IO-Link ports affect the maximum process data length of the master.

Interfacing to the controller

The readers RF2xxR are connected to the controller via the IO-Link from Siemens:
Currently, the following IO-Link masters are available from Siemens:

- ET 200eco PN
- ET 200S with 4SI IO-Link master
- ET 200SP with CM 4 x IO-Link SP
- ET 200AL with CM 4 x IO-Link
- S7-1200 with SM 1278

or via IO-Link masters of other manufacturers.

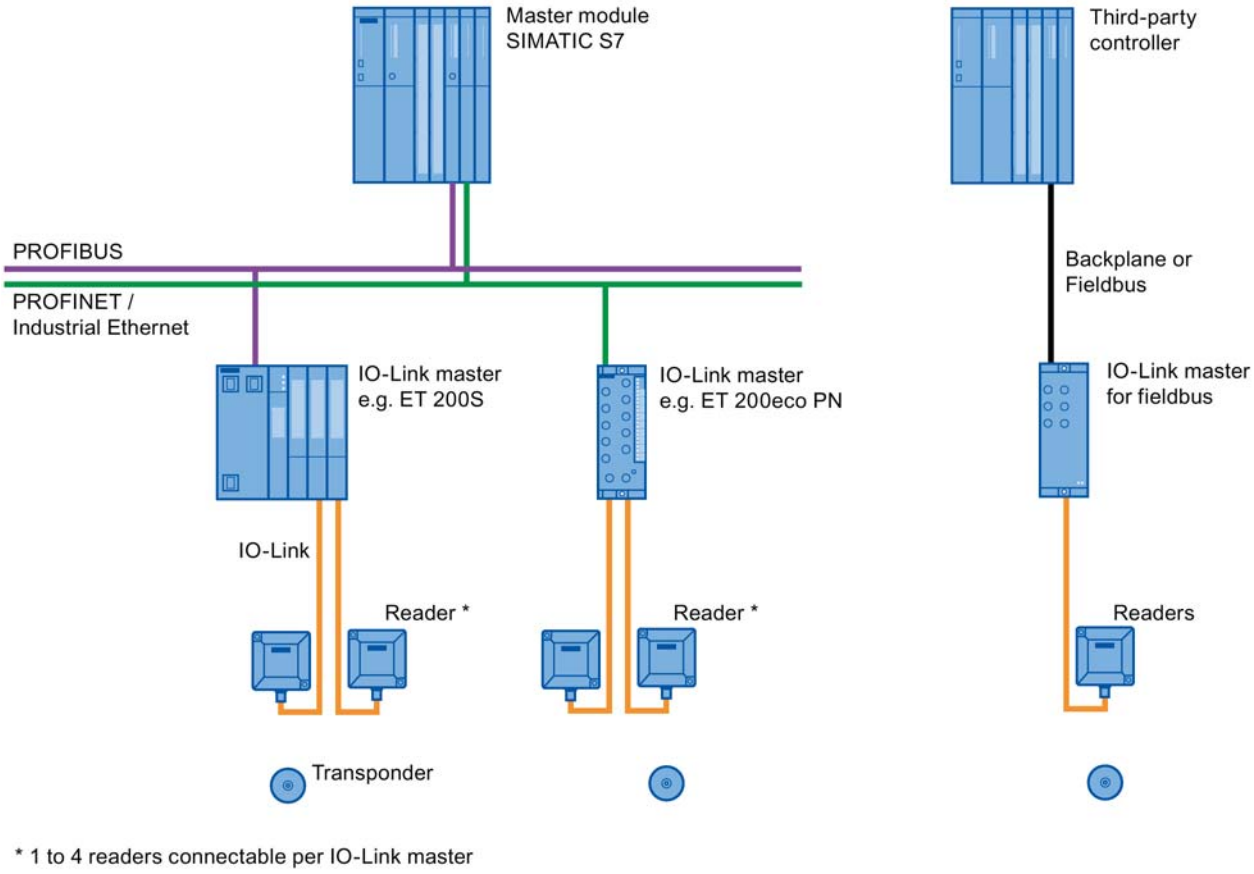

Figure 2-1 Configuration example

System overview

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3.1 RFID components and their function

RF200 IO-Link system components

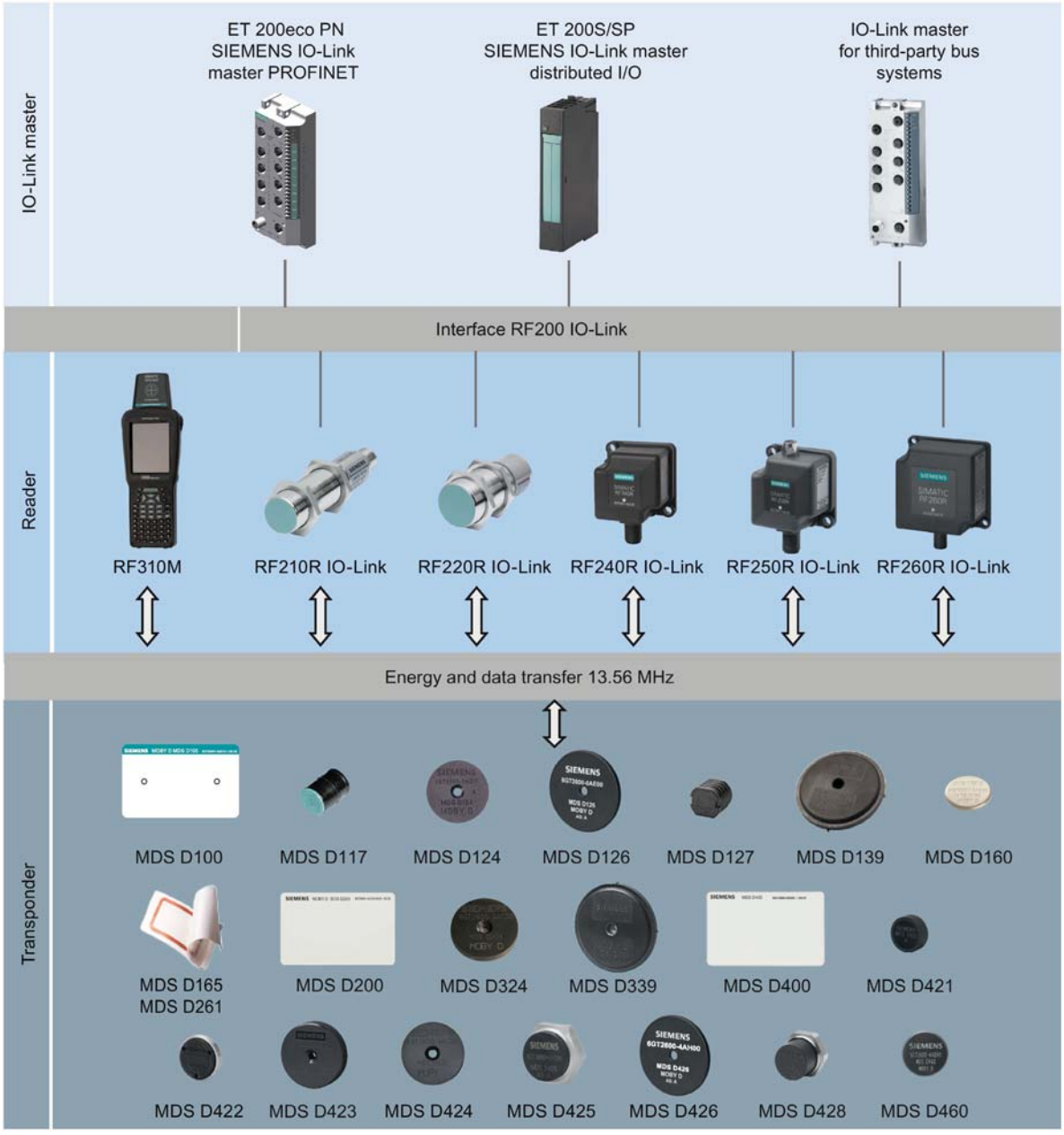

Figure 3-1 System overview RF200 IO-Link

Table 3- 1 Possible reader-transponder combinations

Trans-ponder	RF210R IO-Link	RF220R IO-Link	RF240R IO-Link	RF250R IO-Link				RF260R IO-Link
				with ANT 8	with ANT 12	with ANT 18	with ANT 30	
MDS D100	--	○	✓	--	--	--	○	✓
MDS D117	○	--	--	✓	✓	--	--	--
MDS D124	✓	✓	✓	--	--	✓	✓	✓
MDS D126	--	✓	✓	--	--	--	✓	✓
MDS D127	✓	--	--	✓	✓	--	--	--
MDS D139 [1]	--	○	○	--	--	--	○	✓
MDS D160 [2]	✓	✓	✓	--	✓	✓	✓	✓
MDS D165	--	○	✓	--	--	--	○	✓
MDS D200	--	○	✓	--	--	--	○	✓
MDS D261	--	○	✓	--	--	--	○	✓
MDS D324	✓	✓	✓	--	○	✓	✓	✓
MDS D339	--	○	○	--	--	--	○	✓
MDS D400	--	--	✓	--	--	--	○	✓
MDS D421	✓	○	--	✓	✓	✓	--	--
MDS D422	✓	✓	✓	--	✓	✓	✓	○
MDS D423	✓	✓	✓	--	--	✓	✓	✓
MDS D424	✓	✓	✓	--	--	✓	✓	✓
MDS D425	✓	✓	✓	--	✓	✓	✓	--
MDS D426	--	✓	✓	--	--	--	✓	✓
MDS D428	✓	✓	✓	--	✓	✓	✓	✓
MDS D460	✓	✓	✓	--	✓	✓	✓	✓

[1] only with the article number 6GT2600-0AA10

[2] only with the article number 6GT2600-0AB10

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

Note

For further information about the SIMATIC RF310M mobile reader, please refer to the SIMATIC RF310M Operating Instructions (https://support.industry.siemens.com/cs/ww/en/view/83517565).

3.2 Overview of transponders

Overview of the ISO transponders for RF200 available today from Siemens and their typical areas of application:

Transponder	Application
MDS D100	Barcode supplement for storage and distribution logistics
MDS D117	Tool coding
MDS D124	Small paint shops up to 180° C
MDS D126	Identification of transport units
MDS D127	Identification of small metallic workpieces, workpiece holders or containers
MDS D139	Paint spraying lines in the automobile industry
MDS D160	Hired workwear, hospital clothing
MDS D165	Smart labels (self-adhering labels) as substitute for electronic barcode
MDS D200	Warehouse and distribution logistics
MDS D261	Smart labels (self-adhering labels) as substitute for electronic barcode
MDS D324	Assembly and production lines
MDS D339	Paint spraying lines in the automobile industry
MDS D422	Identification of metallic workpiece holders, workpieces or containers
MDS D421	Tool coding according to DIN 69873
MDS D423	Metallic workpiece holders and containers with direct installation of the transponder in metal
MDS D424	Use in assembly and manufacturing lines
MDS D425	For applying to motors, gearboxes and workpiece holders
MDS D426	Identification of transport units
MDS D428	Compact ISO transponder for automatic assembly with screws
MDS D460	Assembly lines with very small workpiece holders

See also

RF200 system manual (https://support.industry.siemens.com/cs/ww/en/view/47189592)

Planning an RF200 IO-Link system

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4.1 Fundamentals of application planning

4.1.1 Selection criteria for SIMATIC RF200 components

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

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

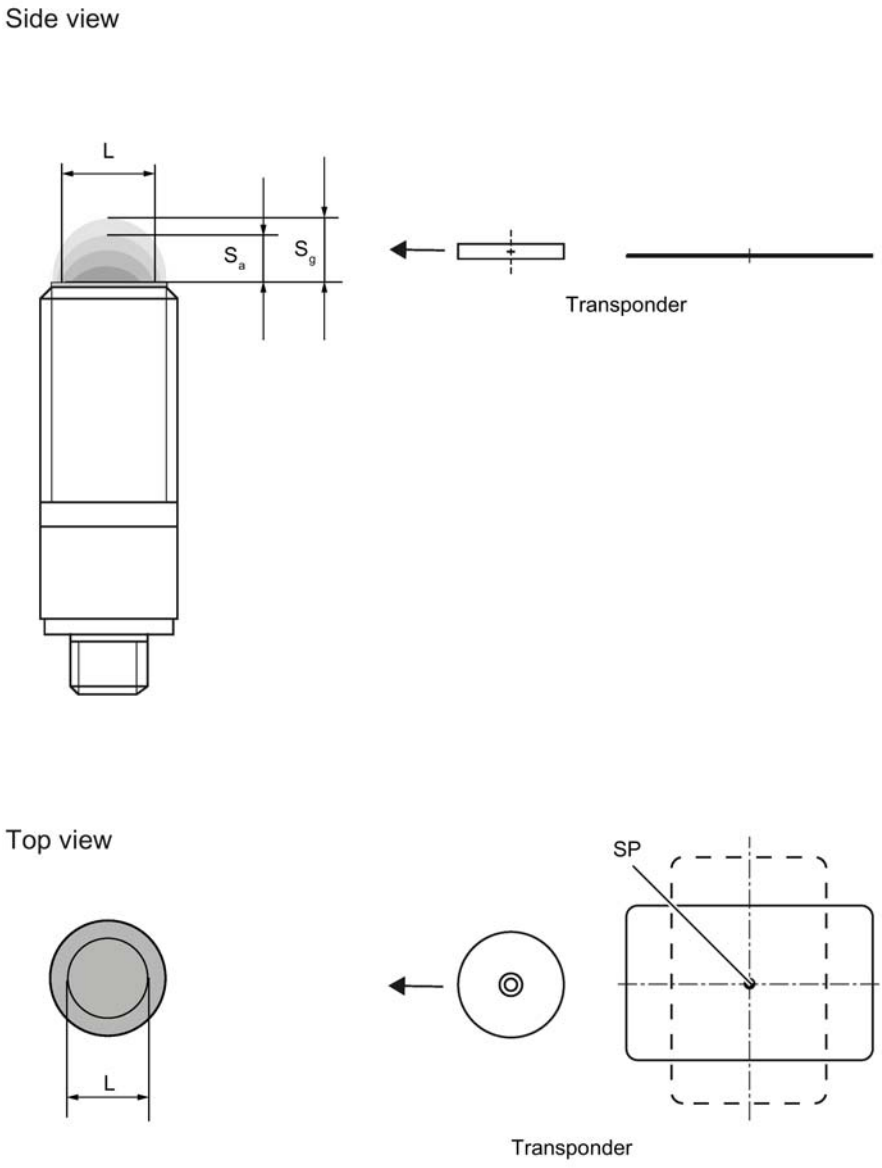
4.1.2 Transmission window and read/write distance

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

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

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

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



S_a Operating distance between transponder and reader

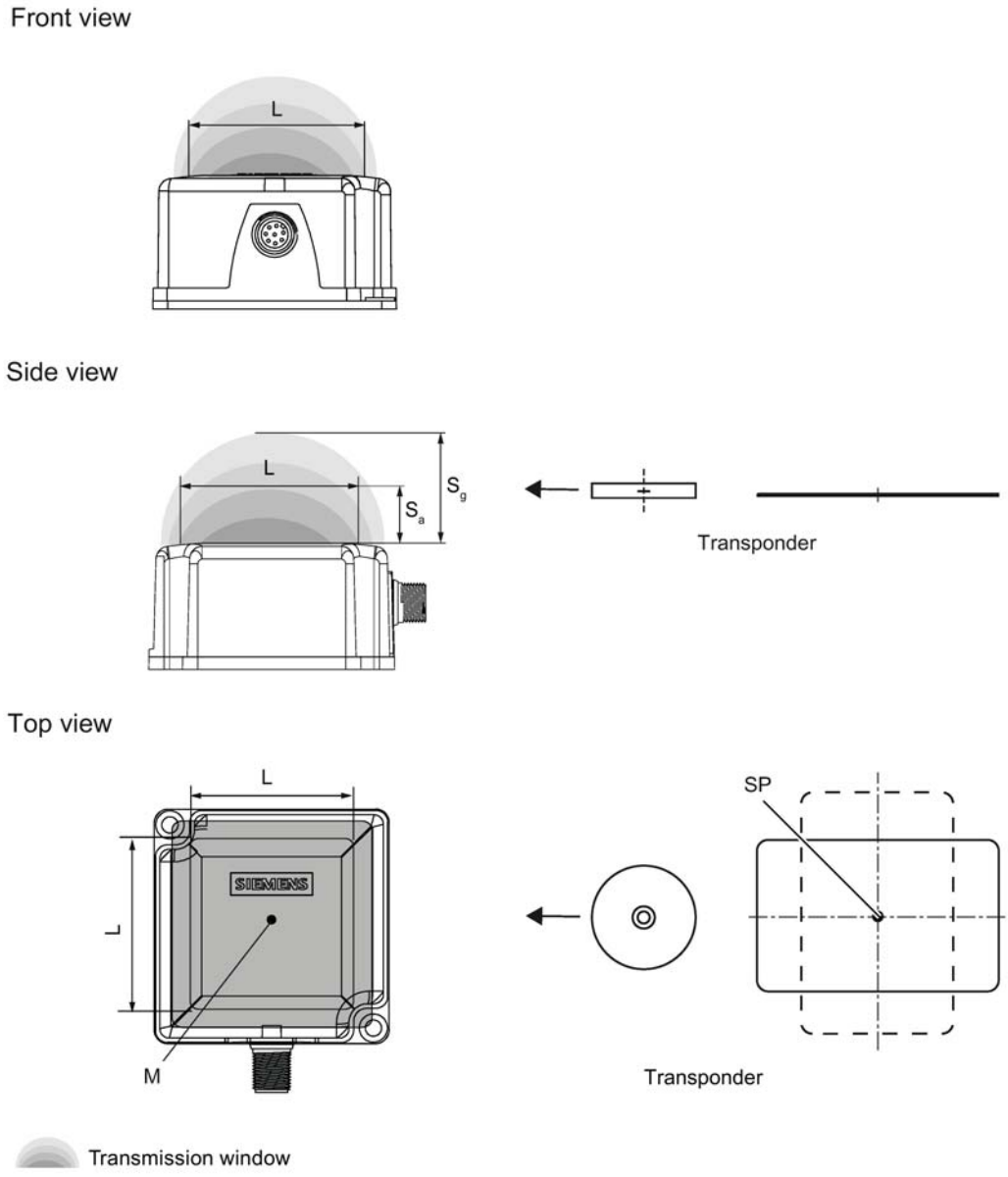
S_g Limit distance (maximum clear distance between upper surface of the reader and the transponder, at which the transmission can still function under normal conditions)

L Diameter of a transmission window..

SP Intersection of the axes of symmetry of the transponder

Figure 4-1 RF210R/RF220R transmission window

The picture below shows the transmission window of the SIMATIC RF260R reader between transponder and reader:



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 function under normal conditions)

L Length of a transmission window

M Field centerpoint

Figure 4-2 RF260R transmission window

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

From the diagrams above, it can also be seen that operation is possible within the area between S_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:

$$B = 0.4 \cdot L$$

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

Tracking tolerances

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

4.1.4 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:

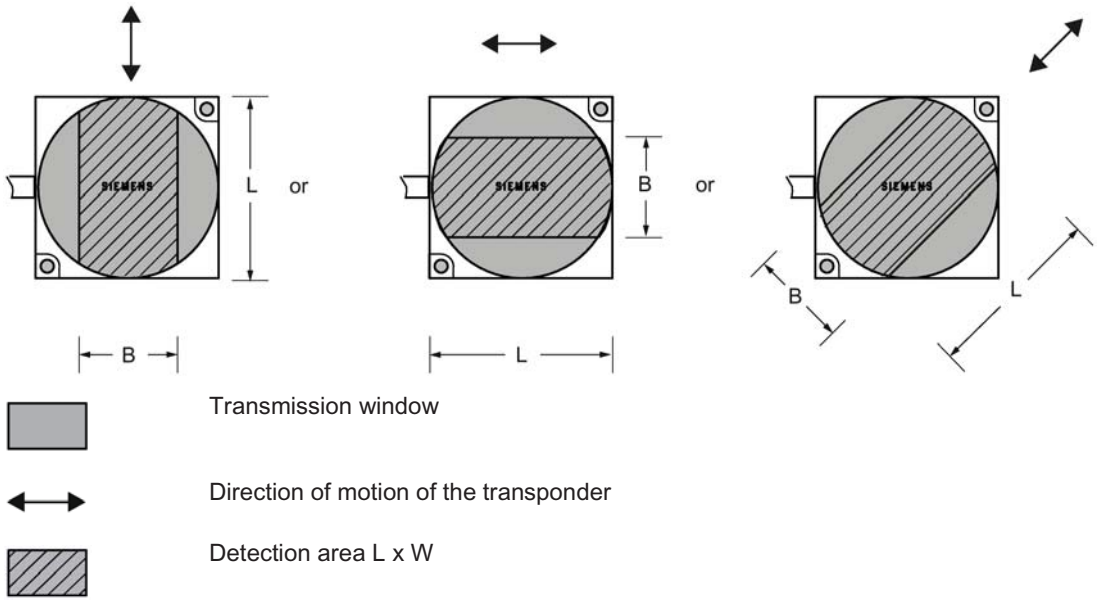


Figure 4-3 Detection areas of the reader for different directions of transponder motion

4.1.5 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:

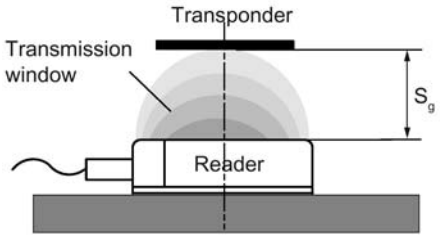


Figure 4-4 Operation in static mode

In static operation, the dwell time tv can be of any length (depending on the application). The dwell time must be sufficiently long to allow communication with the transponder to be completed.

Note

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

Operation in dynamic mode

Working in dynamic mode is not recommended for the RF200 IO-Link.

See also

Field data of transponders and readers (Page 25)

4.1.6 Communication between the IO-Link master, reader and transponder

Communication between the IO-Link master, reader and transponder is asynchronous via the IO-Link interface.

Calculation of the communication time for interference-free transfer

The communication time for problem-free transfer is calculated as follows:

$$t_K = K + t_{Byte} \cdot n \quad (n \geq 1)$$

If the transmission is interrupted briefly due to external interference, the reader automatically continues the command.

Calculation of the maximum amount of user data

The maximum amount of user data is calculated as follows:

$$n_{max} = \frac{t_V - K}{t_{Byte}}$$

t_k: Communication time between IO-Link master, reader and transponder

t_v: Dwell time

n: Amount of user data in bytes

n_{max}: Max. amount of user data in bytes in dynamic mode

t_{byte}: Transmission time for 1 byte

K: Constant; the constant is an internal system time. This contains the time for power buildup on the transponder and for command transfer

Time constants K and t_{byte}

Table 4- 1 Typical time constants for static operation with an IO-Link cycle of 3 ms (data hold time = minimum / ready delay = deactivated)

	IO-Link in the "UID acquisition" mode		IO-Link in the "user data acquisition" mode	
	K [ms]	t_{Byte} [ms]	K [ms]	t_{Byte} [ms]
Read	90	0	0	40
Write	--	--	0	40

Here, it must be taken into account that 4-byte blocks are always read.

4.1.7 Impact of secondary fields

Secondary fields in the range from 0 mm to 30 % of the limit distance (S_g) always exist. They should only be used during configuration in exceptional cases, however, 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, it must be taken into account that at the changeover from the secondary field to the main field, the presence of the transponder can be lost temporarily. It is therefore advisable to select a distance > 30 % of S_g.

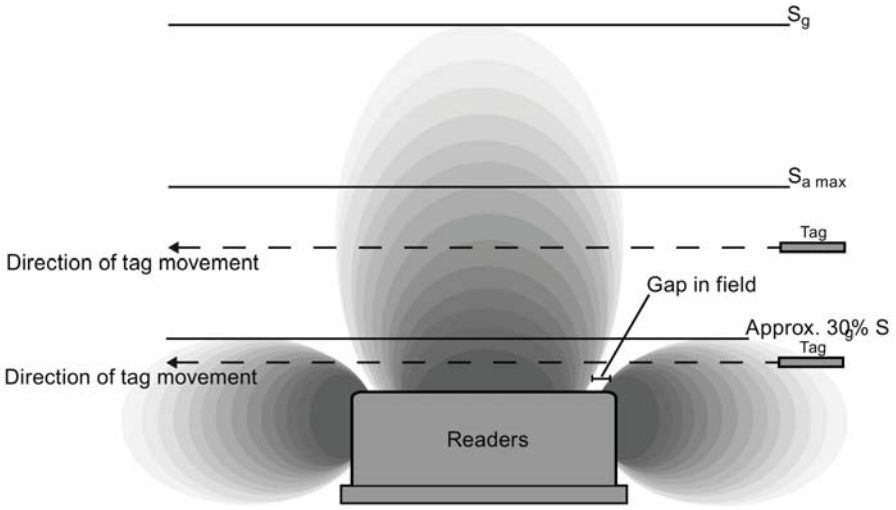


Figure 4-5 Gap in the field resulting from secondary fields

Secondary fields without shielding

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

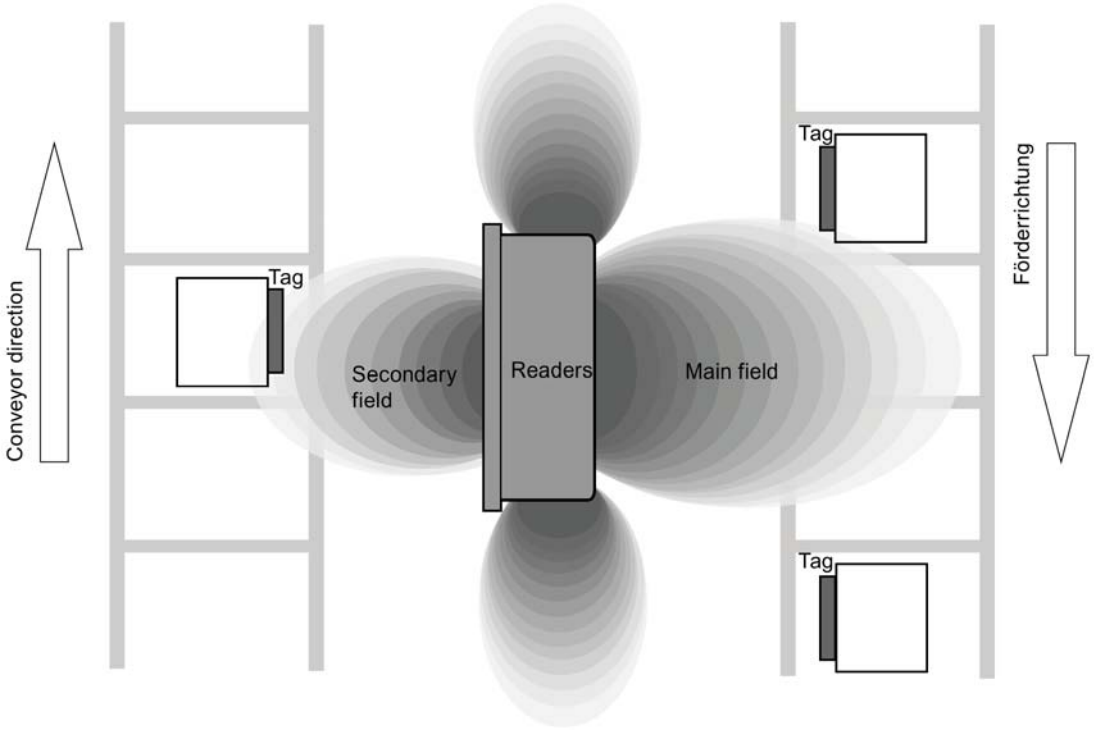


Figure 4-6 Secondary field without shielding

In this arrangement, the reader can also read transponders 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 transponders via the secondary field.

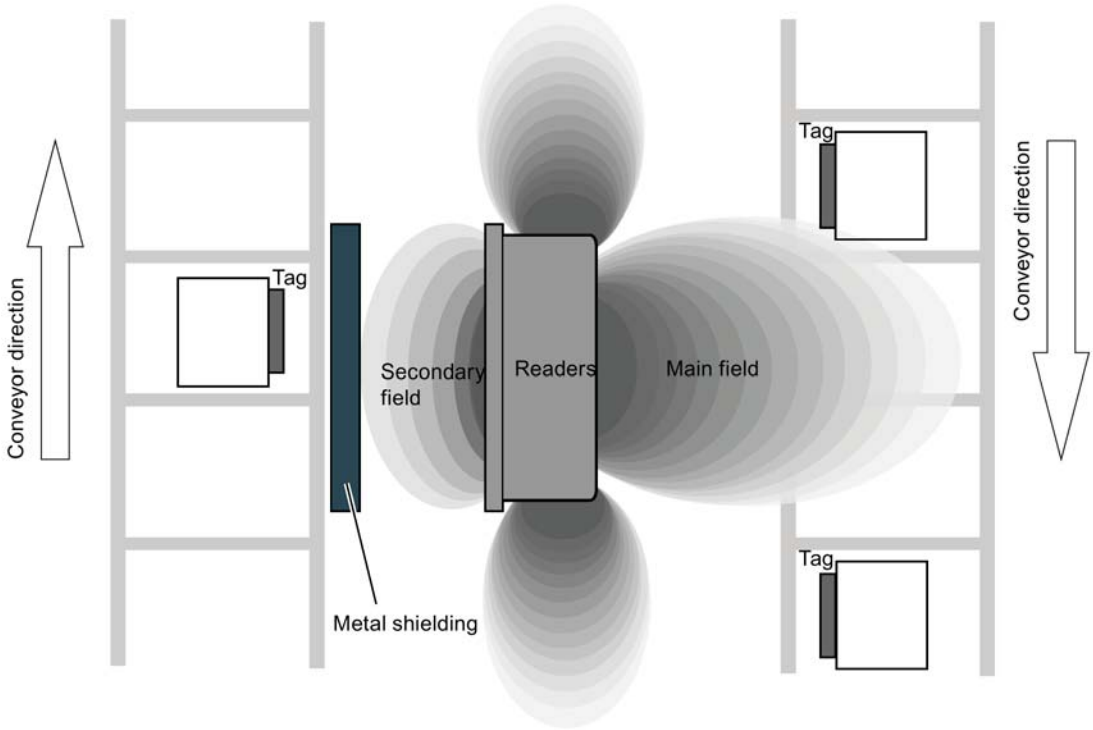


Figure 4-7 Secondary field with shielding

4.2 Field data of transponders and readers

4.2.1 Field data

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

Table 4- 2 SIMATIC RF210R IO-Link field data

	Length of the transmission window (L)	Operating distance (S_a)	Limit distance (S_g)
MDS D124	25	1 ... 18	20
MDS D127 [1)]	5	0 ... 2	2
MDS D160	20	1 ... 10	12
MDS D324	20	1 ... 8	9
MDS D421	5	0 ... 3	4
MDS D422	8	1 ... 9	10
MDS D423	20	2 ... 10	12
MDS D424	24	1 ... 16	18
MDS D425	12	1 ... 6	7
MDS D428	20	1 ... 10	11
MDS D460	8	1 … 8	9

1) The transponder is only suitable for static operation.

All dimensions in mm.

Table 4- 3 SIMATIC RF220R IO-Link field data

	Length of the transmission window (L)	Operating distance (S_a)	Limit distance (S_g)
MDS D124	35	1 ... 28	31
MDS D126	45	2 ... 30	35
MDS D160	20	1 ... 20	22
MDS D324	30	2 ... 21	25
MDS D422	18	1 ... 12	14
MDS D423	30	2 ...24	28
MDS D424	30	2 ... 25	29
MDS D425	20	1 ... 11	13
MDS D426	40	2 ... 25	30
MDS D428	25	1 ... 18	21
MDS D460	25	1 ... 18	20

All dimensions in mm.

Table 4- 4 SIMATIC RF240R IO-Link field data

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

All dimensions in mm.

Table 4- 5 Field data SIMATIC RF250R IO-Link with ANT 8

	Length of the transmission window (L)	Operating distance (S_a)	Limit distance (S_g)
MDS D117	2	0 ... 2	3
MDS D127	3	0 ... 3	4
MDS D421	3	0 ... 3	4

All dimensions in mm.

Table 4- 6 Field data SIMATIC RF250R IO-Link with ANT 12

	Length of the transmission window (L)	Operating distance (S_a)	Limit distance (S_g)
MDS D117	3	0 ... 3	4
MDS D127	4	0 ... 4	5
MDS D160	18	0 ... 12	17
MDS D421	10	0 ... 3	5
MDS D422	22	0 ... 7	10
MDS D425	12	0 ... 8	10

	Length of the transmission window (L)	Operating distance (S_a)	Limit distance (S_g)
MDS D428	18	1 ... 10	15
MDS D460	16	1 ... 10	14

All dimensions in mm.

Table 4- 7 Field data SIMATIC RF250R IO-Link with ANT 18

	Length of the transmission window (L)	Operating distance (S_a)	Limit distance (S_g)
MDS D124	26	2 ... 24	37
MDS D160	22	1 ... 18	26
MDS D324	30	1 ... 18	27
MDS D421	16	0 ... 3	4
MDS D422	24	1 ... 8	14
MDS D423	21	1 ... 15	18
MDS D424	26	1 ... 27	36
MDS D425	19	1 ... 11	16
MDS D428	19	1 ... 8	15
MDS D460	19	1 ... 17	21

All dimensions in mm.

Table 4- 8 Field data SIMATIC RF250R, with ANT 30

	Length of the transmission window (L)	Operating distance (S_a)	Limit distance (S_g)
MDS D124	40	1 ... 35	48
MDS D126	65	0 ... 47	60
MDS D160	24	1 ... 23	30
MDS D324	32	1 ... 22	35
MDS D422	27	0 ... 12	15
MDS D423	30	2 ... 18	26
MDS D424	37	0 ... 34	48
MDS D425	22	1 ... 12	20
MDS D426	65	0 ... 44	58
MDS D428	30	1 ... 20	32
MDS D460	24	1 ... 21	27

All dimensions in mm.

Table 4- 9 SIMATIC RF260R IO-Link field data

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

All dimensions in mm.

4.2.2 Minimum clearances

Minimum distance from transponder to transponder

The specified distances refer to a metal-free environment. For a metallic environment, the specified minimum distances must be multiplied by a factor of 1.5.

Table 4- 10 Minimum clearances for transponders

	RF210R	RF220R	RF240R	RF260R
MDS D100	--	--	--	≥ 240
MDS D117	≥ 15	--	--	--
MDS D124	≥ 25	≥ 40	≥ 90	≥ 180
MDS D126	--	≥ 50	≥ 100	≥ 180
MDS D127	≥ 15	--	--	--
MDS D139	--	--	--	≥ 200
MDS D160	≥ 20	≥ 25	≥ 70	≥ 150
MDS D165	--	--	--	≥ 240
MDS D200	--	--	--	≥ 240
MDS D261	--	--	--	≥ 200
MDS D324	≥ 25	≥ 40	≥ 90	≥ 180

	RF210R	RF220R	RF240R	RF260R
MDS D339	--	--	--	≥ 200
MDS D400	--	--	--	≥ 240
MDS D421	≥ 10	--	--	--
MDS D422	≥ 15	≥ 20	≥ 50	--
MDS D423	--	--	≥ 80	≥ 160
MDS D424	≥ 25	≥ 40	≥ 90	≥ 180
MDS D425	≥ 20	≥ 25	≥ 75	--
MDS D426	--	≥ 50	≥ 90	≥ 180
MDS D428	≥ 25	≥ 25	≥ 75	≥ 150
MDS D460	≥ 20	≥ 25	≥ 70	≥ 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- 11 Minimum clearances for transponders

	RF250R [1]			
	ANT 8	ANT 12	ANT 18	ANT 30
MDS D100	--	--	--	--
MDS D117	≥ 30	≥ 50	--	--
MDS D124	--	--	≥ 80	≥ 100
MDS D126	--	--	--	≥ 100
MDS D127	≥ 40	≥ 60	--	--
MDS D139	--	--	--	--
MDS D160	--	≥ 60	≥ 80	≥ 100
MDS D165	--	--	--	--
MDS D200	--	--	--	--
MDS D261	--	--	--	--
MDS D324	--	--	≥ 80	≥ 100
MDS D339	--	--	--	--
MDS D400	--	--	--	--
MDS D421	≥ 30	≥ 40	≥ 50	--
MDS D422	--	≥ 50	≥ 60	≥ 70
MDS D423	--	--	≥ 80	≥ 100
MDS D424	--	--	≥ 80	≥ 100
MDS D425	--	≥ 50	≥ 60	≥ 80
MDS D426	--	--	--	≥ 100
MDS D428	--	≥ 50	≥ 60	≥ 80
MDS D460	--	≥ 60	≥ 80	≥ 100

[1] Depends on the connected antenna (ANT 8, 12, 18 or 30).

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- 12 Minimum distances to readers or antennas

RF210R IO-Link to RF210R IO-Link	RF220R IO-Link to RF220R IO-Link	RF220R IO-Link to RF220R IO-Link	ANT x to ANT x with RF250R IO-Link	RF260R IO-Link to RF260R IO-Link
≥ 60 mm	≥ 100 mm	≥ 120 mm	ANT 8: ≥ 50 mm	≥ 150 mm
			ANT 12: ≥ 60 mm	
			ANT 18: ≥ 80 mm	
			ANT 30: ≥ 100 mm	

All values are in mm

Note

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

If the values fall below those specified in the "minimum distance from reader to reader", 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.

Adherence to the values specified in the "Minimum distance from reader to reader" table is therefore essential.

If the minimum clearance cannot be maintained due to the construction, the HF field (antenna) of the reader can be turned on or off via the process image (PIQ).

4.3 Installation guidelines

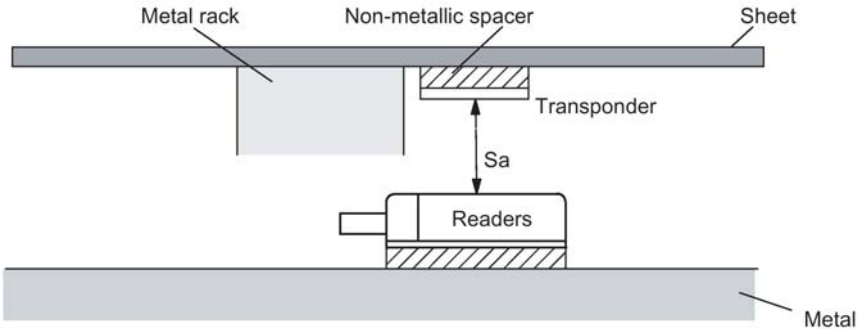
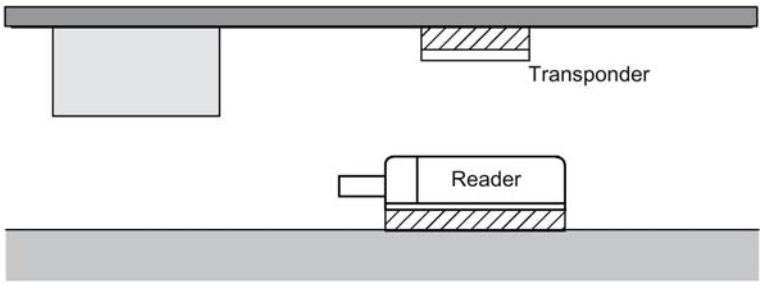
4.3.1 Overview

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 configuration and installation if the values described in the section "Field data (Page 25)" are to retain their validity:

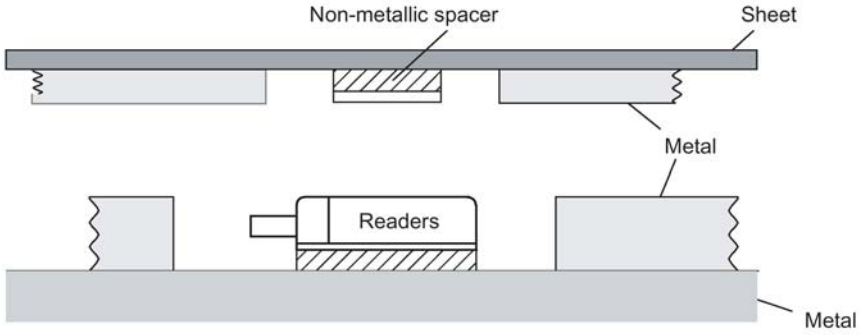
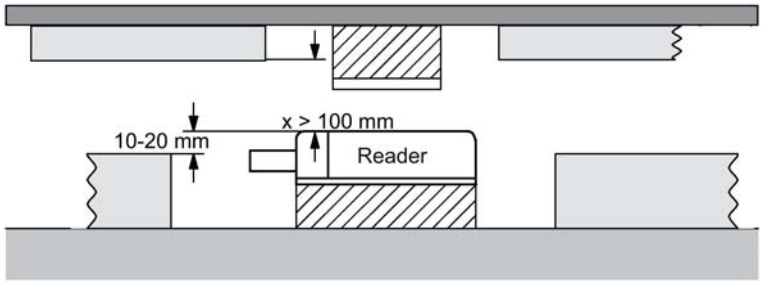
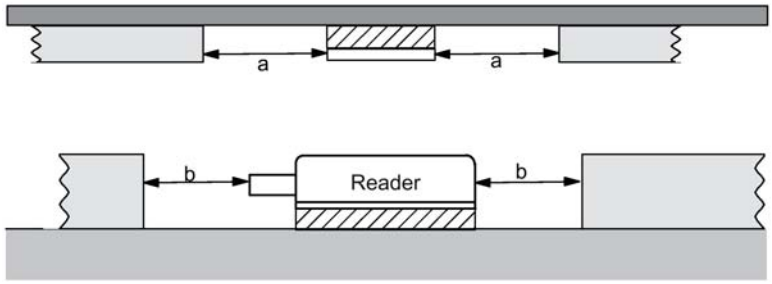
- Minimum spacing between two readers or their antennas
- Minimum distance between two adjacent data memories
- Metal-free area for flush-mounting of readers or their antennas and transponders in metal
- Mounting of multiple readers or their antennas on metal frames or racks

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

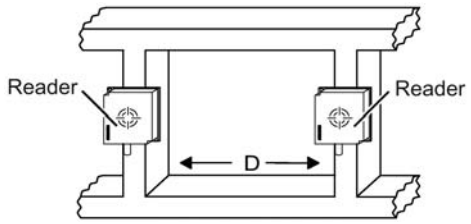
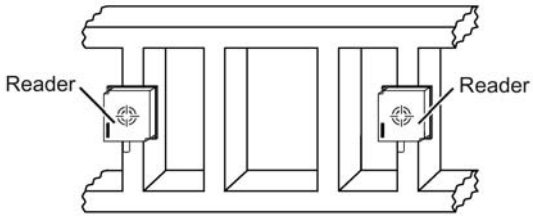
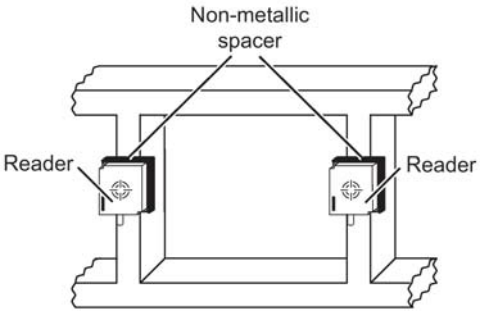
Interference due to metal rack	Problem
	A metal rack is located above the transmission window of the reader. This affects the entire field. In particular, the transmission window between reader and transponder is reduced.
	**Remedy:** The transmission window is no longer affected if the transponder is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

Flush-mounting

Flush-mounting of transponders and readers	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 non-metallic distance a, b. 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.

Mounting of several readers on metal racks	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 of metal on the transmission window

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

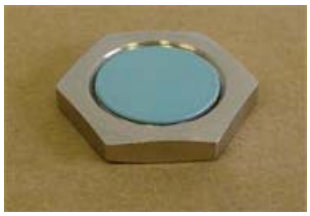
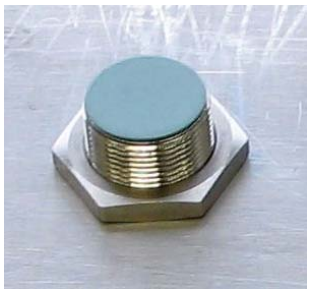
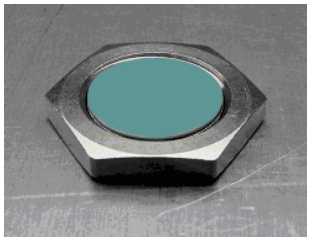
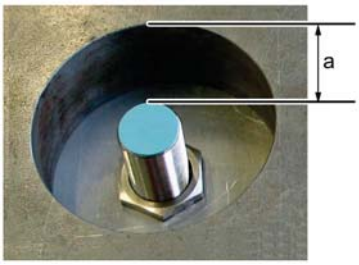
- Direct mounting on metal is allowed only in the case of specially approved transponders.
- Flush-mounting of the components in metal reduces the field data; a test is recommended in critical applications.
- When working inside the transmission window, it should be ensured that no metal rail (or similar part) intersects the transmission field.
  The metal rail would affect the field data.

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 table describe the reduction of the field data in % with reference to non-metal (100% means no impact).

4.3.4.1 RF210R IO-Link

The RF210R IO-Link can be flush-mounted in metal. Please allow for a possible reduction in the field data values.

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

Case	Figure	Description
a)		Reader metal-free
b)		Reader on metal, distance to metal ≥ 12 mm
c)		Reader in metal, flush with M18 nut
d)		Reader in metal, all around

To avoid any influence on the field data, in Case d, the distance a should be ≥ 10 mm.

Table 4- 13 Reduction of field data due to metal, range as %: Transponder and RF210R

Transponder		Reader without direct metal influence (Case a, b and d)	Reader flush-mounted in metal (Case c)
MDS D124 [1]	metal-free	100	82
	on metal, distance 15 mm	90	90
	flush-mounted in metal; distance all round 15 mm	85	80
MDS D127	flush-mounted in metal; distance all round 0 mm	100	75
MDS D160 [1]	metal-free	100	95
	on metal, distance 10 mm	100	95
MDS D324 [1]	metal-free	100	90
	on metal, distance 15 mm	90	90
	flush-mounted in metal; distance all round 25 mm	80	90
MDS D421	metal-free	100	90
	flush-mounted in metal; distance all round 0 mm	75	50
MDS D422	metal-free	100	80
	flush-mounted in metal; distance all round 0 mm	90	40
MDS D423	metal-free	100	90
	on metal, distance 0 mm	180[2]	130[2]
	flush-mounted in metal; distance all round 0 mm	95	85
MDS D424 [1]	metal-free	100	60
	on metal, distance 15 mm	95	75
	flush-mounted in metal; distance all round 25 mm	80	70
MDS D425	metal-free	100	85
	on metal, distance 0 mm	100	85
MDS D428	metal-free	100	90
	on metal, distance 0 mm	100	80
MDS D460 [1]	metal-free	100	90
	on metal, distance 25 mm	100	90

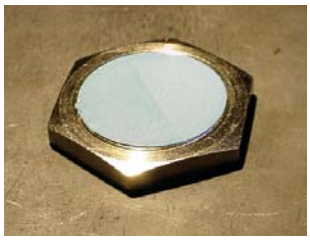
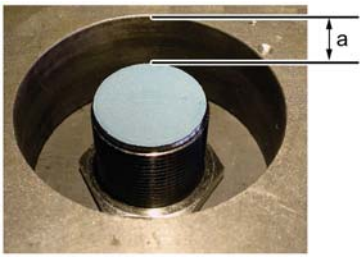
[1] Mounting the transponder on or in metal is only possible with the appropriate spacer or if there is adequate clearance to the metal.

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

4.3.4.2 RF220R IO-Link

The RF220R IO-Link can be flush-mounted in metal. Please allow for a possible reduction in the field data values.

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

Case	Figure	Description
a)		Reader metal-free
b)		Reader on metal, distance to metal ≥ 12 mm
c)		Reader in metal, flush with M30 nut
d)		Reader in metal, all round

To avoid any impact on the field data, in Case d, the distance a should be ≥ 15 mm.

Table 4- 14 Reduction of field data due to metal, range as %: Transponder and RF220R

Transponder		Reader without direct metal influence (Case a, b and d)	Reader flush-mounted in metal (Case c)
MDS D124 [1]	metal-free	100	94
	on metal, distance 15 mm	97	89
	Tag flush-mounted in metal; distance all round 15 mm	86	83
MDS D126 [1]	metal-free	100	75
	on metal, distance 25 mm	85	70
	flush-mounted in metal; distance all round 50 mm	80	65
MDS D160 [1]	metal-free	100	89
	on metal, distance 10 mm	100	89
MDS D324 [1]	metal-free	100	90
	on metal, distance 15 mm	97	86
	flush-mounted in metal; distance all round 25 mm	93	86
MDS D422	metal-free	100	90
	flush-mounted in metal; distance all round 0 mm	85	85
MDS D423	metal-free	100	90
	on metal, distance 0 mm	150 [2]	85
	flush-mounted in metal; distance all round 0 mm	80	75
MDS D424 [1]	metal-free	100	93
	on metal, distance 15 mm	96	89
	flush-mounted in metal; distance all round 25 mm	86	82
MDS D425	metal-free	100	90
	screwed onto metal	100	75
	flush-mounted in metal; distance all round 25 mm	95	75
MDS D426 [1]	metal-free	100	90
	on metal, distance 25 mm	90	75
	flush-mounted in metal; distance all round 50 mm	80	70
MDS D428	metal-free	100	94
	on metal, distance 0 mm	100	94

Transponder		Reader without direct metal influence (Case a, b and d)	Reader flush-mounted in metal (Case c)
MDS D460 [1]	metal-free	100	92
	on metal, distance 0 mm	100	92

[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 % relative to non metal surroundings can occur if transponders were developed specifically for mounting in/on metallic surroundings.

4.3.4.3 RF240R IO-Link

The RF240R IO-Link can be flush-mounted in metal. Please allow for a possible reduction in the field data values.

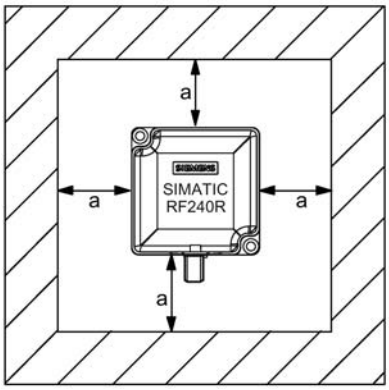


Figure 4-8 Metal-free space RF240R IO-Link

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

Table 4- 15 Reduction of field data due to metal, range as %: Transponder and RF240R

Transponder		Reader without direct metal influence	Reader on metal (metal plate)	Reader flush-mounted in metal (all round 20 mm)
MDS D100 [1]	without metal	100	95	80
	on metal, distance 20 mm	95	90	75
	flush-mounted in metal; distance all round 20 mm	90	75	70
MDS D124 [1]	without metal	100	85	75
	on metal, distance 15 mm	90	80	75
	flush-mounted in metal; distance all round 25 mm	85	70	65

Transponder		Reader without direct metal influence	Reader on metal (metal plate)	Reader flush-mounted in metal (all round 20 mm)
MDS D126 [1]	without metal	100	80	70
	on metal, distance 25 mm	80	75	60
	flush-mounted in metal; distance all round 50 mm	70	55	55
MDS D160 [1]	without metal	100	90	80
	on metal, distance 10 mm	90	85	80
MDS D165	without metal	100	95	75
	on metal, distance 25 mm	75	70	65
MDS D200 [1]	without metal	100	95	85
	on metal, distance 20 mm	95	80	70
	flush-mounted in metal, distance all round 20 mm	70	60	50
MDS D261	without metal	100	90	90
	on metal, distance 25 mm	85	80	70
MDS D324 [1]	without metal	100	90	80
	on metal, distance 15 mm	95	85	80
	flush-mounted in metal; distance all round 25 mm	90	75	70
MDS D400 [1]	without metal	100	90	80
	on metal, distance 20 mm	80	75	55
	flush-mounted in metal, distance all round 20 mm	75	70	50
MDS D422	without metal	100	90	85
	flush-mounted in metal; distance all round 0 mm	90	60	40
MDS D423	on metal, distance 0 mm	100	90	85
	flush-mounted in metal; distance all round 0 mm	185 [2]	75	70
MDS D424 [1]	without metal	100	85	80
	on metal, distance 15 mm	90	80	75
	flush-mounted in metal; distance all round 25 mm	80	70	65
MDS D425	without metal	100	90	85
	on metal, distance 0 mm	95	85	80
MDS D426 [1]	without metal	100	80	70
	on metal, distance 25 mm	90	80	70
	flush-mounted in metal; Distance all-round 50 mm	85	65	60
MDS D428	without metal	100	90	85
	on metal, distance 0 mm	95	85	83

Transponder		Reader without direct metal influence	Reader on metal (metal plate)	Reader flush-mounted in metal (all round 20 mm)
MDS D460 [1]	without metal	100	90	80
	on metal, distance 0 mm	90	85	80

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

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

4.3.4.4 RF250R IO-Link

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

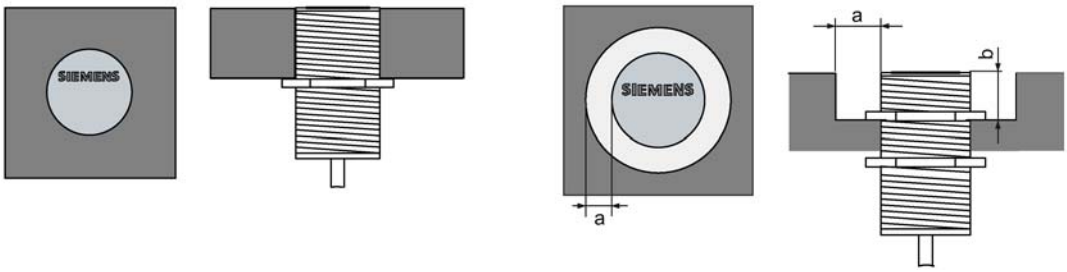


Figure 4-9 Metal-free space for ANT 8 / ANT 12 and ANT 18 / ANT 30

Table 4- 16 Reduction of field data due to metal, range as %: Transponder and RF250R with ANT 8

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

Table 4- 17 Reduction of field data due to metal, range as %: Transponder and RF250R with ANT 12

Transponder		RF250R with ANT 12	
		Antenna without metal	Antenna flush-mounted in metal (all round 7 mm)
MDS D117	without metal	100	85
	flush-mounted in metal; distance all round 0 mm	50	40
MDS D127	without metal	100	85
	flush-mounted in metal; distance all round 0 mm	65	50
MDS D160 [1]	without metal	100	90
	on metal, distance 10 mm	90	85
MDS D421	without metal	100	90
	flush-mounted in metal; distance all round 0 mm	65	45
MDS D422	without metal	100	90
	flush-mounted in metal; distance all round 0 mm	90	75
MDS D425	without metal	100	90
	on metal, distance 0 mm	115[2]	100
MDS D428	without metal	100	85
	on metal, distance 0 mm	110[2]	95
MDS D460 [1]	without metal	100	95
	on metal, distance 10 mm	90	80
	flush-mounted in metal; distance all round 0 mm	85	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 % relative to non metal surroundings can occur if transponders were developed specifically for mounting in/on metallic surroundings.

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

Transponder		RF250R with ANT 18	
		Antenna without metal	Antenna flush-mounted in metal (all round 10 mm)
MDS D124 [1]	without metal	100	80
	on metal, distance 15 mm	100	80
	flush-mounted in metal; distance all round 25 mm	95	70

Transponder		RF250R with ANT 18	
		Antenna without metal	Antenna flush-mounted in metal (all round 10 mm)
MDS D160 [1]	without metal	100	90
	on metal, distance 10 mm	100	90
MDS D324 [1]	without metal	100	80
	on metal, distance 15 mm	100	80
	flush-mounted in metal; distance all round 25 mm	95	75
MDS D421	without metal	100	85
	flush-mounted in metal; distance all round 0 mm	65	50
MDS D422	without metal	100	100
	flush-mounted in metal; distance all round 0 mm	90	90
MDS D423	without metal	100	85
	on metal, distance 0 mm	160[2]	120[2]
	flush-mounted in metal; distance all round 0 mm	95	75
MDS D424 [1]	without metal	100	75
	on metal, distance 15 mm	95	75
	flush-mounted in metal; distance all round 25 mm	95	75
MDS D425	without metal	100	90
	on metal, distance 0 mm	100	90
MDS D428	without metal	100	85
	on metal, distance 0 mm	100	85
MDS D460 [1]	without metal	100	85
	on metal, distance 10 mm	100	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 % relative to non metal surroundings can occur if transponders were developed specifically for mounting in/on metallic surroundings.

Table 4- 19 Reduction of field data due to metal, range as %: Transponder and RF250R with ANT 30

Transponder		RF250R with ANT 30	
		Antenna without metal	Antenna flush-mounted in metal (all round 20 mm)
MDS D124 [1]	without metal	100	80
	on metal, distance 15 mm	90	75
	flush-mounted in metal; distance all round 25 mm	75	70
MDS D126 [1]	without metal	100	80
	on metal, distance 25 mm	85	75
	flush-mounted in metal; distance all round 50 mm	60	50
MDS D160 [1]	without metal	100	85
	on metal, distance 10 mm	95	80
MDS D324 [1]	without metal	100	80
	on metal, distance 15 mm	95	75
	flush-mounted in metal; distance all round 25 mm	85	70
MDS D422	without metal	100	95
	flush-mounted in metal; distance all round 0 mm	95	80
MDS D423	without metal	100	90
	on metal, distance 0 mm	130[2]	110[2]
	flush-mounted in metal; distance all round 0 mm	80	70
MDS D424 [1]	without metal	100	85
	on metal, distance 15 mm	90	75
	flush-mounted in metal; distance all round 25 mm	75	70
MDS D425	without metal	100	90
	on metal, distance 0 mm	95	75
MDS D426 [1]	without metal	100	70
	on metal, distance 25 mm	90	65
	flush-mounted in metal; distance all round 25 mm	55	45
MDS D428	without metal	100	90
	on metal, distance 0 mm	130[2]	110[2]
MDS D460 [1]	without metal	100	85
	on metal, distance 10 mm	90	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 % relative to non metal surroundings can occur if transponders were developed specifically for mounting in/on metallic surroundings.

4.3.4.5 RF260R IO-Link

The RF260R IO-Link can be flush-mounted in metal. Please allow for a possible reduction in the field data values.

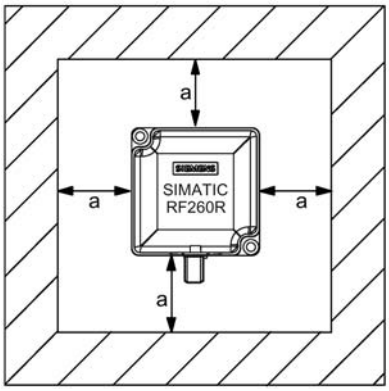


Figure 4-10 Metal-free space RF260R IO-Link

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

Table 4- 20 Reduction of field data due to metal, range as %: Transponder and RF260R

Transponder		Reader without direct metal influence	Reader on metal (metal plate)	Reader flush-mounted in metal (all round 20 mm)
MDS D100 [1]	without metal	100	85	65
	on metal, distance 20 mm	70	65	50
	flush-mounted in metal; distance all round 20 mm	65	50	40
MDS D124 [1]	without metal	100	93	75
	on metal, distance 15 mm	95	85	70
	flush-mounted in metal; distance all round 25 mm	78	75	65
MDS D126 [1]	without metal	100	85	73
	on metal, distance 25 mm	75	68	60
	flush-mounted in metal; distance all round 50 mm	55	53	40
MDS D139 [1]	without metal	100	90	75
	on metal, distance 30 mm	95	90	75
MDS D160 [1]	without metal	100	90	75
	on metal, distance 10 mm	90	80	80
MDS D165	without metal	100	85	65
	on metal, distance 25 mm	65	60	45

Transponder		Reader without direct metal influence	Reader on metal (metal plate)	Reader flush-mounted in metal (all round 20 mm)
MDS D200 [1]	without metal	100	85	70
	on metal, distance 20 mm	70	65	50
	flush-mounted in metal, distance all round 20 mm	55	50	45
MDS D261	without metal	100	85	70
	on metal, distance 25 mm	80	70	60
MDS D324 [1]	without metal	100	90	75
	on metal, distance 15 mm	90	80	70
	flush-mounted in metal; distance all round 25 mm	70	65	55
MDS D339 [1]	without metal	100	90	75
	on metal, distance 30 mm	95	90	75
MDS D400 [1]	without metal	100	85	70
	on metal, distance 20 mm	70	65	50
	flush-mounted in metal; distance all round 20 mm	55	50	45
MDS D423	on metal, distance 0 mm	100	90	80
	flush-mounted in metal; distance all round 0 mm	75	65	60
MDS D424 [1]	without metal	100	90	80
	on metal, distance 15 mm	90	80	70
	flush-mounted in metal; distance all round 25 mm	60	60	50
MDS D426 [1]	without metal	100	100	73
	on metal, distance 25 mm	88	85	68
	flush-mounted in metal; distance all round 50 mm	65	55	55
MDS D428	without metal	100	90	90
	on metal, distance 0 mm	90	90	85
MDS D460 [1]	without metal	100	95	90
	on metal, distance 10 mm	90	85	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.

4.4 Further information

For more detailed information on "fundamentals of application planning" and "EMC", refer to chapter 4 of the "SIMATIC RF300 System Manual (https://support.industry.siemens.com/cs/ww/en/view/21738946)".

Commissioning and parameter assignment 5

After the system has been installed and wired up, the following steps are necessary to commission an RF200 IO-Link reader.

5.1 Configuring

Depending on the operating modes SIO mode or IO-Link communication, the reader needs to be assigned parameters.

- SIO mode:

  In the SIO mode, the reader does not need to be assigned parameters. The reader can be connected as a standard IO to the input modules (for example IO-Link master).

- IO-Link mode:

  In the IO-Link mode, the process image required by the device must be assigned to a specific port of the IO-Link master and the type and length must be configured.

  Using an engineering tool (for example STEP 7), a new project must be created or an existing project opened in which the IO-Link master is inserted.

  "HW Config" is used for configuration in STEP 7.

Configuration of the IO-Link master in HW Config

Note

Configuration software

The configuration described below was created with "HW Config". As an alternative you can also create the configuration with STEP 7 Professional (TIA Portal).

With the aid of "HW Config", the IO-Link masters can be dragged from the catalog to the required location in the PROFIBUS/PROFINET system and the addresses assigned.

Consistency:

For data consistency, the entire communication path must be taken into account. As far as the various CPUs are concerned, a distinction must be made between PROFIBUS DP and PROFINET IO.

The consistent data transfer in PROFIBUS DP (1 to 32 bytes) or in PROFINET IO (1 to 254 bytes) takes place in the process image of the inputs and outputs. With the load commands, up to 4 bytes can be read out consistently from the process image of the inputs. The process image depends on the CPU and details can be found in the relevant manual.

The S7 CPUs have the system functions "SFC14/15" available that make it possible to guarantee consistent data transfer outside the process image. The amount of data that can be transferred consistently depends on the CPU and the bus system being used and details can be found in the relevant manuals.

For the data transfer between the IO-Link master and IO-Link device, the master guarantees consistency for 8 bytes without the "Port Qualifier" being selected in the "Ports" menu.

Transfer consistency is also increased by the "Ready delay" setting. This delays the transfer of the "RDY" or "Done" bit by one IO-Link cycle so that the system has time to transfer the data. If there is a lot of data traffic, we recommend that you enable this setting.

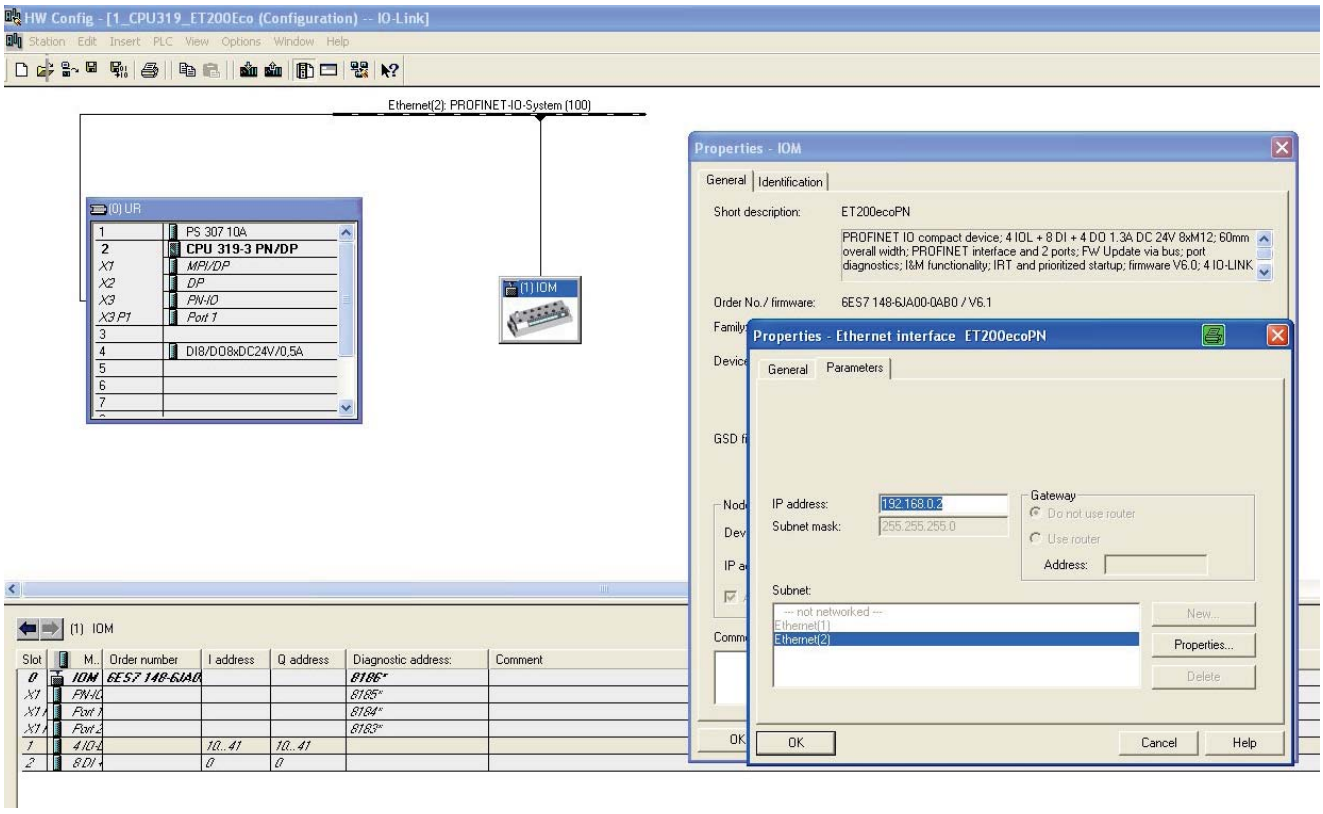


Figure 5-1 Configuration example for an ET 200eco PN

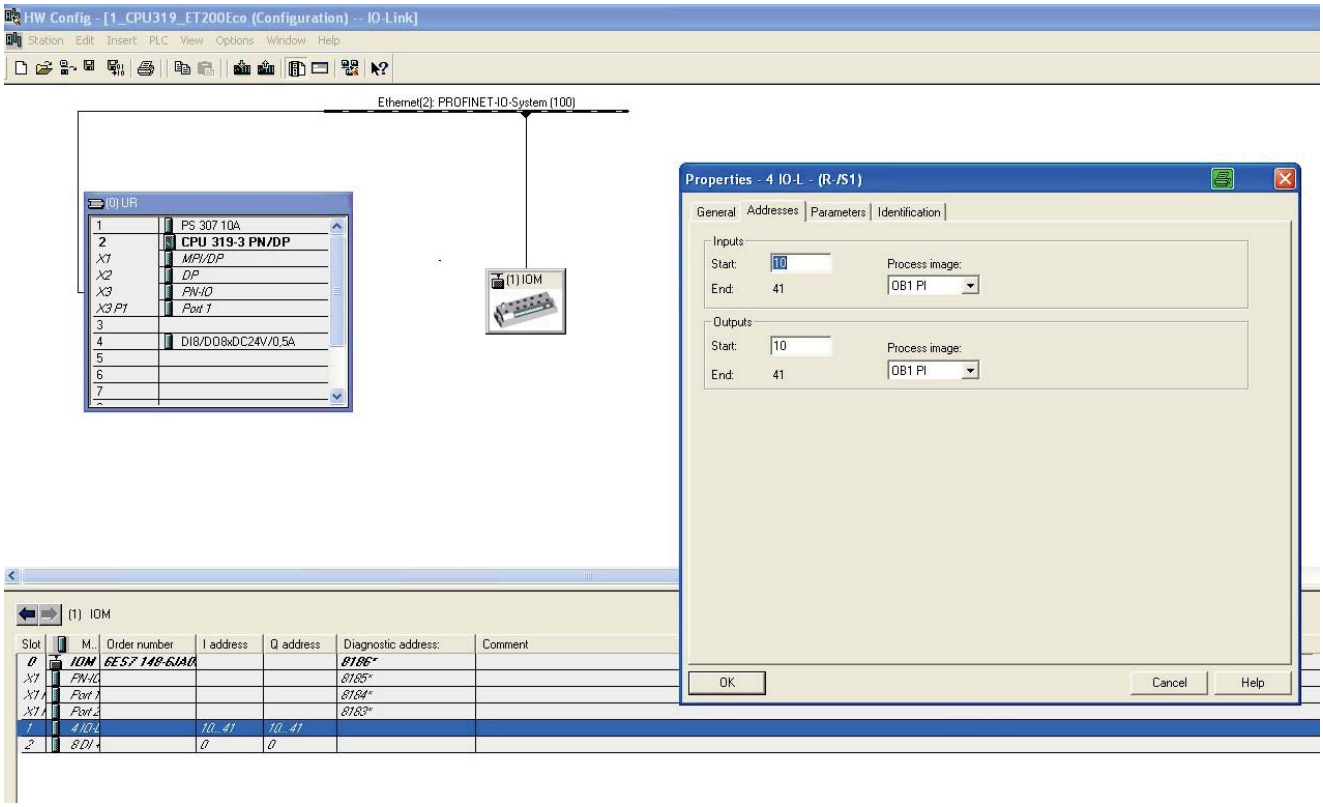


Figure 5-2 Address selection with the ET 200eco PN

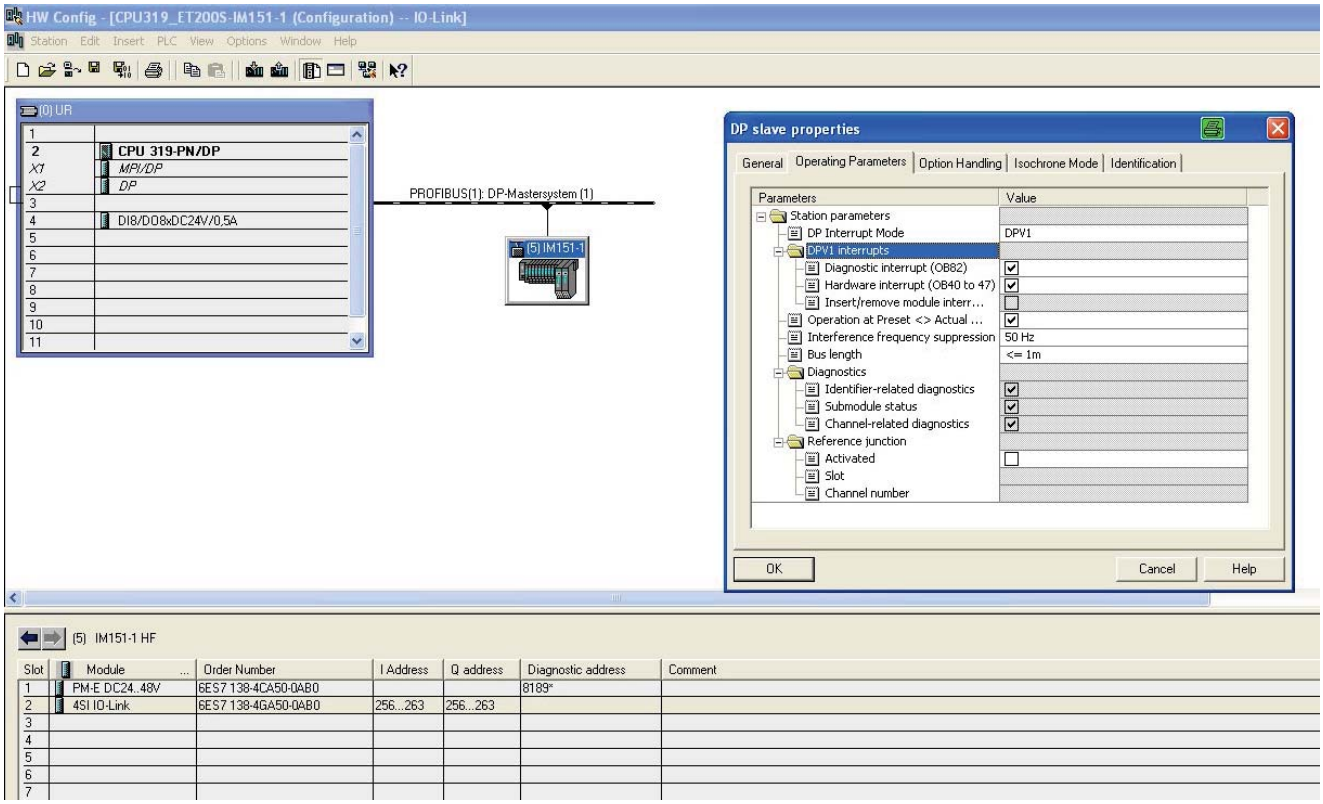


Figure 5-3 Configuration example for an ET 200S

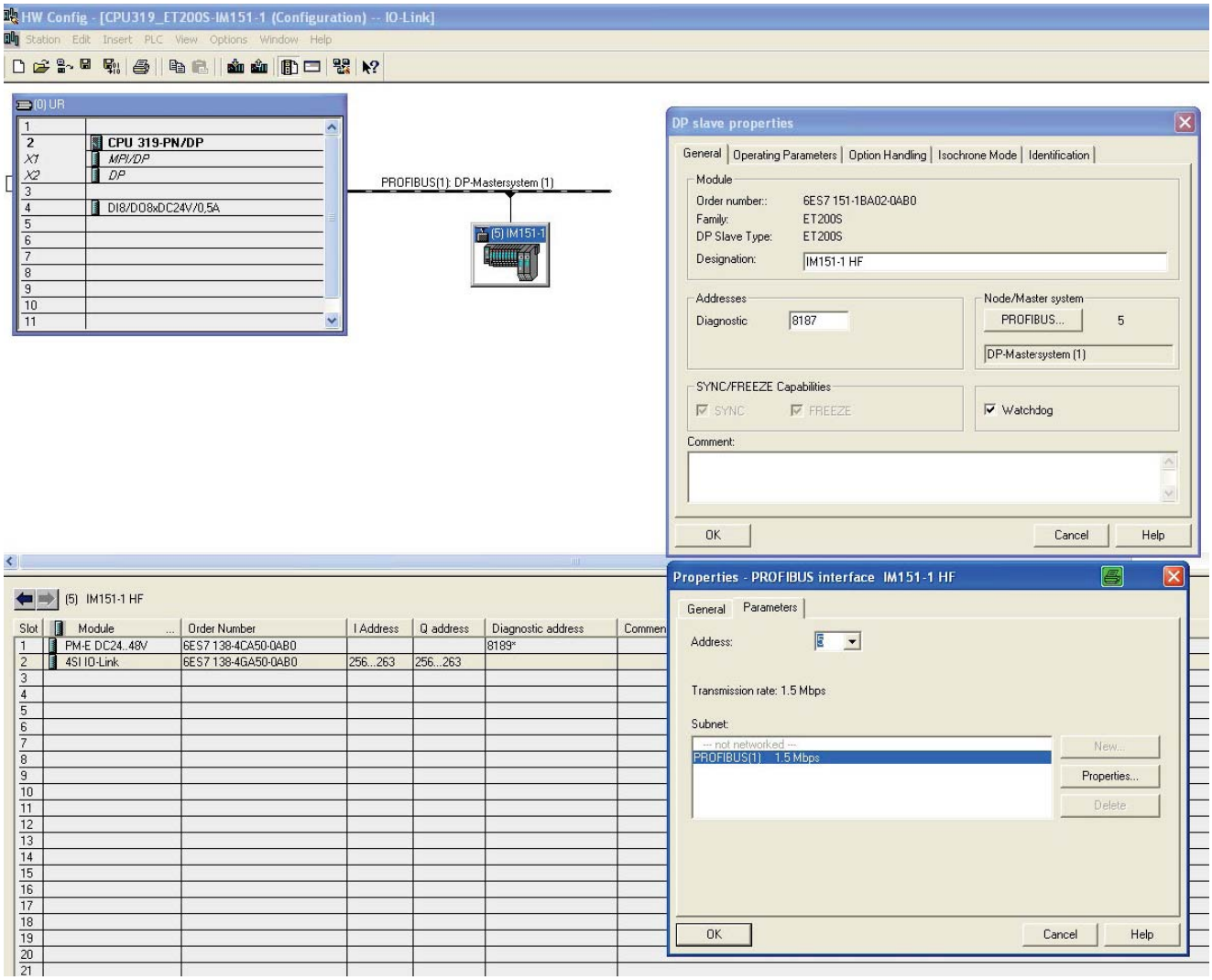


Figure 5-4 Address selection with the ET 200S (I/O and PROFIBUS address)

5.2 Parameter assignment of the IO-Link system

You can call up the Port Configuration Tool from HW Config.

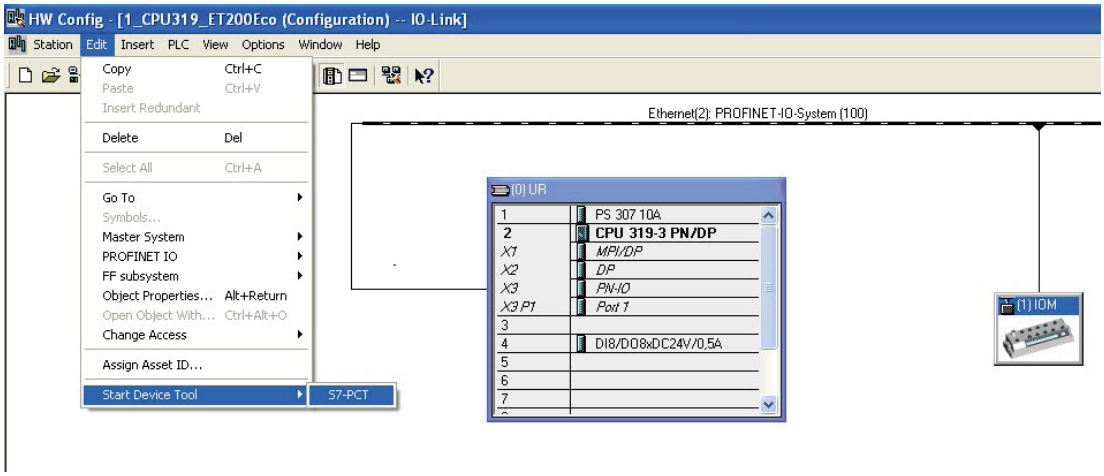


Figure 5-5 Calling the PCT from HW Config using the menu bar

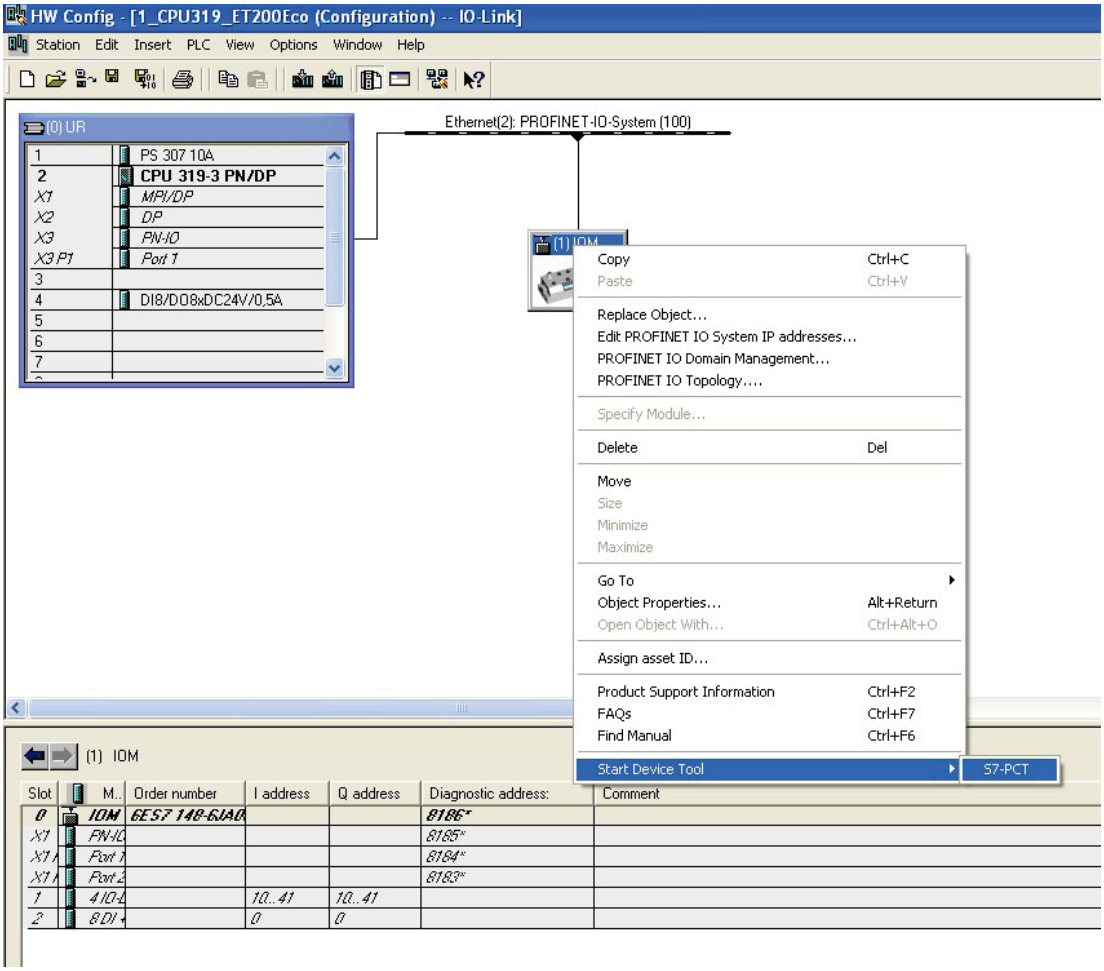


Figure 5-6 Calling the PCT from HW Config using the master

Note

Calling the PCT with STEP 7 V5.4 or older installed

If PCT was not installed along with the STEP 7 installation (up to V5.4), you will need to install PCT extra. In this case, you can call up PCT directly using the master. Right click on the master and then on "Configure IO-Link" in the shortcut menu.

5.2.1 The Port Configuration Tool (PCT)

When using SIEMENS masters, the "Port Configuration Tool" is available for configuring the IO-Link master and to set parameters for the devices.

When using third-party masters, you will first need to install the tool provided by the manufacturer or use the parameter assignment options of the configuration system.

With the PCT (as of V2.3), STEP 7 engineering has a powerful software for assigning parameters for Siemens IO-Link master modules and IO-Link devices. S7 PCT is integrated in STEP 7 as of V5.4 SP5 and is called via the hardware configuration of the IO-Link master. Apart from this program form integrated in STEP 7 engineering, a standalone version of S7 PCT is also available and can be installed separately.

The S7 PCT standalone variant allows simple use of the IO-Link with the distributed SIMATIC I/O system ET200 in control systems of other providers (without STEP 7). The standalone variant is also required to configure with STEP 7 (TIA Portal).

With the Port Configuration Tool, parameter data of the IO-Link devices can be set, changed, copied and saved in the STEP 7 project: In this way, all configuration data and parameters right down to the IO-Link device level are stored consistently.

Properties of the Port Configuration Tool (S7 PCT)

- Available free of charge as a download at Internet (https://support.industry.siemens.com/cs/ww/en/view/32469496)
- Configuration screens (tabs) in S7 PCT with plain language and product image directly from the IODD of the certified device
- Central data storage of all project data in the STEP 7 project with the integrated PCT call
- Wide-ranging test and diagnostics functions
- Reading out identification data from the devices
- Reading back of device information including the parameter assignment supported fully

The PCT integrates IO-Link devices below the fieldbus level completely in all areas of production automation in STEP 7 (TIA Portal).

5.2.2 Parameter assignment with PCT

With the S7 PCT, you can configure IO-Link master ports, change and read out parameters and much more.

Make sure that the necessary IODD files exist in the hardware catalog. If they do not, import them using the "Options" menu. Then transfer the IODD files by dragging them to the PCT tool.

You will find the IODD files on the DVD "RFID Systems Software & Documentation" (6GT2080-2AA20) or on the pages of Siemens Industry Online Support (https://support.industry.siemens.com/cs/de/en/ps/14972/dl).

Note

Assigning rights

In the "Options" menu, it is possible to assign rights for the particular view under "User Role". All the parameters are enabled with the "Commissioning" role.

The following screenshots show some of the important parameter assignment options at the IO-Link master and IO-Link device level:

IO-Link master level

1. In the "Ports" tab, drag the IO-Link masters from the hardware catalog to the "Name" area. You can then configure the ports of the IO-Link masters.

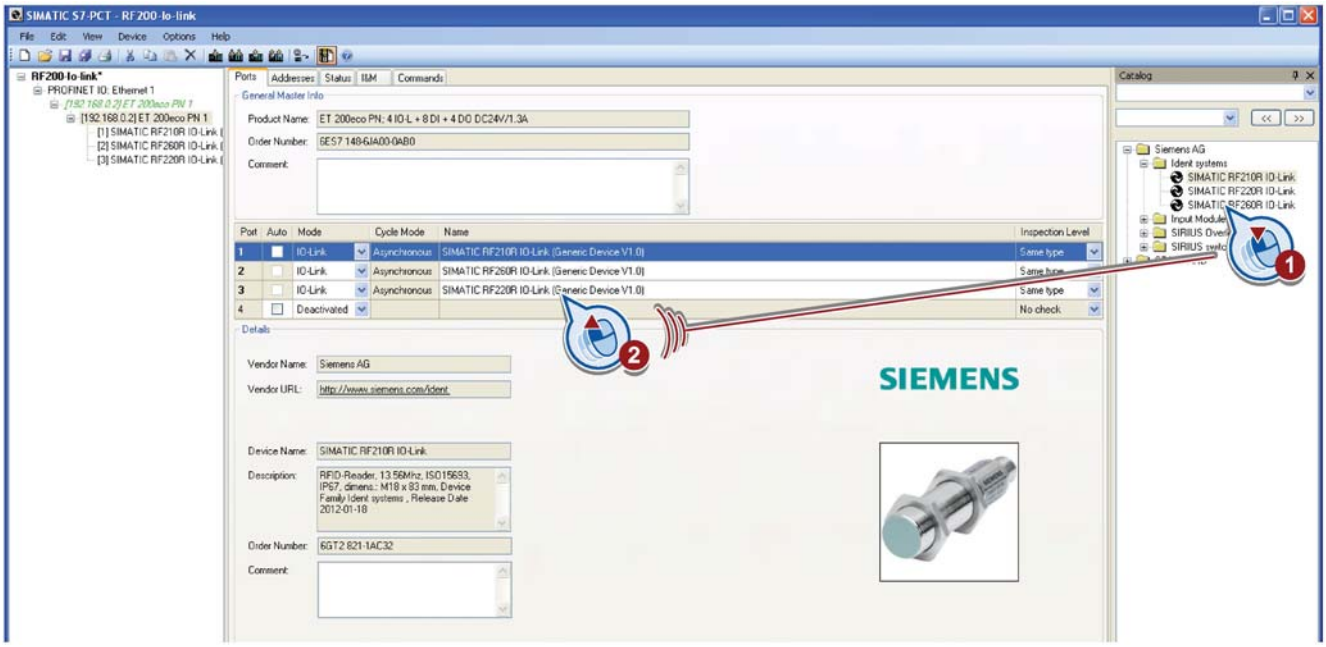


Figure 5-7 Configuring IO-Link master ports

2. In the "Inspection Level" drop-down list, select the value "No check" if you want to disable checking of the device type.

3. Change to the "Addresses" tab to check the addresses that have been set.

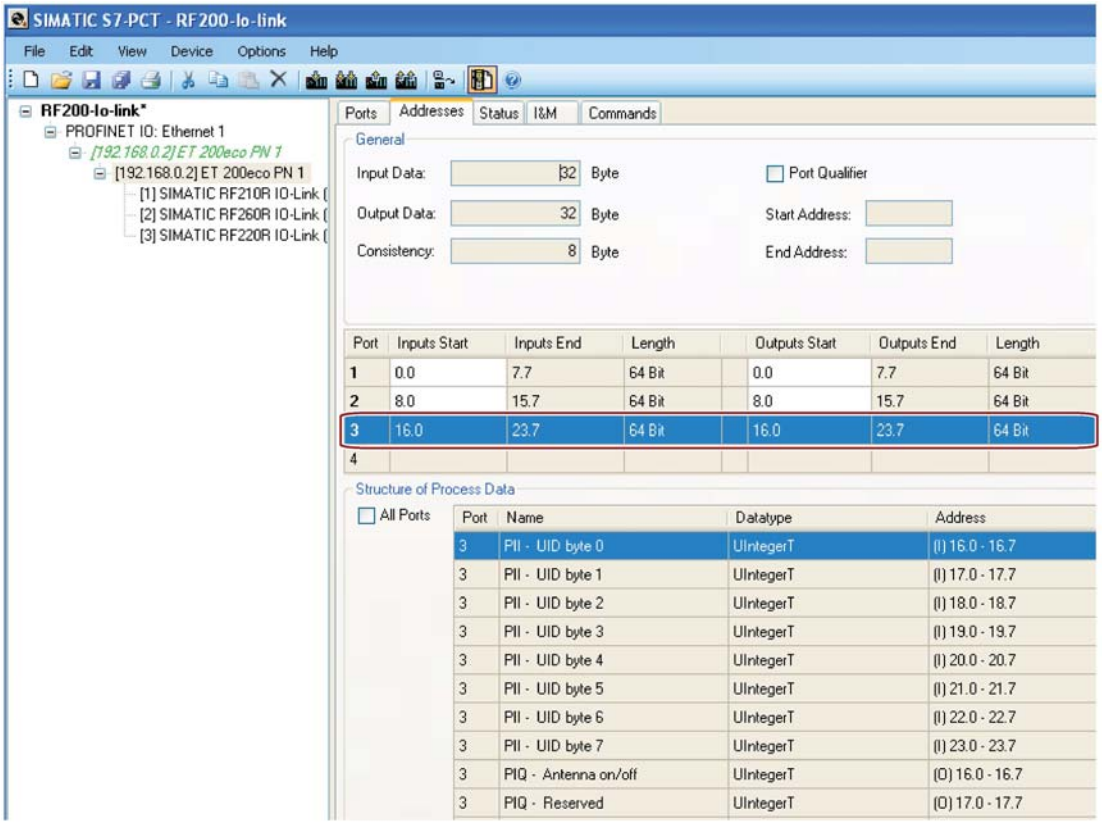


Figure 5-8 Addresses set

4. Change to the "Status" tab and click the "Refresh" button to update the device status.

5. In the "Status" tab, the "Event Buffer" box displays status errors that have occurred.

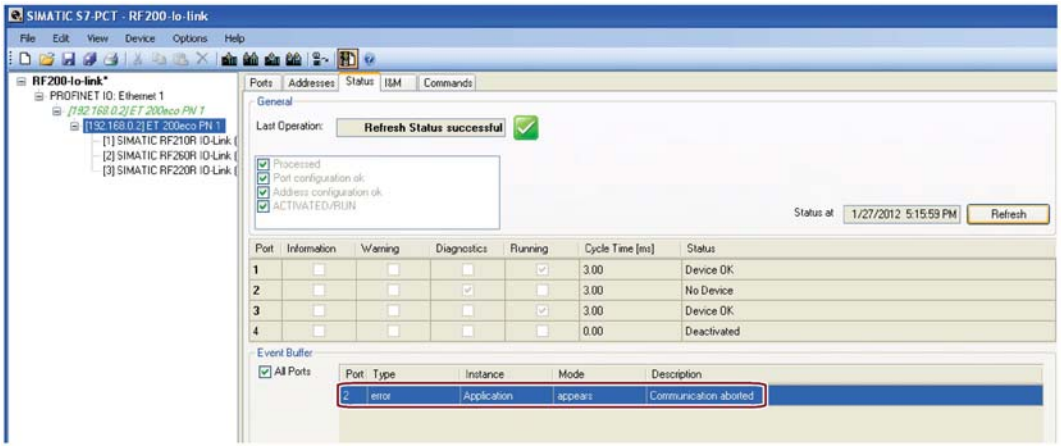


Figure 5-9 Status errors in the event buffer

6. Change to the "I&M" tab and on the left-hand side, select the IO-Link master for which you want to display the I&M data.

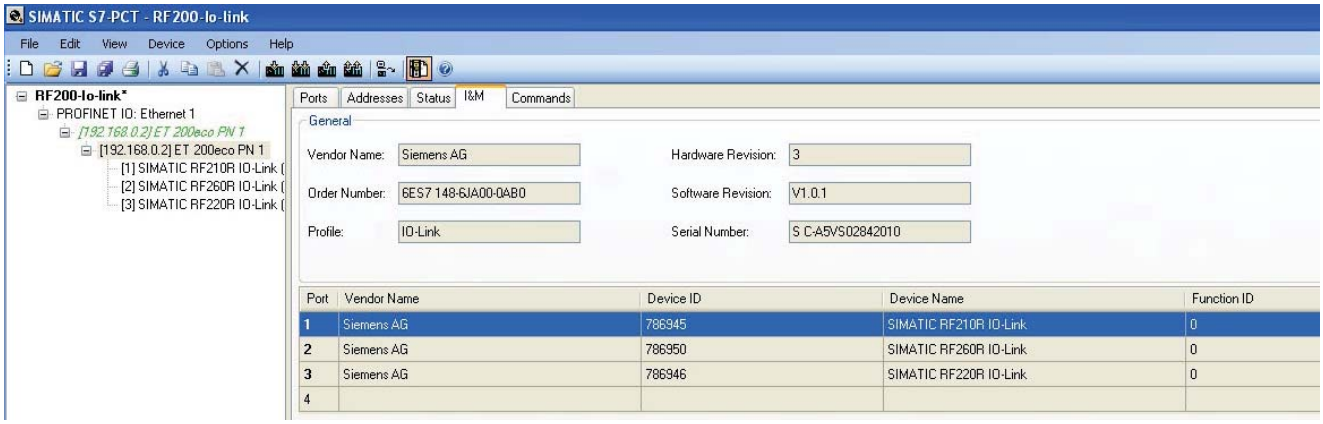


Figure 5-10 Displaying I&M master data

IO-Link device level

Note

Changing tabs in offline mode

Change to offline mode before you change between the "Identification", "Parameters", "Monitoring" or "Diagnostics" tabs.

1. Click on the "Load to PG" symbol to display the identification parameters. Prior to this, you need to select the corresponding IO-Link device.
2. Change to the "Parameters" tab so that the parameters of the IO-Link device are displayed.
3. In the "Parameters" tab, click on the parameters you want to change. Here, you can configure the parameters "Event indication", "Operating Mode", "Ready delay", "Data hold

time" and "Air Interface". To do this, select your configuration for the selected parameter using the drop-down list.

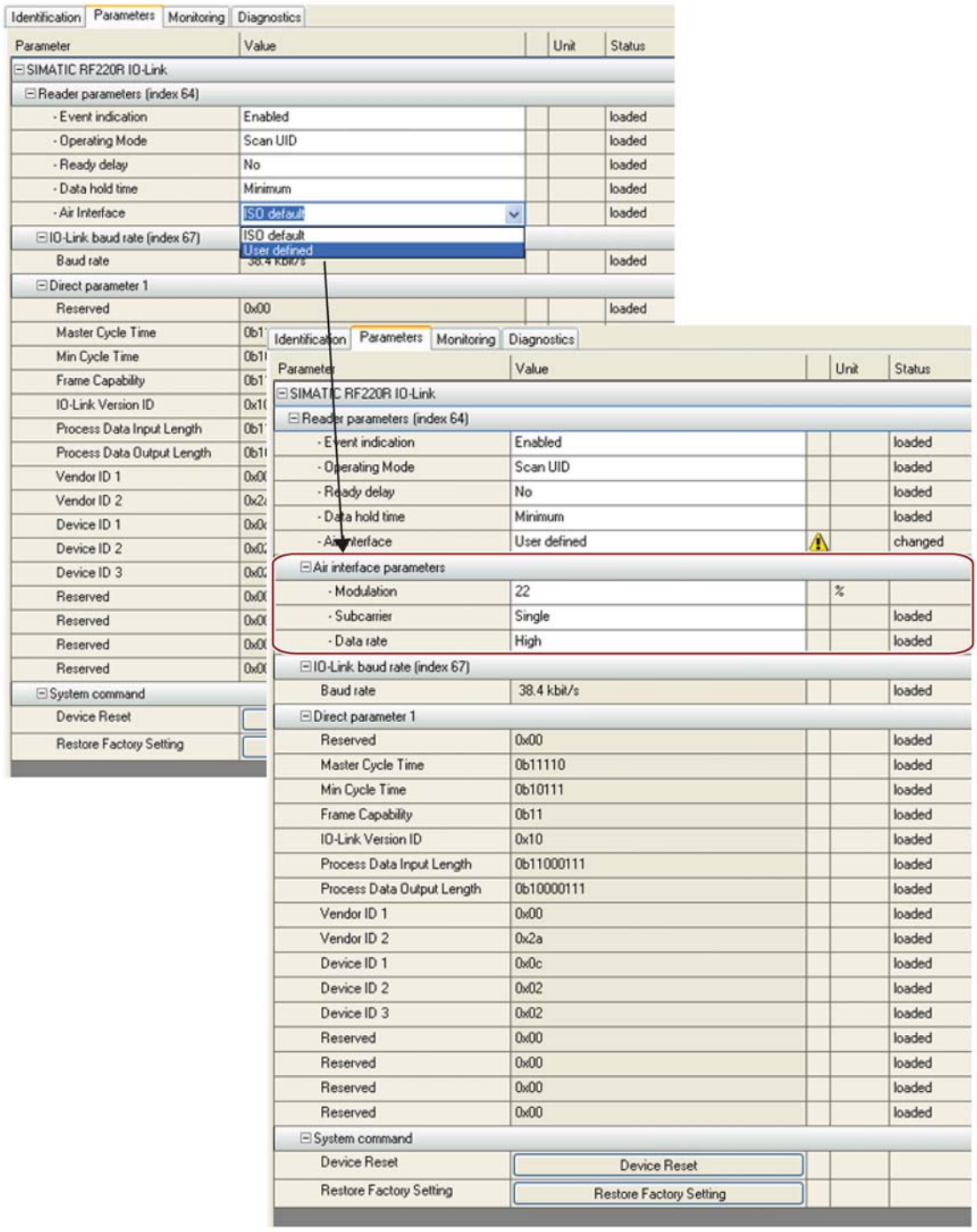


Figure 5-11 Example of the "Parameter" tab: Configuring the "Air Interface parameter"

Note

Expert parameters "Air interface"

The manual adaptation of the "Air interface" parameters is intended only for experts. To do this, select the "Air Interface" parameter and in the drop-down list select the value "User defined" and configure your values for the "Air interface parameters".

You will find more information on the "Data hold time" parameter in the section "IO-Link mode: Scan UID (Page 64)".

You will find more information on the "Ready delay" parameter in the section "Configuring (Page 47)".

You will find more information on the "Event indication" parameter in the section "Event error codes (Page 90)".

Note

RF250R IO-Link: Disabling event messages

If the value "Enable without antenna control" is selected in the "Event indication" parameter. error messages caused by a missing antenna are suppressed with the RF250R IO-Link. In this case, the reader behaves as if there was no transponder in the antenna field.

4. Select "System command" and click the "Device reset" button if you want to reset event indications, error counters, UID history etc. on the diagnostics page.

Note

Resetting event messages

Event indications can only be reset using S7 PCT or the "IOL_CALL" function (system command).

5. Select "System command" and click the "Restore Factory Setting" button if you want to reset all the parameters to the factory settings.

6. Click on the "Load" symbol to download the modified data to the device.

Note

Downloading the parameters

When downloading the data, make sure that you have selected the required reader.

The successful download is displayed in the "Communication Results" area.

In seldom cases, when downloading the parameters, writing to the flash can cause a brief interruption in communication (a few milliseconds). These interruptions have no effect on the transfer of the parameters. By clicking the "Refresh" button in the "Status" tab, the error message in the event buffer disappears.

7. Change to the "Diagnostics" tab so that the diagnostics values are displayed.

Identification | Parameters | Monitoring | Diagnostics

Parameter	Offline: SIMATIC RF210R IO-Link: Value	Unit	Status	Online: SIMATIC RF210R IO-Link: Value(2)	(2	Unit(2)	Status(2)
SIMATIC RF210R IO-Link							
Reader diagnostics							
Error Count	2			0			loaded
Event history (index 74)							
- Last event	Error coming: Invalid PIQ			No event			loaded
- Second last event	Error going: Invalid PIQ			No event			loaded
- Third last Event	Error coming: Invalid PIQ			No event			loaded
- Fourth last event	No event			No event			loaded
- Fifth last event	No event			No event			loaded
Reader status (index 90)							
- Time since startup	510424	s		566		s	loaded
- Tags in the field	1			1			loaded
- Antenna status	On			On			loaded
- Tag changes	3			1			loaded
- IO-Link line driver version	0x1a			0x1a			
- Error counter passive	0			0			loaded
- Abort counter	0			0			loaded
- Code error counter	0			0			loaded
- Signature error counter	0			0			loaded
- CRC error counter	0			0			loaded
- Current command status	0			0			loaded
- Error counter	2			0			loaded
Tag status (index 91)							
- UID byte 0	0xe0			0xe0			loaded
- UID byte 1	0x04			0x04			
- UID byte 2	0x01			0x01			
- UID byte 3	0x00			0x00			
- UID byte 4	0x4a			0x4a			
- UID byte 5	0xbc			0xbc			
- UID byte 6	0x19			0x19			
- UID byte 7	0x00			0x00			
- Tag type	MDS D1xx, I-Code SLI (NXP)			MDS D1xx, I-Code SLI (NXP)			loaded
- Chip version	0x01			0x01			
- Memory size in bytes	112			112			loaded
- Lock state	0			0			loaded
- Memory block size	4			4			loaded
- Number of blocks	28			28			loaded
UID history (index 92)							
- Last UID	0xe00401004abc1900			0xe00401004abc1900			loaded
- Second UID	0xe00801d7e5973772			0x00			loaded
- Third UID	0xe00401004abc1900			0x00			loaded
- Fourth UID	0x00			0x00			loaded
- Fifth UID	0x00			0x00			loaded

Number	Description
①	The values in the "Value" column are not changed by the system command "Device Reset". The values that were read from the device with the last "Load to PG" are always shown.
②	The values of this column are only displayed in "online mode" and are up-to-date values. Values that are changing or have changed can be recognized by the light background. In the example shown, the modified values are displayed after the "Device Reset" system command.
③	UID of the transponder currently in the field of the reader.
④	UID history of the transponders

Figure 5-12 "Diagnostics" tab after the "Device Reset" system command

In the "Event history" section (index 74) of the "Diagnostics" tab, errors and warnings are displayed that were transferred to the IO-Link master. The IO-Link master only signals errors of the category "incoming/outgoing" to the CPU. This is indicated by the LEDs of the IO-Link master or of the CPU (SF). With the help of the diagnostics function "OB82 + SFB/SFC(SFC13, 51/SFB54)" of the relevant CPU, you can perform other diagnostics functions or display them.

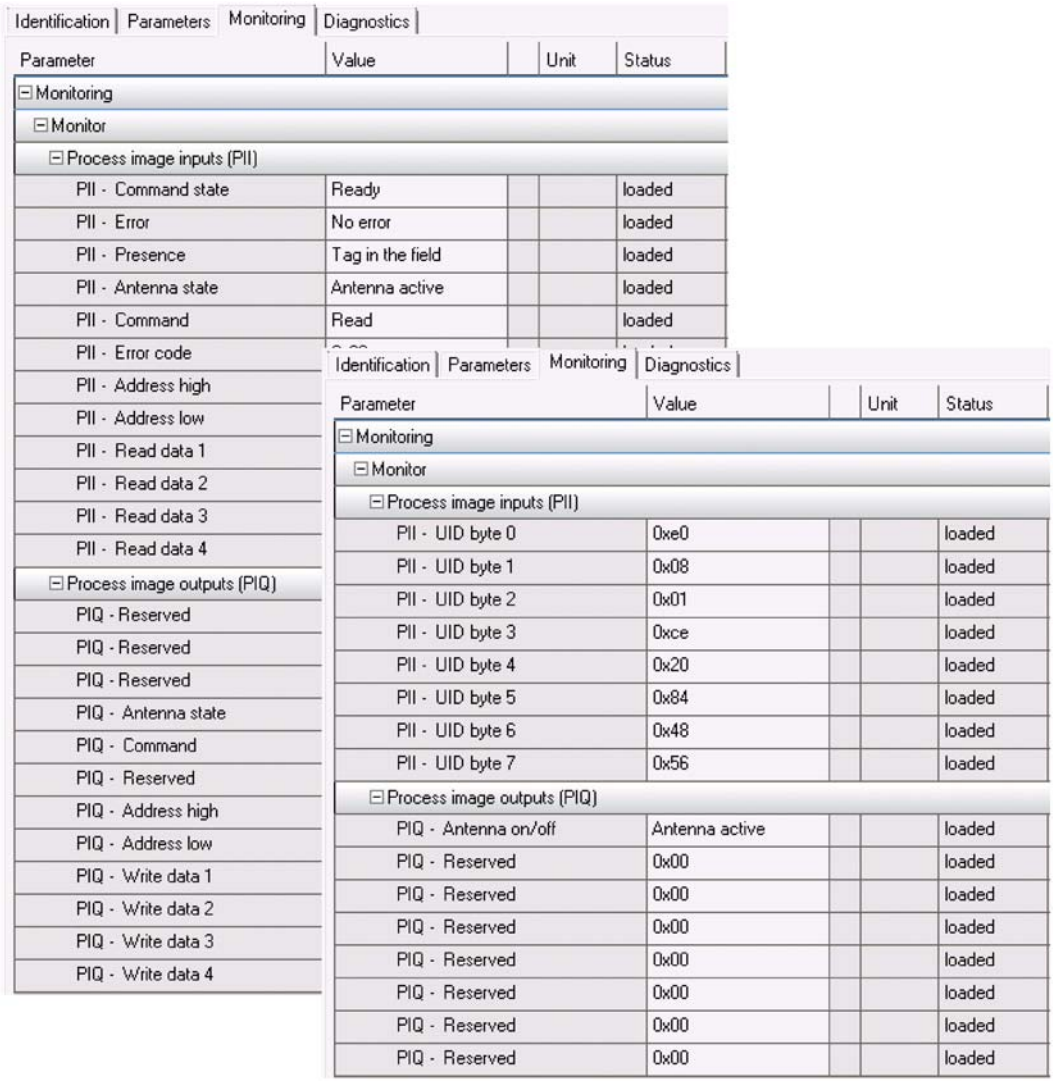
Explanations of the "Diagnostics" tab

The following values are examples.

Reader diagnostics		
Error counter	3	Number of errors that have occurred (not warnings)
Event history (index 74)		
- Last event	Warning going: Overtemperature	Display of the error or warning that has occurred
- Second last event	Invalid PIQ	Display of the error or warning that has occurred
- Third last event	Error: Overload	Display of the error or warning that has occurred
- Fourth last event	Warning: Overtemperature	Display of the error or warning that has occurred
- Fifth last event	No event	Display of the error or warning that has occurred
Reader status (index 90)		
- Time since startup	2641	Operating time in seconds
- Tags in the field	1	Current number of transponders in the field
- Antenna status	On	Antenna turned on/off
- Tag changes	11	Number of transponder changes
- IO-Link line driver version	0x1a	Version of the IO-Link line driver
- Error counter passive	0	Air interface: Counter for errors in idle state
- Abort counter	0	Air interface: Communication aborted

- Code error counter	135	Air interface: Communication disruption
- Signature error counter	0	Reserved
- CRC error counter	255	Air interface: Communication disruption
- Current command status	0	Reserved
- Error counter	3	HOST interface: Communication disruption
Tag status (index 91)		
- UID byte 0	0xe0	Byte 0 of the unique identifier of the transponder
- UID byte 1	0x04	Byte 1 of the unique identifier of the transponder
- UID byte 2	0x01	Byte 2 of the unique identifier of the transponder
- UID byte 3	0x00	Byte 3 of the unique identifier of the transponder
- UID byte 4	0x01	Byte 4 of the unique identifier of the transponder
- UID byte 5	0x9c	Byte 5 of the unique identifier of the transponder
- UID byte 6	0xe9	Byte 6 of the unique identifier of the transponder
- UID byte 7	0x1c	Byte 7 of the unique identifier of the transponder
- Tag type	MDS D1xx, I-Code SLI (NXP)	Transponder name / name of the chip / (manufacturer)
- Chip version	0x01	Version of the chip
- Memory size in bytes	112	Memory size of the chip in bytes
- Lock state	0	Disabled blocks on the chip
- Memory block size	4	Size of the memory blocks of the chip
- Number of blocks	28	Number of memory blocks of the chip
UID history (index 92)		
- Last UID	0xe0040100019ce91c	Transponder history
- Second to last UID	0x00	Transponder history
- Third to last UID	0x00	Transponder history
- Fourth to last UID	0x00	Transponder history
- Fifth to last UID	0x00	Transponder history

If necessary change to the "Monitoring" tab so that you can monitor the read results.



Identification | Parameters | Monitoring | Diagnostics

Parameter	Value		Unit	Status
⊟ Monitoring				
⊟ Monitor				
⊟ Process image inputs (PII)				
PII - Command state	Ready			loaded
PII - Error	No error			loaded
PII - Presence	Tag in the field			loaded
PII - Antenna state	Antenna active			loaded
PII - Command	Read			loaded
PII - Error code				
PII - Address high				
PII - Address low				
PII - Read data 1				
PII - Read data 2				
PII - Read data 3				
PII - Read data 4				
⊟ Process image outputs (PIQ)				
PIQ - Reserved				
PIQ - Reserved				
PIQ - Reserved				
PIQ - Antenna state				
PIQ - Command				
PIQ - Reserved				
PIQ - Address high				
PIQ - Address low				
PIQ - Write data 1				
PIQ - Write data 2				
PIQ - Write data 3				
PIQ - Write data 4				

Identification | Parameters | Monitoring | Diagnostics

Parameter	Value		Unit	Status
⊟ Monitoring				
⊟ Monitor				
⊟ Process image inputs (PII)				
PII - UID byte 0	0xe0			loaded
PII - UID byte 1	0x08			loaded
PII - UID byte 2	0x01			loaded
PII - UID byte 3	0xce			loaded
PII - UID byte 4	0x20			loaded
PII - UID byte 5	0x84			loaded
PII - UID byte 6	0x48			loaded
PII - UID byte 7	0x56			loaded
⊟ Process image outputs (PIQ)				
PIQ - Antenna on/off	Antenna active			loaded
PIQ - Reserved	0x00			loaded
PIQ - Reserved	0x00			loaded
PIQ - Reserved	0x00			loaded
PIQ - Reserved	0x00			loaded
PIQ - Reserved	0x00			loaded
PIQ - Reserved	0x00			loaded
PIQ - Reserved	0x00			loaded

Figure 5-13 "Monitoring" tab in the "Scan user data" or "Scan UID" mode

5.3 The modes of the RF200 IO-Link reader

5.3.1 SIO mode

You can change to the SIO mode by configuring the relevant ports of the IO-Link master as digital inputs. In this mode, there is no communication between the reader and master.

The reader is also in the SIO mode when it is connected to a standard input module.

The RF200 reader behaves like a standard input whose signal state behaves as follows:

24 V	Transponder in the field of the reader
0 V	No transponder in the field of the reader

5.3.2 IO-Link mode: Scan UID

You change to the "Scan UID" mode by setting the value "Scan UID" for the "Operating Mode" reader parameter. The value "Scan UID" is set as the default in the IODD file.

With IO-Link communication, 8 bytes of the process image of the inputs (PII) and 8 bytes of the process image of the outputs (PIQ) are transferred with the following structure:

Address offset	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	
PIQ	0	0	0	0	0	0	0	0	Normal operation
PII	0	0	0	0	0	0	0	0	No transponder present
	UID0	UID1	UID2	UID3	UID4	UID5	UID6	UID7	ISO transponder present

The 8-byte long UID of the transponder currently in the antenna field is displayed in the PII. If the transponder leaves the field, 0 is displayed in the PII.

With the reader parameter data hold time, a minimum display time can be set in which the data of the reader remain displayed when the transponder has already left the field. This display time also applies if there is no longer a transponder in the field or when the transponder has left the field. A new transponder will only be displayed after the data hold time has elapsed.

To be certain that all transponders are displayed, there must be an adequate distance between the individual transponders. If the distance between the individual transponders is not great enough, individual transponders will not be displayed due to the data hold time.

The most significant bit of the address 0 (UID0.7) is "1" when there is a transponder in the field. The 1 at the most significant UID place is guaranteed by the ISO 15693 standard.

By setting bit 4 in byte 0 in the PIQ, you can turn off the antenna of the reader and therefore also the HF field.

In the PII, the turned off antenna is confirmed by 0xFF.

Address offset	0	1	2	3	4	5	6	7	
PIQ	0x10	0	0	0	0	0	0	0	Antenna off
PII	0xFF	0xFF	0xFF	0xFF	0xFF	0xFF	0xFF	0xFF	Antenna off

5.3.3 IO-Link mode: Scan user data

You can change to the "Scan user data" mode by setting the value "Scan user data" for the "Operating Mode" parameter of the reader.

With IO-Link communication, 8 bytes of the process image of the inputs (PII) and 8 bytes of the process image of the outputs (PIQ) are transferred. You can decide which data is read via the process image "output" with a command or by entering an address.

Address offset	0	1	2	3	4	5	6	7	
PIQ	CMD	0	Adr-H	Adr-L	0	0	0	0	Read
	CMD	0	Adr-H	Adr-L	Data (MSB)	Data	Data	Data (LSB)	Write
PII	0	0	0	0	0	0	0	0	No transponder present
	Status	error_ RFID	Adr-H	Adr-L	Data (MSB)	Data	Data	Data (LSB)	Transponder present
	0x10	0	0	0	0	0	0	0	Antenna off
	Status	error_ RFID	0	0	0	0	0	0	Error message of the RFID reader

CMD	Command byte
Adr-H	More significant address byte of the data to be processed on the transponder.
Adr-L	Less significant address byte of the data to be processed on the transponder.
error_RFID	Error message of the RFID reader: Errors are acknowledged (=RESET) by the command "Antenna off" or by the transponder leaving the field. You will find more detailed information on the error messages in the section "Diagnostics (Page 79)".
Status	Status byte

PIQ

Command byte:

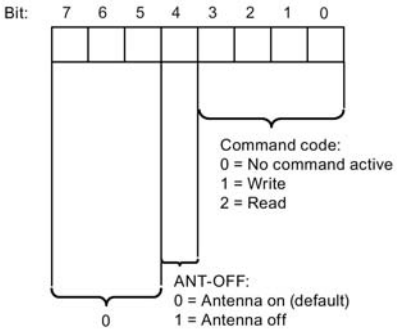


Figure 5-14 Structure of the command byte "PIQ"

PII

Status byte:

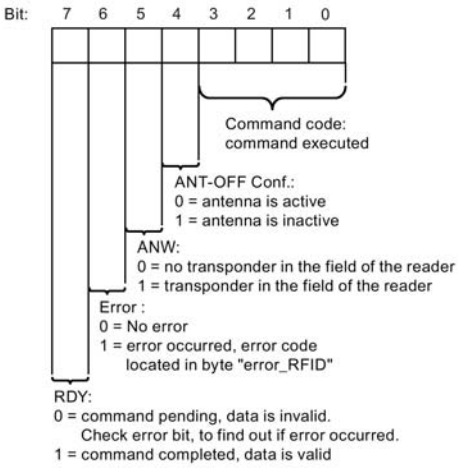


Figure 5-15 Structure of the status byte in the "PII"

Note

Error message of the RFID reader

Errors are acknowledged (=RESET) by the command antenna off or by the transponder leaving the field.

Starting a command:

A valid command in the PIQ (read or write) is started on the reader as soon as a transponder enters the field. Other commands (e.g. for reading longer data sequences) are started on the reader as soon as a new address (Adr-L, Adr-H) is transferred to the reader. Here, it is not necessary to set CMD =0 in the meantime.

Finished message without error:

A command was executed correctly when RDY = 1 is set and at the same time the address in the PII has the same value as in the PIQ.

Finished message with error:

An error is indicated if RDY = 0 and Error = 1. The error is reset when the transponder has left the field or when the command "Antenna off" is sent.

5.4 ISDU data traffic

Apart from the process data, various data objects (Indexed Service Data Unit) can be addressed acyclically as necessary for diagnostics and maintenance purposes (you will find further information in the section "Overview of the service data (Page 92)"). For SIEMENS CPUs, the IOL_CALL block is available for this.

5.4.1 IOL_CALL

Using the IOL_CALL function block, you can read any data objects of IO-Link devices, save them in non-volatile memory and after replacing an IO-Link device or master write the objects back to the IO-Link device using the IOL_CALL again.

You can control the IOL_CALL function block call and the retentive saving of the objects from the user program.

Properties of the IOL_CALL function block

The IOL_CALL function block is convenient when programming and assigning parameters in the IO-Link engineering due to the following properties:

- Can run on all SIMATIC S7 CPUs
- Little programming effort required for IO-Link parameter assignment and diagnostics in the runtime environment
- Can be used universally for all masters and devices
- Supports IO-Link masters on PROFINET and PROFIBUS DP
- Contains HMI faceplates with user interfaces for SIEMENS masters and devices for SIMATIC HMI
- Parameter assignment and diagnostics during operation without an engineering system
- (Re)assignment of parameters of an IO-Link device during operation
- Reading out of additional information from the IO-Link device (for example diagnostics, maintenance etc.)
- Execution of IO-Link port functions
- Saving/restoring IO-Link parameters when replacing IO-Link masters or devices
- Use of FB1 "IOL_CALL" for replacing IO-Link masters and IO-Link devices without a PG

5.5 Application example

In the following example, a transponder MDS D124 is read completely with a simple loop and an RF2X0 IO-Link reader in the "Scan user data" mode. The valid read data is saved in a global data block.

Table 5- 1 Programming example

```
Program code //Comments
//If there is no transponder in the field, jumped to error evaluation
      U     "ANW";                      // Presence (I10.5)
      SPBN  ende;
//Run through the read loop only once
      U     "Once_flag";                // Run through loop once (M2.0)
      SPB   ende;
//If an error occurs, increment error counter
      U     "Error";;                   // Error bit (I10.6)
      SPB   erro;                       // => Abort if error
//New read command when <ready bit>is set and no <error>
      U     "Done";;                    // Ready bit (I10.7)
      SPBN  ende;
//Does the address <read command> = <read acknowledgement>?
//Address 10 is set (see hardware configuration)
      L     "PAE_Status";               // PII : CMD
      UW    W#16#2;
      L     B#16#2;     // Read command
      ==I   ;     //Acknowledgement
      U(    ;
      L     "PAA_Adr_L";                // PIQ : Adr-L
      L     "PAE_Adr_L";               // PII : Adr-L
      ==I   ;
      )     ;
      SPB   adre;                       // Valid acknowledgment => adopt data
      SPA   Lese;                       // => Output read command
//Save data at current transponder address in data DB
adre: L     "PAE_Adr_L";               // PII : Adr-L
      SLD   3;                          // Expand to 16-bit address
      T     "lwa";;                     // Memory of the current address (MD3)
      L     "PAE_Data";               // PII : Data (bytes 4-7)
      AUF   "FC1Daten";;                // Memory DB (DB100)
      T     DBD ["lwa"];                // Enter read data in DB
      L     "PAE_Adr_L";                // Increment address by 4 bytes
      +     B#16#4;
      T     "FC1Daten".dbadresse;       // Save new read address
//New read command when <ready bit>is set and no <error>
Read: L     B#16#2;     // Read command
      T     "PAA_CMD";                  // PII: CMD
//Load the last valid address
      L     "FC1Daten".dbadresse;;      // Memory DB (DB100.DBB114)
      T     "PAA_Adr_L";                  // PII: Adr-L
//Increment read address (address range 112 bytes = 70 Hex for MDS D124)
      L     "FC1Daten".dbadresse;;      // Memory DB (DB100.DBB114)
```

```
Program code //Comments
      L     B#16#6C;                    // Check end address
                                           (MDS D124 = 112 bytes = 6F hex)
      >I    ;
      SPB   enda;                       // => End when end address reached
      SPA   ende;                       // => Continue reading in next cycle
//Read next transponder
enda: U     "VKE1";                     // When all data has been read
      =     "Once_flag";
      L     0;                          // End reading of the transponder
      T     "PAA_CMD";                  // => then deleted address etc.
      T     "lwa";                      //     "
      T     "PAA_Adr_L";                //     "
      T     "FC1Daten".dbadresse;       // => wait for new transponder
      SPA   ende;
// Troubleshooting
erro: L     "FC1Daten".fehler1;         // Count errors
      L     1;
      +I    ;
      T     "FC1Daten".fehler1;         // and end reading
      L     "PAA_Adr_L";                // Data that led to error
      T     "FC1Daten".err_dbadresse;     // save
      L     "PAA_CMD";                  //     "
      T     "FC1Daten".err_cmd;         //     "
      L     "PAE_Status";               //     "
      T     "FC1Daten".err_Status;      //     "
      L     "PAE_Error_RFID";           //     "
      T     "FC1Daten".err_ErrorRFID;   //     "

      L     0;                          // Delete addresses/memory bits/memory
      T     "FC1Daten".dbadresse;       //     "
      T     "lwa";                      //     "
      T     "PAA_Adr_L";                //     "
      T     "PAA_CMD";                  //     "
      U     "VKE1";                     // End reading
      =     "Once_flag";
ende: BE    ;
```

Shared data block

Program code //Comments

```
DATA_BLOCK "FC1Daten"
TITLE =ScanUserData
AUTHOR : IASCCI
FAMILY : RFID
NAME : IOLink
VERSION : 1.0

STRUCT
  data       : ARRAY  [1 .. 112 ] OF BYTE;   // Memory for "data"
  fehler1    : WORD  := W#16#0;           // Memory for "error" count
  dbadresse  : Byte  := B#16#0;           // Memory for "dbadresse"
  err_dbadresse : BYTE ;                  // Memory address if error occurs
  err_cmd    : BYTE ;                     // memory Command if error occurs
  err_Status : BYTE ;                    // Memory status if error occurs
  err_ErrorRFID : BYTE ;                     // memory Error_RFID if error occurs
END_STRUCT ;
BEGIN
  fehler1        := W#16#0;            // Memory for "error" count
  dbadresse      := B#16#0;            // Memory for "dbadresse"
  err_dbadresse := B#16#0;                  // Memory address if error occurs
  err_cmd       := B#16#0;                     // memory Command if error occurs
  err_Status    := B#16#0;                   // Memory status if error occurs
  err_ErrorRFID := B#16#0;                    // memory Error_RFID if error occurs
END_DATA_BLOCK
```

Readers

6

6.1 Features

SIMATIC RF210R IO-Link	Characteristics	
	Area of application	Identification tasks on assembly lines in harsh industrial environments
	Structure	① RF200 IO-Link interface ② Operating indicator

SIMATIC RF220R IO-Link	Characteristics	
	Area of application	Identification tasks on assembly lines in harsh industrial environments
	Structure	① RF200 IO-Link interface ② Operating indicator

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

SIMATIC RF250R IO-Link	Characteristics	
	Area of application	Identification tasks on assembly lines in harsh industrial environments
	Structure	① RS-422 or RS-232 interface ② Operating indicator ③ Antenna connector, M8

Note

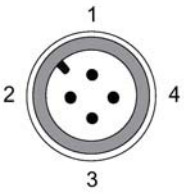
Reader requires external antennas

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

SIMATIC RF260R IO-Link	Characteristics	
	Area of application	Identification tasks on assembly lines in harsh industrial environments
	Structure	① RF200 IO-Link interface ② Operating indicator

6.2 Pin assignment of the RF200 reader with IO-Link interface

Table 6- 1

Pin	Pin Device end 4-pin M12	Assignment
	1	24 VDC
	2	reserved [1]
	3	GND
	4	IO-Link data signal or switching output port in SIO mode

[1] The pin must not be used.

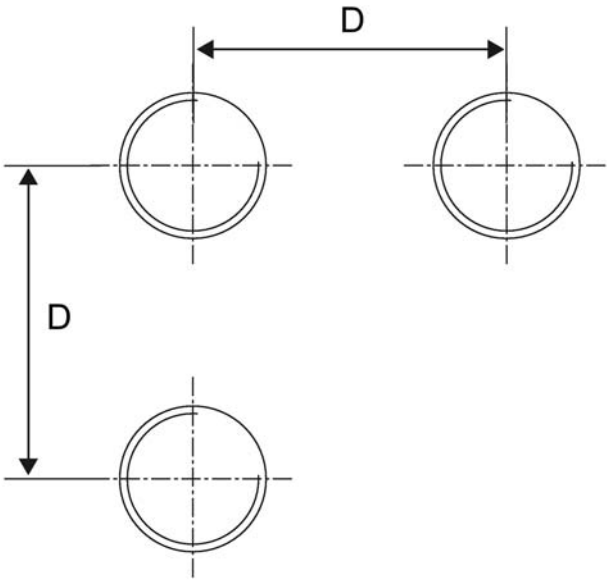
6.3 Display elements of the RF200 IO-Link readers

As the display element, there is an LED on the reader.

LED display		Operating state
off		No power supply on the reader
Red	pulsed	Startup
	Flashing	Error occurred, the number of pulses provides information about the error that has occurred (see section "Diagnostics (Page 79)") For example hardware fault, invalid parameters, watchdog
Green	Flashing	Antenna turned off On-off ratio 1:1, 1 Hz
	Permanently on	SIO mode, no transponder in the field
	pulsed	IO-Link mode, no transponder in the field On-off ratio 1:10
Yellow	Permanently on	SIO mode, transponder in the field
	pulsed	IO-Link mode, transponder in the field On-off ratio 1:10
Alternating, flashing red/green		Firmware update Pulse duration 500 ms

6.4 Minimum distance between several readers

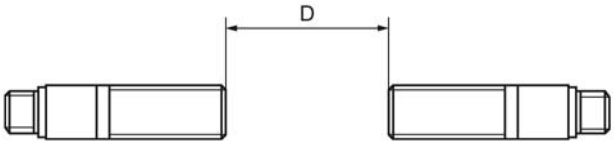
RF210R, RF220R or antennas beside each other



RF210R	≥ 60 mm
RF220R	≥ 100 mm
RF250R with ANT 8	≥ 30 mm
RF250R with ANT 12	> 30 mm (with 2 readers) ≥ 40 mm (with more than 2 readers)
RF250R with ANT 18	> 30 mm (with 2 readers) ≥ 40 mm (with more than 2 readers)
RF250R with ANT 30	> 40 mm (with 2 readers) ≥ 50 mm (with more than 2 readers)

Figure 6-1 Minimum distance between several RF210R, RF220R or antennas

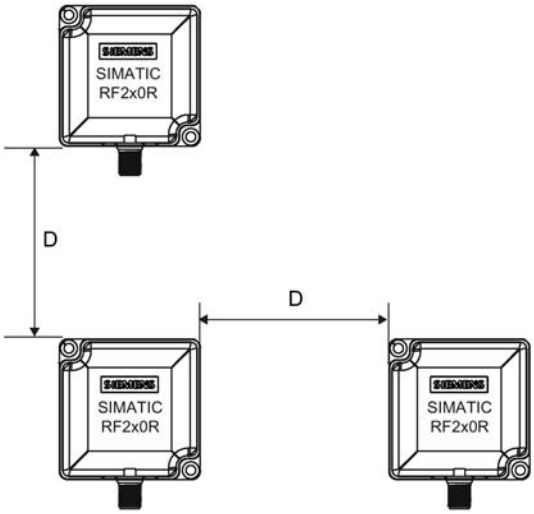
RF210R, RF220R or antennas face to face



RF210R	≥ 100 mm
RF220R	≥ 150 mm
RF250R with ANT 8	≥ 50 mm
RF250R with ANT 12	≥ 100 mm
RF250R with ANT 18	≥ 100 mm
RF250R with ANT 30	≥ 200 mm

Figure 6-2 Face-of-face distance between two RF210R, RF220R or antennas

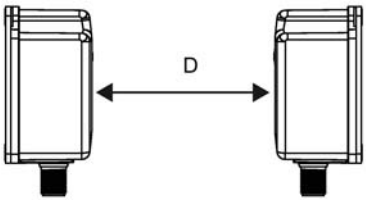
RF240R, RF260R side by side



RF240R ≥ 120 mm (with 2 readers)
≥ 200 mm (with more than 2 readers)
RF260R ≥ 150 mm (with 2 readers)
≥ 250 mm (with more than 2 readers)

Figure 6-3 Minimum distance between several RF240R, RF260R

RF240R, RF260R face to face



RF240R ≥ 400 mm
RF260R ≥ 500 mm

Figure 6-4 Face-of-face distance between two RF240R, RF260R

6.5 Dimensional drawings

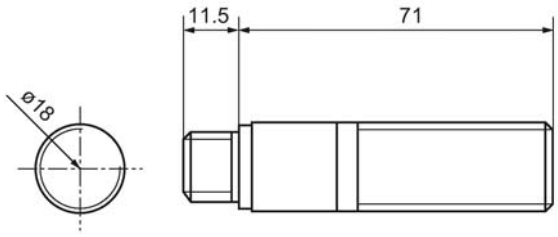


Figure 6-5 RF210R IO-Link dimension drawing

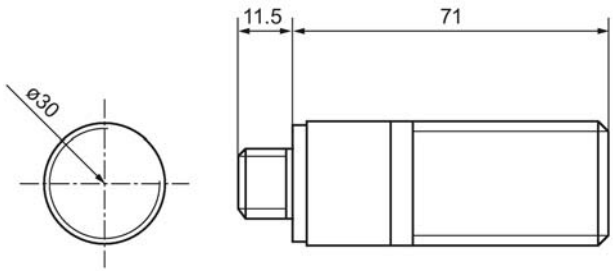


Figure 6-6 RF220R IO-Link dimension drawing

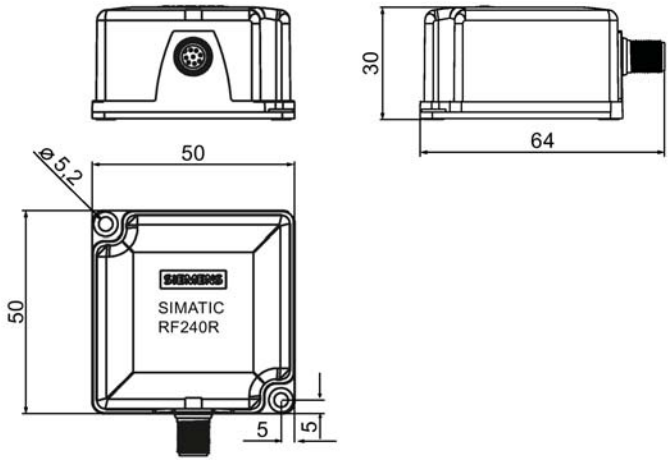


Figure 6-7 RF240R IO-Link dimension drawing

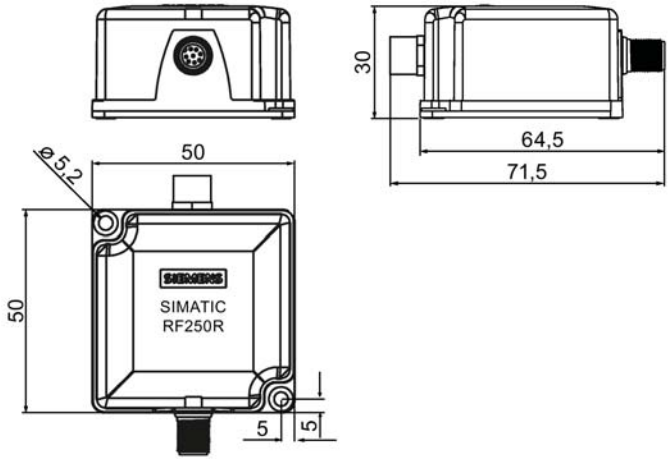


Figure 6-8 RF250R IO-Link dimension drawing

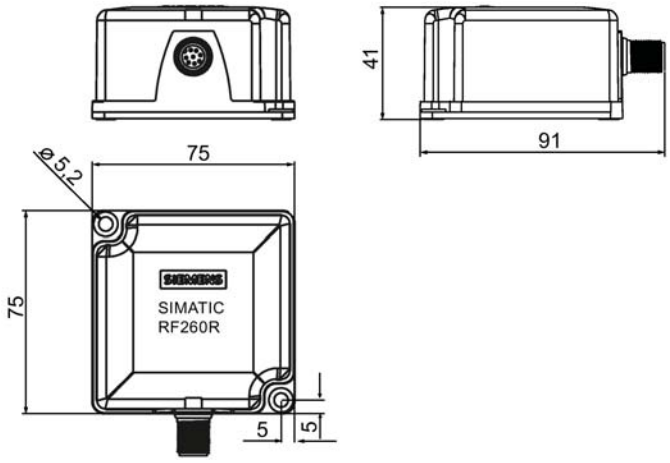


Figure 6-9 RF260R IO-Link dimension drawing

All dimensions in mm

Diagnostics

7

RFID error codes of the RF 200 readers

You can identify the error in several ways:

- Directly on the reader by counting the flashing pattern of the red error LED
- Error code in the PII byte 1 "error_RFID" (see section "IO-Link mode: Scan user data (Page 65)")
- Message as IO-Link event (compare section "Event error codes (Page 90)")

Flashing of the red LED on the reader	Error code	Description
00	0x00	no error
02	0x01	Presence error, possible causes: • The active command was not carried out completely • The transponder left the field while the command was being processed - Communication disruption between reader and transponder
05	0x05	Parameter assignment error, possible causes: • Unknown command • Incorrect parameter • Function not allowed
06	0x06	Air interface disrupted
13	0x0D	Error in the specified memory address (access attempted to non-existent or non-accessible memory areas).
17	0x11	Short-circuit or overload or overtemperature • The affected output is turned off • All outputs are turned off when total overload occurs • A reset can only be performed by turning the 24 V voltage off and on again
18	0x12	Internal hardware fault, possible causes: • Connector contact problem on the reader • Hardware defective
20	0x14	Serious system fault (hardware fault)
21	0x15	Parameter assignment error: Bad parameter
24	0x18	Only "RESET" permitted
25	0x19	Previous command is still active

Flashing of the red LED on the reader	Error code	Description
28	0x1C	RF250R IO-Link: Antenna not connected, antenna cable or antenna damaged. Note: The RF250R can only be operated with antennas. As soon as the antenna is present again and correctly connected, the error "0x1C" is reset in the process image and the event "Antenna missing: going" is sent. The error LED however continues to flash with "0x1C" until a transponder leaves the antenna field or the command "ANT off" is sent. You can suppress this error message using the "Event indication" parameter.
--	0x1F	Active command canceled by "RESET"

Note

Error acknowledged/reset

These errors are acknowledged (= RESET) by the command antenna off or by the transponder leaving the antenna field. The errors 0x11, 0x12, 0x14 and 0x15 are only indicated by the LED "flashing" the "error_RFID" byte is not used.

So-called event messages are also passed on to the master (see section "Event error codes (Page 90)"). You can display these error messages using S7-PCT (diagnostics) or read them out using the "IOL_CALL" function block. You can only reset event messages using S7 PCT or the "IOL_CALL" function (system command).

Technical data

8

8.1 Technical specifications of the RF200 IO-Link readers

Table 8- 1 Technical specifications of the RF200 IO-Link readers

Operating frequency	13.56 MHz
Interface to the IO-Link master	IO-Link
Maximum data transmission rate Point-to-point connection	38.4 kbps
Cable length reader ↔ IO-Link master	max. 20 m
Read distances of the reader	See section "Field data (Page 25)"
Protocol for wireless transmission	ISO 15693, ISO 18000-3
Maximum data transmission rate Wireless transmission	26.6 kbps
Typical transmission time for user data per byte	
• for write access	• 40 ms/byte
• for read access	• 40 ms/byte
Plug-in connectors	M12, 4-pin
Power supply (min ... max)	24 VDC (20.4 to 28.8 VDC)
Current consumption (at 24 VDC)	50 mA
Display elements	3-color LEDs (operating voltage, presence, error)
Ambient temperature	
• During operation	• -20 ... +70 °C
• During transportation and storage	• -25 ... +80 °C
Degree of protection to EN 60529	
• RF210R, RF220R, RF240R, RF260R	IP67
• RF250R	IP65
Shock acceleration to EN 60721-3-7, Class 7 M2	500 m/s²
Vibration acceleration to EN 60721-3-7, Class 7 M2	200 m/s²
Approvals	Radio to R&TTE directives EN 300 330, EN 301489, CE, FCC, UL/CSA
MTBF	505 a

Technical specifications specific to RF210R	
Antenna	integrated
Material	Brass, nickel-plated
Dimensions (L x ∅)	83 x 18 mm (incl. 8-pin connector sleeve and plastic cap)
Color	silver
Mounting	2 metal M18 hexagonal nuts; thickness: 4 mm Tightening torque ≤ 20 Nm
Weight	approx. 65 g (incl. two M18 nuts)

Technical specifications specific to RF220R	
Antenna	integrated
Material	Brass, nickel-plated
Dimensions (L x ∅)	83 x 30 mm (incl. 8-pin connector sleeve and plastic cap)
Color	silver
Mounting	2 metal M30 hexagonal nuts; thickness: 5 mm Tightening torque ≤ 40 Nm
Weight	approx. 140 g (incl. two M30 nuts)

Technical specifications, specific to RF240R	
Antenna	integrated
Material	Plastic PA 6.6
Dimensions (L x W x H)	50 x 50 x 30 mm
Color	Anthracite
Mounting	2 metal M5 screws; Tightening torque ≤ 1.5 Nm
Weight	Approx. 60 g

Technical specifications, specific to RF250R	
Antenna	external, ANT 8, ANT 12, ANT 18 or ANT 30 connectable via M8 antenna connector
Material	Plastic PA 6.6
Dimensions (L x W x H)	50 x 50 x 30 mm
Color	Anthracite
Mounting	2 metal M5 screws; Tightening torque ≤ 1.5 Nm
Weight	Approx. 60 g

Technical specifications specific to RF260R	
Antenna	integrated
Material	Plastic PA 6.6
Dimensions (L x W x H)	75 x 75 x 41 mm
Color	Anthracite
Mounting	2 metal M5 screws; Tightening torque ≤ 1.5 Nm
Weight	Approx. 200 g

8.2 Approvals

FCC information

Siemens SIMATIC RF210R IO-Link (MLFB 6GT2821-1AC32) FCC ID: NXW-RF210RIOL

Siemens SIMATIC RF220R IO-Link (MLFB 6GT2821-2AC32) FCC ID: NXW-RF220RIOL

Siemens SIMATIC RF240R IO-Link (MLFB 6GT2821-4AC32) FCC ID: NXW-RF240RIOL

Siemens SIMATIC RF250R IO-Link (MLFB 6GT2821-5AC32) FCC ID: NXW-RF250RIOL

Siemens SIMATIC RF260R IO-Link (MLFB 6GT2821-6AC32) FCC ID: NXW-RF260RIOL

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.

(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.

cULus information

When using an ET200S IO-Link master, make sure that the power supply unit being used corresponds to a Class 2 device (limited current/limited voltage) and that it is listed in the UL file.

Connecting cable

9

Cable with open ends for ET 200S and ET 200SP with CM 4xIO-Link master and S7-1200 with SM 1278 4xIO-Link master

The connecting cable has a length of 5 m (standard) or 10 m.

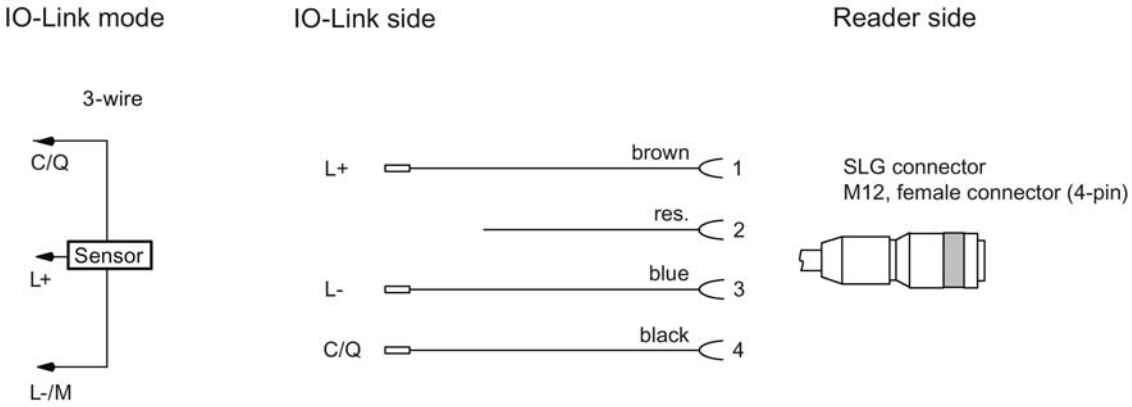


Figure 9-1 Design of the connecting cable between the IO-Link master and reader with single wire technology

Note: 2)The pin "2" (res.) must not be used.

Pin assignments of the IO-Link masters from Siemens

Table 9- 1 ET 200SP

Pin assignment for the CM 4xIO-Link electronic module (6ES7137-6BD00-0AB0)					
Terminal	**Assignment**	**Terminal**	**Assignment**	**Explanations**	**Color labeling plate**
1	C/Q 1	**2**	C/Q 2	• C/Q: Communication signal • RES: Reserved, must not be used • L+: Supply voltage (positive) • M: Ground	 CC04 6ES7193-6CP04-2MA0
3	C/Q 3	**4**	C/Q 4		
5	RES	**6**	RES		
7	RES	**8**	RES		
9	L + 1	**10**	L + 2		
11	L + 3	**12**	L + 4		
13	M	**14**	M		
15	M	**16**	M		
L+	24VDC	**M**	Ground		

Table 9- 2 ET 200S

Terminal assignment for the 4SI IO-Link master electronic module (6ES7138-4GA50-0AB0)				
Terminal	**Assignment**	**Terminal**	**Assignment**	**Explanations**
1	C/Q Port 1	**5**	C/Q Port 2	• C/Q: Communication signal • L+: Supply voltage • L-/M: Ground
2	C/Q Port 3	**6**	C/Q Port 4	
3	L + Port 1	**7**	L + Port 2	
4	L + Port 3	**8**	L + Port 4	
A4	M Port 1 (AUX)	**A8**	M Port 2 (AUX)	
A3	M Port 3 (AUX)	**A7**	M Port 4 (AUX)	

Usable terminal modules: Spring terminal (6ES7193-4CA50-0AA0), screw terminal (6ES7193-4CA40-0AA0) and Fast Connect (6ES7193-4CA80-0AA0)

Table 9- 3 S7-1200: SM 1278 4xIO-Link master

Pin assignment for the SM 1278 4xIO master electronic module (6ES7278-4BD32-0XB0)					
Pin	**X10**	**X11**	**X12**	**X13**	**Explanations**
7	M_1	M_2	M_3	M_4	• M_n: Ground to slave • C/O_n: Communication signal • L_n: 24 VDC to slave • M: Ground • L+: 24 VDC to master • RES: Reserved; must not be used
6	C/O_1	C/O_2	C/O_3	C/O_4	
5	L_1	L_2	L_3	L_4	
4	RES	RES	RES	RES	
3	Functional earth	RES	RES	RES	
2	M	RES	RES	RES	
1	L+	RES	RES	RES	

ET 200eco PN

For the IO-Link master ET 200eco PN, there are preassembled cables available with M12 connectors at both ends (refer to the section "Ordering data (Page 87)").

Ordering data

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Table 10- 1 Ordering data readers with IO-Link interfaces

	Article number
RF210R with IO-Link interface	6GT2821-1AC32
RF220R with IO-Link interface	6GT2821-2AC32
RF240R with IO-Link interface	6GT2821-4AC32
RF250R with IO-Link interface	6GT2821-5AC32
RF260R with IO-Link interface	6GT2821-6AC32

Table 10- 2 Ordering data accessories

		Article number
Plug-in cable IO-Link, open end - M12	5 m	6GT2891-4LH50
	10 m	6GT2891-4LN10
Plug-in cable IO-Link, M12 plug - M12 socket	5 m	6GT2891-0MH50
	10 m	6GT2891-0MN10
Plug-in cable IO-Link for ET 200 AL, M12 plug - M12 socket	5 m	6GT2891-4MH50
	10 m	6GT2891-4MN10

Appendix

A

To understand this appendix, you should be familiar with the "IOL_CALL" function.

A.1 IO-Link error codes

A.1.1 ISDU return error codes

S7-PCT, IOL_CALL and the IO-Link device (reader) use the frame transport layer "ISDU". The following table lists possible ISDU return error codes. The ISDU return error codes are not generated by the reader. You can display the error codes using the "IOL_CALL" function block.

Error code (hex)	Error description	Remedy
8000	Command error	-
8011	Index not available	Correct index
8012	Subindex not available	Correct subindex
8020	Service temporarily not available	Repeat query after a waiting time
8021	Service temporarily not available. Local control unit blocked.	Repeat query after a waiting time
8022	Service temporarily not available. Device is busy with another task.	Repeat query after a waiting time
8023	Access denied	Index can only be read
8030	Parameter value is outside the permitted range	Transfer the correct value
8031	Parameter value is above the limit	Transfer the correct value
8032	Parameter value is below the limit	Transfer the correct value
8033	Parameter length exceeded	Check parameter length
8034	Parameter not long enough	Check parameter length
8035	Function not available	Check call parameters
8036	Function temporarily not available	Repeat query after a waiting time
8040	Invalid parameter set	Transfer correct parameter set
8041	Invalid parameter set	Transfer correct parameter set
8082	Application not ready	-

A.1.2 Event error codes

The following event error codes are displayed if you have enabled the "Event message" parameter in S7-PCT.

The event error codes with the event type "coming/going" are signaled by the IO-Link reader and forwarded by the IO-Link master to the programmable controller (PLC) at the fieldbus level for diagnostics purposes. You can display these event error codes using the standard diagnostics of the CPU. You can display the event type "Warning" using the "IOL_CALL" function block or the PCT tool.

Error code (hex)	Error description	Device status 1)	Event type	Causes of error
1823	Internal error	0x0001	Warning	The read command is on the air interface and there is a communication disruption. Possible causes: • The active command was not carried out completely • The transponder left the field while the command was being processed • Communication disruption between reader and transponder, for example due to EMC interference
1831	Flash error	0x0012	Error coming/ going	Hardware fault when saving (flash error)
1833	Internal error	0x0005, 0x0006, 0x000D, 0x0015, 0x0018, 0x0019	Error	Group error, classic RFID error. Possible causes (in the "Scan user data" mode): • Firmware/parameter assignment errors • Errors in the specified memory address (RFID error 0D) • Air interface disturbed (RFID error 06) • Parameter assignment error (RFID error 05): – Unknown command (wrong information in the PIQ) – Bad parameter (for example address wrong, length wrong) – Function not permitted (for example sending a command in UID mode)
1834	Invalid PIQ	0x0005	Error coming/ going	Command was written to the PIQ although this is not permitted. For example "read" command in the "Scan UID" mode
1835	Antenna missing	0x001C	Coming/going	RF250R: Antenna not connected or antenna cable damaged.

Error code (hex)	Error description	Device status [1])	Event type	Causes of error
4000	Overtemperature	0x0011	Error coming/ going	Overtemperature in the reader device (> 110°C) so that a dangerous state is detected. Turn off the power to the device.
5100	General problem with the power supply	0x0011	Error coming/ going	Hardware fault: Under/overvoltage Check the power supply.
6000	Firmware error	0x0014	Error coming/ going	The firmware has detected an internal error (system error). For example illogical status or watchdog etc.
6320	Parameter assignment error	0x0015	Error coming/ going	Parameter assignment error: Bad parameter
8C00	Reset Device	0x0014	Error coming/ going	Serious system error, watchdog: Cycle power

[1]) The device status has the same meaning as the RFID error code.

Note

You can display these event messages using S7-PCT or read them out using the "IOL_CALL" function block. You can only reset event messages using S7 PCT or the "IOL_CALL" function.

The event messages cannot be reset by "antenna off" or "move transponder out of field" as is possible with the RFID errors (compare section "Diagnostics (Page 79)").

A.2 Overview of the service data

The device RF200R IO-Link supports the following indexes for service data and parameter assignment:

Note

Direct Parameter Page 1 (Index 0)

These parameters are only used internally in the system and do not normally need to be taken into account. When necessary, however, they can be read out using index 0 (see section "IOL_CALL (Page 67)").

Index	Object name	Subindex	Length in bytes	Access	Parameter name	Description
0x00	Direct parameter page 1	0x00	16	r	-	Entire index selected
		0x01	1	r	Master-Command	Switch the IO-Link operating mode (Fallback, Operate, Preoperate)
		0x02	1	r	MasterCycle-Time	Master cycle time
		0x03	1	r	MinCycleTime	Minimum device cycle time (reader)
		0x04	1	r	F-sequence Capability	Supported frame types for communication.
		0x05	1	r	RevisionID	IO-Link protocol version implemented on the device
		0x06	1	r	ProcessDataIn	Number and structure of the data process image of the inputs to the master
		0x07	1	r	ProcessDataOut	Number and structure of the data process image of the outputs from the master
		0x08	1	r	VendorID 1 (MSB)	Unique vendor identification number
		0x09	1	r	VendorID 2 (LSB)	SIEMENS: 0x002A
		0x0A	1	r	DeviceID 1 (Octet 2, MSB)	Unique device identification number. RF210R IO-Link: 0x0C0201 RF220R IO-Link: 0x0C0202 RF260R IO-Link: 0x0C0206
		0x0B	1	r	DeviceID 2 (Octet 1)	
		0x0C	1	r	DeviceID 3 (Octet 0, LSB)	
		0x0D	1	r	FunctionID 1 (MSB)	Reserved
		0x0E	1	r	FunctionID 2 (LSB)	
		0x0F	1	r	-	Reserved
		010	1	r	System-Command	Unused, system command is enabled using index 2.

Index	Object name	Subindex	Length in bytes	Access	Parameter name	Description
0x02	System command	0x00	1	w	-	Supported system commands: Device Reset: 0x80 Reset to factory setting: 0x82
0x03	Data storage index	0x01	1	r/w	DS command	• 0x00: reserved • 0x01: DS upload start • 0x02: DS upload end • 0x03: DS download start • 0x04: DS download end • 0x05: DS break • 0x06 ... 0xFF: Reserved
		0x02	1	r	State property	Bit 0: Reserved Bit 1 and bit 2 Status • 0b00: Inactive • 0b01: Upload • 0b10: Download • 0b11: Data memory locked Bit 3 to bit 6: Reserved Bit 7: Upload status • "0": No upload • "1": Upload pending
		0x03	4	r	Data storage size	Number of bytes for storing the parameters required for device replacement
		0x04	4	r	Parameter cecksum	Revision Counter (RC)
		0x05	variable	r	Index List	List of the stored parameters
0x10	Vendor name	0x00	12	r	-	Vendor name: "SIEMENS AG"
0x11	Vendor text	0x00	12	r	-	Vendor text: "SIEMENS AG"
0x12	Product name	0x00	24	r	-	Product name: "SIMATIC RF2xxR IO-Link"
0x13	Product ID	0x00	16	r	-	Product ID: MLFB of the reader e.g. "6GT2821-1AC32"
0x14	Product text	0x00	64	r	-	Product text: Information on reader properties
0x15	Serial number	0x00	12	r	-	Serial number is not supported
0x17	Firmware revision	0x00	12	r	-	Firmware version (e.g. V1.0.0)
0x18	Application specific tag	0x00	32	r/w	-	User-specific data. For example, plant designation, function, maintenance data, location identifier

Index	Object name	Subindex	Length in bytes	Access	Parameter name	Description
0x20	Error count	0x00	2	r	-	Number of errors since turning on (number of events)
0x28	Process Data Input	0x00	8	r	-	Read out last process image of the inputs
0x29	Process Data Out-put	0x00	8	r	-	Read out last process image of the outputs
0x40	Reader parameter	0x00	8	r/w	-	Read out the reader parameters of the reader (total possible = subindex 0x00)
			1	r/w	Event indications	2: Event indication enabled (default) 4: No message
			1	r/w	Operation mode	4: Scan UID (default) 8: Scan user data
			1	r/w	Ready delay	2: Turn off (default) 4: Turn on additional backup mechanism for consistent data transfer
			1	r/w	Data hold time	Minimum time during which the pro-cess input data is not changed by the device. • 0x00: minimum (default) • 0x0A: 100 ms • 0x14: 200 ms • 0x32: 500 ms • 0x64: 1 s • 0xC8: 2 s • 0xFE: Test mode "Trigger events"
			1	r/w	Air Interface	Setting the 2: ISO default (default) 4: Special settings
			1	r/w	Modulation	Setting for the modulation strength 0 ... 100 % (default 22 %)
			1	r/w	Subcarrier	Subcarrier 2: single (default) 4: double
			1	r/w	Data rate	Date rate 2: low 4: high (default)
0x43	IO-Link baudrate	0x00	1	r	-	IO-Link baud rate 4: 38.4 kbps

Index	Object name	Subindex	Length in bytes	Access	Parameter name	Description
0x4A	Event history	0x00	20	r	-	Entire index selected
		0x01	4	r	-	Last event
		0x02	4	r	-	Second last event
		0x03	4	r	-	Third last event
		0x04	4	r	-	Fourth last event
		0x05	4	r	-	Fifth last event
0x5A	Reader status	0x00	18	r	-	Can only be read out entirely, only subindex 0 possible.
			4	r	Time since startup	Operating time of the reader since startup
			1	r	Tags in the field	Number of transponders located in the field Here, only 1 transponder is permitted.
			1	r	Antenna ctatus	Status of the antenna: • 0: Unknown • 1: Antenna on • 2: Antenna off
			4	r	Tag changes	Number of transponders that have passed through the field since the reader was turned on
			1	r	Line driver Revision	Version of the physical IO-Link driver block
			1	r	Reader FZB	RF field, error counter passive (for example interference pulses) Is reset when read out.
			1	r	Reader ABZ	RF protocol error, abort counter Is reset when read out.
			1	r	Reader CFZ	RF protocol error, code error counter Is reset when read out.
			1	r	Reader SFZ	RF protocol error, signature error counter Is reset when read out.
			1	r	Reader CRCFZ	RF protocol error, CRC error counter Is reset when read out.
			1	r	Reader BSTAT	Number of command repetitions Is reset when read out.
			1	r	Reader FZ	Error counter

Index	Object name	Subindex	Length in bytes	Access	Parameter name	Description
0x5B	Tag status	0x00	15	r	-	Can only be read out entirely, only subindex 0 possible.
			8	r	UID	Unified identifier of the transponder located in the field.
			1	r	Tag type	Tag type: • 0: undetermined • 1: ISO general, non-specific or unknown • 3 my-d (Infineon), MDS D3xx • 4: MB89R118 (Fujitsu), MDS D4xx • 5 I-Code SLI (NXP), MDS D1xx • 6: Tag-it (Texas Instruments), MDS D2xx • 7: LRI2K (ST)
			1	r	Transponder Chip version	Chip version of the tag
			2	r	Transponder Memory size	Memory size of the tag
			1	r	Transponder Lock state	Lock state, OTP information: One bit per block is used (4x4 bytes or 2x8 bytes). Bit = 1: Block is locked) e. g. 03 = block 1 and block 2 are locked.
			1	r	Transponder Memory block size	Block size of the transponder
			1	r	Transponder Number of blocks	Number of blocks of the transponder
0x5C	UID history	0x00	40	r	-	Entire index selected
		0x01	8	r	-	List of the UIDs of the transponders that were last located in the field: Last UID
		0x02	8	r	-	Second last UID
		0x03	8	r	-	Third last UID
		0x04	8	r	-	Fourth last UID
		0x05	8	r	-	Fifth last UID

System commands

You can execute system commands using the "IOL_CALL" function block or the PCT tool.

- Device reset:

  The reader restarts. Corresponds to cycling power.

- Restore Factory Setting:

  The reader restarts. The reader parameters (index 0x40) and the application specific tag (index 0x18) are also reset to the defaults.

A.3 Certificates and Approvals

CE marking

Certificate	Description
CE	Conforms to R&TTE directive

The following applies to the system described in this documentation:

If a device has the CE marking, the corresponding approval has been obtained.

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 certificates

Safety

One of the following markings on a device is indicative of the corresponding approval:	
c UL us	Underwriters Laboratories (UL) in accordance with UL 508 and C22.2 No. 142 (IND.CONT.EQ)

EMC

If a device has one of the following marks, the corresponding approval has been obtained:	
	Brazil ANATEL Certificado de Homologação REPÚBLICA FEDERATIVA DO BRASIL AGÊNCIA NACIONAL DE TELECOMUNICAÇÕES
CMIIT ID: 20xxDJxxxx	China CMMIT 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.
Sistema de RFID para uso Industrial Marca: SIEMENS Modelo: RF xxxR COFETEL: XXXXXXXXX-XXXX	Mexico Estados Unidos Mexicanos Comision Federal de Telecomunicaciones
	South Africa Independent Communications Authority of South Africa, Sandton Radio Equipment Type Approval Certificate
 KCC-CRM-RF5-RFxxxR	South Korea Korea Communications Commission Certificate of Broadcasting and Communication Equipments The Republic of Korea

You will find the EMC directives for the USA and Canada in the section "Approvals (Page 83)".

A.4 Service & support

Technical Support

You can reach technical support for all PD projects as follows:

- Phone: + 49 (0) 911 895 7222
- Fax: + 49 (0) 911 895 7223
- E-mail (mailto:support.automation@siemens.com)
- Internet: Online support request form: (https://support.industry.siemens.com/My/ww/en/requests)

Contacts

If you have any further questions on the use of our products, please contact one of our representatives at your local Siemens office.

The addresses are found on the following pages:

- On the Internet (http://w3.siemens.com/aspa_app)
- In Catalog CA 01
- In the catalog ID 10 specially for Industrial Identification Systems

Service & Support for Process Industries and Drives

On the Internet, on the Support homepage (https://support.industry.siemens.com/cs/de/en/) of Process Industries and Drives (PD), you will find various services.

There you will find the following information, for example:

- Our newsletter containing up-to-date information on your products.
- Relevant documentation for your application, which you can access via the search function in "Product Support".
- A forum for global information exchange by users and specialists.
- Your local contact for PD.
- Information about on-site service, repairs, and spare parts. Much more can be found under "Our service offer".

RFID homepage

For general information about our identification systems, visit RFID homepage (http://w3.siemens.com/mcms/identification-systems/).

Online catalog and ordering system

The online catalog and the online ordering system can also be found on the Industry Mall Homepage (https://mall.industry.siemens.com).

Training center

We offer appropriate courses to get you started. Please contact your local training center or the central training center in

D-90327 Nuremberg.

Phone: +49 (0) 180 523 56 11
(€ 0.14 /min. from the German landline network, deviating mobile communications prices are possible)

For information about courses, see the SITRAIN homepage (http://sitrain.automation.siemens.com/sitrainworld/).

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