

## **ANT 30**

The ANT 30 is designed for use in small assembly lines. In comparison to ANT 18, the maximum write/read distance is approximately 60 % larger. Due to its compact construction, the antenna can be easily positioned for any application using two plastic nuts (included in the package). The antenna cable can be connected at the reader end. With the RF320T, RF340T and RF350T tags, communication with the data storage unit is only possible in static mode.

### **5.5.10.2 Ensuring reliable data exchange**

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

### 5.5.10.3 Metal-free area

The antennas ANT1, ANT18 and ANT30 can be flush-mounted on metal. Please allow for a possible reduction in the field data values.

Metal-free area for flush-mounting:  
a = 40 mm

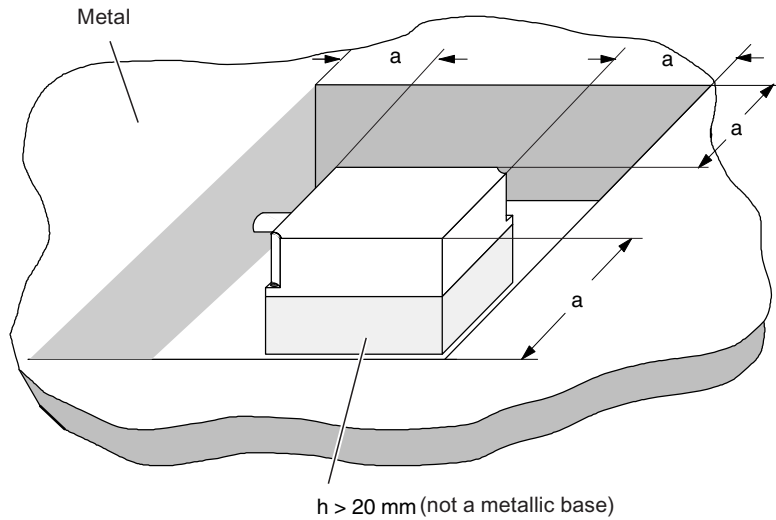
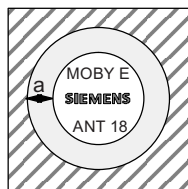
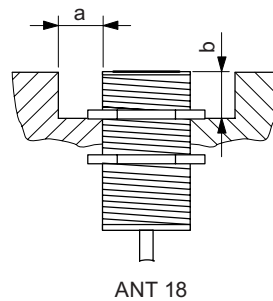


Figure 5-11 Metal-free area for ANT 1



a = 10 mm  
b = 10 mm  
Metal-free area for flush-mounting:



Note:  
If the metal-free area is not observed the limit and operating distances are reduced

Figure 5-12 Metal-free area for ANT 18

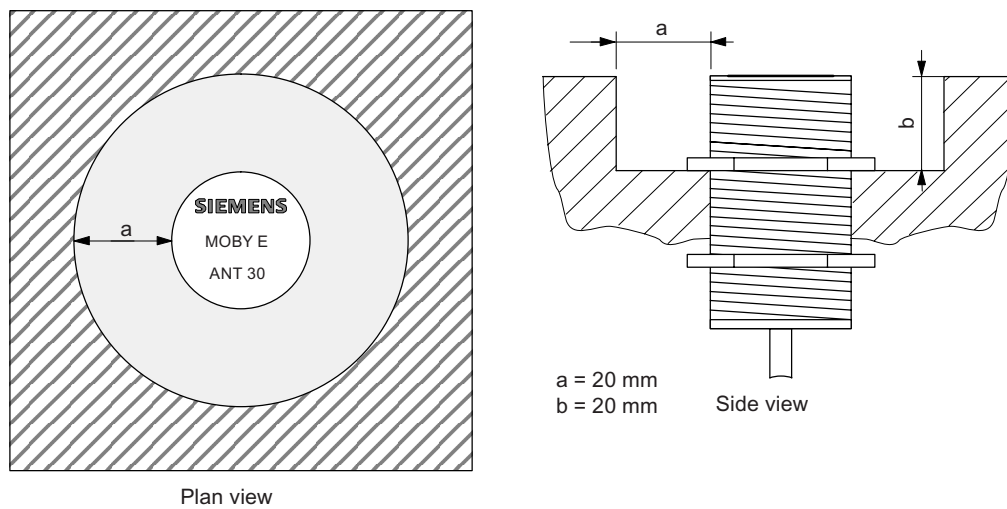


Figure 5-13 Metal-free area for ANT 30

### 5.5.10.4 Minimum distance between antennas

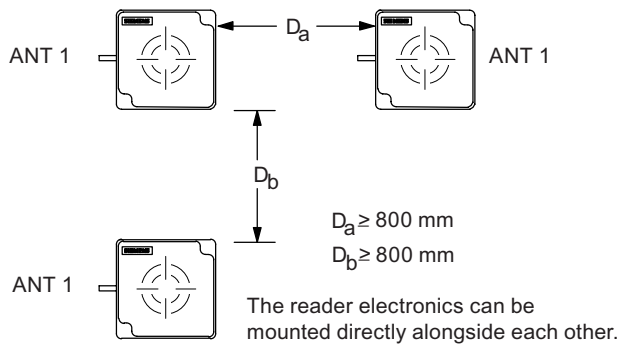


Figure 5-14 Minimum distance for ANT 1

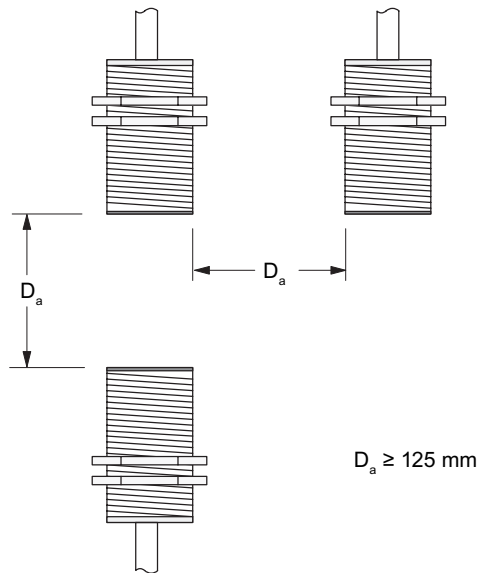


Figure 5-15 Minimum distance for ANT 18

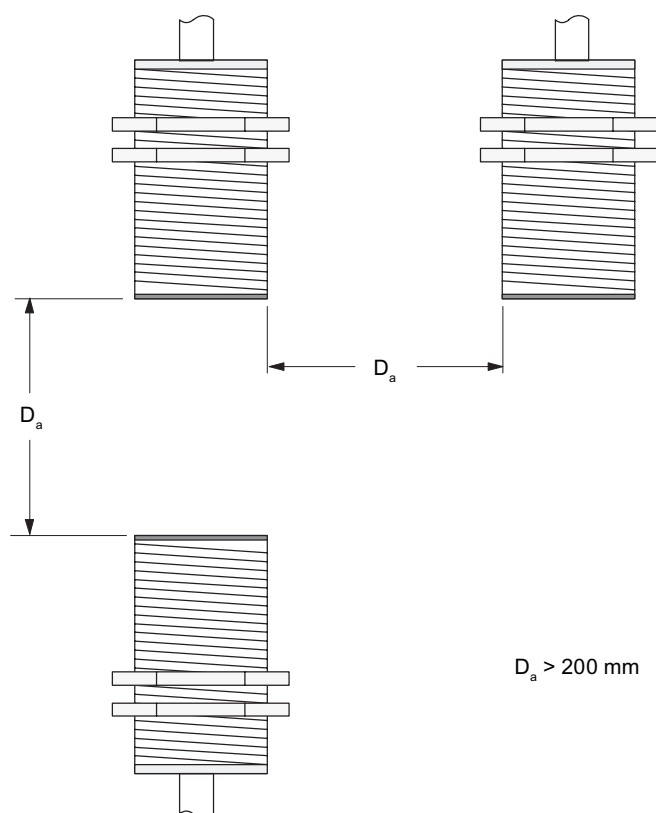


Figure 5-16 Minimum distance for ANT 30

## 5.5.10.5 Technical data for antennas

Table 5-6 Technical data for antennas ANT1, ANT18 and ANT30

Antenna	ANT1	ANT18	ANT30
Read/write distance antenna to transponder (Sg) max	100 mm	15 mm	24 mm
Enclosure dimensions in mm	75 x 75 x 20 (L x W x H)	M18 x 1.0 x 55 (Ø x thread x L)	M30 x 1.5 x 58 (Ø x thread x L)
Color	Anthracite	Pale turquoise	
Material	Plastic PA 12	Plastic Crastin	
Plug connection	4-pin (pins on antenna side)		
Antenna cable lengths	3 m		
Degree of protection according to EN 60529	IP 67	IP 67 (at the front)	
Shock-resistant acc. to EN 60721-3-7, Class 7M2	50 g <sup>1)</sup>		
Vibration-resistant to EN 60721-3-7, Class 7M2	20 g ( 3 to 500 Hz) <sup>1)</sup>		
Attachment of the antenna	2 x M5 screws	2 plastic nuts M18 x 1.0	2 plastic nuts M30 x 1.5
Ambient temperature	<ul style="list-style-type: none"> <li>• During operation                      • -25 °C to +70 °C</li> <li>• During transport and storage      • -40 °C to +85 °C</li> </ul>		
MTBF (at +40 °C)	2.5 x 10 <sup>5</sup> hours		
Approx. weight	80 g	120 g	150 g
1) Warning: The values for shock and vibration are maximum values and must not be applied continuously.			

## 5.5.10.6 Ordering data for antennas

Product description	Order No.
MOBY E, ANT 1	6GT2398-1CB00
MOBY E, ANT 18	6GT2398-1CA00
MOBY E, ANT 30	6GT2398-1CD00

### 5.5.10.7 Dimension drawings for antennas

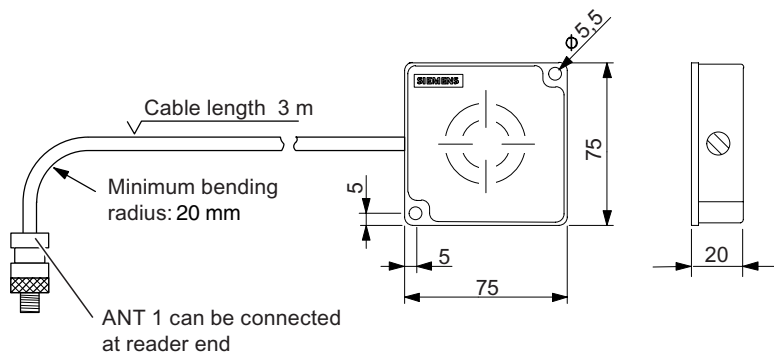


Figure 5-17 Dimension drawing for ANT 1

Dimensions in mm

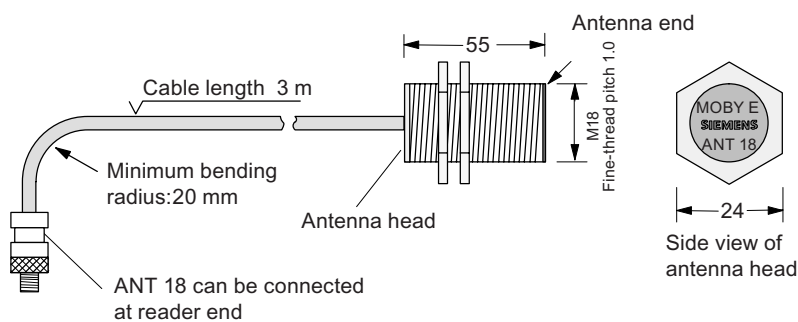


Figure 5-18 Dimension drawing for ANT 18

Dimensions in mm

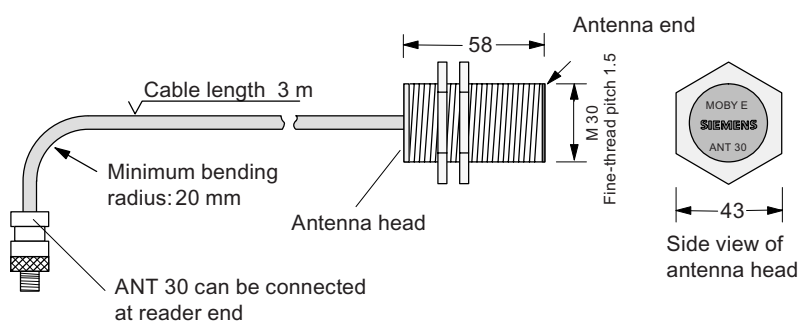



Figure 5-19 Dimension drawing for ANT 30

Dimensions in mm

## 5.6 RF380R

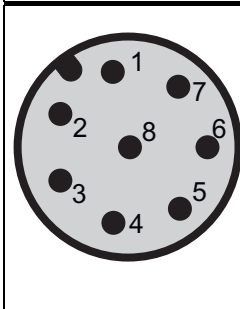
### 5.6.1 Features

RF380R reader	Features	
	Design	① RS232 or RS422 interface ② Status display
	Area of application	Identification tasks on assembly lines in harsh industrial environments
	Read/write distance to transponder	Max. 125 mm
	Data transmission rate	<ul style="list-style-type: none"> <li>Read: approx. 3,100 byte/s</li> <li>Write: approx. 3,100 byte/s</li> </ul>

### 5.6.2 Pin assignment of RF380R RS232/RS422 interface

You can connect the RF380R reader to a higher-level system via the internal RS422 interface or via the RS232 interface. After connection, the interface module automatically detects which interface has been used.

Note correct assignment of the pins here:

Pin	Pin Device end 8-pin M12	Assignment	
		RS232	RS422
	1	+ 24 V	+ 24 V
	2	RXD	- Transmit
	3	0 V	0 V
	4	TXD	+ Transmit
	5	NC	+ Receive
	6	NC	- Receive
	7	not used	not used
	8	Earth (shield)	Earth (shield)



### 5.6.3 Display elements of the RF380R reader

Color		Meaning
Green	Flashing	Operating voltage present, reader not initialized or antenna switched off
	Permanently on	Operating voltage present, reader initialized and antenna switched on
Yellow <sup>1)</sup>		Transponder present
Flashing red		Error has occurred, the type of flashing corresponds to the error code in the table in Section "Error codes". The optical error display is only reset if the corresponding reset parameter ("option_1", see FC45 / FB45 documentation, Section "Input parameters") is set.

<sup>1)</sup> In the operating state "Without presence", the lighting duration may be very short.

### 5.6.4 Ensuring reliable data exchange

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

### 5.6.5 Metal-free area

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

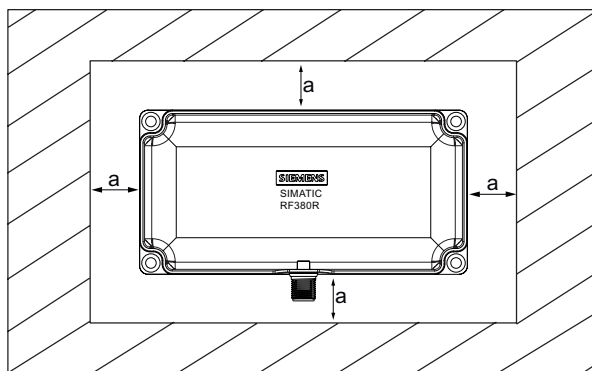


Figure 5-20 Metal-free area for RF380R

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

### 5.6.6 Minimum distance between RF380R readers

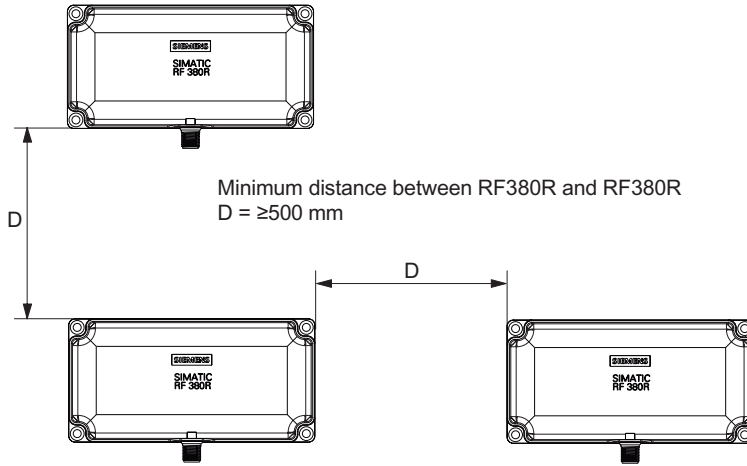


Figure 5-21 Minimum distance between RF380R readers

## 5.6.7 Technical specifications of the RF380R reader

Table 5-7 Technical specifications of the RF380R reader

Inductive interface to the transponder	
Transmission frequency for power/data	13.56 MHz
Antenna	integrated
Interface to communication module	RS232 or RS422 (3964R protocol)
Baud rate	19200 baud, 57600 baud, 115200 baud
Cable length between reader and communication module	RS422 data cable length: max. 1000 m RS232 data cable length: Max. 30 m
Read/write distances of reader	See RF380R field data
Minimum distance between two RF380R readers	≥ 500 mm
Maximum data transfer rate reader - transponder (tag)	
Reading	Approx. 3100 byte/s
Writing	Approx. 3100 byte/s
Functions	Initialize/read/write transponder Scan status and diagnostics information Switch antenna on/off Repeat command Scan transponder serial numbers
Power supply	24 V DC
Display elements	2-color LED (operating voltage, presence, error)
Plug connector	M12 (8-pin)
Enclosure	
Dimensions (in mm)	160 x 80 x 40 (without M12 plug connector)
Color	Anthracite
Material	Plastic PA 12
Fixing	4 x M5 screws
Ambient temperature during operation	-25 °C to +70 °C
during transport and storage	-40 °C to +85 °C
Degree of protection to EN 60529	IP67
Shock to EN 60 721-3-7 Class 7 M2	50 g
Vibration to EN 60 721-3-7 Class 7 M2	20 g
Weight	Approx. 600 g
MTBF (Mean Time Between Failures) in years	109 years
Approvals	Radio to R&TTE guidelines EN 300 330, EN 301489, CE, FCC, UL/CSA
Current consumption	Typ. 160 mA

### 5.6.8 FCC information

#### Siemens SIMATIC RF380R

FCC ID: NXW-RF380R

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.

### 5.6.9 RF380R ordering data

Product description	Order No.
Reader RF380R With RS422 interface (3964R) IP67; -25 °C to +70 °C, dimensions 160 x 96 x 40 (L x W x H in mm); with integrated antenna; max. limit distance 150 mm (depending on transponder)	6GT2801-3AA10

### 5.6.10 Dimension drawing

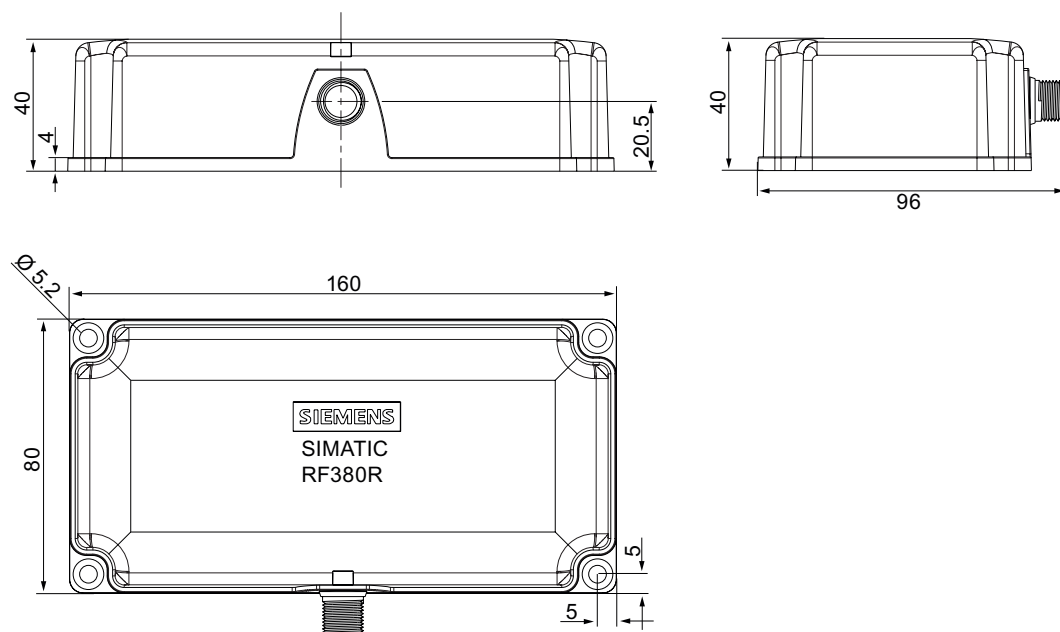


Figure 5-22 Dimension drawing RF380R

Dimensions in mm



# Transponders


## 6.1 Overview

Transponders consist predominantly of logic, FRAM and/or EEPROM.

If a transponder moves into the transmission window of the reader, the necessary power for all of the circuit components is generated and monitored by the power supply unit. The pulse-coded information is prepared in such a way that it can be processed further as pure digital signals. The handling of data, including check routines, is performed by the logic, which also manages the various memories.

## 6.2 RF320T

### 6.2.1 Features

Transponder RF320T	Features	
	Field of application	Identification tasks on small assembly lines in harsh industrial environments
	Memory	Read-only area (4 bytes UID) User data area (20 bytes)
	Read/write range	See Section Field data for transponders, readers and antennas (Page 39)
	Mounting on metal	Not possible Recommended distance from metal $\geq 20$ mm



## 6.2.2 Metal-free area

### Mounting of RF320T on metal

Direct mounting of the RF320T on metal is not allowed.

The following figures show the minimum distance between the RF320T and metal:

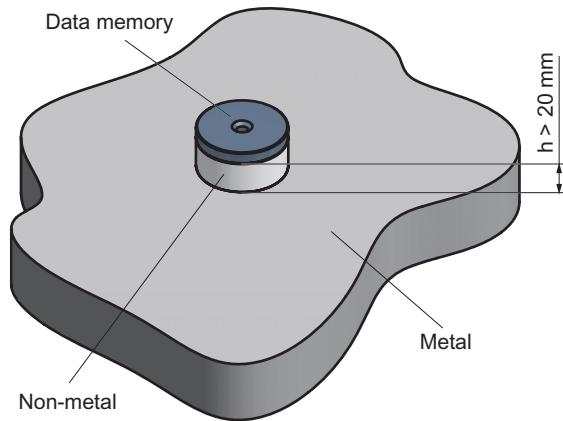


Figure 6-1 Mounting of an RF320T on metal with spacer

### Flush-mounting of RF320T in metal

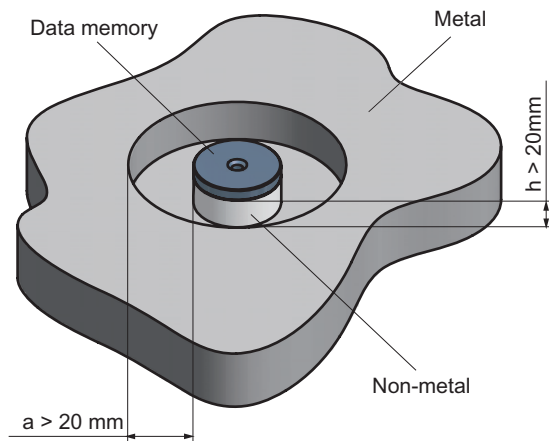


Figure 6-2 Flush-mounting of RF320T in metal with spacer

At lower values, the field data change significantly, resulting in a reduced range.

### 6.2.3 Technical data

Table 6-1 Technical data for RF320T

Memory size	20 bytes EEPROM (r/w), 4 bytes UID (ro)
Memory organization	Byte-oriented access, write protection possible in 4-byte blocks
MTBF (Mean Time Between Failures) in years	1871
Read cycles	Unlimited
Write cycles, min. at ≤ 40 °C, typical	50 000 > 100 000
Data retention time	> 10 years (at < +40 °C)
Write/read distance	dependent on the reader used (see field data)
Energy source	Inductive power transmission
Shock/vibration-resistant to EN 60721-3-7, Class 7 M3	100 g/20 g
Torsion and bending load	not permissible
Fixing	Adhesive/M3 screws
Recommended spacing from metal	> 20 mm
Degree of protection to EN 60529	• IP67/IPX9K
Housing	Button
• Dimensions	• Ø 27 mm x 4 mm
• Color/material	• Black/epoxy resin
Ambient temperature	
• Operation	• -25 to +85 °C
• Transport and storage	• -40 to +125 °C
Weight	Approx. 5 g

**Note**

All the technical data listed are typical data and are applicable for an ambient temperature of between 0 °C and +50 °C and a metal-free environment.

### 6.2.4 Ordering data

Transponder RF320T	Order No.
Transponder RF320T, button, 20 byte EEPROM, IP 67, -25 °C to +85 °C, d = 27 mm x 4 mm	6GT2800-1CA00

### 6.2.5 Dimension drawing

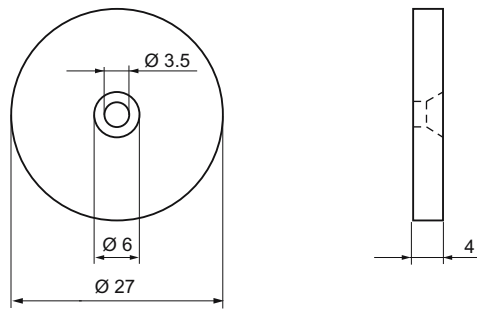



Figure 6-3 RF320T dimension drawing

Dimensions in mm

## 6.3 RF340T

### 6.3.1 Features

Transponder RF340T	Features	
 <p>The image shows a grey, rectangular transponder with a small circular hole at the top right. The text on the device reads: 'SIEMENS B', 'SIMATIC', 'RF 340 T', and '65T2800-4B800'.</p>	Field of application	Identification tasks on small assembly lines in harsh industrial environments
	Memory	Read-only area (4 bytes UID) Read/write memory (8 KB) OTP <sup>1)</sup> memory (20 bytes)
	Read/write range	See Section Field data for transponders, readers and antennas (Page 39)
	Mounting on metal	Direct mounting on metal is possible.

<sup>1)</sup> OTP: (One Time Programmable)

### 6.3.2 Metal-free area

Direct mounting of the RF340T on metal is permitted.

#### Mounting of RF340T on metal

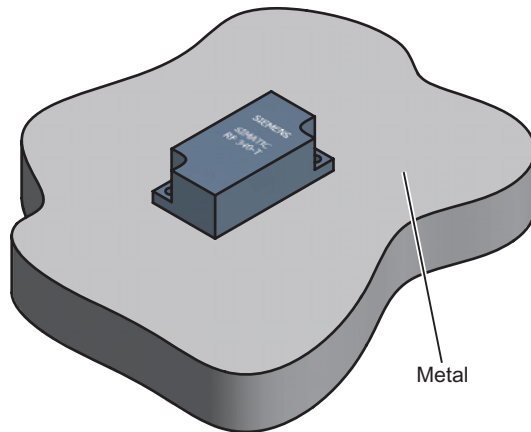


Figure 6-4 Mounting of RF340T on metal

#### Flush-mounting of RF340T in metal:

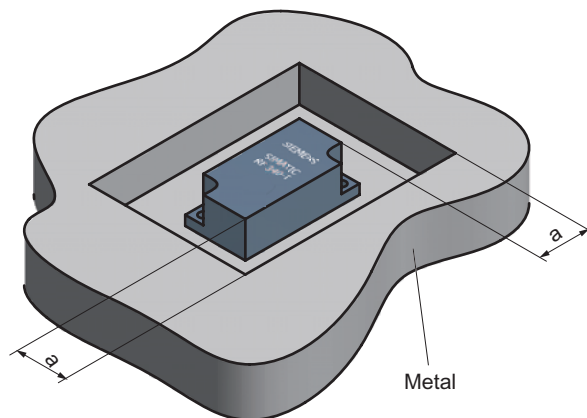


Figure 6-5 Flush-mounting of RF340T in metal

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



### 6.3.5 Dimension drawing

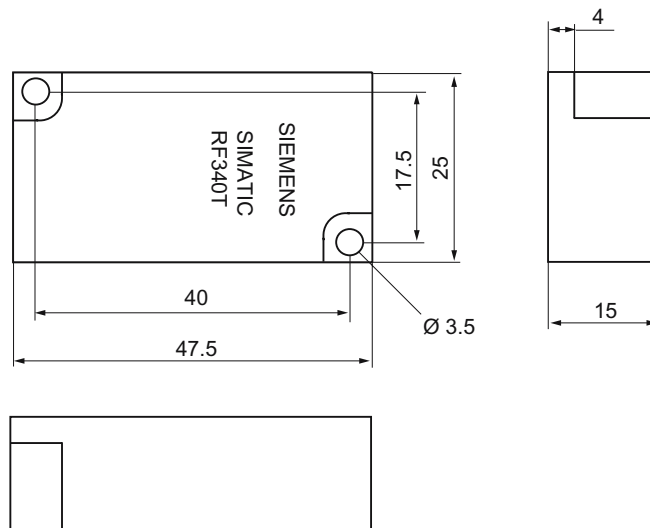



Figure 6-6 RF340T dimension drawing

Dimensions in mm

## 6.4 RF350T

### 6.4.1 Features

Transponder RF350T	Features	
 <p>The image shows a dark grey, octagonal transponder with rounded corners. It has two circular mounting holes on opposite sides. The text on the device includes 'SIEMENS' at the top, 'SIMATIC RF350T' in the center, and '6GT2800-5B000 AS A' at the bottom.</p>	Field of application	Identification tasks on small assembly lines in harsh industrial environments
	Memory	Read-only area (4 bytes UID) Read/write memory (32 KB) OTP <sup>1)</sup> memory (20 bytes)
	Read/write range	See Section Field data for transponders, readers and antennas (Page 39)
	Mounting on metal	Direct mounting on metal is possible.

<sup>1)</sup> OTP: (One Time Programmable)



## 6.4.2 Metal-free area

Direct mounting of the RF350T on metal is permitted.

### Mounting of RF350T on metal

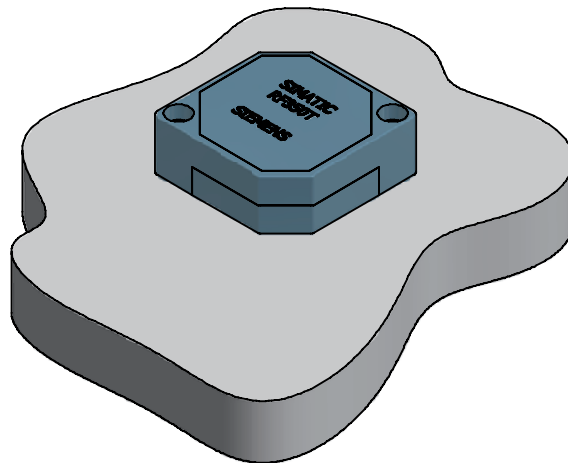


Figure 6-7 Mounting of RF350T on metal

### Flush-mounting of RF350T in metal:

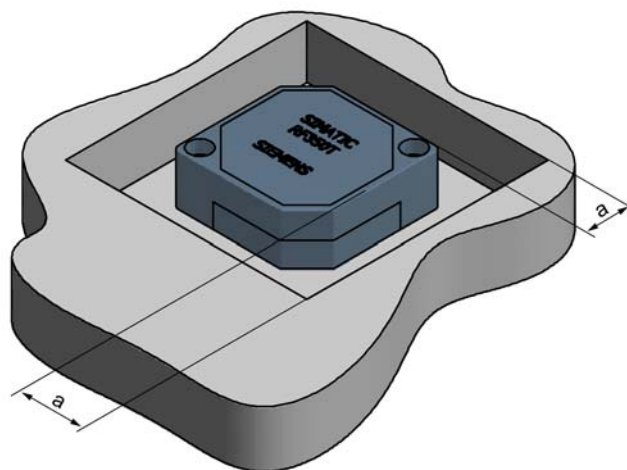


Figure 6-8 RF350T flush-mounted in metal

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

### 6.4.3 Technical data

Table 6-3 Technical specifications for RF350T

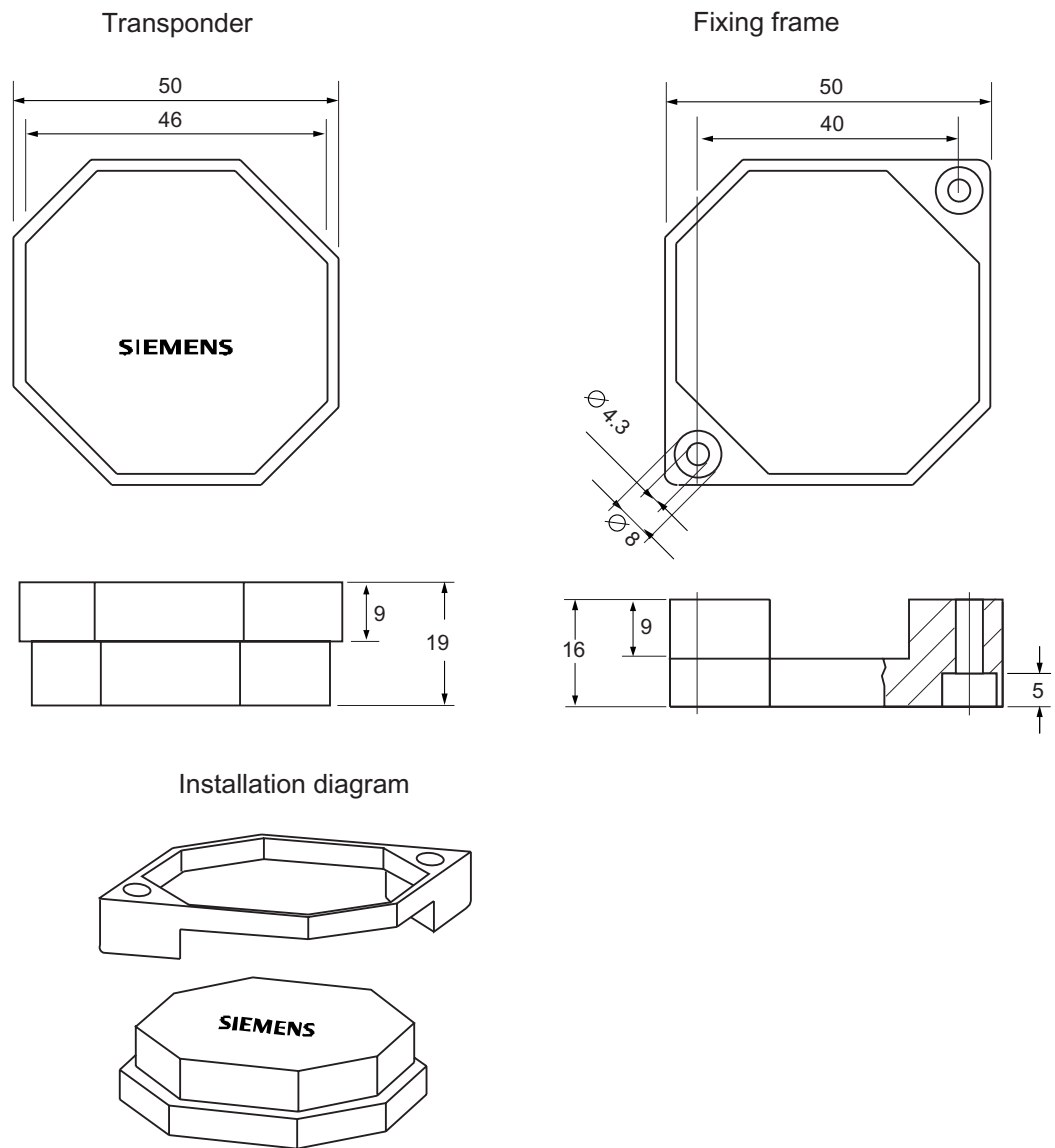
Memory size	32 KB	
Memory organization	Blocks of 8 bits / 1 byte	
Memory configuration	<ul style="list-style-type: none"> <li>• Serial number (UID) <span style="float: right;">• 4-byte (fixed code)</span></li> <li>• Application memory <span style="float: right;">• 32765 bytes r/w</span></li> <li>• OTP <sup>1)</sup> memory <span style="float: right;">• 20 bytes</span></li> </ul>	
Storage technology	FRAM / EEPROM	
MTBF (Mean Time Between Failures) in years	1201	
Write cycles, at +40°C	Virtually unlimited (>10 <sup>10</sup> )	
Read cycles	Virtually unlimited (>10 <sup>10</sup> )	
Transmission rate	with RS422 reader:	with IQ-Sense reader:
• Reading	Approx. 0.3 ms / byte	Approx. 20 ms / byte
• Writing	approx. 0.3 ms / byte	approx. 25 ms / byte
Data retention	> 10 years	
Read/write distance	dependent on the reader used (see field data)	
Multitag capability	max. 4 transponders	
Recommended spacing from metal	can be directly mounted on metal	
Power supply	Inductive, without battery	
Degree of protection to EN 60529	IP68	
Shock to EN 60721-3-7	50 g	
Vibration to EN 60721-3-7	20 g	
Torsion and bending load	Not permitted permanently	
Enclosure dimensions	50 x 50 x 20 mm (L x W x H)	
Color	Anthracite	
Material	PA12	
Fixing	2 screws M4	
Ambient temperature	<ul style="list-style-type: none"> <li>• During operation <span style="float: right;">-25 °C to +85 °C</span></li> <li>• During transport and storage <span style="float: right;">-40 °C to +85 °C</span></li> </ul>	
Weight	Approx. 25 g	

<sup>1)</sup> OTP: (One Time Programmable)

### 6.4.4 Ordering data

RF350T	Order No.
32 KB FRAM (read/write) + 4 byte EEPROM (read only), IP 68, -25 °C to +85 °C, dimensions 50 x 50 x 20 (LxWxH in mm)	6GT2800-5BD00

### 6.4.5 Dimension drawing




The transponder can be mounted as shown with the fixing frame.

Figure 6-9 RF350T dimension drawing

Dimensions in mm

## 6.5 RF360T

### 6.5.1 Features

Transponder RF360T	Features	
 <p>The image shows a black rectangular transponder with a blue Siemens logo at the top. Below the logo, the text 'SIMATIC RF360T' is printed in white, followed by the part number '6GT2800-4AC00' in smaller white text. There are two small white circular marks on the surface, one on each side of the text.</p>	Area of application	Identification tasks on small assembly lines in harsh industrial environments
	Memory	Read-only area (4 bytes UID) Read/write memory (8 KB) OTP <sup>1)</sup> memory (20 bytes)
	Read/write range	Refer to SectionField data for transponders, readers and antennas (Page 39)
	Mounting on metal	Not possible; recommended distance from metal $\geq 20$ mm

<sup>1)</sup> OTP. (One Time Programmable)

## 6.5.2 Metal-free area

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

### Mounting of RF360T on metal

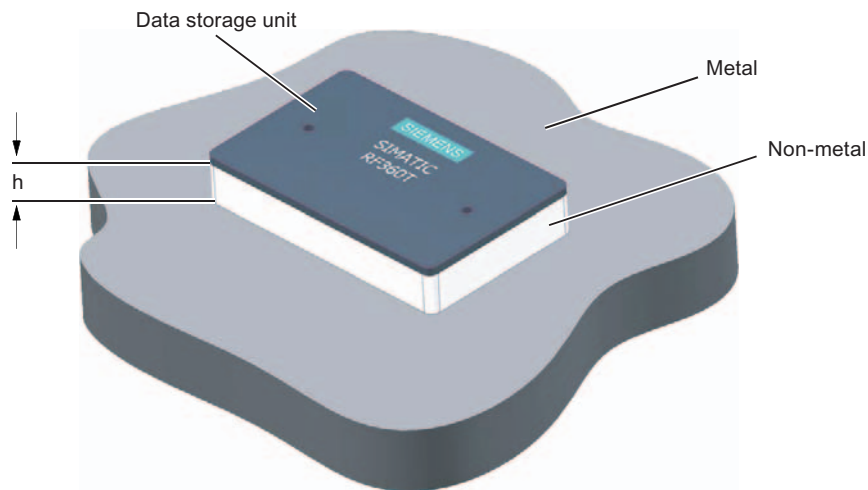


Figure 6-10 Mounting of RF360T with spacer

The standard value for  $h$  is  $\geq 20$  mm.

### Flush-mounting of RF360T in metal:

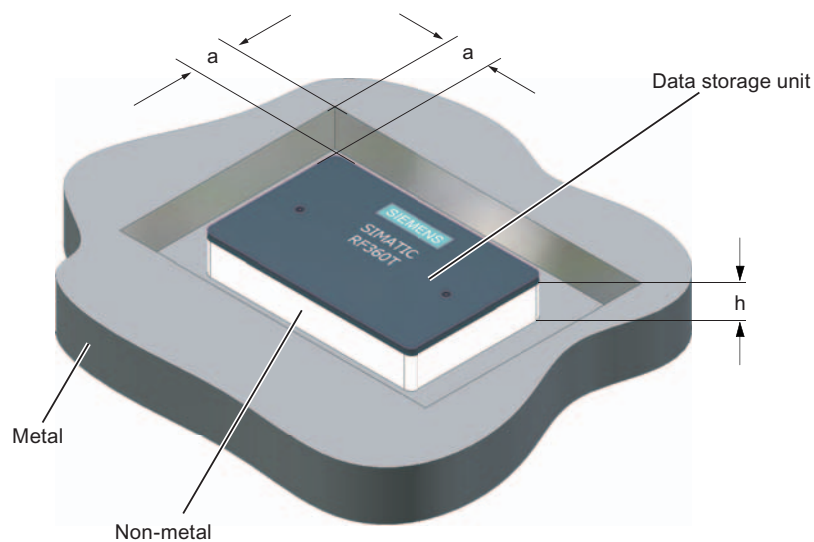


Figure 6-11 Flush-mounting of RF360T with spacer

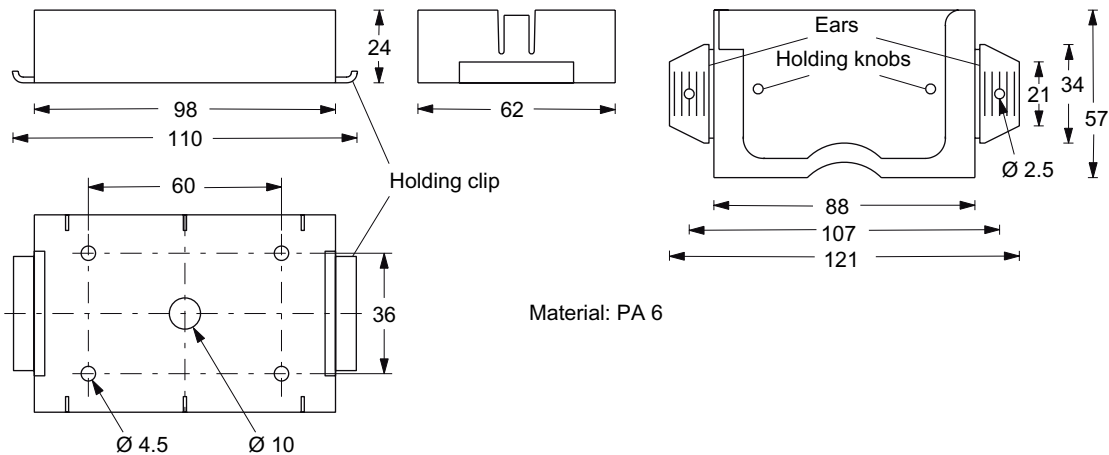
The standard value for  $a$  is  $\geq 20$  mm. At lower values, the field data change significantly, resulting in a reduction in the range.

**Dimensions of spacer and fixing pocket for RF360T**

Dimension sketch

Spacer: 6GT2190-0AA00

Fixing pocket: 6GT2190-0AB00

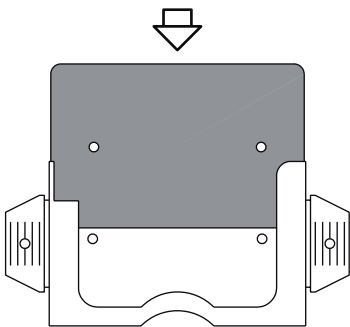


The spacer can be directly mounted on metal. In combination with the fixing pocket, a non-metal distance of 20 mm results between the transponder and metal.

Mounting:

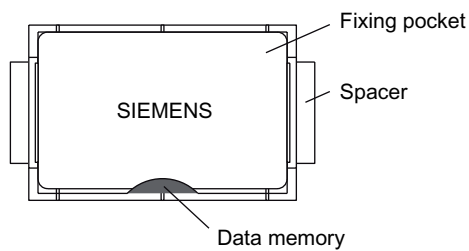
- With 2 or 4 screws (M4)
- With rubbers on the holding clips (e.g. on mesh boxes)
- With cable ties on the holding clips (e.g. on mesh boxes)

Transponder with fixing pocket



The transponder is inserted into the fixing pocket. Locking is via the holding knobs in the fixing pocket.

Transponder with fixing pocket and spacer (connected together)



The fixing pocket is attached to a non-metal base by the ears. This can be achieved with:

- Screws in the holes provided
- Rivets in the holes provided
- Nails through the holes
- Tacks through the plastic of the ears
- Pushing into the spacers

The ears can be moved through up to 90°.

**Re-assembly instructions:**

The transponder is inserted into the fixing pocket. The ears are moved by 90° and inserted into the spacer. The fixing pocket must be aligned such that it covers the transponder (see Figure). Locking is automatic.

Figure 6-12 Dimensions of spacer and fixing pocket for RF360T

### 6.5.3 Technical data

Table 6-4 Technical specifications for RF360T

Memory size	8 KB				
Memory organization	Blocks of 8 bits / 1 byte				
Memory configuration					
<ul style="list-style-type: none"> <li>• Serial number (UID)</li> <li>• Application memory</li> <li>• OTP <sup>1)</sup> memory</li> </ul>	<ul style="list-style-type: none"> <li>• 4-byte (fixed code)</li> <li>• 8189 bytes r/w</li> <li>• 20 bytes</li> </ul>				
Storage technology	FRAM / EEPROM				
MTBF (Mean Time Between Failures) in years	1201				
Write cycles, at +40°C	Virtually unlimited (>10 <sup>10</sup> )				
Read cycles	Virtually unlimited (>10 <sup>10</sup> )				
Transmission rate	with RS422 reader:      with IQ-Sense reader:				
<ul style="list-style-type: none"> <li>• Reading</li> <li>• Writing</li> </ul>	<table style="width: 100%; border: none;"> <tr> <td style="width: 50%;">Approx. 0.3 ms / byte</td> <td style="width: 50%;">Approx. 20 ms / byte</td> </tr> <tr> <td>approx. 0.3 ms / byte</td> <td>approx. 25 ms / byte</td> </tr> </table>	Approx. 0.3 ms / byte	Approx. 20 ms / byte	approx. 0.3 ms / byte	approx. 25 ms / byte
Approx. 0.3 ms / byte	Approx. 20 ms / byte				
approx. 0.3 ms / byte	approx. 25 ms / byte				
Data retention	> 10 years				
Read/write distance	dependent on the reader used (see field data)				
Multitag capability	max. 4 transponders				
Recommended spacing from metal	≥ 20 mm; e.g. using spacer 6GT2190-0AA00 in conjunction with fixing pocket 6GT2190-0AB00				
Power supply	Inductive, without battery				
Degree of protection to EN 60529	IP67				
Shock to EN 60721-3-7	50 g				
Vibration to EN 60721-3-7	20 g				
Torsion and bending load	Not permitted permanently				
Enclosure dimensions	85.8 x 54.8 x 2.5 mm (L x W x H)				
Color	Anthracite				
Material	Epoxy resin				
Fixing	2 screws (M3) or with fixing pocket 6GT2190-0AB00				
Ambient temperature					
<ul style="list-style-type: none"> <li>• During operation</li> <li>• During transport and storage</li> </ul>	<table style="width: 100%; border: none;"> <tr> <td style="width: 50%;">-25°C to +75°C</td> <td style="width: 50%;"></td> </tr> <tr> <td>-40°C to +85°C</td> <td></td> </tr> </table>	-25°C to +75°C		-40°C to +85°C	
-25°C to +75°C					
-40°C to +85°C					
Weight	Approx. 25 g				

<sup>1)</sup> OTP: (One Time Programmable)

### 6.5.4 Ordering data

RF360T	Order No.
8 KB FRAM (read/write) + 4 byte EEPROM (read only), IP 67, -25 °C to +75 °C, dimensions 85.8 x 54.8 x 2.5 (LxWxH in mm)	6GT2800-4AC00

### 6.5.5 Dimension drawing

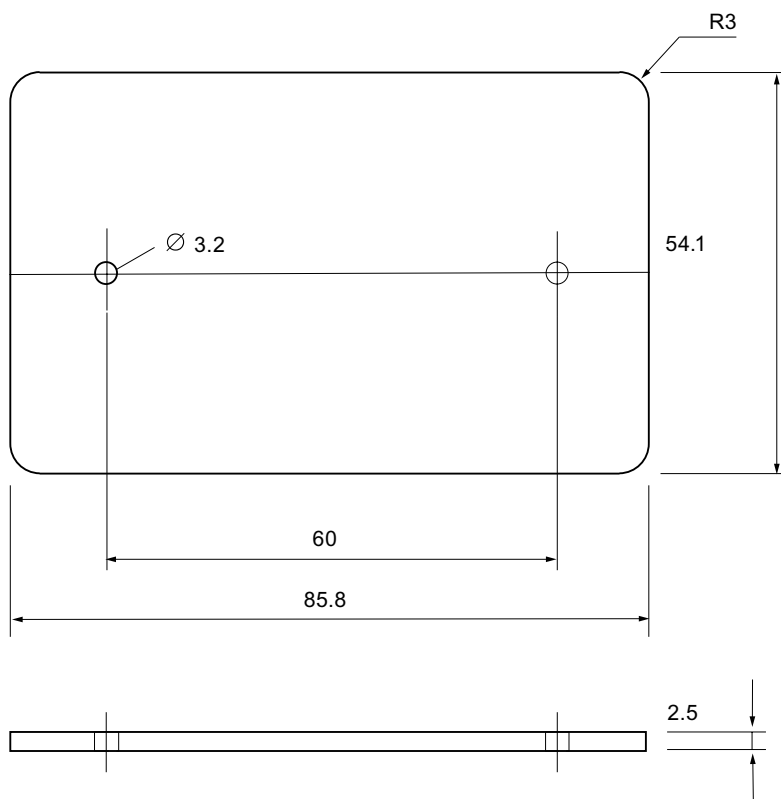


Figure 6-13 RF360T dimension drawing


Dimensions in mm



## 6.6 RF370T

### 6.6.1 Features

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

SIMATIC RF370T transponder	Features	
	Area of application	Identification tasks on assembly lines in harsh industrial environments, suitable for larger ranges, e.g. automotive industry
	Memory	Read-only area: 4 byte UID read/write memory: 32/64 KB OTP <sup>1)</sup> memory: 20 bytes
	Read/write range	Refer to SectionField data for transponders, readers and antennas (Page 39)
	Assembly	Direct assembly on metal or flush-mounting is possible (with two M5 screws)
	Degree of protection	IP68 IPx9K
	High resistance	to mineral oils, lubricants and cleaning agents

<sup>1)</sup> OTP: (One Time Programmable)

### 6.6.2 Metal-free area

Direct mounting of the RF370T on metal is permitted.

#### Mounting of RF370T on metal

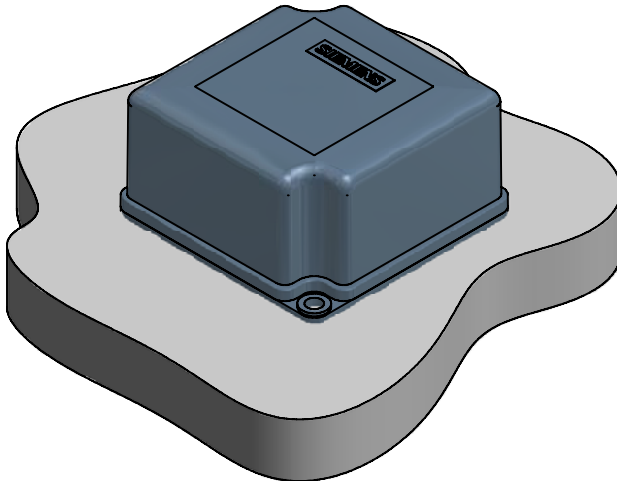


Figure 6-14 Mounting of RF370T on metal

#### Flush-mounting of RF370T in metal:

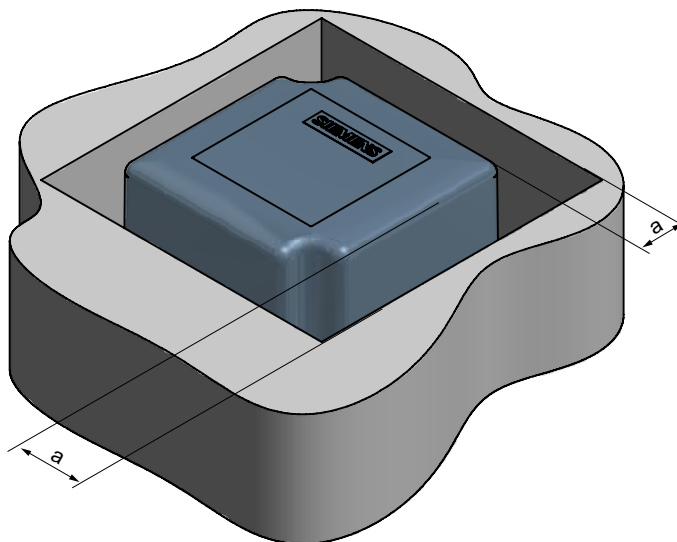


Figure 6-15 RF370T flush-mounted in metal

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

### 6.6.3 Mounting instructions

It is essential that you observe the instructions in the Section Installation guidelines (Page 57).

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

## 6.6.4 Technical specifications

### 6.6.4.1 Technical data for RF370T with 32 KB FRAM

Table 6-5 Technical specifications for RF370T with 32 KB FRAM

Characteristic	Description	
Memory size	32KB	
Memory organization	Blocks of 8 bits / 1 byte	
Memory configuration	Serial number	4-byte (fixed code)
	Application memory	32765 bytes r/w
	OTP <sup>1)</sup> memory	20 bytes
Storage technology	FRAM / EEPROM	
MTBF (Mean Time Between Failures) in years	1189	
Write cycles, at +40°C	Virtually unlimited (>10 <sup>10</sup> )	
Read cycles	Practically unlimited (>10 <sup>10</sup> )	
Transmission rate	Read	approx. 0.3 ms/byte
	Write	approx. 0.3 ms/byte
Data retention in years	> 10	
Read/write distance	dependent on the reader used (see field data)	
Multitag capability	max. 4 transponders	
Recommended spacing from metal	can be directly mounted on metal	
Power supply	Inductive, without battery	
Degree of protection to EN 60529	IPx9K	
Shock resistant to EN 60721-3-7	50 g	
Vibration resistant to EN 60721-3-7	20 g	
Torsion and bending load	Not permissible continuously	
Housing dimensions	75 x 75 x 40 mm (L x W x H)	
Color	Anthracite	
Material	PA12	
Fixing	Two M5 screws	
Ambient temperature	During operation	-25 °C to +85 °C
	During transport and storage	-40°C to +85°C
Weight	Approx. 200 g	

<sup>1)</sup> OTP: One Time Programmable; single write

## 6.6.4.2 Technical data for RF370T with 64 KB FRAM

Table 6-6 Technical specifications for RF370T with 64 KB FRAM

Characteristic	Description	
Memory size	64 KB	
Memory organization	Blocks of 8 bits / 1 byte	
Memory configuration	Serial number	4-byte (fixed code)
	Application memory	65276 bytes r/w
	OTP <sup>1)</sup> memory	20 bytes
Storage technology	FRAM / EEPROM	
MTBF (Mean Time Between Failures) in years	1189	
Write cycles, at +40°C	Practically unlimited (>10 <sup>10</sup> )	
Read cycles	Practically unlimited (>10 <sup>10</sup> )	
Transmission rate	Read	approx. 0.3 ms/byte
	Write	approx. 0.3 ms/byte
Data retention in years	> 10	
Read/write distance	dependent on the reader used (see field data)	
Multitag capability	max. 4 transponders	
Recommended spacing from metal	Can be directly mounted on metal	
Power supply	Inductive, without battery	
Degree of protection to EN 60529	IPx9K	
Shock resistant to EN 60721-3-7	50 g	
Vibration resistant to EN 60721-3-7	20 g	
Torsion and bending load	Not permissible continuously	
Housing dimensions	75 x 75 x 40 mm (L x W x H)	
Color	Anthracite	
Material	PA12	
Fixing	Two M5 screws	
Ambient temperature	During operation	-25 °C to +85 °C
	During transport and storage	-40°C to +85°C
Weight	Approx. 200 g	

<sup>1)</sup> OTP: One Time Programmable, single write

### 6.6.5 Ordering data

Ordering data	Order No.
SIMATIC RF300 RF370T transponder 32 KB FRAM, -25 to +85 degrees C, IP68; 75 x 75 x 40 mm	6GT2800-5BE00
SIMATIC RF300 RF370T transponder 64 KB FRAM, -25 to +85 degrees C, IP68; 75 x 75 x 40 mm	6GT2800-6BE00

### 6.6.6 Dimensional drawing

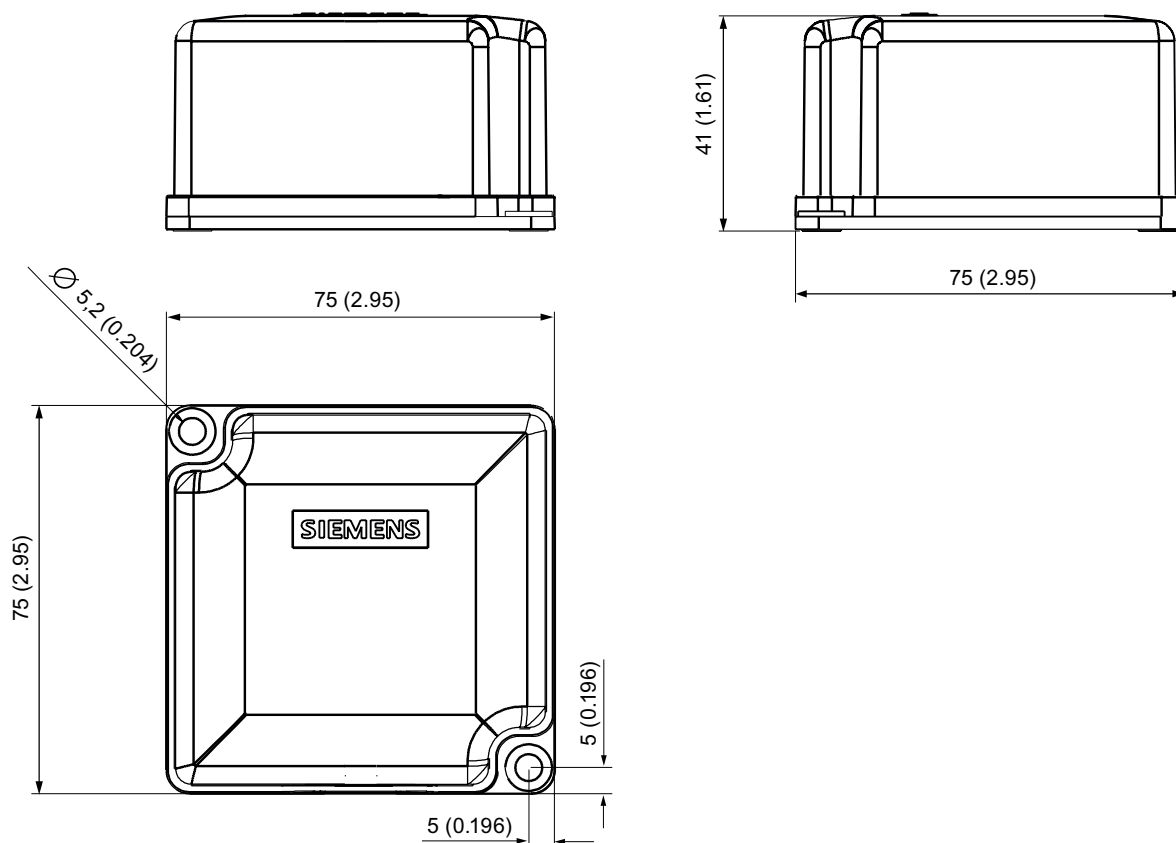



Figure 6-16 RF370T dimension drawing

Dimensions in mm (inches in brackets)

## 6.7 RF380T

### 6.7.1 Features

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

SIMATIC RF380T transponder	Features	
	Area of application	Identification tasks in applications (e.g. automotive industry) with cyclic <b>high temperature stress</b> > 85 °C and < 220 °C Typical applications: <ul style="list-style-type: none"> <li>• Primer coat, electrolytic dip area, cataphoresis with the associated drying furnaces</li> <li>• Top coat area with drying furnaces</li> <li>• Washing areas at temperatures &gt; 85°C</li> <li>• Other applications with higher temperatures</li> </ul>
	Memory	<ul style="list-style-type: none"> <li>• Read-only area (4 bytes UID)</li> <li>• Read/write memory (32 KB)</li> <li>• OTP <sup>1)</sup> memory (20 bytes)</li> </ul>
	Write/read range	Refer to SectionField data for transponders, readers and antennas (Page 39)
	Assembly	<ul style="list-style-type: none"> <li>• Direct assembly on metal or flush-mounting is possible.</li> <li>• The transponder can be secured using a special holder (see installation guidelines, section on RF380T). The tag size is designed such that it can be secured on a skid or also directly on a body.</li> </ul>
	Degree of protection	IP 68
	High resistance	to mineral oils, lubricants and cleaning agents
	1) OTP: One Time Programmable	

### 6.7.2 Installation guidelines for RF380T

It is essential that you observe the instructions in the Section Installation guidelines (Page 57).

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

6.7.2.1 Mounting instructions

**CAUTION**

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

Data memory support

Short version (6GT2 090-0QA00)	Long version (6GT2090-0QA00-0AX3)
<p>Dimensions in mm, inches in brackets</p>	<p>Dimensions in mm, inches in brackets</p>
<p>Material: V2A sheet-steel with thickness 2.5 mm BI 2.5 DIN 59382 1.4541</p>	



### Assembly of data memory with support

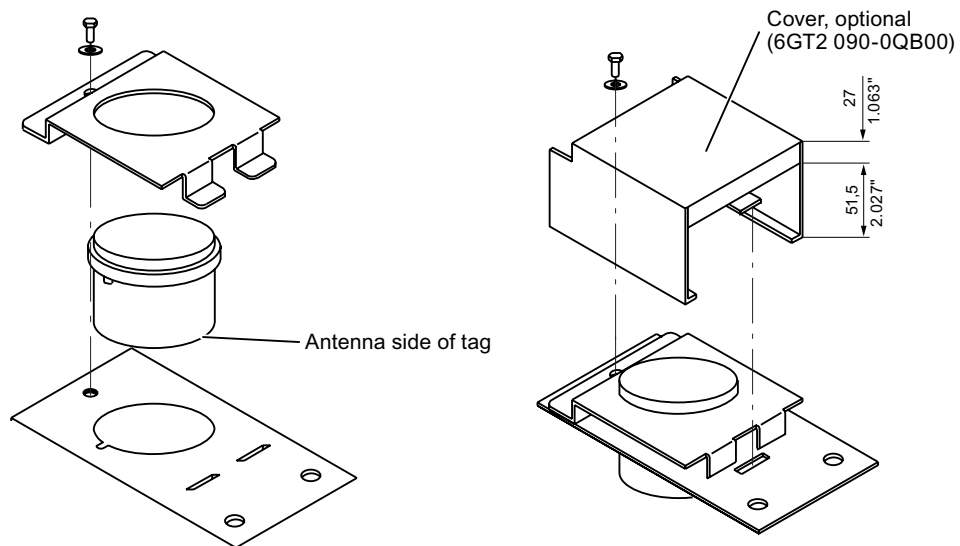


Figure 6-17 Assembly of tag with support

### Scope of supply

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

### 6.7.2.2 Metal-free area

Direct mounting of the RF380T on metal is permitted.

#### Mounting of RF380T on metal

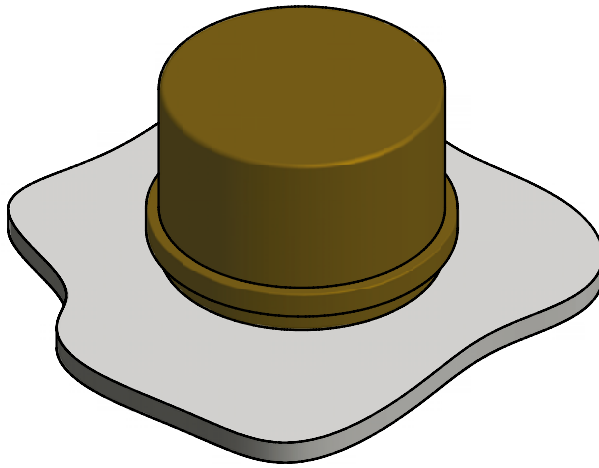


Figure 6-18 Mounting of RF380T on metal

#### Flush-mounting of RF380T in metal:

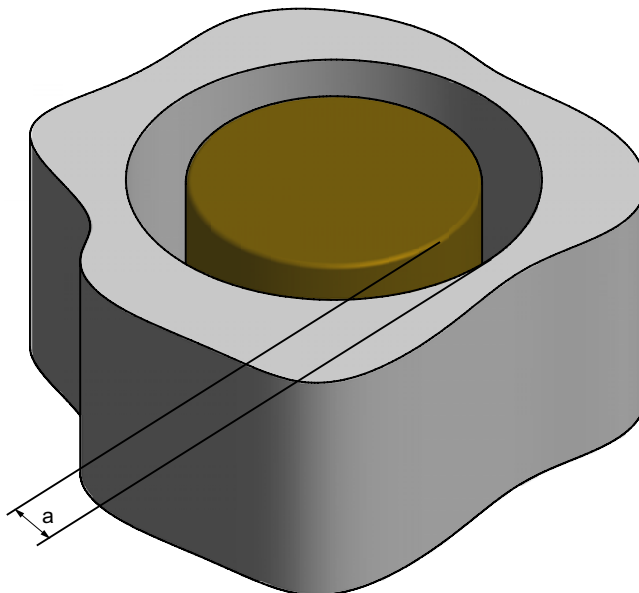


Figure 6-19 RF380T flush-mounted in metal

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

## 6.7.3 Configuring instructions

### 6.7.3.1 Temperature dependence of the transmission window

The guidelines in Section "Planning the RF300 system" apply to configuration of heat-resistant data memories, with the exception of the limit distance and field length at temperatures above 85 °C.

#### Calculation of transmission window with heat-resistant data memories

The factor 0.8 is required for calculating the transmission window, and takes into account production tolerances and temperature influences of to 85 °C.

An additional correction factor C must be included in the calculation at temperatures > 85 °C (up to 110 °C):

$t_{v[T < 85\text{ °C}]} = \frac{L \cdot 0,8}{V_{MDS}}$	
$S_{g[T > 85\text{ °C}]} = S_g \cdot C \quad L_{[T > 85\text{ °C}]} = L \cdot C$	
$t_{v[T > 85\text{ °C}]} = \frac{L \cdot C \cdot 0,8 \text{ [m]}}{V_{MDS} \text{ [m/s]}}$	
L	Field length
S <sub>g</sub>	Limit distance tag - reader
V <sub>Tag</sub>	Tag speed
C	Correction factor at temperatures > 85 °C (cf. following picture with correction factor C depending on temperature)
t <sub>v</sub>	Tag dwell time

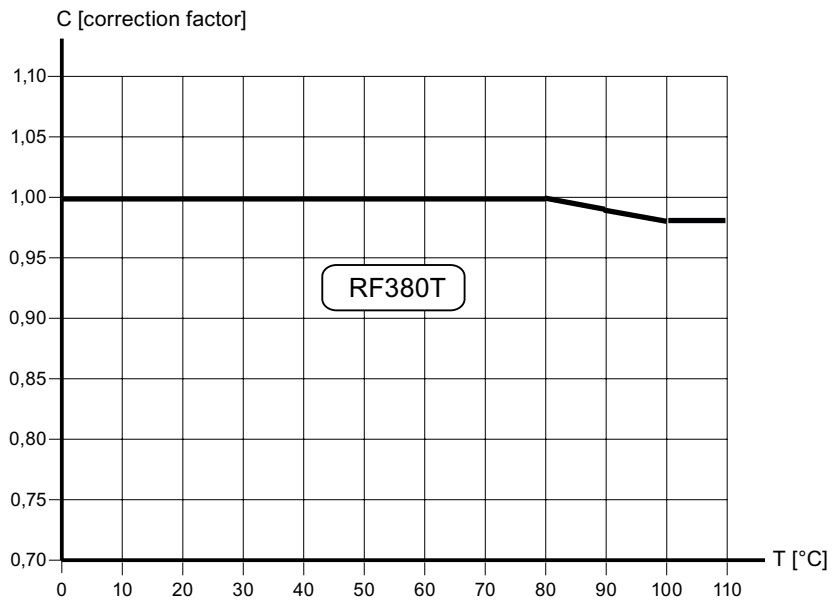


Figure 6-20 Correction factor C depending on temperature

The following diagram shows the reduction in the limit distance and field length at increased processing temperatures (internal temperature of tag):

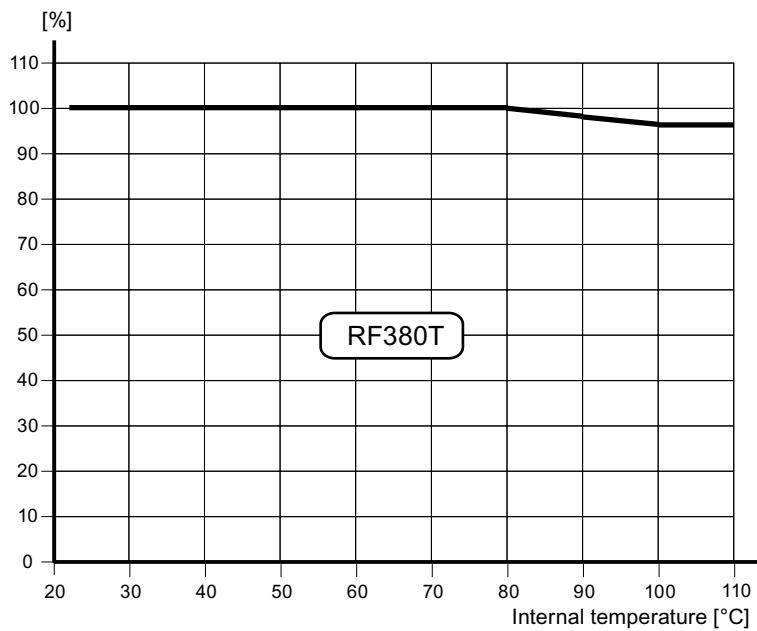


Figure 6-21 Reduction in field length and limit distance

The reduction in the field data at higher temperatures is due to the increased current consumption of the electronics.

### 6.7.3.2 Temperature response in cyclic operation

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

#### Note

##### Calculation of the temperature curves

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

### Ambient temperatures > 110 °C

#### NOTICE

##### Cancellation of warranty

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

Some limit cycles are listed in the table below:

Table 6-7 Limit cycles of data memory temperature

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

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

### Ambient temperatures > 220°C

#### NOTICE

##### Cancellation of warranty

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

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

Example of a cyclic sequence

Table 6-8 Typical temperature profile of an application in the paint shop

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

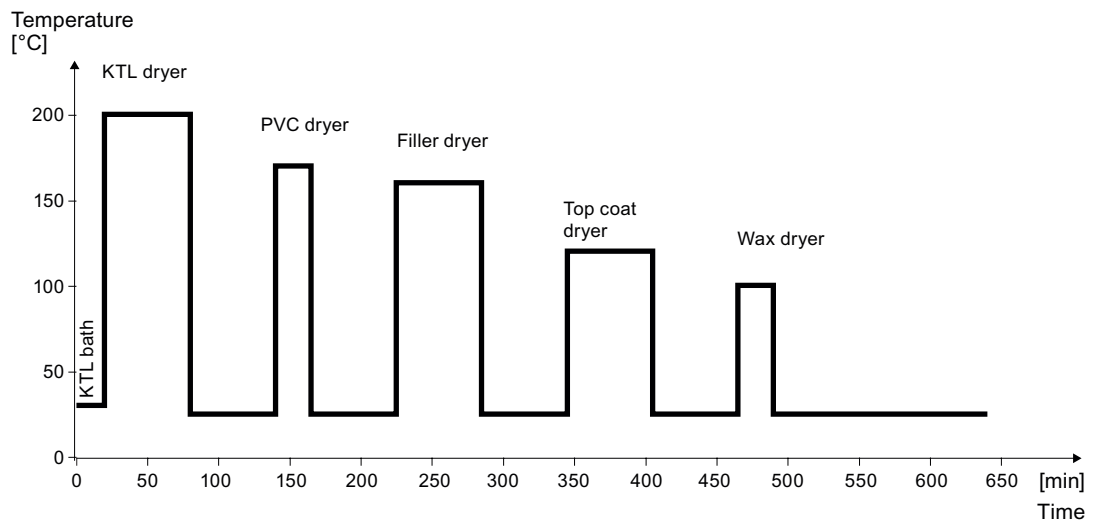


Figure 6-22 Graphic trend of temperature profile from above table

**The simulation results in the following:**

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

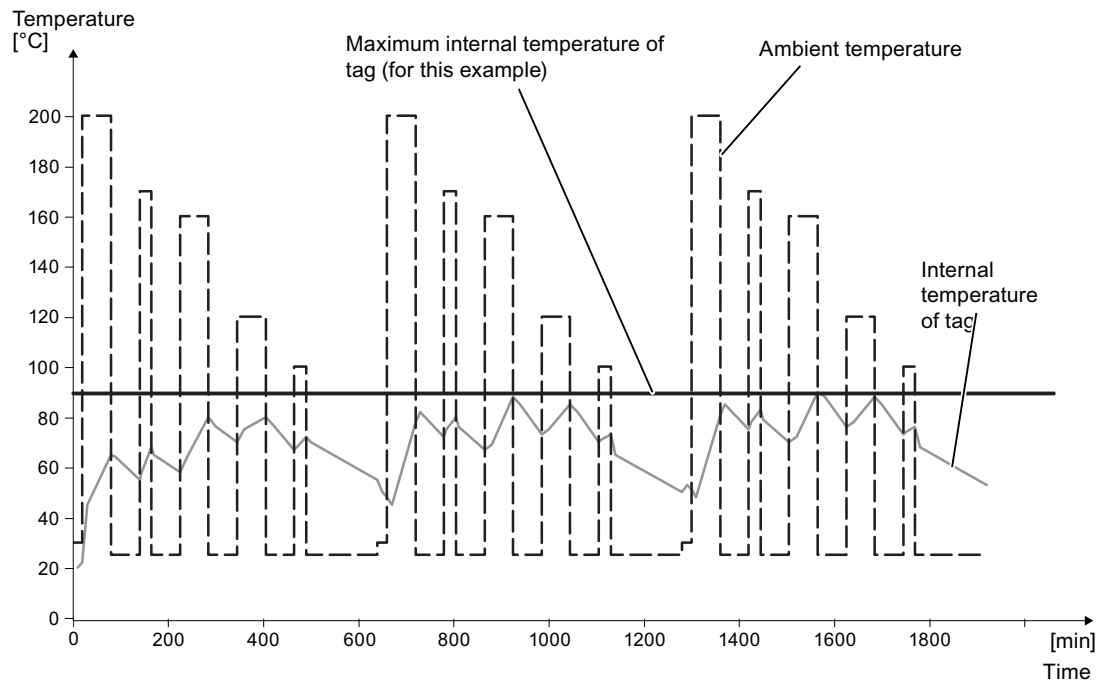


Figure 6-23 Complete temperature response due to simulation

### 6.7.4 Technical specifications

Table 6-9 RF380T with 32 KB FRAM

Characteristic	Description	
Memory size	32KB	
Memory organization	Blocks of 8 bits / 1 byte	
Memory configuration	Serial number	4-byte (fixed code)
	Application memory	32765 bytes r/w
	OTP <sup>1)</sup> memory	20 bytes
Storage technology	FRAM / EEPROM	
MTBF (Mean Time Between Failures) in years	1177	
Write cycles, at +40°C	Virtually unlimited (>10 <sup>10</sup> )	
Read cycles	Virtually unlimited (>10 <sup>10</sup> )	
Transmission rate	Read	approx. 0.3 ms/byte
	Write	approx. 0.3 ms/byte
Data retention	> 10 years	
Write/read distance	dependent on the reader used (see field data)	
Multitag capability	max. 4 transponders	
Recommended spacing from metal	can be directly mounted on metal	
Power supply	Inductive, without battery	
Degree of protection to EN 60529	IP68	
Shock resistant <sup>2)</sup> to EN 60721-3-7	50 g	
Vibration <sup>2)</sup> to EN 60721-3-7	5 g	
Direction-dependent	No	
Torsion and bending load	Not permissible continuously	
Enclosure dimensions	(diam. x H in mm) 114 x 83	
Color	Brown	
Material	PPS	
Fixing	Support to be ordered separately	
Ambient temperature	During operation	-25 °C to +110°C
	During cyclic operation	-25 °C to +220°C
	During transport and storage	-40°C to +110°C
Weight	Approx. 900 g	

<sup>1)</sup> OTP: (One Time Programmable)

<sup>2)</sup> Applies only in connection with original bracket



### 6.7.5 Ordering data

RF380T/ accessories	Order No.
<ul style="list-style-type: none"> <li>Operating temperature -25 to +200 °C (cyclic)</li> <li>Dimensions (diam. x H in mm) 114 x 83</li> <li>IP 68 degree of protection</li> <li>32 KB FRAM (read/write) + 4 byte EEPROM</li> </ul>	6GT2800-5DA00
Accessories <ul style="list-style-type: none"> <li>Support (short version)</li> <li>Support (long version)</li> <li>Covering hood</li> </ul>	6GT2090-0QA00 6GT2090-0QA00-0AX3 6GT2090-0QB00

### 6.7.6 Dimensional drawing

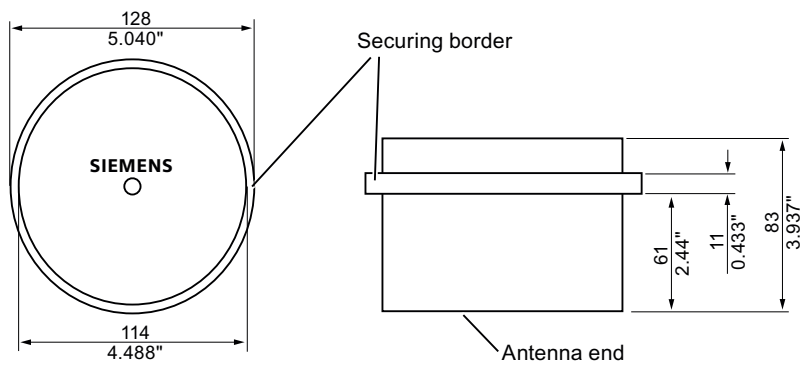


Figure 6-24 Dimension drawing RF380T

Dimensions in mm (inches in brackets)

### 6.8 Memory configuration of the RF300 tags

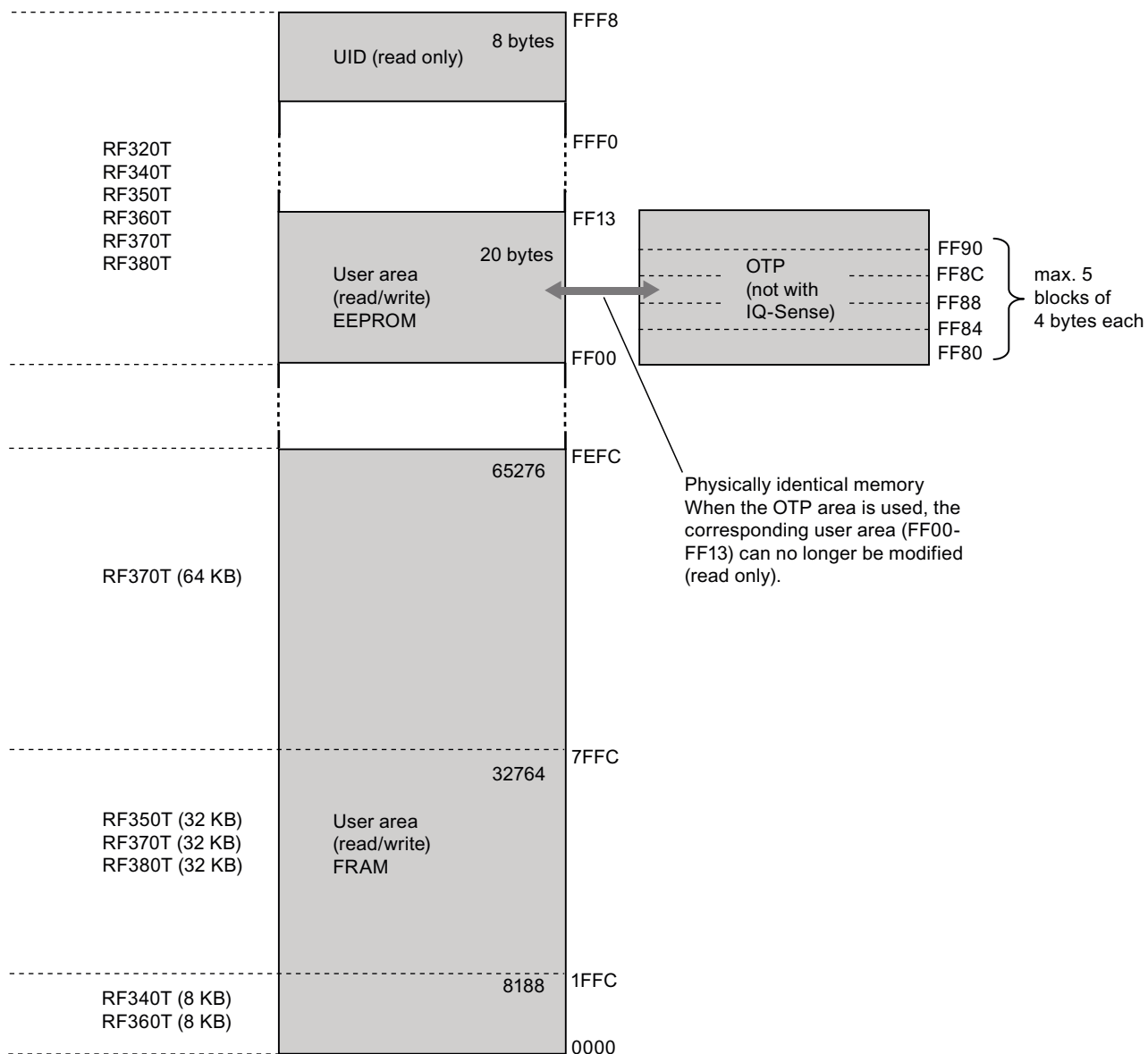


Figure 6-25 Memory configuration of the RF300 tags

## Memory areas

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

A high-speed FRAM memory (read/write) is available as an option. Depending on the tag type, this is 8 KB (0-1FFC) or 32 KB (0-7FFC) in size.

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

<b>NOTICE</b>
---------------

<b>This operation is not reversible.</b>
--

## OTP area

---

### Note

**The OTP area cannot be used for the IQ-Sense reader variant.**

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

Examples:

3 blocks (with write command), Block 0, 1, 2 (FF80, length = 12): valid

2 blocks (consecutive), Block 0 (FF80, length =4), Block 1 (FF84, length = 4): valid

2 blocks (consecutive), Block 0 (FF80, length =4), Block 2 (FF88, length = 4): Invalid

1 Block, Block 4 (FF90, length = 4): Invalid

The EEPROM user memory (address FF00-FF13, or FF80-FF90) requires significantly more time for writing (approx. 11 ms/byte) than the high-speed FRAM memory. For time-critical applications with a write function, it is therefore recommended that FRAM tags are used (e.g. RF340T, RF350T, RF360T).

---



## Communication modules

### 7.1 Overview

The communication modules (interface modules) are links between the RFID components (reader and transponder) and the higher-level control systems (e.g. SIMATIC S7) or PC or computers.

## 7.2 8xIQ-Sense

### 7.2.1 Features

#### Field of application

The 8xIQ-Sense module is the link between the RF310R with 8xIQ-Sense interface and SIEMENS S7-300 and functions in the same manner as the communication module (interface module). It can be operated centrally in an S7-300 or decentrally in an ET200M.



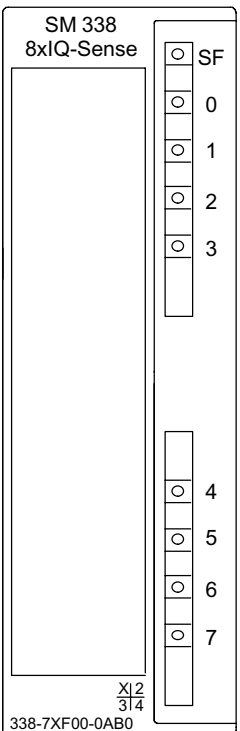
Figure 7-1 8xIQ-Sense interface module

## 7.2.2 Indicators

### Status displays

The 8xIQ-Sense module has the following LEDs:

A green LED, which has no function for RFID devices, and a red SF LED (system fault LED), which indicates the diagnostic state of the module.

	LEDs	Labeling	LED status	Meaning
	Green LED per channel	0...7		Has no function here
	Red	SF	Illuminated	Module fault, sensor fault, active teach-in operation, external auxiliary voltage missing
			Not illuminated	No fault or no active teach-in operation

### 7.2.3 Configuration

#### Centralized configuration with SIMATIC S7-300

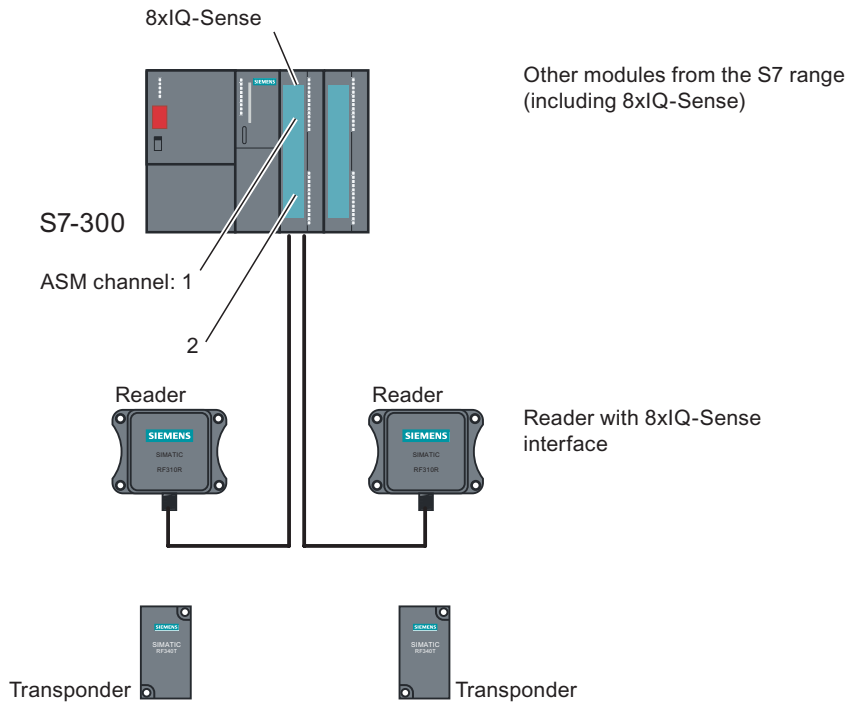


Figure 7-2 RF310R reader with 8xIQ-Sense interface



### Distributed configuration with ET 200M

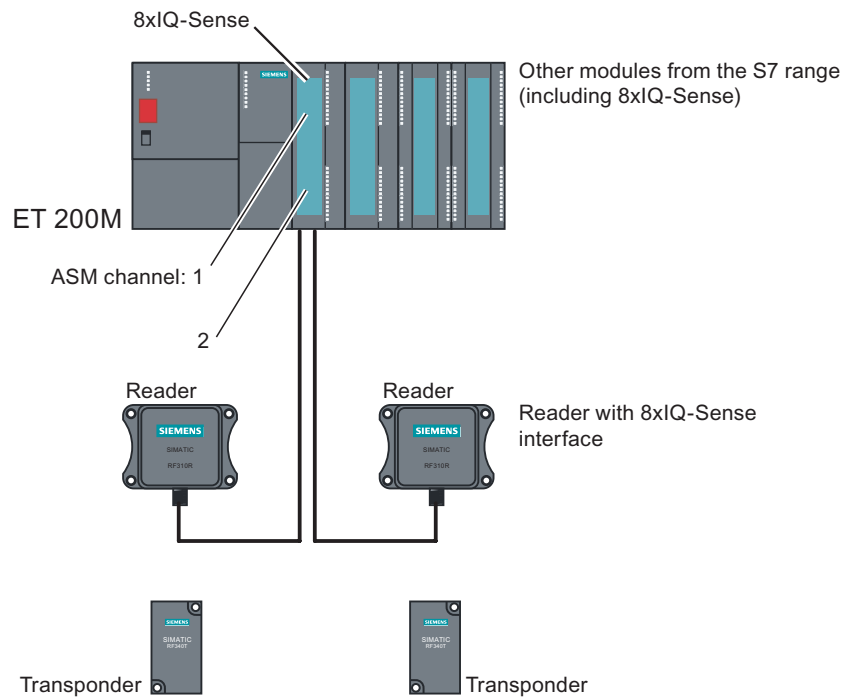


Figure 7-3 RF310R reader with 8xIQ-Sense interface

Table 7-1 Pin assignment of RF310R with IQ-Sense interface

Pin	Pin, device end, 4-pin M12	Assignment
	1	IQ-Sense
	2	Not assigned
	3	IQ-Sense
	4	Not assigned

**Configuration of connecting cable from 8xIQ-Sense to RF310R**

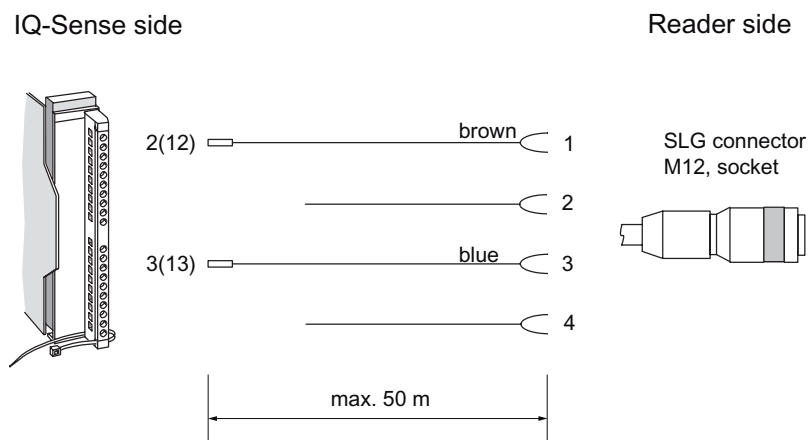


Figure 7-4 Cable and pin assignment of RF300 with IQ-Sense

**7.2.4 Addressing**

The address range of the 8xIQ-Sense module is 16 bytes I/O.

This is independent of the choice of channel profiles on the connected device (i.e. the IQ profile IDs in HW Config).

**Access to memory areas**

A direct association exists between the number of the channel to which the IQ-Sense device is connected (terminal) and the input and output data area of the module. Based on the address range, the following addresses can be used to access the memory areas:

$$\text{Address} = \text{module initial address} + (\text{channel no.} \times 2)$$

**Example**

Module initial address = 280

I/O address for channel 3: 286

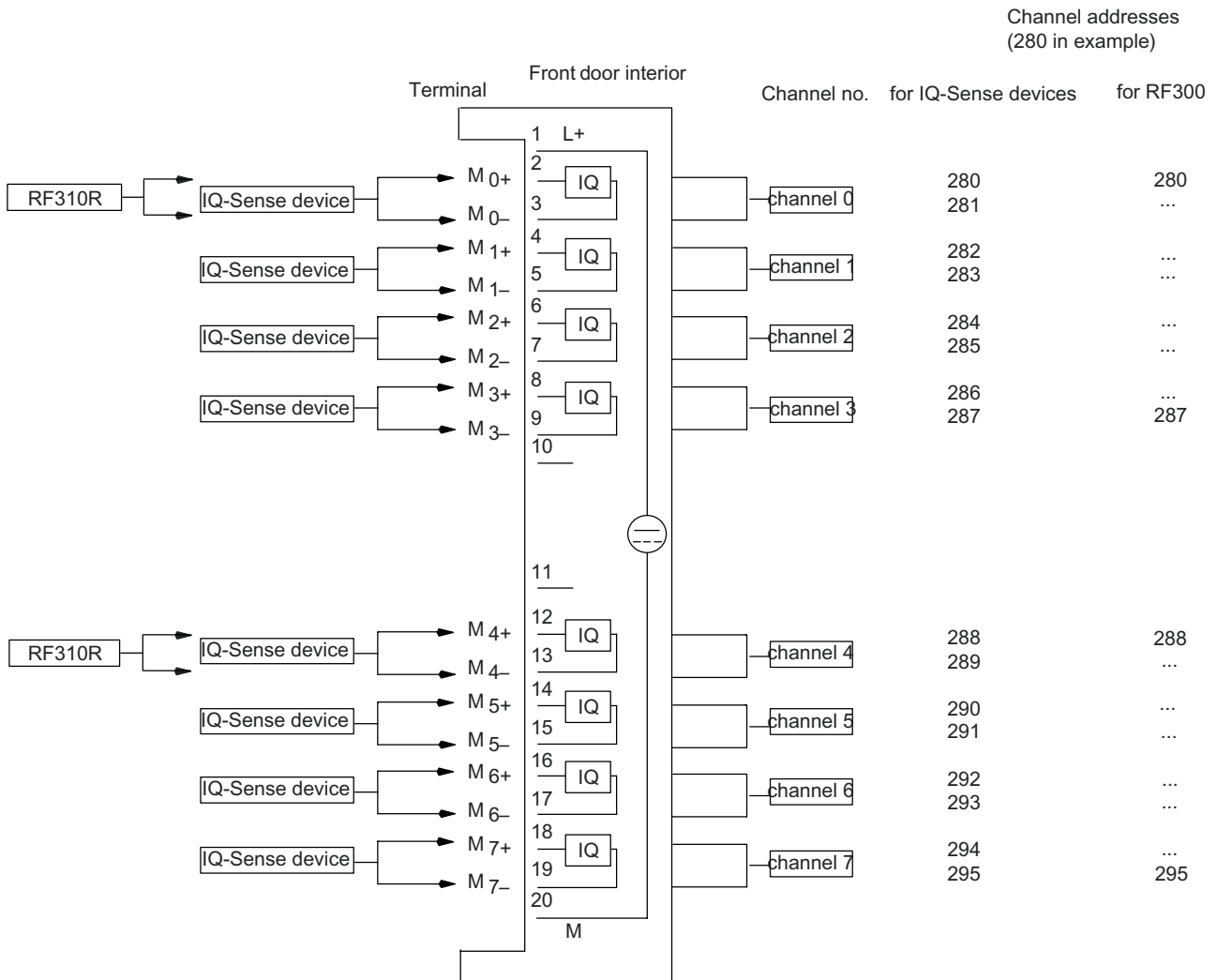


Figure 7-5 8xIQ-Sense module: Assignment of terminal pair to memory area

**Note**

A maximum of two read/write devices can be operated!

Each read/write device uses channel numbers 0 to 3 or 4 to 7.

### 7.2.5 Technical data

<b>Voltages and currents</b>	
Rated supply voltage	24 V DC
Reverse polarity protection	yes
Galvanic isolation	
• Between the channels	no
• Between channels and backplane bus	yes
Permissible potential difference	
Between different circuits	75 V DC / 60 V AC
Insulation tested at	500 V DC
Current input	
• from the backplane bus	120 mA typical
• from L+ power supply	500 mA max.
Module power loss	2.5 W typical
<b>Module-specific data</b>	
Number of channels	8
Channels for RFID systems	2
Cable length, unshielded	50 m max.
<b>Dimensions and weight</b>	
Dimensions w x h x d (mm)	40 x 125 x 120
Weight	Approx. 235 g

### 7.2.6 Ordering data

Table 7-2 Ordering data for 8xIQ-Sense and accessories

<b>Product description</b>	<b>Order No.</b>
SIMATIC S7-300 IQ-Sense SM338 for S7-300 and ET200M for the connection of up to 8xIQ-Sense sensors Optical sensors, ultrasonic sensors and RF identification systems can be connected.	6ES7 3387XF000AB0
<b>Accessories</b>	
M12 cable plug, 4-pole, with 5 m black PUR cable, 4 x 0.34 mm <sup>2</sup>	3RX8000-0CB42-1AF0
M12 cable plug, 4-pole, with 10 m black PUR cable, 4 x 0.34 mm <sup>2</sup>	3RX8000-0CB42-1AL0