SIEMENS

SIMATIC Ident
RFID systems
SIMATIC RF625T

Compact Operating Instructions

1 Characteristics

The SIMATIC RF625T transponder is a passive, maintenance-free data carrier with a round design. It functions based on the UHF Class 1 Gen 2 technology and is used for saving the electronic product code (EPC) of 96 bits/128 bits. The transponder also has a 512-bit user memory.

Fields of application are industrial asset management, RF identification of tools, containers and metallic equipment.

The Disk Tag is small and rugged and suitable for industrial applications with degree of protection IP68. It is highly resistant to oil, grease and cleaning agents.

Ideally, the SIMATIC RF625T is mounted directly on a flat metal surface of at least 150 mm diameter where it achieves a typical sensing distance of 1.5 m.

SIMATIC RF625T	Features		
	Application	Identification tasks in rugged industrial environments	
	Frequency versions	Europe	USA / Canada
		865 MHz ... 868 MHz	902 MHz ... 928 MHz
	Air interface	according to ISO°18000-6C	
	Polarization	Linear	
	Memory	EPC 96 bits/128 bits Add-on-memory 64 bytes	
	Read/write range	typically 1.5 m in conjunction with: • RF670R/RF640R reader and RF660A antenna • RF640R reader with integrated antenna	
		typically 0.7 m in conjunction with: • RF620R/RF630R reader and RF660A antenna	
		typically 0.7 m in conjunction with: • RF620R reader with integrated antenna	
	Installation	Suitable for direct mounting on conductive materials (preferably metal)	

2 Ordering data

Ordering data	Order no.
SIMATIC RF625T (Europe), frequency range 865 MHz ... 868 MHz	6GT2810-2EE00
SIMATIC RF625T (USA / Canada), frequency range 902 MHz ... 928 MHz	6GT2810-2EE01

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3 Planning the use

3.1 Optimum antenna/transponder positioning with planar mounting of the transponder on metal

Example of optimum reader-transponder positioning with RF620R and RF640R

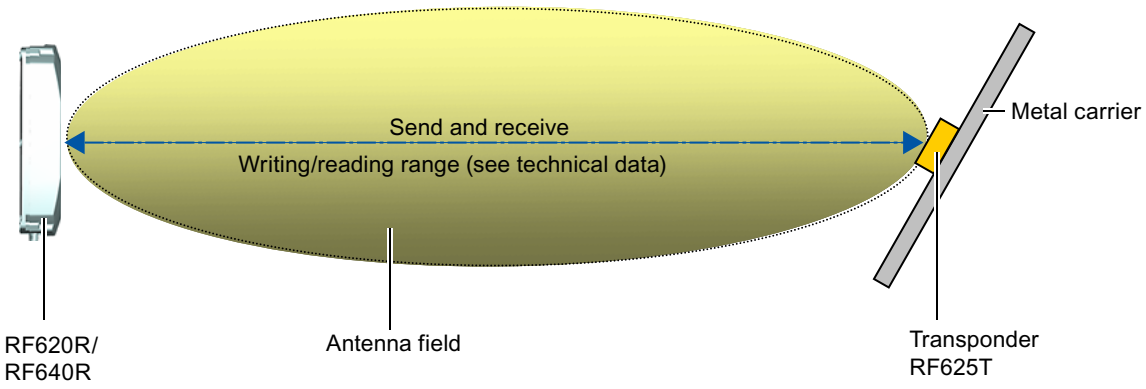


Figure 1-1 Example of optimum reader-transponder positioning with RF620R and RF640R via the internal reader antenna.

Example of optimum antenna-transponder positioning with RF620R, RF630R, RF640R and RF670R

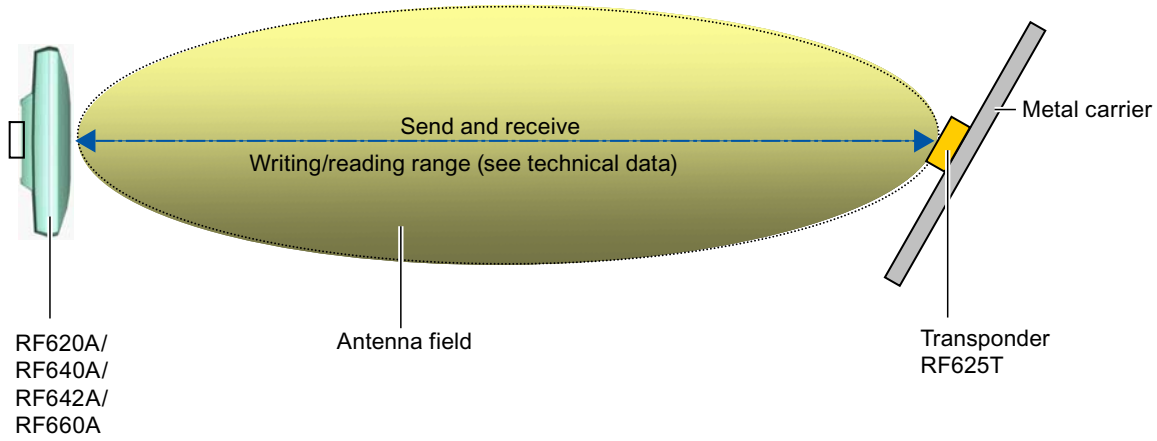


Figure 1-2 Example of optimum antenna-transponder positioning with the RF620R, RF630R, RF640R and RF670R readers in conjunction with the external antennas RF620A, RF640A, RF642A or RF660A.

3.2 Reading range when mounted on flat metallic carrier plates

The transponder generally has linear polarization. The polarization axis runs as shown in the diagram below. If the tag is centrically mounted on a flat metal plate, which may either be almost square or circular, it can be aligned in any direction since the transmitting and receiving RF660A antennas operate with circular polarization.

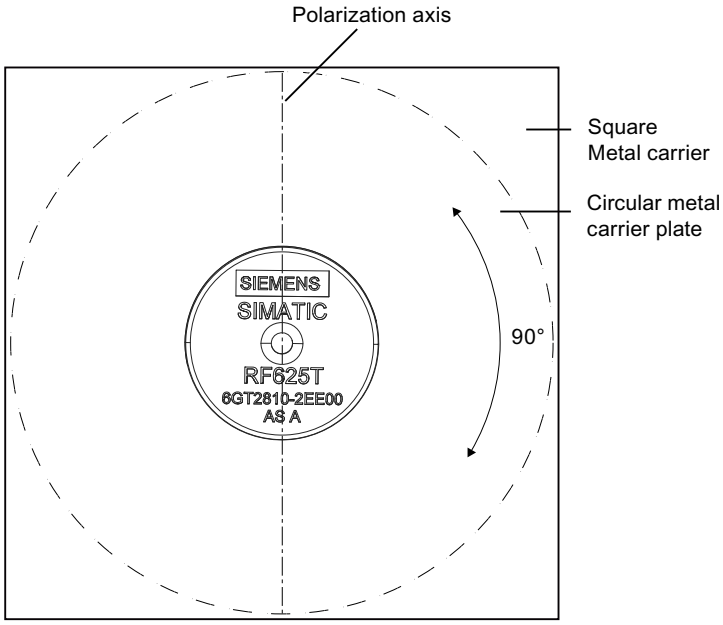


Figure 1-3 Optimum positioning of the transponder on a (square or circular) metal plate

Table 1-1 Reading range on flat metallic carrier plates

Carrier plate material	Reading range
Metal plate of at least Ø 150 mm	100 %
Metal plate Ø 120 mm	Approx. 70 %
Metal plate Ø 85 mm	Approx. 60 %
Metal plate Ø 65 mm	Approx. 60 %

On rectangular carrier plates, the reading range depends on the mounting orientation of the transponder You will find more detailed information on reading ranges in the section "Electrical data (Page 11)".

3.3 Reading range when mounted on non-metallic carrier materials

The transponder is generally designed for mounting on metallic objects which provide the conditions for the maximum reading ranges

Table 1-2 Reading range on non-metallic carriers

Carrier plate material	Reading range [1]
Transponder on wooden carrier	Approx. 60 %
Transponder on plastic carrier	Approx. 65 %
Transponder on plastic mineral water bottle	Approx. 70 %
Transponder without base	Approx. 50 %

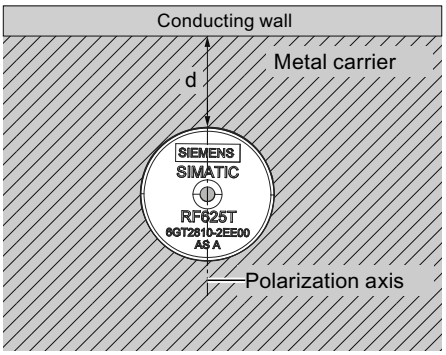
[1] The maximum read range of 100 % is achieved by mounting the transponder on a flat metallic carrier with a diameter of at least 150 mm.

You will find more detailed information on reading ranges in the section "Electrical data (Page 11)".

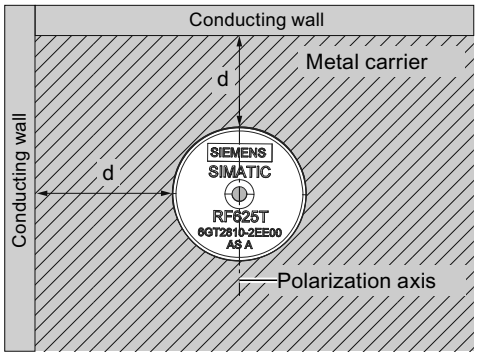
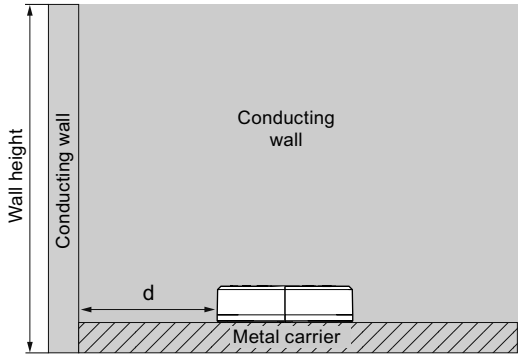
3.4 Influence of conducting walls on the reading range

If there are conducting walls or restrictions in the vicinity that could affect the radio field, a distance of approx. 10 cm is recommended. In principle, walls have least influence if the polarization axis is orthogonal to the wall.

Reading range: One conducting wall

Influence on reading range when positioned against one conducting wall				
View from above 				
Distance d	20 mm	50 mm	100 mm	
Reading range	Approx. 100 %	Approx. 100 %	Approx. 100 %	Wall height 20 mm
	Approx. 100 %	Approx. 100 %	Approx. 100 %	Wall height 50 mm
	Approx. 80 %	Approx. 100 %	Approx. 100 %	Wall height 100 mm

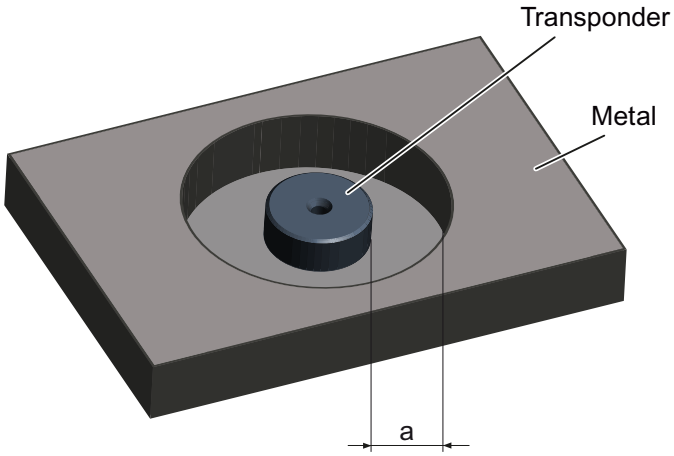
Reading range: Two conducting walls

Influence on reading range when positioned against two conducting walls				
View from above 			Side view 	
Distance d	20 mm	50 mm	100 mm	
Reading range	Approx. 70 %	Approx. 75 %	Approx. 100 %	Wall height 20 mm
	Approx. 70 %	Approx. 80 %	Approx. 100 %	Wall height 50 mm
	Approx. 70 %	Approx. 40 %	Approx. 50 %	Wall height 100 mm

The values specified in the tables above are guide values.

3.5 Mounting in metal

It is possible to mount the transponder in metal. If there is not enough clearance to the surrounding metal, this reduces the reading range.



Clearance (all-round)	Reading range [1]
a = 5 mm	Approx. 50 %
a = 10 mm	Approx. 70%

[1] The read range information applies when the transponder is mounted on a metallic carrier with a diameter of at least 150 mm.

Figure 1-4 Flush-mounting of RF625T in metal

3.6 Directional radiation pattern of the transponder

Directional diagram in the ETSI frequency band (Europe)

The directional diagram is shown for nominal alignment and a center frequency of 866.3 MHz. The nominal transponder alignment is achieved when the transponder is viewed as shown in the following figure.

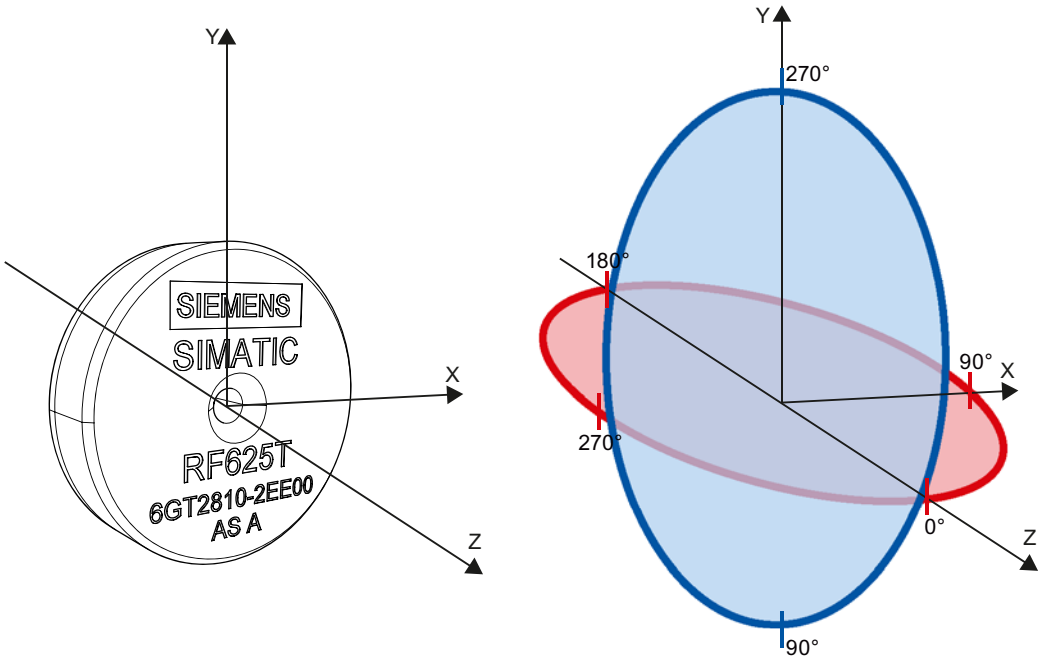


Figure 1-5 Reference system of the RF625T

Ideally, align the data carrier parallel with the transmitting antenna or the reader. If the data carrier including the (metallic) carrier plate is tilted, the reading range will be reduced. The following diagrams show the effects on the reading range depending on the carrier material and the angle of inclination of the transponder.

Directional characteristics of the transponder when mounted on a metallic carrier

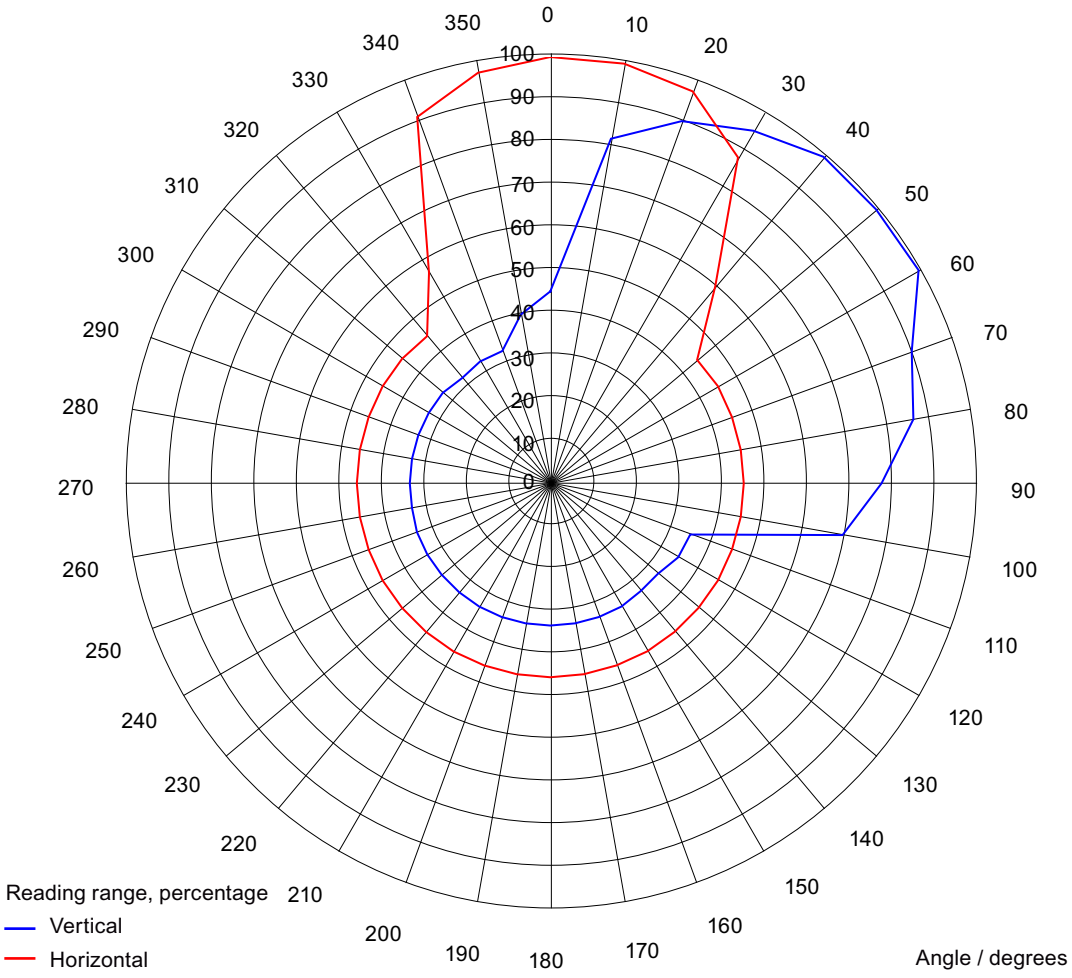


Figure 1-6 Directional characteristics of the RF625T on a metallic carrier depending on the angle of inclination in a vertical or horizontal direction

Directional characteristics of the transponder when mounted on a non-metallic carrier

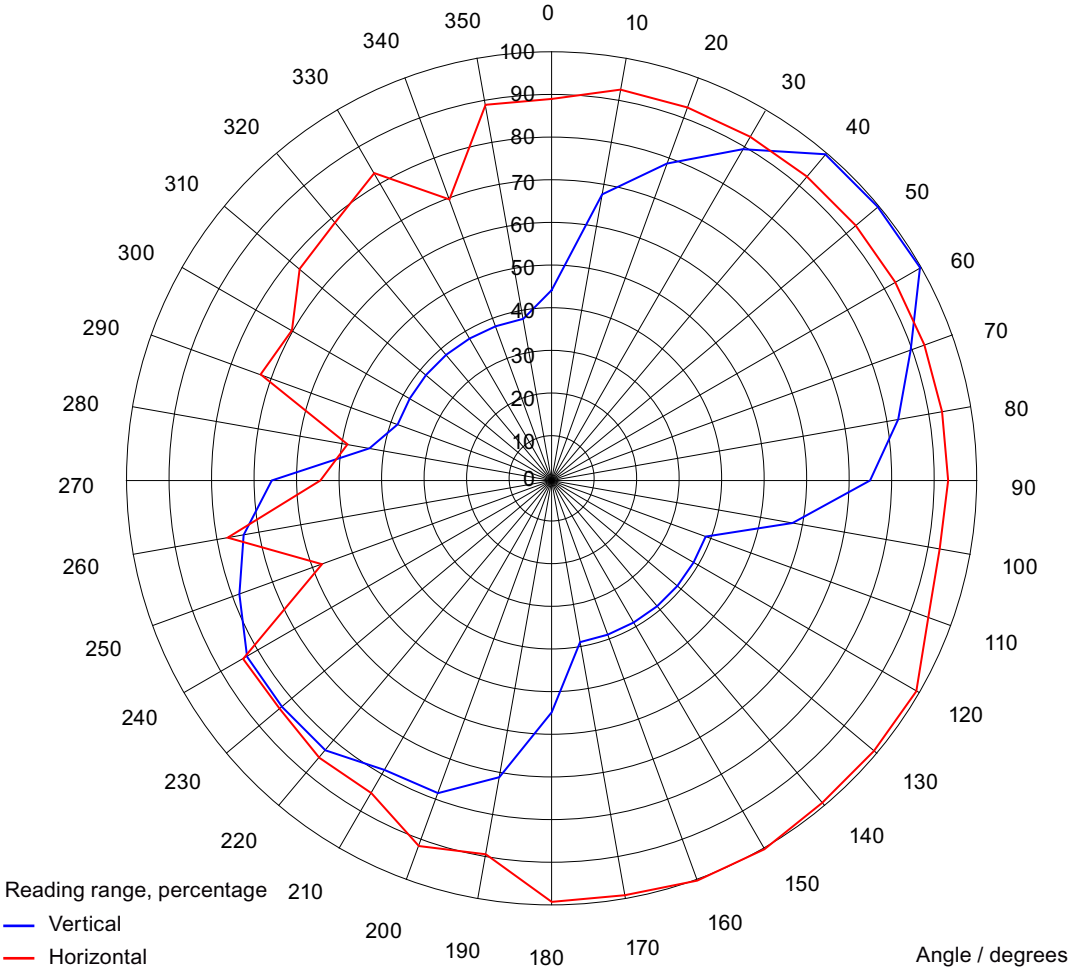


Figure 1-7 Directional characteristics of the RF625T on a non-metallic carrier depending on the angle of inclination in a vertical or horizontal direction

4 Mounting instructions

Properties	Description
Type of installation	Secured with screw ①, (M3 counter-sunk head screw)
Tightening torque (at room temperature)	≤ 1.0 Nm

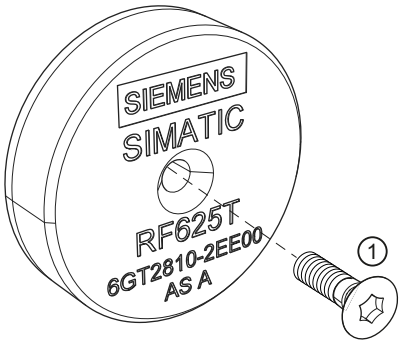


Figure 1-8 Screw mounting

Note

Make sure that the mounting surface is even when mounting the transponder.

5 Memory configuration

SIMATIC memory configuration

The following graphic shows the structure of the virtual SIMATIC memory for the RF620R/RF630R reader and explains the function of the individual memory areas. The SIMATIC memory configuration is based on the 4 memory banks, as they are defined in EPC Global.

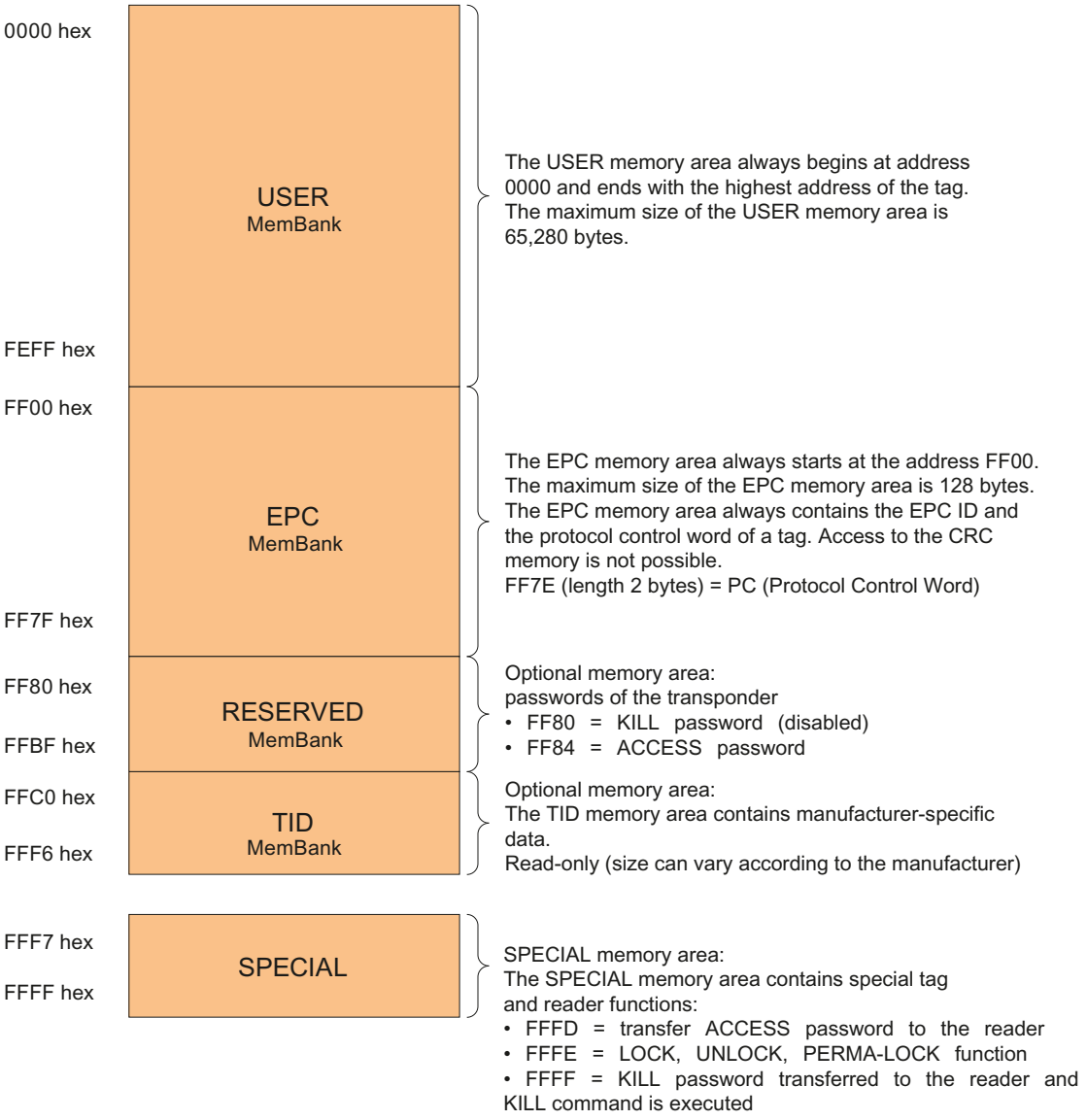


Figure 1-9 SIMATIC memory configuration

Memory configuration for RF625T

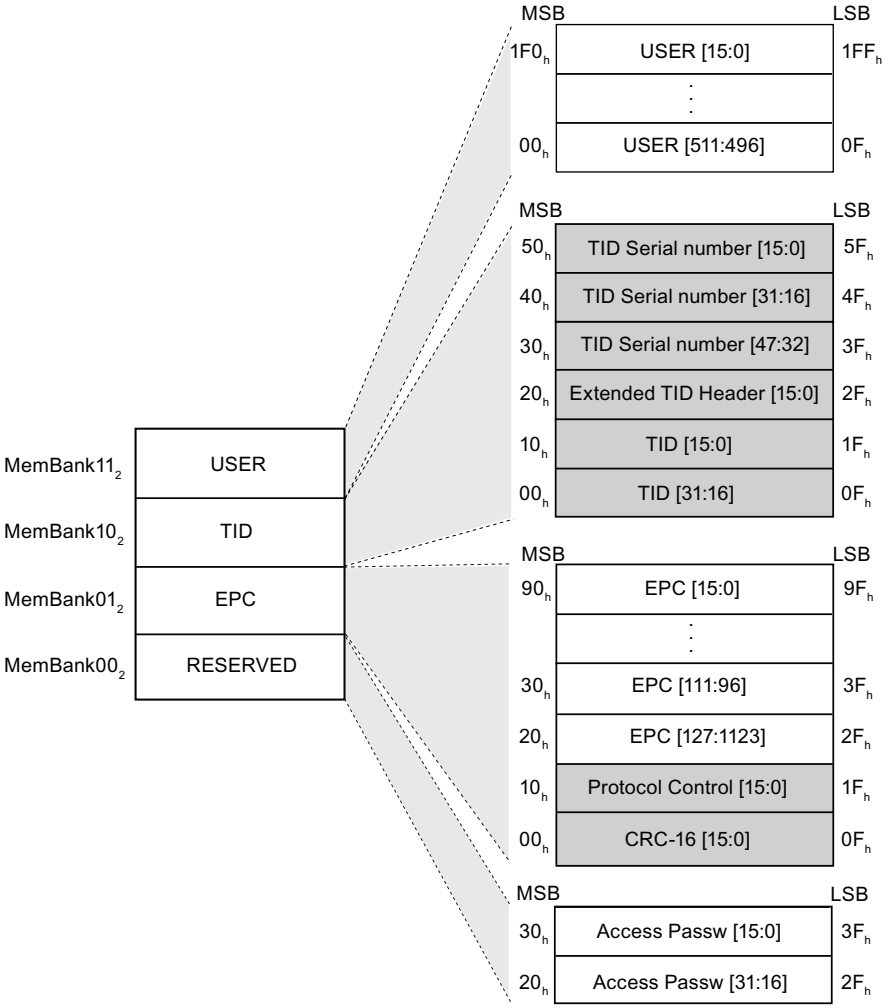
Tags	User [hex]	EPC		TID	RESERVED (passwords)	Special	
		Range	Access			KILL-PW	Lock function
RF625T	00 - 3F	FF00-FF0B (128 bits = FF00-FF0F)	read/ write	FFC0-FFC9	FF80-FF87	LOCKED	Yes

Memory representation according to EPC

The memory of the ISO 18000-6C EPC Class 1 Gen 2 chip is divided logically into four different memory banks:

Memory bank (decimal)	Memory type	Description
MemBank 11_2	USER	User-writable USER memory area
MemBank 10_2	TID	Is defined by the manufacturer, contains the class identifier and serial number of a tag
MemBank 01_2	EPC	Contains the EPC UID, the protocol and the CRC of a tag You can write to the EPC memory area. In the delivery condition, the memory contents can have the following states: • empty • containing the same data • containing different data
MemBank 00_2	RESERVED	Contains the access and kill password.

The graphic below illustrates the exact memory utilization: Each box in the right part of the graphic represents one word (16 bit) in the memory.



Color	Mode of access by RF600 reader
	Read
	Write / read

Figure 1-10 Representation of the RF625T memory configuration according to EPC (logical memory map)

Parameterization

Which parameter assignment options available to you for which reader of the RF600 family is outlined in the system manual "RF600". Detailed information for parameterization as well as examples for describing and reading specific memory areas can be found in the referenced chapters of the documentation.

6 Technical Specifications

6.1 Mechanical data

Property	Description
Dimensions (D x H)	30 (+0.5) mm x 8 (+0.5) mm
Design	Plastic housing (PA6.6), silicone-free
Weight	Approx. 6 g
Mounting on metal	directly on metal without spacing

6.2 Electrical data

Property	Description	
	Europe	USA / Canada
Air interface	According to ISO 18 000-6 C	According to ISO 18 000-6 C
Frequency range	865 MHz … 868 MHz	902 MHz ... 928 MHz [1]
Necessary transmit power	2 W (ERP)	4 W (EIRP)
Reading range [2] Mounting on non-metal Mounting on metal [3]	 typical 1.0 m min. 1.2 m; typical 1.5 m	 typical 1.0 m min. 1.2 m; typical 1.5 m
Writing range [2] Mounting on non-metal Mounting on metal [3]	 typical 0.7 m min. 1 m; typical 1.2 m	 typical 0.7 m min. 1 m; typical 1.2 m
Polarization type	Linear	Linear
Minimum distance to transmit antenna [4]	Approx. 0.2 m	Approx. 0.2 m
Energy source	Magnetic energy via antenna, without battery	Magnetic energy via antenna, without battery
Multi-tag capability	Yes, minimum distance between data carriers ≥ 50 mm [5]	Yes, minimum distance between data carriers ≥ 50 mm [5]

[1] Reduction of range to about 70% at the band limits 902 MHz or 928 MHz; acquisition is guaranteed at 915 MHz due to frequency hopping procedure.

[2] Tolerances of ±20% of the maximum acquisition ranges are permitted due to production and temperature conditions.

[3] Mounting on a flat surface with a diameter of at least 150 mm

[4] When using the RF620R and RF640R readers in conjunction with the antennas RF640A, RF642A and RF660A.

[5] When these minimum clearances are not kept to, there is a reduction in the maximum possible read and write ranges of the transponders.

You will find more detailed information on reading range, directional characteristics and installation in the sections "Planning the use (Page 2)" and "Mounting instructions (Page 8)".

6.3 Information on memory

Property	Description	
Type	EPC Class 1 Gen 2	
Memory organization	EPC code	96 bits/128 bits
	User memory	64 bytes
	TID	96 bits
	Reserved (passwords)	64 bits
Protocol	ISO 18000-6C	
Data retention time	10 years	
Read cycles	Unlimited	
Write cycles	Minimum 100 000, at +22 °C	

6.4 Environmental conditions

Property	Description
Temperature range during operation	-25 °C … +85 °C
Temperature range during storage	-40 °C … +125 °C
Shock resistant to EN 60068-2-27 Vibration to EN 60068-2-6	50 g, [1] 20 g, [1]
Torsion and bending load	Not permissible
Degree of protection	IP68 according to EN 60529: (45 minutes. immersion in water; water depth 1 m from top edge of housing at +20 °C)
	IPx9K to EN 60529: • Steam blaster nozzle distance 150 mm • 10 ... 15 l water per minute • Pressure 100 bar • Temperature 75 °C • Test time 30 seconds
MTBF	2 x 10 [5] hours

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

6.5 Chemical resistance of the RF625T transponder

The following table provides an overview of the chemical resistance of the data memory made of polyamide 6.6. It must be emphasized that the plastic housing is extremely resistant to chemicals in automobiles (e.g.: oil, grease, diesel fuel, gasoline) which are not listed separately.

Substance	Concentration
Mineral lubricants	■
Aliphatic hydrocarbons	■
Aromatic hydrocarbons	■
Petroleum spirit	■
Weak mineral acids	◪
Strong mineral acids	□
Weak organic acids	◪
Strong organic acids	□
Oxidizing acids	□
Weak alkalis	◪
Strong alkalis	□
Trichloroethylene	■
Perchloroethylene	■
Acetone	■
Alcohols	■
Hot water (hydrolysis resistance)	◪

Abbreviations:	
■	Resistant
◪	Limited resistance
□	Not resistant

7 Certificates and approvals

Table 1-3 SIMATIC RF625T UHF Disk Tag (Europe), 6GT2810-2EE00

Certificate	Description
CE	Conforms to R&TTE directive

Table 1-4 SIMATIC RF625T UHF Disk Tag (USA/Canada), 6GT2810-2EE01

Standard	
FCC Federal Communications Commission	Passive labels or transponders comply with the valid regulations; certification is not required
C UL US	This product is UL-certified for the USA and Canada. It meets the following safety standard(s): • UL508 - Industrial Control Equipment • CSA C22.2 No. 142 - Process Control Equipment • UL Report E 120869

8 Dimension drawing

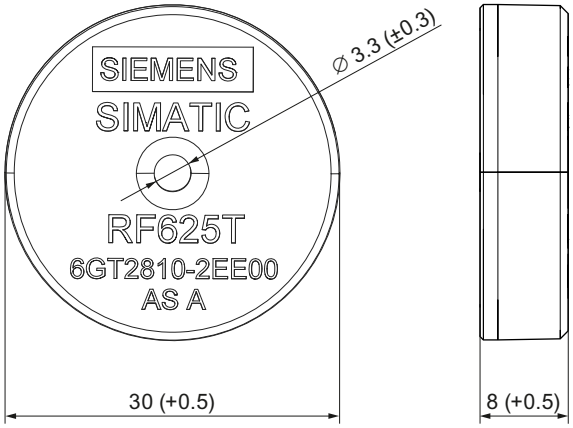


Figure 1-11 SIMATIC RF625T UHF Disk Tag

Units of measurement: All dimensions in mm

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