RFID Systems SIMATIC RF for optimizing material flow and logistics Technical Brochure · April 2008



SIMATIC Sensors

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RFID Systems SIMATIC RF

for optimizing material flow and logistics

The clever electronic identification systems identify products reliably, quickly and efficiently. They are insensitive to dirt and save data directly on the product. They control and optimize the material flow and ensure efficient logistics.

Everyone who works with identification systems has their own specific requirements. Some need low-cost Smart Labels for logistics and others need rugged data memories for assembly lines. And "long range" data memories are indispensable in traffic control systems and transport logistics.

Suitable for every sector:

- Assembly lines
- Conveyor systems
- Industrial production
- Warehouses
- Logistics
- Distribution
- Order picking
- Transport logistics

RF identification systems from Siemens have been wellproven over many years in a wide range of different applications, operating securely and reliably round-the-clock.

Successful industrial enterprises have relied on Siemens RFID systems worldwide for more than 25 years.

Highlights

- Fully automatic, rapid identification, with 100% transmission reliability
- Production and quality data can be saved directly on the product
- Insensitive to temperature variations and pollution
- Wide spectrum of data memories that can be re-used at any time – from Smart Labels through to the 64 KB tag
- Flexible communications with the automation system: Serially via PROFIBUS, PROFINET or Ethernet
- Seamless integration in SIMATIC reduces engineering costs
- Support of ISO 14443, ISO 15693, ISO 18000-2, ISO 18000-4 standards as well as EPCglobal and ISO/IEC 18000-6.



	Production		Logistics			
RFID system	MOBY E	MOBY I	SIMATIC RF300	MOBY U	MOBY D	SIMATIC RF600
Read/write distance	Up to 0.1 m	Up to 0.15 m	Up to 0.15 m	Up to 3.0 m	Up to 0.9 m	up to 10 m (2x 2 antennae, mounted opposite each other)
Frequency	13.56 MHz	1.81 MHz	13.56 MHz	2.4 GHz	13.56 MHz	865 to 868 MHz (Europe) 902 to 928 MHz (North Ameri- ca)
Standards	ISO 14443	-	-	ISO 18000-4	ISO 15693 ISO 18000-3	EPC Gen 1, EPC Gen 2, ISO 18000-6B, ISO 18000-6C

Relying on well-proven technology

The RFID operating principle

Meaningful data from the very beginning

In contrast to conventional identification systems, the RFID systems from Siemens offer wide-ranging advantages: Contact-less data transfer offers high reliability. And the uniform system integration ensures quick and easy integration in the application saving time and costs. Our RFID systems ensure that meaningful data accompany a product or object from the very beginning. The mobile data storage units (MDSes or tags/transponders) are attached to the product, product carrier, object or its transport or packing unit and written contact-free. All application-specific data can then be found on the mobile data storage unit. This may be on a body component in the automotive industry or even on an orderpicking crate. Up to 64 KB of data can be stored and individually read and expanded at each work place or manufacturing station. The material flow is therefore synchronized with the data flow.

Contact-free data transmission and a high degree of industrial compatibility

High-performance write/read devices (SLGs) in various rugged types of construction ensure fast and reliable data transfer between the mobile data storage units and the higher-level systems (PLCs, PCs, etc.). The data as well as the energy are inductively transferred through a changing electromagnetic field by radio waves. This principle of contact-free data transmission operates reliably through pollution or non-metallic materials.

Perfectly tuned components

- Mobile data storage units (tags)
- Write/read devices as well as mobile handheld terminals
- Antennas
- Communication modules for connection to the automation system (PROFIBUS, PROFINET, Ethernet)
- Software for system integration

Broad spectrum of mobile data storage units

We offer you various mobile data storage units in different memory technologies (read-only, EEPROM or FRAM/SRAM) and geometric designs. Their strengths lie not only in the high level of data security but also in the excellent degree of protection against ambient conditions such as pollution, temperature variations, washing water or shocks.

Flexible system integration

Whatever the requirements: The RFID systems SIMATIC RF support easy system integration into SIMATIC or SINUMERIK, in the PROFIBUS, Ethernet or PC environment and can be connected to any controllers. A wide spectrum of communication modules, function blocks and high-performance drivers and function libraries support quick and easy integration into the application.



RFID systems for production

Powerful performance and tough resistance

In the vicinity of assembly lines and industrial production, conditions can be extremely harsh. This is not a problem for our RFID systems and their components specifically developed for industrial applications. These are reliable and perform well on reading and writing and feature high degrees of protection up to IP68. They impress customers with their high degree of data security and enormous memory capacity, they can manage large volumes of data, communicate at lightning speed and are extremely resistant to faults.

They provide extremely reliable identification combined with cost savings.

The principle is always the same: Mobile data storage units contain all the production and manufacturing data. They accompany your product along assembly, transfer and production lines for optimum control of your flow of materials.

	Production					
RFID system	MOBY E	MOBY I	SIMATIC RF300	MOBY U		
Read/write distance	Up to 0.1 m	Up to 0.15 m	Up to 0.15 m	Up to 3.0 m		
Frequency	13.56 MHz	1.81 MHz	13.56 MHz	2.4 GHz		
Standards	ISO 14443	-	-	ISO 18000-4		

Applications

- Main assembly lines in the automotive industry, such as body shop, paint shop and final assembly
- Production lines for motors, gearboxes or steering gear
- Conveyor systems for the assembly of ABS systems, airbags, brake systems, doors and cockpits
- Assembly lines for domestic appliances, entertainment systems or communication electronics
- Assembly lines for PCs, small motors, contactors or switches
- Production lines in the glass and ceramics industry
- Baggage handling systems







RFID systems for production at a glance

	Production				
RFID system				MOBY E	
Read/write distance	Up to 100 mm				
Data transmission rate Reading Writing 	Typically 400 bytes/s Typically 350 bytes/s				
Memory			51.	EEPROM	
Standards			19	50 14443-A	
Approvals			ETS 300 330 (Europ	oe); FCC Part 1	5 (USA), UL/CSA
Bulk capability			= (d	only with SIM)	
Multi-tag capability			((only with SIM)	
Frequency	13.56 MHz				
Mobile data storage units (tags)		Designation	Memory size		Operating temperature
		MDS E600 MDS E624 MDS E611 MDS E623	752 bytes 752 bytes 752 bytes 752 bytes		-25 +00 °C -25 +125 °C -25 +75 °C -25 +85 °C
Read/write devices		Designation		Operating to	emperature
Stationary, with separate antenna		SIM 70 with ANT 0 SIM 70 with ANT 1 SLG 75		-25 +70 °C -25 +70 °C -25 +70 °C	
Stationary, with integrated antenna	SLG 72 -25 + SIM 72 -25 +			-25 +70 °C -25 +70 °C	
 Mobile handheld terminal with integrated antenna 		STG E		-20 +60 °C	
Antennas		Designation		Operating to	emperature
	SLA 71 ANT 1 ANT 12 ANT 18 ANT 30 ANT 4		-25 +70 °C -25 +70 °C -25 +70 °C -25 +70 °C -25 +70 °C -25 +70 °C		
Connection to the automation system					
directly		Se	erial interface to other	controllers, PC	s, any other systems
Via communication module (ASM)			SIMATIC S7-300, S7 Serial coupling to oth	-400; PROFIBL er controllers,	IS DP; PROFINET; PC, other systems
Product selection code				6GT23	

Use the product selection code to find the right product more quickly:

In the A&D Mall: Enter the product selection code under "Find" and the relevant products will be listed immediately:

In Catalog FS 10: In Chapter 6, in the order number index, look up the product selection code to find the chapter and page for the products in question.

	MOBY I						
				Up to 150 mm			
	Typically 1250 bytes/s Typically 1250 bytes/s FRAM						
			EN 300 330 (Eur	–	USA), ULICSA		
				_			
				1.81 MHz			
Degree of protection		Designation	Memory size		Operating temperature	Degree of protection	
1P68 1P67/IPX9K 1P67 1P67/IPX9K		MDS 402 MDS 401 MDS 403 MDS 404 MDS 506 MDS 514 MDS 439E	8 KB FRAM 8 KB FRAM 8 KB FRAM 8 KB FRAM 32 KB FRAM 32 KB FRAM 8 KB FRAM		-25 +70 °C -25 +85 °C -25 +85 °C -25 +70 °C -25 +70 °C -25 +85 °C -25 +85 °C -25 +110 °C (+220 °C cvclic)	IP68/IPX9K IP67 IP68/IPX9K IP68/IPX9K IP68 IP68/IPX9K IP68	
Degree of protection		Designation		Operating temp	erature	Degree of protection	
IP65/67 IP65/67 IP65		SLG 40 S (with antenna) SLG 40 (with antenna)		-25 +70 °C -25 +70 °C		IP65 IP65	
IP65 IP65		SLG 41 S SLG 41 SLG 41 C SLG 41 CC SLG 42 SLG 43 SIM 41/42/43		-25 +70 °C -25 +70 °C -25 +70 °C -25 +70 °C -25 +70 °C -25 +70 °C 0 +60 °C		IP65 IP65 IP67 IP67 IP65 IP65 IP54	
IP54		STG I		-20 +60 °C		IP54	
Degree of protection		Designation		Operating temp	erature	Degree of protection	
IP67 IP67 IP67 IP67 IP67 IP67							
		<u> </u>	Linterfect to all	an agentrallare DC	any other evotence		
		Seria Seria Se	SIMATIC S7-300, Sinal coupling to o	er controllers, PCs, S7-400; PROFIBUS I ther controllers, PC	any otner systems DP; PROFINET; 2, other systems		
				6GT20	· · · · · ·		

SIMATIC RF300



Up to 150 mm

Typically 3 KB/s, (IQ-Sense 50 bytes/s) Typically 3 KB/s, (IQ-Sense 50 bytes/s) FRAM / EEPROM

> – CE, UL, FCC, CSA

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		13.30 101112			
Designation	Memory size		Operating temperature	Degree of protection	
RF320T RF340T RF350T RF360T RF370T RF380T	20 bytes 8 KB 32 KB 8 KB 32 KB/64 KB 32 KB/64 KB		-25 +85 °C -25 +85 °C -25 +85 °C -25 +75 °C -25 +85 °C -25 +110 °C (+220 °C cyclic)	IP67 / IPX9K IP68 / IPX9K IP68 IP67 IP68 IP68	
Designation		Operating temp	erature	Degree of protection	
RF350R		-25 +70 °C		IP65	
RE310R		-25 +70 °C		IP67	
RE340R		-25 +70 °C		IP67	
RF380R		-10 +70 °C		IP67	
RF310M		-10 +50 °C		IP54	
Designation		Ambient tempe	rature	Degree of protection	
ANT 1 ANT 18 ANT 30		-25 +70 °C -25 +70 °C -25 +70 °C		IP65 IP65 IP65	
<u> </u>	serial interface to oth	her controllers, PCs	s, any other systems		
	SIMATIC S7-300	, S7-400; PROFIBU	S DP; PROFINET		

6GT28

		MO	BY U		RFID system
		150 mm t	o 3000 mm		Read/write distance
		Typical Typically 4.8 K	ly 8 KB/s B/s without bulk		Data transmission rate Reading Writing
		Ki ISO 1	AM 8000 4		Memory
	EN 33(130 F	art 15C (USA) III/CSA		Approvals
	LINUSS	J 440 2, I CC I			Bulk capability
			•		Multi-tag capability
		2.4	GHz		Frequency
Designation	Memory size		Operating temperature	Degree of protection	Mobile data storage units (tags)
MDS U313 MDS U315 MDS U524 MDS U525 MDS U589 MDS U Service	2 KB RAM 2 KB RAM 32 KB RAM 32 KB RAM 32 KB RAM		-25 +70 °C -25 +70 °C -25 +85 °C -25 +85 °C -25 +85 °C, up to +220 °C cyclic -25 +70 °C	IP67 IP65 IP68/IPX9K IP65 IP68	
Designation	52 10 10 101	Operating te	emperature	Degree of protection	Read/write devices
Designation		operating a			 Stationary, with separate antenna
SLG U92		-25 +70 °C		IP65	 Stationary, with integrated antenna
STG U		-20 +60 °C		IP54	 Mobile handheld terminal with integrated antenna
Designation		Operating to	emperature	Degree of protection	Antennas
					Connection to the automation system
	Serial interface	e to other cont	rollers, PCs, any other system	5	directly
SIM	IATIC \$7-300, \$7	/-400; PROFIBI	US UP; Ethernet (TCP/IP); PROI	-INE I	Via communication module (ASM)
6GT25					Product selection code

RFID systems for production

Features and highlights

For the harshest conditions

Regardless of the field of application, our identification systems adapt themselves perfectly to the requirements of your production facility. They not only provide a high degree of data security, an enormous memory capacity up to 64 KB and an extremely high degree of protection up to IP68, but also exceptional ruggedness against the harshest ambient conditions. Our identification systems are as powerful as they are rugged.

Immune to interference

The transmission frequency of 1.81 MHz, 13.56 MHz or 2.4 GHz makes our RFID systems largely insensitive to electromagnetic interference. Even extreme environmental effects do not influence the system.

With techniques such as range limiting, MOBY U sets new standards in easy commissioning, reliability and low-maintenance operation.

With new functions such as the automatic selection of unreserved frequency channels (frequency hopping), it interacts perfectly with other 2.4 GHz systems (wireless LAN, Bluetooth etc.).

High-temperature data memory

For paint shops, we have developed hightemperature data storage units of the type used successfully worldwide in the automotive industry over many years.



The small, compact "power pill"

A small, compact "power pill" revolutionizes the identification of tools It can be fixed in any commonly available tool holder, flush with the metal, and can store all the data required for tool management, for example automatic tool presetting – up to a maximum of 752 bytes.

RFID system with IQ-Sense

When SIMATIC RF300 IQ-Sense components are used, communications between the write/read device and SIMATIC controller are conducted over a low-cost two-core cable. Other characteristics include system diagnostics, such as wire-break or short-circuit down to the individual write/read unit as well as its replacement during normal operation. This ensures higher availability and reduced down times.



RFID system MOBY U

Assembly lines with small workpiece carriers

The FRAM memory technology combines the advantages of RAM and EEPROM. The result: Almost unlimited write cycles. The service life is increased, because a backup battery is not required. For assembly lines with small workpiece carriers, we offer small data storage units that can be mounted, for example, on metal.



RFID system SIMATIC RF300

RFID systems for logistics and distribution

Warehouses and order picking

Our RFID systems have been setting new standards for controlling and managing in logistics and distribution, for example, with regard to reliability in mail-order or frozen goods warehouses, in the identification of containers and crates and in parts recognition for textiles.

Applications range from simple identification, such as replacing and supplementing a barcode or acting as a goods docket under harsh environmental conditions, in warehouse and distribution logistics and in product identification.

	Logistics	
RFID system	MOBY D	SIMATIC RF600
Read/write distance	Up to 0.9 m	up to 10 m (2x 2 antennae, mounted opposite each other)
Frequency	13.56 MHz	865 868 MHz (Europe) 902 928 MHz (North America)
Standards	ISO 15693 ISO 18000-3	EPC Gen 1, EPC Gen 2, ISO 18000-6B, ISO 18000-6C





Applications

- Mail-order warehouse including order picking ("brown goods", food, tyres etc.)
- Frozen food warehouse (incl. order picking)
- Container or crate identification
- Identification of crates, pallets, containers or boxes
- Distribution and loading control with electronic delivery note
- Parts identification for textiles (e.g. hired work clothing, OP textiles) in laundries
- Identification of window components, furniture parts etc. in the logistics chain
- Parts identification in the clothing industry (e.g. shirts, suits, medical stockings), in manufacturing and in mail order
- Distribution of goods in open distribution chains, e.g. for mail and parcel services, mail-order companies or haulage firms
- Baggage handling and tracking



RFID systems for logistics and distribution at a glance

	Logistics				
RFID system				MOBY D	
Read/write distance			Up to 680 mm (9	00 mm with cust	comized antenna)
Data transmission rate Reading Writing 			Ty Ty	vpically 285 bytes vpically 100 bytes	s/s s/s
Memory				EEPROM	
Standards			ISO	15693, ISO 1800	00-4
Approvals			EN 300	0 330 (Europe), F	-CC, IC
Bulk capability			■ (PC	variant with RS	232)
			■ (PC	13 56 MHz	232)
Mobile data storage units (tags)		Designation	Memory size	15.50 10112	Operating temperature
		MDS D100 MDS D124 MDS D139 MDS D160 Smart Label (customized version for large quantities)	112 bytes 112 bytes 44 bytes 112 bytes 112/256 bytes		-25 +80 °C -25 +125 °C -25 +220 °C -25 +175 °C -25 +85 °C
Read/write devices		Designation		Operating tem	perature
 Stationary, with separate antenna 		SLG D10 SLG D10S SLG D11 ANT D5 SLG D11S ANT D5		-20 +55 ℃ -20 +55 ℃ -25 +55 ℃ -25 +55 ℃	
 Stationary, with integrated antenna 		SLG D12 SLG D12S		-25 +55 ℃ -25 +55 ℃	
 Mobile handheld terminal with integrated antenna 		STG D		-20 +60 °C	
Antennas		Designation		Operating tem	perature
		ANT D5 ANT D6 ANT D10		-20 +55 °C -20 +55 °C -20 +55 °C	
Software					
Connection to the automation system					
■ directly			Serial interface to oth	ner controllers, Po	Cs, any other systems
Via communication module (ASM)			SIMATIC \$7-300, \$7-400;	PROFIBUS DP; PR	OFINET, Ethernet (TCP/IP)
Product selection code	6GT26				

Use the product selection code to find the right product more quickly: In the A&D Mall: Enter the product selection code under "Find" and the relevant products will be listed immediately:

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			SIMA	TIC RF600			
		up to 10 m (2x 2 antennae	e, mounted opp	oosite each other)		
		EPC Gen 2, a ma: EPC Gen 2, a ma	x. of 160 Kbit/ Ix. of 128 Kbit	/s; ISO 18000-6 :/s; ISO 18000-(B, a max. of 160 bit/s 6B, a max. of 40 bit/s		
		EPC Gen 1	l , EPC Gen 2, ETSI EN	ISO 18000-6B, 302208, FCC	ISO 18000-6C		
		Adjustable: 86	5 868 MHz	z (Europe), 902	928 MHz (USA)		
Degree of protection		Designation	Memory size	e	Operating temperature	Degree of protection	
IP68 IP67 IP68 IP68 IP65		RF630L RF620T RF640T	EPC 96 bit EPC 96 bit 216 byte		-40 +65 °C, up to +80 °C (200 cycles) -25 +80 °C -25 +85 °C	− IP67 IP68 / IPX9K / Ex ibD 21 T 140 °C	
Degree of protection		Designation		Operating ter	mperature	Degree of protection	
P65 IP65 IP65 IP65 IP65 IP65		RF660R		-25 +55 °C		IP65	
IP54		RF610M		-10 +50 °C		IP65	
Degree of protection		Designation		Operating te	mperature	Degree of protection	
IP65 IP65 IP65		RF660A		-25 +75 ℃		IP67	
			SIMATIC	RF-MANAGER			
		Serial interfa SIN	Etherr ce to other co /ATIC S7-300,	net (TCP/IP); ntrollers, PCs, a . S7-400; PROFI	any other systems IBUS DP		
	001281						

RFID systems for logistics and distribution

Features and highlights

Manages your processes

The high-performance RFID systems solve even complex tasks quickly and elegantly. In contrast to the conventional barcode systems, they not only read and identify, but also manage the logistical processes with re-writable electronic data storage units/Smart Labels.

This means that your product has a type of electronic product docket on which you or your customer has all the necessary information at hand – anywhere and at any time, contact-free and totally automatically.

And the best thing is, If necessary, you can even identify several data storage units simultaneously and process the data selectively. Identification functions reliably, through wood, plastic, paper, non-metallic materials and even through pollution.

RFID system in the UHF bands

The RFID system SIMATIC RF600 complies with the requirements of the EPCglobal and ISO/IEC 18000-6 standards, and is suitable for the 865 to 868 megahertz UHF bands in Europe and the 902 to 928 megahertz UHF bands in North America. The UHF technology allows large distances between the read/write device and the data media (tags).

Various data storage units

A broad spectrum of data storage units are available – from the Smart Label through to the industrial tag. Smart Labels of different manufacturers can be used that are based on the ISO 15693, EPCglobal and ISO/IEC 18000-6 standards.

Customer-specific Smart Labels / antennas

For high-volume applications, we can develop low-cost Smart Labels / data storage units that are tailored to your requirements. You can also obtain a tailor-made antenna (e.g. gate antenna) specially designed for your application.



Data memory of MOBY D

Mobile and flexible with handheld terminals

The mobile handheld terminals for the RFID systems SIMATIC RF provide you with maximum flexibility for processing data storage units. For logistical applications, the mobile handheld terminal can be used as a stand-alone device for storing the read data or as a "mobile reader" with a WLAN interface. The handheld terminal is easily integrated into SIMATIC RF600 applications using the SIMATIC RF-MANAGER software and is operated in the same manner as a stationary write/read device.



Easy management of RFID systems with the SIMATIC RF-MANAGER 2008 software

With our SIMATIC RF-MANAGER, we are offering for the first time a totally integrated software solution for all write/read devices of the RFID system SIMATIC RF600 from the acquisition level through to the ERP and MES level.

Fully compatible with the EPCglobal standards, SIMATIC RF-MANAGER stands overall for efficient engineering and smooth operation. So what opportunities does this open up for you in the UHF range? You can commission readers quickly and easily, preprocess tag data efficiently, manage individual devices and save a great deal of time and effort.



Get more information

Any amount of information and know-how to your advantage

Product information for SIMATIC sensors: www.siemens.com/simatic-sensors

Reference projects for SIMATIC Sensors: www.siemens.com/simatic-sensors/references

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