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Transparent Processes

SIMATIC RF600 –
Taking RFID to the Next Level

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Undreamed-of transparency

New possibilities for production and logistics

To be successful in the future, companies have to invest in solutions for the digital enterprise today – solutions that bring lower costs, higher quality, greater flexibility and efficiency, as well as shorter response times to customer requests and market requirements. UHF-RFID technology is an important part of the digital factory, and SIMATIC RF600 makes it easy for you to take advantage of all its benefits. The system reads transponders with absolute reliability, and it can be integrated seamlessly into your automation (such as in Totally Integrated Automation) and IT environments (such as in cloud solutions). Project planning is carried out using a standard Web browser or the TIA Portal, and can be performed quickly. It is also easy to use, even during factory operation. From production to delivery of the finished products, SIMATIC RF600 opens up new possibilities for you.



Today, we manufacture products in global networks with increasingly shorter life cycles. And we gear our manufacturing processes to increasingly specific customer requests while meeting increasingly strict standards and requirements.

To keep pace with the global competition, companies need a continuous, up-to-the-minute overview of their processes and material flows, because knowing where materials are at all times is crucial for better planning and optimization of production and logistics.

RFID provides this transparency. Stationary read/write devices in the production and supply chain as well as transponders on products, workpieces, and goods allow uninterrupted tracking and tracing.

Modern systems in the ultra-high frequency band (UHF-RFID) offer long ranges, high reading speed, and the option of bulk reading.

As processes within companies and in the outside world become more inter-linked, RFID technology is becoming increasingly important for Industry 4.0. The concept of the digital factory encompasses the entire process from development and simulation, to the physical implementation of a product in a highly automated production sequence. This requires technologies that can identify semi-finished products, tooling, containers and machines, as well as communication technologies to digitally transmit data between machines or factories.

SIMATIC RF600 RFID system

Read/write distance	Max. 8 m (with 1 antenna), farther with antennas mounted opposite each other in portal applications
Frequency	865–868 MHz (Europe) 902–928 MHz (North America) 920–925 MHz (China) 920–924 MHz (Japan)
Standards	EPCglobal Class 1 Gen 2 ISO 18000-6B ISO 18000-6C



Versatile applications

Quality and efficiency throughout the value chain

Production control

Make production flexible

- Reliable and rugged, even in challenging radio environments
- Economic production, even down to unique-item runs
- Suitable for difficult-to-access assembly stations
- Greater availability thanks to distributed control
- Optimized inventory management
- Greater manufacturing efficiency through automatic, synchronous feeding of parts and components
- Simple material flow control thanks to automation with Kanban

Tracking and tracing

Track with precision

- Improved product quality
- Focused after-sales support (e.g. product recalls)
- Observation of legal regulations
- Automatic data recording for process optimization

Asset management

Maintain an overview

- Increased rate of inventory turnover
- Reduction of inventory and less need for replenishment
- Increased availability
- Improved service, maintenance and repair processes
- New business models based on service life

Supply chain management

Keep global logistics under control

- Greater transparency in logistics
- Support of new logistics concepts
- Automatic data entry instead of the manual processing of goods, which can frequently incur errors, for example during the receipt and shipping of goods
- Integration in global supplier networks
- Automatic monitoring of cold chains



SIMATIC RF600

All benefits bundled in a single system

Everything in a single device

Everything you need:

Commissioning and diagnostic tools are already integrated in SIMATIC RF600. This makes it unnecessary to install and update PC software – everything is available when it is needed. The reading results are preprocessed right in the reader, substantially reducing the time and effort needed for integration in higher-level systems.

Nothing gets lost:

SIMATIC RF600 detects tags reliably – whether individually or in mass detection, static or moving quickly, with fluctuating tag quality, or in a difficult, reflective radio environment. A high-quality radio processor as well as the proven “UHF for Industry” algorithms enable top-notch detection quality. A special feature of the RF685R is that its integrated antenna automatically adapts to different ambient conditions, thus increasing reading reliability.

Reliable tag detection

For fast results:

Simply open the user interface for RF600 via your web browser or TIA Portal and you're ready to start. The tools facilitate the alignment of the antennas and make it easier to calculate the response performance of tags. You can initialize tags and edit data content, and you also have access to the error log and diagnostic views, even when the plant is in operation. If a device is damaged, it can easily be replaced, because stored parameters are compared automatically. The result is reduced downtime and increased plant availability.

Always the right system:

Whether you need RFID for a standard logistics application or a high-end solution for harsh production conditions, you will always find the right product with SIMATIC RF600. The scaled UHF portfolio also offers an optimum price / performance ratio. This allows you to remain flexible at all times. It is the first RFID system that supplies data to MindSphere, the cloud-based open IoT operating system from Siemens.

Simple commissioning, maintenance, and service

Suitable solutions for any application

New in the cloud

SIMATIC RF600 supplies data to MindSphere

Digitalization is changing everything: Billions of smart devices and machines are generating staggering volumes of data that flow together into virtual clouds to the Internet of Things (IoT). The analysis and utilization of this data are opening up unimagined potential. Siemens has developed MindSphere, the cloud-based open IoT operating system that allows this potential to be fully exploited. MindSphere supports the digital transformation of enterprises of any size and in any sector – in the shortest possible time. The simple act of connecting the SIMATIC RF600 RFID system to

The future is digital

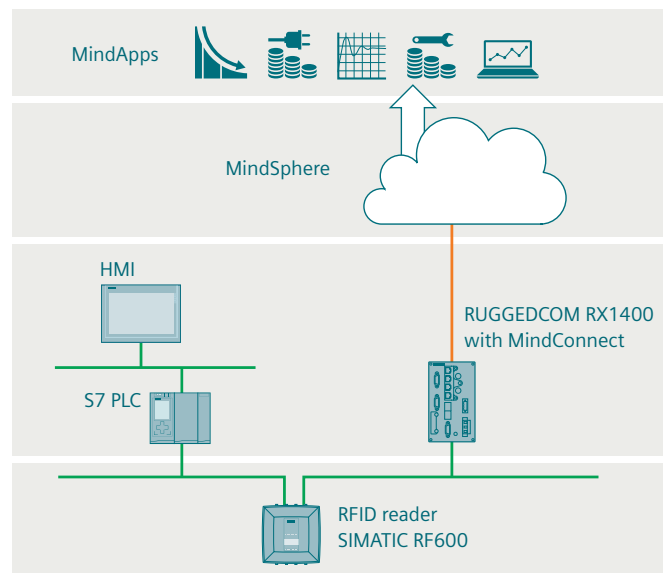
MindSphere via OPC UA opens up exciting new scopes for the use of data captured from RFID transponders. As a link between the real and digital world, the RFID system allows operating resources such as containers, pallets or products that previously could not be mapped digitally to now be registered and tracked. The new firmware version V3 makes this link possible. SIMATIC RF600 uses it to support the

OPC UA interface, which is an important standard on the way towards digitalization. As a platform-independent standard, OPC UA offers high performance and proven security mechanisms. It enables seamless communication and can be scaled to meet any requirement. The data is transmitted to MindSphere via a connect element such as the Industrial IoT gateway RUGGEDCOM RX1400 with MindConnect or MindConnect Nano. Siemens relies on OPC UA as the open interface – from the sensor to the cloud.

The analysis of the data that are provided to MindSphere with the help of SIMATIC RF600 is creating transparency in terms of KPIs such as plant availability, utilization of assets, or energy-saving potential. This will allow the targeted optimization of production processes and supply chains with a view to improving efficiency and quality in production, logistics, asset management, and other areas. In all industries.

Highlights

- OPC UA enables standardized connection to MindSphere
- Simple connection, for example, via the Industrial IoT gateway RUGGEDCOM RX1400 with MindConnect or MindConnect Nano
- Project engineering via web interface in a browser
- Worldwide availability of KPIs thanks to the web-based concept
- Complete solution from the sensor and the connection to MindSphere to the point of applications and digital services



SIMATIC RF600 and MindSphere are essential components of a successful digitalization strategy and the basis for data-based services from Siemens for predictive maintenance and management of energy data, assets, and supply chain management.

Technical data at a glance

Read/write devices



	SIMATIC RF650R read/write device	SIMATIC RF680R read/write device	SIMATIC RF685R read/write device
Description	Stationary UHF read/write device with integrated processing logic for max. four remote antennas	Stationary UHF read/write device with integrated processing logic for max. four remote antennas	Stationary UHF read/write device with integrated processing logic with an integrated antenna and an external antenna connection

Interfaces

Ethernet	1 × RJ45 (100 Mbps)	2 × M12 (100 Mbps)	2 × M12 (100 Mbps)
RS422		1	1
Digital inputs 24 V	4	4	4
Digital outputs 24 V/0.5 A nom.	4	4	4

Connection to the automation system

SIMATIC <ul style="list-style-type: none"> • S7-300 • S7-400 • S7-1200 • S7-1500 		<ul style="list-style-type: none"> • via integrated PROFINET interface • PROFIBUS: via communications module ASM456
Dist. I/O <ul style="list-style-type: none"> • ET 200pro • ET 200M 		
Bus systems <ul style="list-style-type: none"> • PROFINET • PROFIBUS • Ethernet/IP • Ethernet (TCP/IP) 	<ul style="list-style-type: none"> • Ethernet (TCP/IP, OPC UA): integrated 	<ul style="list-style-type: none"> • PROFINET: integrated • PROFIBUS via communications module ASM456 • Ethernet/IP: integrated • Ethernet (TCP/IP, OPC UA): integrated

Other properties

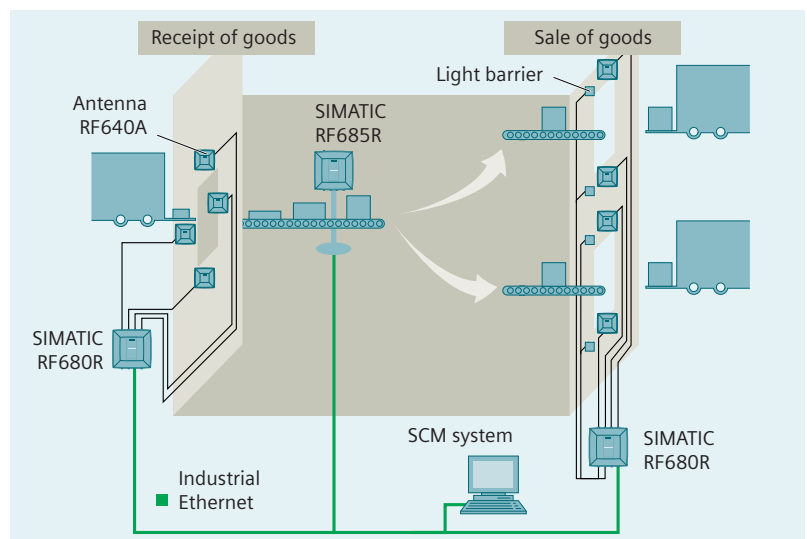
Capable of multi-tag/mass detection	yes	yes	yes
Range, max.	8 m	8 m	8 m
Data transmission rate, max.	300 kbps	300 kbps	300 kbps
Antenna	max. 4 external antennas	max. 4 external antennas	1 internal antenna max. 1 external antenna
Operating temperature	–25 °C to +55 °C	–25 °C to +55 °C	–25 °C to +55 °C
Degree of protection	IP30	IP65	IP65
Approvals	CE, ETSI EN 302208, UL, FCC, CMIIT, ARIB	CE, ETSI EN 302208, UL, FCC, CMIIT, ARIB	CE, ETSI EN 302208, UL, FCC, CMIIT, ARIB
Dimensions in mm (L × W × H)	258 × 258 × 80	258 × 258 × 80	258 × 258 × 80

Technical data at a glance

Antennas



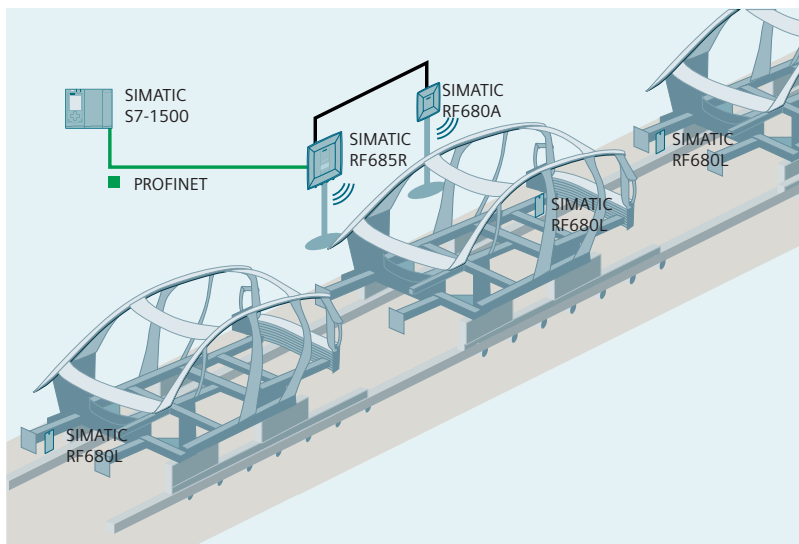
	SIMATIC RF620A antenna	SIMATIC RF642A antenna
Description	Compact antenna for use in production facilities and conveyor technology	Universal medium-range UHF antenna in industrial-suited, compact design
Impedance (nominal)	50 ohms	50 ohms
Polarization	Linear	Linear
Antenna gain	-10 dBi to -5 dBi	6 dBi (ETSI) 7 dBi (FCC, CMIIT)
Frequency range	865 to 868 MHz (ETSI) 902 to 928 MHz (FCC, CMIIT)	865 to 928 MHz (ETSI, FCC, CMIIT)
Conformity	CE, FCC, IC-FCB, UL	CE, FCC, IC-FCB, UL
Connector	Reverse-polarity TNC	Reverse-polarity TNC
Mounting	2 × M5 drilled hole	4 × M4 drilled hole (VESA 100 mounting system) optional: flexible mounting with antenna mounting kit
Operating temperature	-20 °C to +70 °C	-25 °C to +75 °C
IP rating, degree of protection	IP67	IP65
Dimensions (L × H × D in mm)	75 × 75 × 20	185 × 185 × 45



Monitoring of incoming goods,
distribution of goods and outgoing goods
(Supply Chain Management)



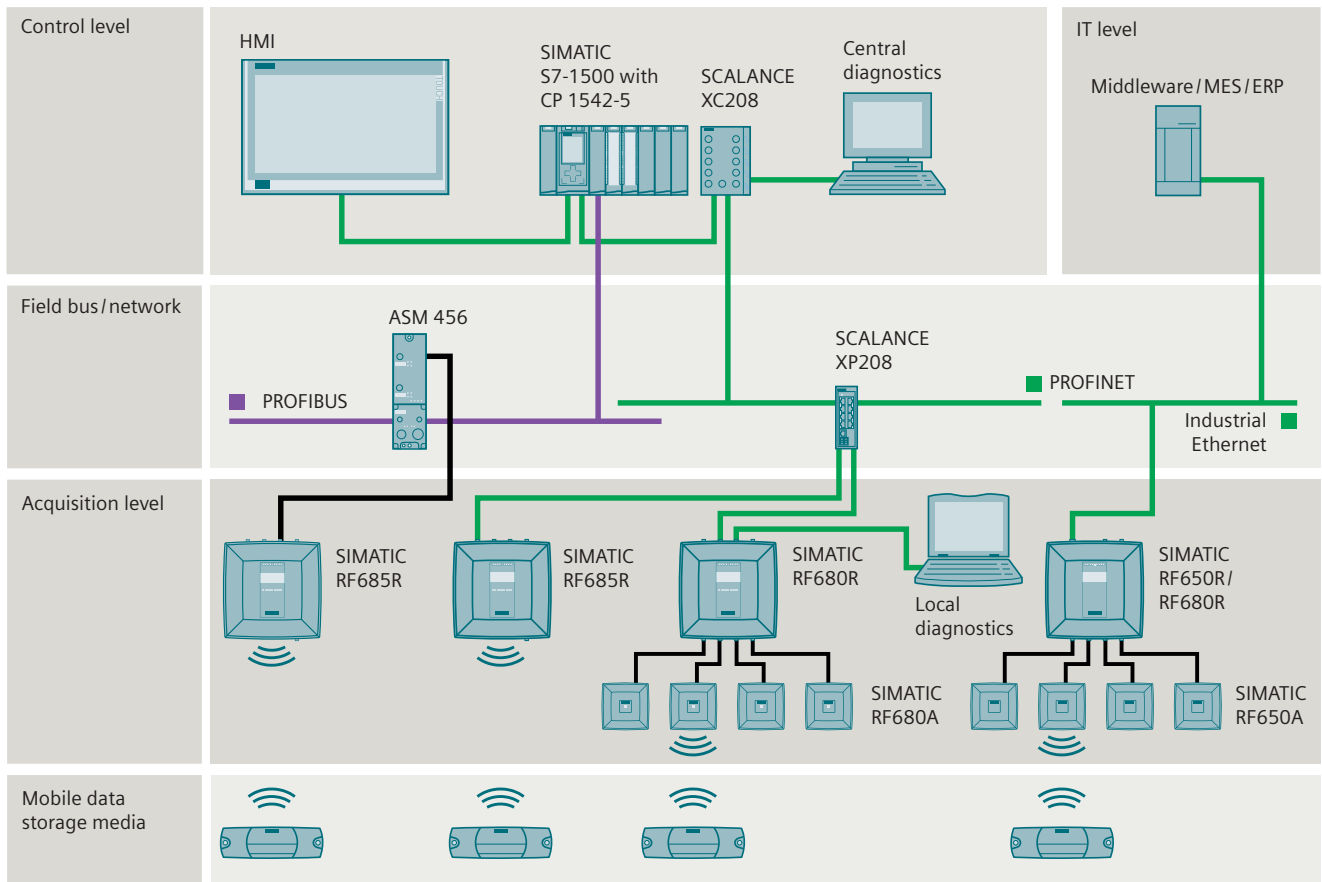
SIMATIC RF650A antenna	SIMATIC RF660A antenna	SIMATIC RF680A antenna	
Circular antenna for universal deployment in industrial applications in production and logistics	Universal antenna for general applications in production and logistics	Adaptive high-end antenna for use in harsh industrial environments. Polarization can be switched over automatically	Description
50 ohms	50 ohms	50 ohms	Impedance (nominal)
Circular	Circular	Linear, circular, automatic	Polarization
4 dBi (ETSI) 3.5 dBi (FCC, CMIIT)	7 dBi (ETSI) 6 dBi (FCC, CMIIT)	3.5 dBi (ETSI) 3.5 dBi (FCC, CMIIT)	Antenna gain
865 to 928 MHz (ETSI, FCC, CMIIT)	865 to 868 MHz (ETSI) 902 to 928 MHz (FCC, CMIIT)	865 to 928 MHz (ETSI, FCC, CMIIT)	Frequency range
CE, FCC, IC-FCB, UL	CE, FCC, IC-FCB, UL	CE, FCC, IC-FCB, UL	Conformity
Reverse-polarity TNC	Reverse-polarity TNC	Reverse-polarity TNC	Connector
4 x M4 drilled hole (VESA 100 fixing system) optional: flexible installation with antenna mounting kit	4 x M4 drilled hole (VESA 100 mounting system) optional: flexible mounting with antenna mounting kit	4 x M4 drilled hole (VESA 100 fixing system) optional: flexible installation with antenna mounting kit	Mounting
-25 °C to +75 °CC	-25 °C to +75 °C	-25 °C to +75 °C	Operating temperature
IP65	IP67	IP65	IP rating, degree of protection
198 x 198 x 60	313 x 313 x 80	198 x 198 x 60	Dimensions (L x H x D in mm)



Consistent, end-to-end identification of car bodies, from the shell construction to the final assembly

Seamless integration

Standard interfaces for flexible architectures



Whether for automation or IT, the RF600 system can be seamlessly integrated into your existing environment.

Technical data at a glance

Labels ¹⁾



	SIMATIC RF622L Smart Label	SIMATIC RF630L Smart Label	SIMATIC RF640L Smart Label	SIMATIC RF690L Smart Label
Description	UHF smart label with fast FRAM user memory for logistic applications, for example, for permanent identification of products	UHF smart label for attaching to paper, cardboard, plastic, or film packaging	UHF smart label for direct mounting to metal surfaces	UHF smart label for direct mounting to metal surfaces
Memory size	EPC 496 bits User memory: 3424 bytes	EPC 96 / 128 / 240 bits User memory: 512 bits	EPC 96 to 480 bits ²⁾ User memory: 16 to 64 bytes ²⁾	EPC 96 to 480 bits ²⁾ User memory: 16 to 64 bytes ²⁾
Standard	ISO 18000-6C	ISO 18000-6C	ISO 18000-6C	ISO 18000-6C
Frequency	860 to 960 MHz (ETSI, FCC, CMIIT)	860 to 960 MHz (ETSI, FCC, CMIIT)	865 to 868 MHz (ETSI) 902 to 928 MHz (FCC, CMIIT)	865 to 868 MHz (ETSI) 902 to 928 MHz (FCC, CMIIT)
Data retention	10 years	10 years	10 years	10 years
Write/read distance, typ.	Write up to 3 m on nonmetallic subsurface Read up to 3 m on nonmetallic subsurface	Write up to 5 m Read up to 8 m	Write up to 0.5 m Read up to 3.5 m on metal, up to 2.3 m on nonmetallic subsurface	Write up to 1.5 m Read up to 2.4 m on metal, up to 4.5 m on nonmetallic subsurface
Read cycles	min. 10 ¹⁰	Unlimited	Unlimited	Unlimited
Write cycles	min. 10 ¹⁰	min. 100,000	min. 500	min. 100,000
Dimensions	90 x 18 x 0.5 mm	105 x 25 mm 4" x 6" 97 x 27 mm 74 x 27 mm 4" x 2" 54 x 34 mm 45 x 20 mm	50 x 22.5 x 1.6 mm	88 x 25 x 1.6 mm (ETSI) 77 x 25 x 1.6 mm (FCC, CMIIT)
Operating temperature	-20 °C to +85 °C	-40 °C / -25 °C to +65 °C / +85 °C	-20 °C to +85 °C	-20 °C to +85 °C (permanent), +160 °C for three cycles of 30 minutes each, higher temperatures available on request
Material	PET plastic	Paper / PET plastic	Plastic, top surface PET	Plastic, top surface PEN
Degree of protection	IP64 (bonded)	IP65 (when affixed)	IP67	IP67
Labeling	Printable by thermal transfer	Printable by thermal transfer, depending on design	Printable by thermal transfer	Printable by thermal transfer

¹⁾ Customer-specific labels and transponders available on request.

²⁾ The EPC memory has a standard size of 96 bits. If required, the EPC memory size can be increased in 16-bit increments up to 480 bits, at the expense of the user memory.

Technical data at a glance

Mobile transponders ¹⁾



	SIMATIC RF610T transponder	SIMATIC RF620T transponder	SIMATIC RF622T transponder	SIMATIC RF625T transponder
Description	UHF transponder for simple identification, screw-on or adhesive	UHF transponder for industry and logistics, mountable on conductive materials with spacer	UHF transponder with fast FRAM user memory to use, for example, in the fields of production control, asset management and intralogistics	Compact UHF transponder for mounting in and on metal
Memory size	EPC 96/240 bits User memory: 512 bits	EPC 96/128 bits User memory: 512 bits	EPC 496 bits User memory: 3424 bytes	EPC 96/128 bits User memory: 512 bits
Standard	ISO 18000-6C	ISO 18000-6C	ISO 18000-6C	ISO 18000-6C
Frequency	860 to 960 MHz (ETSI, FCC, CMIIT)	860 to 960 MHz (ETSI, FCC, CMIIT)	860 to 960 MHz (ETSI, FCC, CMIIT)	865 to 868 MHz (ETSI) 902 to 928 MHz (FCC, CMIIT)
Data retention	10 years	10 years	10 years	10 years
Write/read distance, typ.	Write: 3 m Read: 5 m	Write: 6 m Write: 4 m (on metal with spacer) Read: 8 m Read: 6 m (on metal with spacer)	Write: 3 m Write: 1 m (on metal with spacer) Read: 3 m Read: 1 m (on metal with spacer)	Write: 1.2 m (on metal) Read: 1.5 m (on metal)
Read cycles	Unlimited	Unlimited	min. 10 ¹⁰	Unlimited
Write cycles	min. 100,000	min. 100,000	min. 10 ¹⁰	min. 100,000
Dimensions in mm	86 × 54 × 0.4 (L × H × D)	Transponder: 127 × 38 × 6 (L × H × D) Spacer: 155 × 38 × 12 (L × H × D)	120 × 30 × 6.5 (L × H × D)	30 × 8 (Ø × H)
Operating temperature	-25 °C to +85 °C	-25 °C to +85 °C	-20 °C to +85 °C	-25 °C to +85 °C
Material	PVC plastic	PP plastic housing (food grade)	Plastic housing (PA12)	Plastic housing (PA6.6)
Degree of protection	IP67	IP67	IP67	IP68/IPx9K
Labeling	Printable	Laser printing	Laser printing	no



SIMATIC RF630T transponder	SIMATIC RF640T transponder	SIMATIC RF680T transponder	
UHF screw transponder (M6) for mounting on metal	UHF tool transponder for mounting on metal	UHF high-temperature transponder, for mounting on metal, robust and heat-proof (up to 220 °C) with long range for harsh industrial environments	Description
EPC 96/240 bits User memory: 512 bits	EPC 96/240 bits User memory: 512 bits	EPC 96/240 bits User memory: 512 bits	Memory size
ISO 18000-6C	ISO 18000-6C	ISO 18000-6C	Standard
865 to 868 MHz (ETSI) 902 to 928 MHz (FCC, CMIIT)	865 to 868 MHz (ETSI) 902 to 928 MHz (FCC, CMIIT)	865 to 928 MHz (ETSI, FCC, CMIIT)	Frequency
30 years	30 years	30 years	Data retention
Write: 1.2 m (on metal) Read: 1.5 m (on metal)	Write: 2.5 m (on metal) Read: 4 m Read: 2.5 m (on metal)	Write: 4 m (on metal) Read: 6 m (on metal)	Write/read distance, typ.
Unlimited	Unlimited	Unlimited	Read cycles
min. 100,000	min. 100,000	min. 100,000	Write cycles
21 × 20 (Ø × H), Wrench size 19	50 × 8 (Ø × H)	130 × 32 × 15 (L × H × D)	Dimensions in mm
-25 °C to +85 °C	-25 °C to + 85 °C	-25 °C to +100 °C (permanent) +200 °C up to 5,000 hours or 3,000 cycles tested +220 °C up to 2,000 hours or 1,500 cycles tested	Operating temperature
Plastic/stainless steel	PA12 plastic, anthracite	PPS plastic	Material
IP68/IPx9K	IP68/IPx9K/Ex ibD 21 T140 °C	IP68/IPx9K	Degree of protection
no	no	no	Labeling

Technical data at a glance

Mobile handheld terminal



Mobile handheld terminal SIMATIC RF650M	
Description	Powerful, compact, mobile RFID reader for applications in production logistics, warehouse management, inventory and service
Display	TFT colour touch screen
Size	2.2" screen size
Resolution (W × H in pixels)	240 x 320
Operating temperature	-20 °C to +55 °C
Degree of protection	IP54
Power supply	Lithium-polymer battery (2260 mAh)

Operating elements

Display	Function keys and touch screen
Keyboard	Alphanumeric

Storage

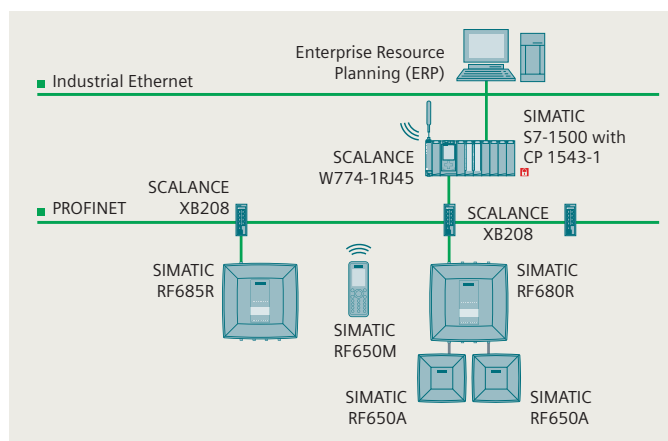
Flash / RAM	256 MB / 256 MB
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RFID reader

Frequency	865 to 868 MHz (Europe) per ETSI 902 to 928 MHz (USA) per FCC
Write-read distance	typ. 2.5 m
Capable of multi-tag/mass detection	yes

Interfaces

Wireless	WLAN integrated (IEEE 802.11 a/b/g/n)
USB, Ethernet	via docking station



Exemplary configuration
for an assembly line with
SIMATIC RF600, SCALANCE W
and SCALANCE X

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In order to protect plants, systems, machines and networks against cyber threats, it is necessary to implement – and continuously maintain – a holistic, state-of-the-art industrial security concept. Siemens' products and solutions only form one element of such a concept.

Customer is responsible to prevent unauthorized access to its plants, systems, machines and networks. Systems, machines and components should only be connected to the enterprise network or the Internet if and to the extent necessary and with appropriate security measures (e.g. use of firewalls and network segmentation) in place.

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