SIMATIC Ident
Identification Systems

5

Note

You can find detailed information on identification systems in the catalog "Industrial Identification Systems ID 10 · 2011" and on the Internet at:

www.siemens.com/ident

Introduction

Overview

SIMATIC Ident – for more economic production and logistics processes

Fiercer competition, stricter standards and legal regulations, shorter product life cycles, more individual customer requirements and increasingly globalized value-adding chains: to stay ahead in dynamic markets, companies must increase the efficiency of their value-adding chains – in production control, asset management, tracking & tracing as well as in supply chain management. Through the use of innovative identification technology, companies gain an important advantage.

But what is best: RFID or optical code reading systems? What is the right technology for the specific application? Where is alternative use relevant, where is joint use relevant, and how flexibly will you be able to respond to different requirements? Siemens can help you here. With SIMATIC Ident, we are offering you a comprehensive portfolio that covers all aspects of industrial identification, supplies you with the perfect solution for your requirements, and gives you flexibility for the future.

Both technologies build a single system.

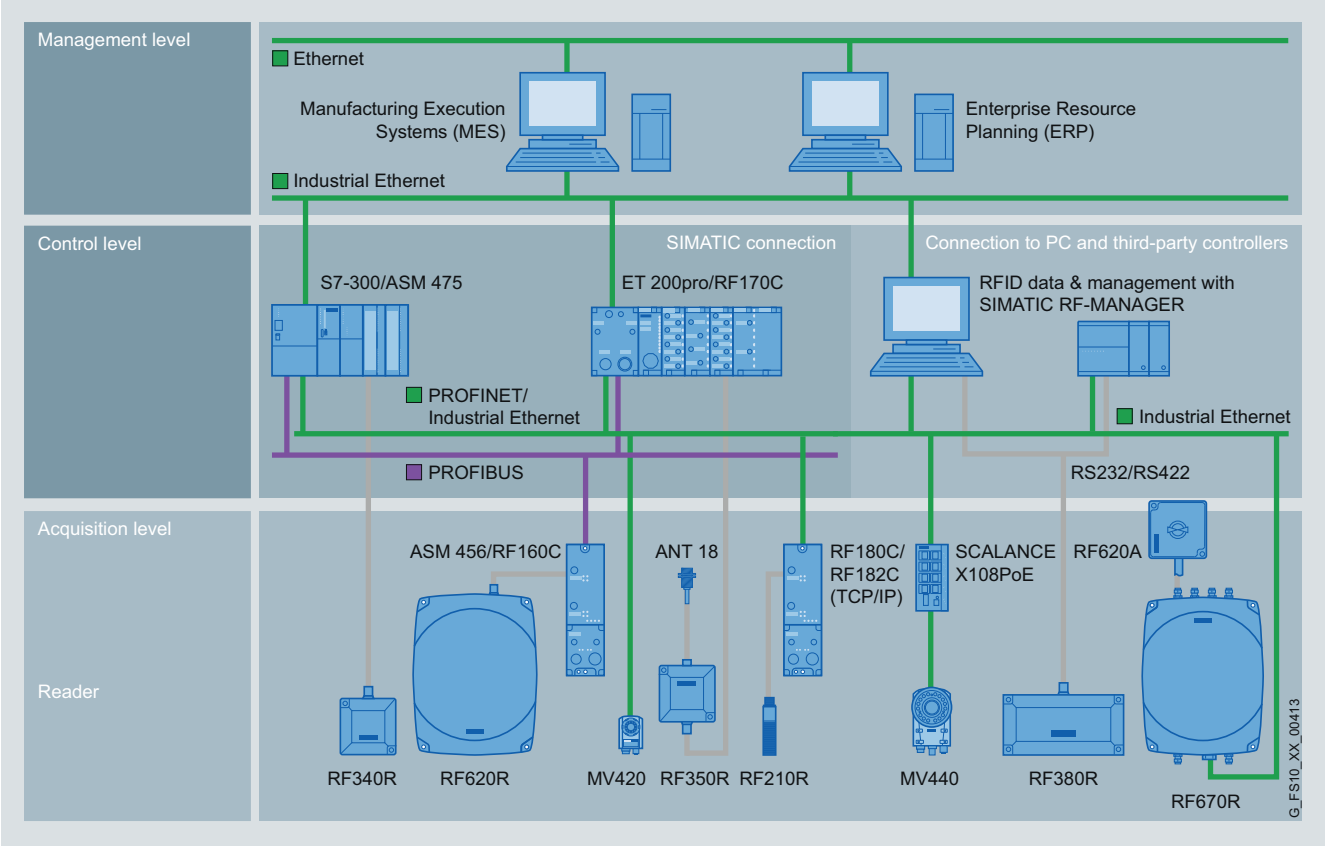
The right identification technology depends on factors such as sensing distance, lighting conditions, single or repeat markings, as well as environmental effects such as temperature and pollution. Depending on the application, optical and RFID systems can be used in the same production line alongside each other in the form of a hybrid solution, e.g. DMC for direct part marking on the product and RFID for pallets or workpiece carriers.

Easy integration in Totally Integrated Automation

In this case, seamless interlinking of both technologies and the continuous integration into the automation or IT level is necessary.

With our SIMATIC Ident portfolio we can offer you the right solution for this:
Using joint communication modules and function blocks, SCALANCE switches or IWLAN Access Points, Siemens offers a complete connection to SIMATIC PLC for all applications.

This ensures that you have a system-wide, uniform software architecture as well as communication and saves considerable outlay and costs in engineering, commissioning and maintenance.



SIMATIC identification systems in the automation environment

Overview (continued)

Identification systems: RFID and optical codes

Whether barcode, DMC, RFID or OCR: every technology has its specific strengths. Character recognition is used for cases in which codes must also be readable by persons, such as use-by dates.

2D codes and RFID impress customers with their high level of data security and have proved reliable even under harsh industrial conditions. The decisive criterion for an identification system: your individual application.

Code reading systems: Verification, identification

When higher performance is required, 2D codes are recommended as an alternative to barcodes, because they offer greater memory capacity and a better read rate. They can be applied inexpensively, e.g. together with shipping labels. They also enable the products to be marked directly (Direct Part Marking, DPM) using lasers, printing or nail punching, which is extremely resistant to external influences. 2D codes can be read with complete reliability even from a small viewing angle or under difficult lighting conditions.

With SIMATIC code reading systems, we offer you the ideal solution for reading and verifying 1D and 2D codes as well as for text recognition (OCR) - for the reliable tracing of production batches beyond the manufacturing plant.

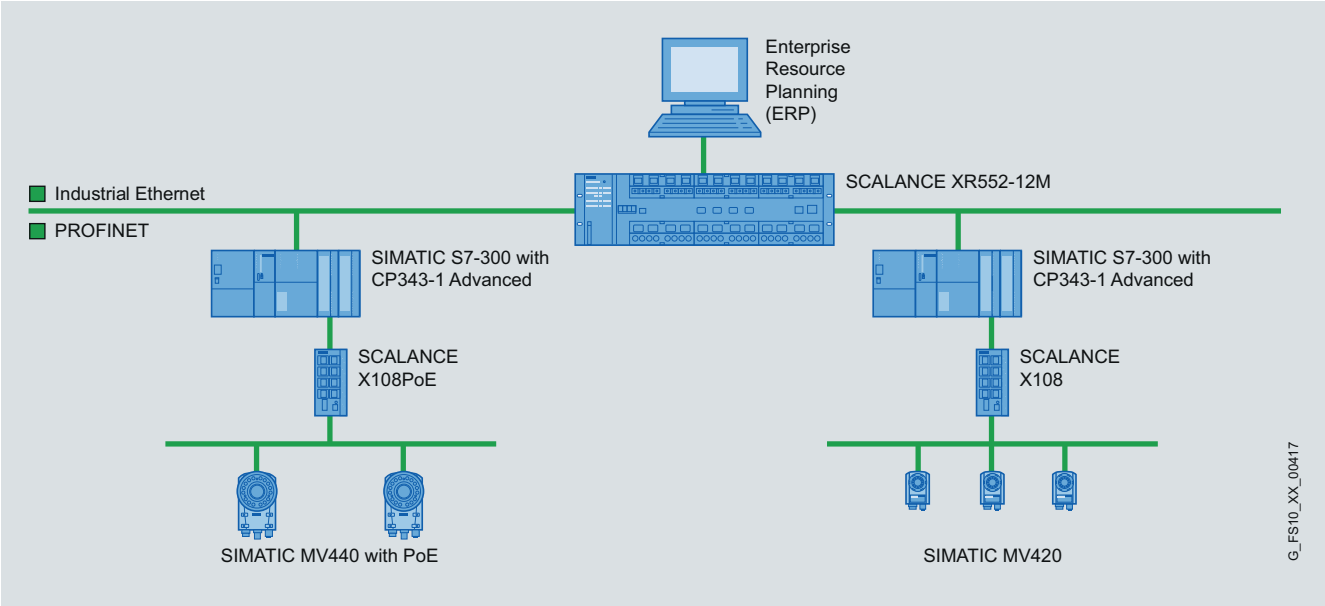
RFID: Identification, mobile data storage

RFID is the ideal solution when there is no line of sight between the reader and the marking, large volumes of data or wide ranges are required, or the stored information has to be changed. Here the product or object is fitted with a memory chip that can be programmed and read using radio techniques. With low-cost Smart Labels available for logistics, rugged data memories for assembly lines as well as transponders with a wide range, RFID is perfectly suited to a variety of different applications.

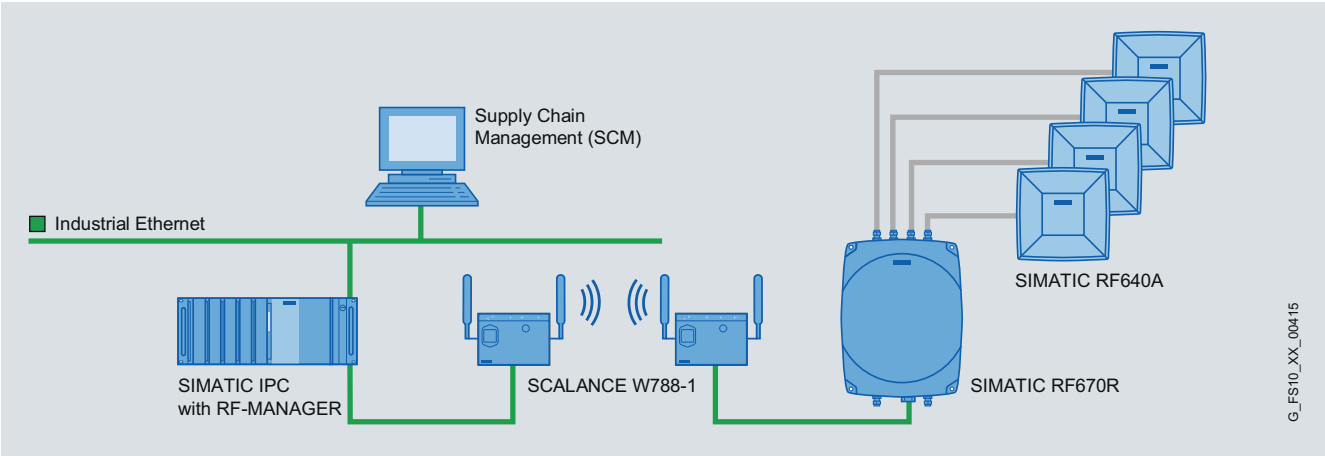
Our intelligent SIMATIC RF system family offers you transparency without gaps. Data is therefore available at any time along the complete production and distribution chain – for perfect control and optimization of material flow and logistics.

Configuration examples

Overview (continued)

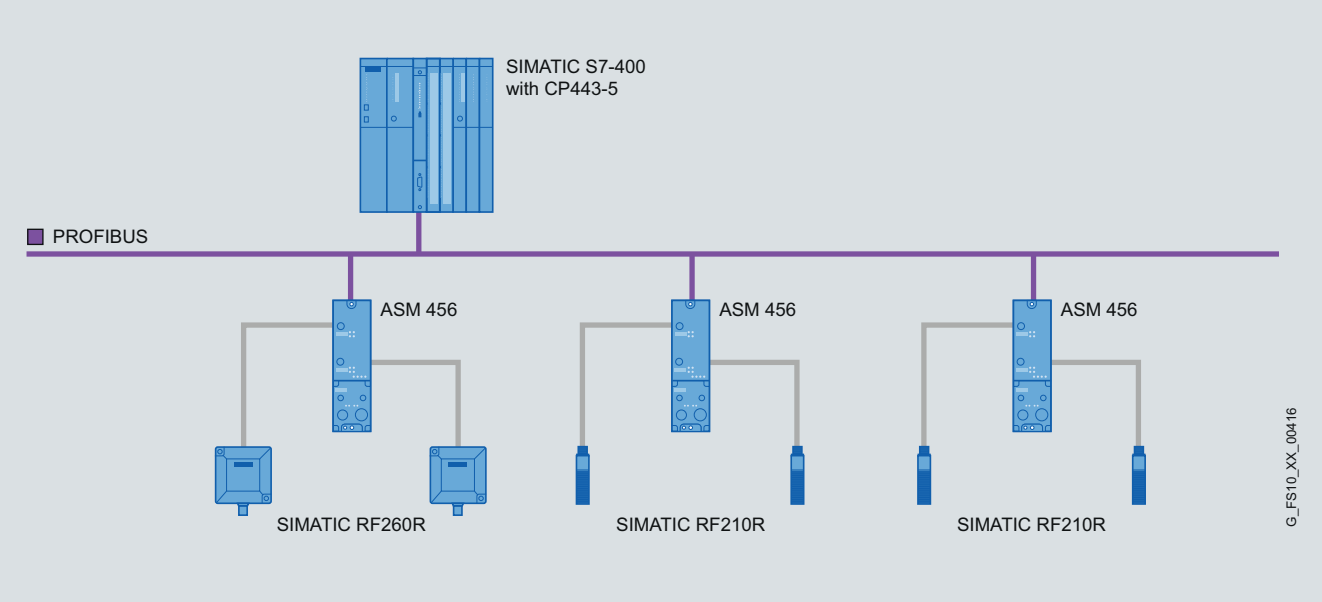


Tracking & Tracing

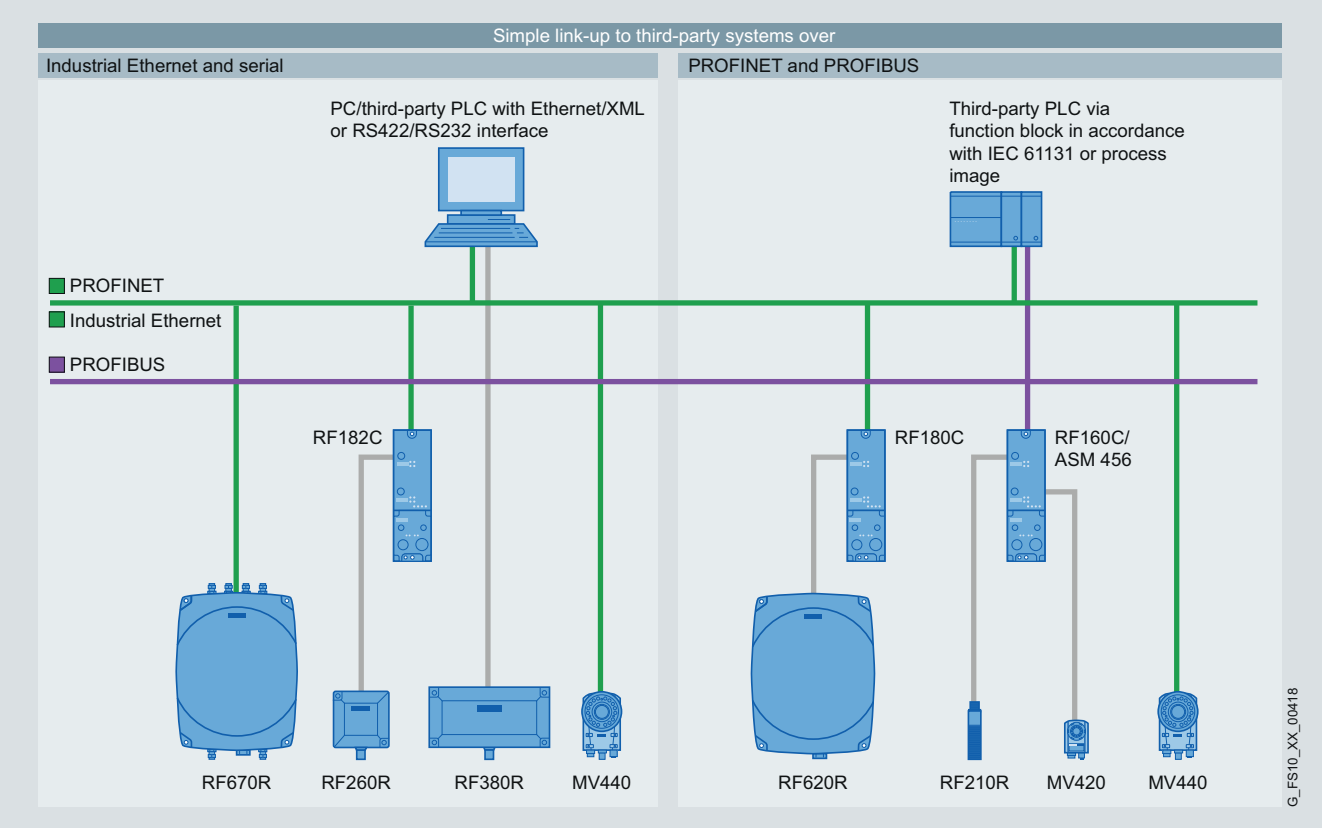


Logistics portal

Overview (continued)



Assembly lines



Integration in third-party systems

Introduction

Overview

RFID systems –
for optimization of material flow and logistics

As the world-leading supplier of RFID systems, Siemens offers a unique scalable portfolio for flexible and cost-effective solutions.

RFID systems are offered for the most diverse requirements on performance, range, frequency range as well as HF and UHF.

Easy integration of the RFID systems via communication modules and pre-configured software blocks in the world of Totally Integrated Automation significantly reduces the outlay and costs for commissioning, diagnostics and maintenance.

Thanks to many years of experience in the area of RFID, Siemens is a competent partner for implementation of the most diverse solutions in all sectors, but especially in the areas of production and logistics.

Meaningful data from the outset

The RFID systems ensure that meaningful data accompanies a product or object from the very beginning. The transponders are attached to the product, product carrier, object, or its transport or packing unit and are written to contact-free. This means that all the application-specific data is located on the transponder. This is true whether you are dealing with vehicle body parts in the automotive industry or order picking boxes.

Up to 64 KB of data can be stored and individually read and supplemented when required at the various workstations or manufacturing stations. This all means that the flow of material and data is synchronized optimally.

Contactless data transfer and a high degree of industrial compatibility

Powerful readers (read/write devices) in various rugged designs ensure fast and reliable data transfer between the transponders and the higher-level systems (e.g. PLC, PC).

The data and power are transmitted inductively by an electromagnetic alternating field or by radio waves. This principle of contactless data transfer works reliably in the presence of contamination or through non-metallic materials.

Perfectly matched components

The RFID systems consist of perfectly matched individual components:

- Transponder
- Readers
- Antennas
- Communication modules for connection to the automation system (e.g., PROFIBUS, PROFINET)
- Software for system integration

For a wide range of applications in all sectors

- Production control
- Asset management
- Tracking & tracing
- Supply chain

Wide range of transponders

A wide range of different transponders is available using a variety of storage technologies (fixed code, EEPROM or FRAM/SRAM) and geometric designs. Their strength is not only their high level of data security but also the excellent high degree of protection against ambient conditions such as contamination, temperature fluctuations, washing water or shock load.

Flexible system integration

A wide range of communication modules, function blocks, as well as high-performance drivers and function libraries permits easy and quick integration into the application.

And best of all: SIMATIC RFID is part of Totally Integrated Automation and can be integrated easily and cost-effectively into the SIMATIC world.

For more details on the connection possibilities, see the respective chapters of the communication modules at PROFINET/ Indstrial Ethernet, PROFIBUS and ET 200 Distributed Peripherals.

Benefits

- Flexible and economic solutions thanks to the complete and scalable portfolio for the field of industrial identification.
- Simplified engineering, commissioning, diagnostics and maintenance through seamless integration into Totally Integrated Automation:
  - Integrated bus connection to an automation system, such as SIMATIC, SIMOTION or SINUMERIK via communication modules with PROFIBUS and PROFINET.
  - Simple S7 software integration via ready-to-use function blocks.
  - Integrated diagnostic functions.
- High degree of investment protection thanks to:
  - Open standards (e.g. ISO 15693, ISO 18000-6C).
  - Software compatibility between the RFID systems of Siemens AG.
  - Standardized communications interfaces.
- Openness through connection possibilities to different bus systems from different manufacturers and PC environments via communication modules.
- Worldwide Service and Support.

SIMATIC RF200

Overview

The RFID system SIMATIC RF200 is, thanks to its compact and low-cost reader, particularly suitable for use in industrial production in the areas of small assembly lines and intralogistics.

With RF200, identification tasks of medium-performance in the HF range (13.56 MHz, ISO 15693) can be implemented extremely cost effectively. RF200 readers can be operated with all ISO transponders of the product range of MOBY D (MDS Dxxx).

SIMATIC RF300

Overview

The RFID system SIMATIC RF300 is particularly suitable for use in industrial production in the areas of production control, assembly lines and conveyors.

SIMATIC RF300 is used to implement identification tasks with medium to high performance in the HF range (13.56 MHz).

Depending on the demands on the performance of the identification system, three versions of the system are available:

- A particularly economical solution with a link to SIMATIC S7-300 over the IQ-Sense interface for low requirements in terms of speed and data volume.
- Medium performance: System configuration with SIMATIC RF300 readers in ISO 15963 mode and low-cost MOBY D transponders.
- High performance: System configuration with SIMATIC RF300 readers in RF300 mode and SIMATIC RF300 transponders.

MOBY D

Overview

The RFID system MOBY D is particularly suitable for use in industrial production in the areas of production control, asset management and tracking & tracing.

MOBY D is used to implement identification tasks with medium to high performance (ISO 15693) in the HF range (13.56 MHz) that require particularly high ranges.

MOBY D offers a comprehensive portfolio of ISO 15693 transponders for a whole variety of requirements - from low-cost SmartLabels for simple identification tasks through rugged credit card formats, right up to transponders for use in especially harsh environments such as paint shops or in the laundry and cleaning industry.

Depending on the read/write distance, different readers are available with integrated or remote antennas.

SIMATIC RF600

Overview

Identification tasks in the UHF range (865 to 868 MHz and 902 to 928 MHz) that demand a wide range of up to 5 m are implemented with SIMATIC RF600. The system is suitable for storing and recording a unique identification according to the EPCglobal standard (Electronic Product Code) on products, containers or transport units. Storage of additional, freely-definable user data is also possible.

Various data carriers - from low-cost SmartLabels through to heat-resistant transponders that can be used for several thousand cycles – are available for industrial applications.

SIMATIC RF600 can be used with SIMATIC controllers and PC/IT systems.

MOBY U

Overview

MOBY U is used to implement identification tasks with medium to high performance in the microwave frequency range (2.4 ... 2.4835 GHz) that require particularly high ranges.

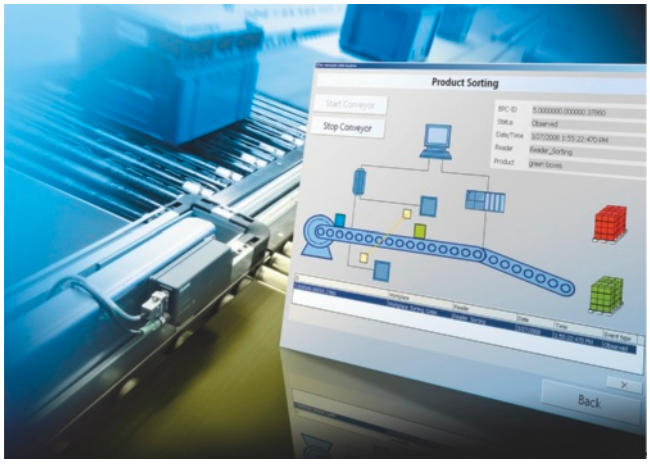
MOBY U eliminates familiar sources of interference, such as reflections, electromagnetic interference and overreach, by means of appropriate technical measures.

Correspondingly constructed antennas ensure a homogeneous transmission field to guarantee reliable recognition of the transponders (MDS) even from unfavorable locations.

In addition, special coding procedures ensure that the data transmission functions without errors and the data integrity is guaranteed. To achieve this, methods and algorithms that have been tried and tested in mobile radio technology (GSM, UMTS) have been transferred to the identification technology.

RFID Software

Overview



SIMATIC RF-MANAGER

The SIMATIC RF-MANAGER is a software tool designed for fast and simple creation and commissioning of RFID applications as well as their smooth operation in combination with a higher-level enterprise system or SIMATIC S7 controllers.

The current RF-MANAGER version supports read/write devices of the RFID systems RF300 and RF600. Depending on the scope of the RFID application, various
software packages are available which differ in the number of supported readers (maximum 50).

Overview of technical specifications

Technical specifications

Frequency range	HF		
RFID system	**SIMATIC RF200**	**SIMATIC RF300**	**MOBY D**
			
Transmission frequency	13.56 MHz	13.56 MHz	13.56 MHz
Read/write distance, max.	130 mm	210 mm	900 mm
Protocol (air interface)	ISO 15693	RF300 ISO 15693	ISO 15693
Approvals	• EN 300330, 301489, CE (Europe) • FCC Part 15 (USA) • UL/CSA)	• EN 300330, 301489, CE (Europe) • FCC Part 15 (USA) • UL/CSA) • Japan	• EN 300330, 301489, CE (Europe) • FCC Part 15 (USA) • UL/CSA
Memory capacity, max.	992 byte (EEPROM)/ 2 000 byte (FRAM)	64 KB	992 byte (EEPROM)/ 2 000 byte (FRAM)
Data transmission rate reader – transponder			
• **Read, max.**	1.5 KB/s	7.8 KB/s	1.5 KB/s
• **Writing, max.**	0.5 KB/s	7.8 KB/s	0.5 KB/s
Multitag/Bulk capability	No	No	Yes
Special features	• Particularly compact designs • For particularly low-cost RFID solutions	• High data transmission rate • Extended diagnostic possibilities	• SIMATIC or PC/IT integration • Long sensing ranges with excellent interference immunity • External antennas for industrial applications

Technical specifications (continued)

Frequency range	UHF	Microwave range
RFID system	**SIMATIC RF600**	**MOBY U**
		
Transmission frequency	865 ... 868 MHz (ETSI) 902 ... 928 MHz (FCC)	2.4 GHz
Read/write distance, max.	5 m	3 m
Protocol (air interface)	EPCglobal Class 1 Gen 2 ISO 18000-6C	ISO 18000-4
Approvals	• ETSI EN 302208, CE • FCC • UL	• CE • FCC • UL
Memory capacity, max.	96 / 240 bit EPC 512 bit user memory	32 KB
Data transmission rate reader – transponder		
• **Read, max.**	160 kbit/s	8 kbit/s
• **Write, max.**	160 kbit/s	4.8 kbit/s
Multitag/Bulk capability	Yes	Yes
Special features	• SIMATIC or PC/IT integration • Configurable data processing in the readers • Special antennas for industrial applications	• Active range limiting • High memory capacity

More information

Wireless approvals:

Current approvals can be found on the Internet at:
www.siemens.com/wireless-approvals

Introduction

Overview

Code reading systems –
Reading and verification of 1D/2D codes

For state-of-the-art production systems, tracing products and parts with machine-readable identification is a central requirement. A unique coding system permits the planning of each and every step of production for every part manufactured and changes within the production process or in the materials used. Direct marking of products also allows the implementation of specified legal requirements for tracing production batches throughout the production system.

What is Direct Part Marking (DPM)?

Direct Part Marking (DPM) indicates the application of a mark directly on the surface of a product without the use of a separate carrier material such as e.g. an adhesive label. This makes it possible to identify products in production and tracing them after delivery as well. So-called 2D codes have been used for years in a coding method that meets all user requirements. 2D codes consist of easy to implement, point-shaped basic elements. Laser and needle marking technologies are outstanding regarding durability, marking speed and material independence. Because of mechanical deformation, 2D codes can still be read using 2D read devices after multiple processing steps on metallic work pieces for example. 2D codes also provide the advantage of being able to encode data in more limited spaces than comparable barcodes or text.

The product range of Siemens code reading systems

Stationary code reading systems

SIMATIC MV440 and MV420 stationary code reading systems

The stationary code reading systems include compact basic and high-performance reading devices. The devices read various two-dimensional (2D) codes as well as one-dimensional (1D) barcodes. Many readers use data matrix print quality monitoring (verification) for process control.

SIMATIC MV440 can also read plain text (OCR stands for Optical Character Recognition)

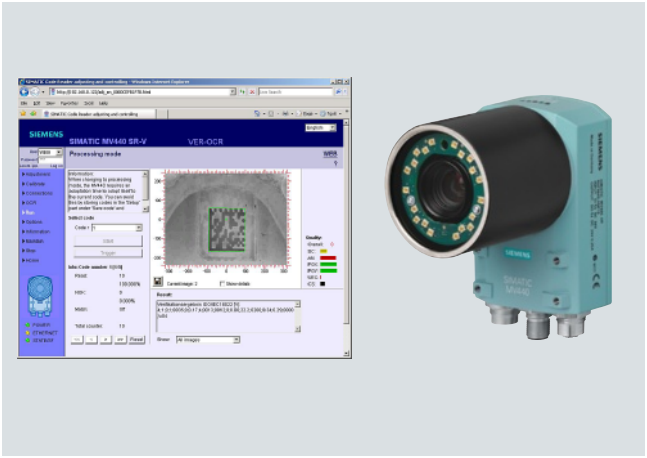
Handheld reading systems

Handheld reading system SIMATIC HawkEye 40T

This handheld reading system is a powerful, high-resolution read device for either two-dimensional (2D) data matrix codes and/or one-dimensional bar codes (1D). The device can communicate with a host computer using RS232, USB, PS2 and Bluetooth depending on the selected version.

Overview (continued)

Verification systems



By using verification systems, the readability of marks is guaranteed throughout the entire production process regardless of any possible contamination or when using different read devices. Moreover, the marking can continue to be read after the production process throughout the lifespan of the product.

With the "Veri-Genius" verification license the SIMATIC MV440 can be expanded at any time by the verification functionality, in addition to reading 1D barcodes and 2D matrix codes. This license is supplied as a "Single License" on a USB flash drive and can be copied via the SIMATIC Automation License Manager (ALM) to the SIMATIC MV440 using a plug-in. The license is executable on any SIMATIC MV440 with firmware version 4.0 and higher.

Optical character recognition

With the OCR license "Text Genius" SIMATIC MV440 can also be used for text recognition in addition to reading 1D bar codes and 2D matrix codes. This is also known as OCR (Optical Character Recognition). It is also possible to read and compare plain text and machine-readable code in the same image field.

The license is supplied as a "Single License" on a USB stick and can be copied to the device with the SIMATIC Automation License Manager (ALM) using a plug-in. The license can be installed on a SIMATIC MV440 with firmware version 3.0 and higher.

Benefits

- Unique identification of products or product parts – Direct Part Marking is the key technology for tracing products
- Part-specific documentation of the production process
- Automation of the manufacturing process
- Verification for product liability cases (e.g. recall actions)

Overview of technical specifications

Technical specifications

Major differences

Code reading system	SIMATIC MV420	SIMATIC MV440	SIMATIC VS130-2
			
Enclosure	Very compact design, IP67	Compact design, IP67	Modular design (signal evaluator, sensor head and light separately), IP65
Sensor / resolution	CMOS 640 x 480 pixels 752 x 480 pixels	CCD 640 x 480 pixels 1024 x 768 pixels 1600 x 1200 pixels	CCD 640 x 480 pixels
Lens system	Flexible lens system (M12)	Freely selectable lenses due to C-Mount lens connection	Integrated fixed focus lens, or freely selectable lenses due to C-Mount lens connection
Lighting	Integrated lighting	Integrated or external lighting	External lighting
Commissioning and operation	• Integrated web server • Auto-optimizing of parameters • Languages: E/G/F/I/S/CH	• Integrated web server • Auto-optimizing of parameters • Languages: E/G/F/I/S/CH	• Integrated web server • Onboard operator controls • Auto-optimizing of parameters • Languages: E/G/F/I/S/CH
Communication	• PROFIBUS (via ASM module; M12) • PROFINET (onboard, M12 or via ASM module, different interfaces) • Ethernet (onboard, M12) • RS232 (onboard, M16)	• PROFIBUS (via ASM module, M12) • PROFINET (onboard, M12 or via ASM module, different interfaces) • Ethernet (onboard, M12, PoE) • RS232 (onboard, M16)	• PROFIBUS (onboard; DB9) • PROFINET (onboard, RJ45) • Ethernet
Text recognition	–	Polyfont	–
Verification	–	• ISO/IEC 16022:2000 • ISO/IEC 15415:2004 • AS9132 Rev A, 2005 • ISO/IEC 15416:2000 • ANSI X3.182-1990 • Siemens DPM • AIM DPM-1-2006	ISO16022 based