

SIMATIC Ident

RFID systems SIMATIC RF120C

Operating Instructions

<u>Introduction</u>	1
<u>Description</u>	2
<u>Mounting, connecting up and commissioning</u>	3
<u>Configuration and parameter assignment</u>	4
<u>Service and maintenance</u>	5
<u>Technical data</u>	6
<u>Dimension drawings</u>	7
<u>Appendix</u>	A
<u>Service & Support</u>	B

Legal information

Warning notice system

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring only to property damage have no safety alert symbol. These notices shown below are graded according to the degree of danger.

 DANGER
indicates that death or severe personal injury will result if proper precautions are not taken.
 WARNING
indicates that death or severe personal injury may result if proper precautions are not taken.
 CAUTION
indicates that minor personal injury can result if proper precautions are not taken.
NOTICE
indicates that property damage can result if proper precautions are not taken.

If more than one degree of danger is present, the warning notice representing the highest degree of danger will be used. A notice warning of injury to persons with a safety alert symbol may also include a warning relating to property damage.

Qualified Personnel

The product/system described in this documentation may be operated only by **personnel qualified** for the specific task in accordance with the relevant documentation, in particular its warning notices and safety instructions. Qualified personnel are those who, based on their training and experience, are capable of identifying risks and avoiding potential hazards when working with these products/systems.

Proper use of Siemens products

Note the following:

 WARNING
Siemens products may only be used for the applications described in the catalog and in the relevant technical documentation. If products and components from other manufacturers are used, these must be recommended or approved by Siemens. Proper transport, storage, installation, assembly, commissioning, operation and maintenance are required to ensure that the products operate safely and without any problems. The permissible ambient conditions must be complied with. The information in the relevant documentation must be observed.

Trademarks

All names identified by ® are registered trademarks of Siemens AG. The remaining trademarks in this publication may be trademarks whose use by third parties for their own purposes could violate the rights of the owner.

Disclaimer of Liability

We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

Table of contents

1	Introduction	5
1.1	Security information	6
2	Description	9
2.1	Area of application and features.....	9
2.2	Setup and configuration	10
2.3	Integration	12
3	Mounting, connecting up and commissioning.....	13
3.1	Important notes on using the device.....	13
3.2	Use of the communications module in hazardous areas	14
3.2.1	Notes on use in hazardous areas	14
3.2.2	Notes on use in hazardous areas according to ATEX, UKEX, IECEx and CCC-Ex	15
3.2.3	Notes on use in hazardous areas according to FM.....	16
3.3	Installing and commissioning the RF120C.....	16
3.4	Connecting readers / serial devices.....	21
3.5	External power supply	23
3.6	Pin assignment of the socket for the external power supply.....	24
3.7	Pinout of the D-sub socket	24
4	Configuration and parameter assignment	25
4.1	Hardware configuration	25
4.2	Configuration.....	25
4.3	Parameter assignment with the device configuration.....	25
4.3.1	"Module parameters" parameter group.....	26
4.3.2	"Frame" parameter group.....	27
4.4	Programming via SIMATIC controller.....	29
5	Service and maintenance	31
5.1	LED status display on the RF120C.....	31
5.2	Diagnostics.....	33
5.3	Error messages.....	34
5.4	Module replacement.....	35
6	Technical data.....	37
7	Dimension drawings.....	39

A	Appendix	41
A.1	Certificates & approvals	41
A.1.1	Approvals	41
A.1.2	Standards and test regulations.....	47
A.2	Connecting cable	49
A.2.1	Routing of standard cables.....	49
A.2.2	Self-assembled cables	52
A.3	Connection of serial devices via Freeport protocol	53
A.3.1	Compatible Ident devices.....	53
A.3.2	Connecting handheld readers / access control readers / serial devices.....	53
A.3.3	Hardware configuration.....	54
A.3.4	Functions and commands.....	56
A.3.5	Block-specific error messages.....	58
A.4	Ordering data.....	59
A.4.1	Ordering data for RF120C	59
A.4.2	Ordering data for SIMATIC S7-1200 accessories	60
A.4.3	Further ordering data.....	60
B	Service & Support	61

Introduction

Purpose of this documentation

With the information in this documentation, you will be able to commission and operate the SIMATIC RF120C communications module with a SIMATIC S7-1200 controller.

Basic knowledge required

These operating instructions assume general knowledge of automation engineering and identification systems.

Scope of the manual

These operating instructions are valid for the SIMATIC RF120C communications module and describe the delivery status as of product version 06. If you are using older product versions, please refer to the 10/2018 edition of the documentation.

Note

Validity of the manual for other communications modules

You can also use the function blocks described in the section "Programming via SIMATIC controller (Page 29)" in the same way for the communication modules RF18xC/RF18xCI (PROFINET) and RF166C (PROFIBUS) if these are connected to an S7-1200 or S7-1500. You can find the reset blocks required for these communication modules in the manual "Ident profile and Ident blocks, standard function for Ident systems (<https://support.industry.siemens.com/cs/ww/en/view/109781633>)".

Position in the information landscape

- In addition to these operating instructions, you need the system manual "SIMATIC S7-1200 programmable controller (<https://support.industry.siemens.com/cs/ww/en/view/109772940>)".
- The manuals of the relevant IID system (<https://support.industry.siemens.com/cs/ww/en/ps/14970/man>) contain information on the readers and optical code readers to be connected.
- You can find information on configuration and parameter assignment, as well as on the reset blocks, in the "Ident profile and Ident blocks, standard function for Ident systems (<https://support.industry.siemens.com/cs/ww/en/view/109781633>)" manual.

Trademarks

The following and possibly other names not identified by the registered trademark sign ® are registered trademarks of Siemens AG:

SIMATIC ®, SIMATIC RF ® and MOBY ®

Decommissioning

Shut down the device properly to prevent unauthorized persons from accessing confidential data in the device memory.

To do this, restore the factory settings on the device.

Recycling and disposal



The products are low in harmful substances, can be recycled and meet the requirements of the Directive 2012/19/EU for disposal of waste electrical and electronic equipment (WEEE).

Do not dispose of the products at public disposal sites.

For environmentally compliant recycling and disposal of your electronic waste, please contact a company certified for the disposal of electronic waste or your Siemens representative.

Note the different country-specific regulations.

1.1 Security information

Siemens provides products and solutions with industrial security functions that support the secure operation of plants, systems, machines, and networks.

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 form one element of such a concept.

Customers are responsible for preventing unauthorized access to their plants, systems, machines and networks. These systems, machines and components should only be connected to the enterprise network or the Internet if and only to the extent necessary and with appropriate security measures (firewalls and/or network segmentation) in place.

You can find more information on protective measures in the area of industrial security by visiting:

<https://www.siemens.com/industrialsecurity>.

Siemens' products and solutions undergo continuous development to make them more secure. Siemens strongly recommends performing product updates as soon as they are available and using only the latest product versions. Use of product versions that are no longer supported, and failure to apply latest updates may increase customer's exposure to cyber threats.

To stay informed about product updates, subscribe to the Siemens Industrial Security RSS Feed under
<https://www.siemens.com/industrialsecurity>.

Description

2.1 Area of application and features

Area of application

The SIMATIC RF120C communications module is a module for the SIMATIC S7-1200 controllers. The RF120C can be used as a central I/O device in a SIMATIC S7-1200 with firmware version ≥ 3.0 .



Figure 2-1 RF120C communications module

When operating the communications modules with a SIMATIC S7-1200, there is a global library with function blocks available to you.

Only one reader or one optical reader can be operated with a SIMATIC RF120C communication module via an RS232/RS422 interface. RFID readers and optical readers from the following product families can be operated with the RF120C:

- RF200
- RF300
- RF1000
- MV320
- Freeport
- MV400/MV500

Features

With the help of the SIMATIC RF120C communications module, you can address the data on the transponders physically. This type of addressing is also referred to as normal addressing.

- A maximum of three RF120C modules can be operated at the same time with one SIMATIC S7-1200.
- There are no restrictions relating to operation with other modules from the SIMATIC S7-1200 range.
- Degree of protection IP20
- System integration with standard cables
- Standardized user interface for Ident technology with easy-to-use function blocks

2.2 Setup and configuration

This section describes the setup of a SIMATIC S7-1200 with RF120C as an example.

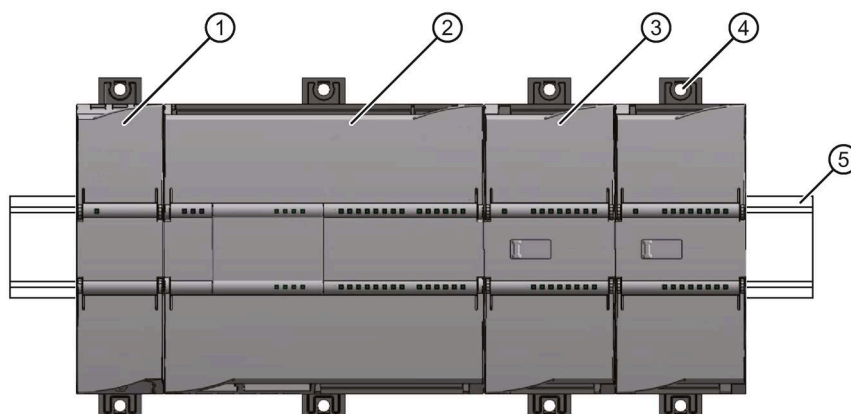
Configuration

The SIMATIC S7-1200 is designed for panel or rail mounting and consists of the following components:

- SIMATIC S7-1200
- Power supply unit
- Up to 3 communications modules (CM); e.g RF120C
- Up to 8 signal modules (SM)

You can thus set the focus of your configuration on local requirements.

The simple handling of the SIMATIC S7-1200 ensures fast commissioning and user-friendly maintenance.



- ① RF120C communications module
- ② CPU SIMATIC S7-1200
- ③ Signal modules
- ④ DIN rail mounting clip
- ⑤ DIN rail / panel

Figure 2-2 SIMATIC S7-1200 with RF120C

Configuration

The following figure shows the SIMATIC S7-1200 with three RF120C communications modules.

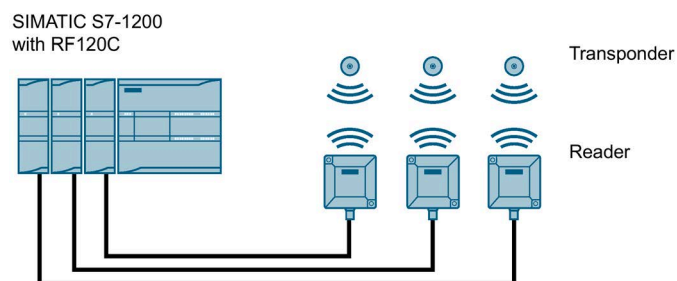


Figure 2-3 Maximum configuration of RF120C with a SIMATIC S7-1200

Extensive configurations are possible using a PROFIBUS/PROFINET setup with various SIMATIC Ident communications modules.

2.3 Integration

Integration

The figure below shows how the SIMATIC S7-1200 with RF120C is integrated into an automation system.

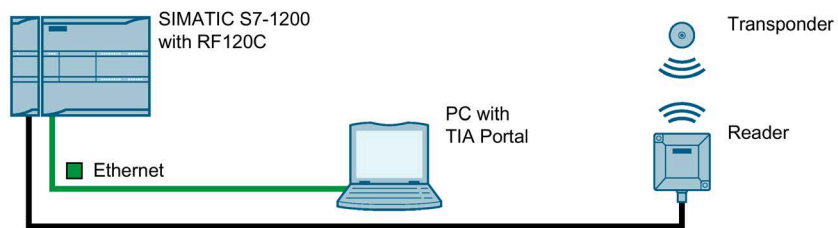


Figure 2-4 Example of integrating a SIMATIC S7-1200 with RF120C

As of STEP 7 Basic/Professional V13, the communication module RF120C (V1.0) is integrated in the TIA Portal; V2.0 of the communication module is integrated as of STEP 7 Basic/Professional V17 in the TIA Portal.

Mounting, connecting up and commissioning

3.1 Important notes on using the device

Safety notices on the use of the device

Observe the following safety notices when setting up and operating the device and during all related work such as installing and connecting the device or replacing the device.

General notes

 WARNING
Power supply The equipment is designed for operation with Safety Extra-Low Voltage (SELV) by a Limited Power Source (LPS). Therefore, the power supply must meet at least one of the following conditions: • Only SELV / LPS complying with IEC 60950-1 / EN 60950-1 / VDE 0805-1 or IEC 62368-1 / EN 62368-1 / VDE 62368-1 can be connected to the power supply terminals. • The power supply unit for the device must meet NEC Class 2 according to the National Electrical Code (r) (ANSI / NFPA 70). There is an additional requirement if devices are operated with a redundant power supply: If the device is connected to a redundant power supply (two separate power supplies), both must meet these requirements.

Overvoltage protection

NOTICE
Protection of the external 24 VDC voltage supply If the module is supplied via widespread 24 V power supply cables or networks, coupling of strong electromagnetic pulses into the power supply cables is possible, for example due to lightning or the switching of large loads. The connection of the external 24 VDC power supply is not protected against strong electromagnetic pulses. Make sure that any cables liable to lightning strikes are fitted with suitable overvoltage protection.

3.2 Use of the communications module in hazardous areas

Observe the following safety notices when setting up and operating the device and during all related work such as installing and connecting the device or replacing the device.

3.2.1 Notes on use in hazardous areas

The SIMATIC Ident products described in these operating instructions meet the requirements of the EU directive 2014/34/EU "Equipment and protective systems for use in hazardous areas" and the explosion protection requirements according to IECEx, UKEX and CCC-Ex.



WARNING

Cleaning the cabinet

- In hazardous areas
Only clean the exterior cabinet parts with a damp, but not wet, cloth.
- In non-hazardous areas
Only clean the exterior cabinet parts with a dry cloth.

Do not use liquids or solvents.



WARNING

Permissible pollution degree

The equipment shall only be used in an area of pollution degree 1 or 2 (see also EN/IEC 60664-1, GB/T 16935.1).



WARNING

EXPLOSION HAZARD

- When used in hazardous environments corresponding to Class I, Division 2 or Class I, Zone 2, the device must be installed in a cabinet or a suitable enclosure.
- Replacement of components may impair suitability for Class I, Division 2 or Zone 2.
- In a flammable or combustible environment, no cables may be connected to or disconnected from the device.

! WARNING

Risk of explosion in hazardous areas

When using SIMATIC NET/SIMATIC Ident products in Zone 2 hazardous areas, it is essential that you pay attention to the associated special conditions in the document:

"SIMATIC NET Product Information Use of subassemblies/modules in a Zone 2 Hazardous Area".

You will find this document here:

- On the data medium that ships with some products:
 - Product CD / product DVD
 - SIMATIC NET Manual Collection
- On the Web pages of Siemens Industry Online Support (<https://support.industry.siemens.com/cs/ww/en/view/78381013>)

! WARNING

Permissible DIN rail

In the ATEX, UKEX, IECEx and CCC-Ex area of application, only the Siemens DIN rail 6ES5 710-8MA11 may be used to mount the modules.

3.2.2

Notes on use in hazardous areas according to ATEX, UKEX, IECEx and CCC-Ex

! WARNING

Requirements for the control cabinet

To comply with the EU directive 2014/34 EU (ATEX 114), the UK regulation SI 2016/1107 or the conditions of IECEx or CCC-Ex, the enclosure or control cabinet must meet at least the requirements of IP54 (according to EN/IEC 60529, GB/T 4208) in line with EN IEC/IEC 60079-7, GB 3836.8.

! WARNING

Cables: Permitted temperatures

If the temperature at the cable or housing socket exceeds 70 °C or the temperature at the branching points of the cables exceeds 80 °C, special precautions must be taken. If the equipment is operated at ambient temperatures in excess of 50 °C, only use cables with permitted maximum operating temperature of at least 80 °C.

 WARNING

Transient overvoltages (safety extra-low voltage)

Take measures to prevent transient surges of more than 40 % of the rated voltage (or more than 119 V). This is guaranteed if you only operate the devices with SELV (safety extra-low voltage).

3.2.3 Notes on use in hazardous areas according to FM

 WARNING

EXPLOSION HAZARD

You can only remove or connect the cables carrying voltage when the power supply is switched off or when the device is in an area without flammable gas concentrations.

This device is only suitable for use in Class I, Division 2, Groups A, B, C and D and in non-hazardous areas. This device is only suitable for use in Class I, Zone 2, Group IIC and in non-hazardous areas.

 WARNING

EXPLOSION HAZARD

The equipment is intended to be installed within an ultimate enclosure. The inner service temperature of the enclosure corresponds to the ambient temperature of the module. Use installation wiring connections with admitted maximum operating temperature of at least 30 °C higher than maximum ambient temperature.

3.3 Installing and commissioning the RF120C

Prior to installation and commissioning

 WARNING

Read the system manual "S7-1200 Programmable Controller"

Prior to installation, connecting up and commissioning, read the relevant sections in the system manual "S7-1200 Programmable Controller". When installing and connecting up, keep to the procedures described in the system manual "S7-1200 Programmable Controller".

Make sure that the power supply is turned off when installing/uninstalling the devices.

Parameter assignment

One requirement for the commissioning of the CP is the completeness of the STEP 7 project data. For more information, read the section "Configuration and parameter assignment (Page 25)".

Dimensions for installation

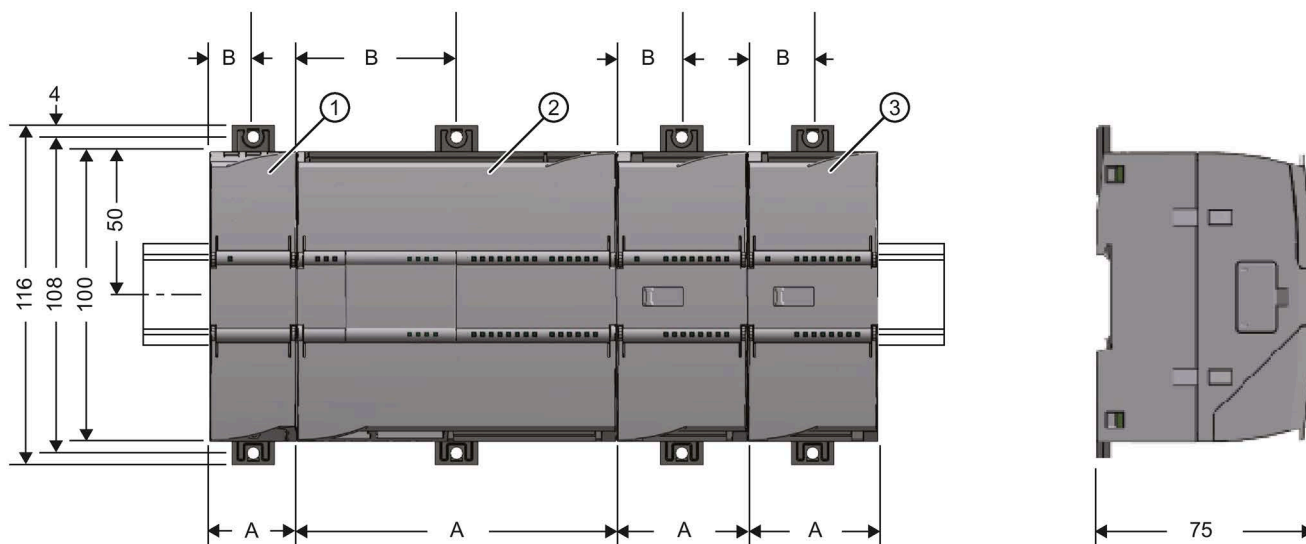


Figure 3-1 Dimensions for installation of the S7-1200

Table 3- 1 Dimensions for installation

S7-1200 devices		Width A	Width B *
CPU ②	Width depends on the CPU being used	90 mm	45 mm
		110 mm	55 mm
Signal modules ③	Width depends on the signal module being used	45 mm	22.5 mm
		70 mm	35 mm
Communications interfaces ①	e.g. RF120C	30 mm	15 mm

* Width B: The distance between the edge of the housing and the center of the hole in the DIN rail mounting clip

DIN rail mounting clips

All CPUs, SMs, CMs and CPs can be installed on the DIN rail in the cabinet. Use the pull-out DIN rail mounting clips to secure the device to the rail. These mounting clips also lock into place when they are extended to allow the device to be installed in a switching panel. The inner dimension of the hole for the DIN rail mounting clips is 4.3 mm.

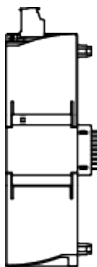
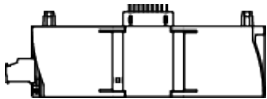
Procedure for installation and commissioning

Note

Installation location

All RF120C communications modules must be installed to the left beside the SIMATIC S7-1200. During installation, make sure that the upper and lower ventilation slits of the module are not obstructed and good ventilation is possible. Above and below the device, there must be a clearance of 25 mm to allow air to circulate and prevent overheating.

Remember that the permitted temperature ranges depend on the position of the installed device.

Device position / permitted temperature range	Installation location
Horizontal installation of the rack: 0 °C to 55 °C	
Vertical installation of the rack: 0 °C to 45 °C	

NOTICE

Connection with power off

Wire up the SIMATIC S7-1200 and modules to be connected only when the power is off.

Note

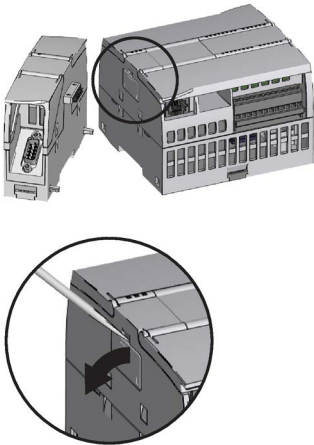
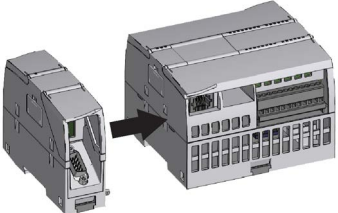
Power supply from the power outputs of the CPU

Connected modules obtain their power via the backplane bus of the SIMATIC S7-1200. Readers or code reading systems connected to the CM require an additional external power supply via the CM. Keep within the maximum load of the power outputs of the CPU.

You will find data relating to the current consumption and power loss of the CM in the section "Technical data (Page 37)".

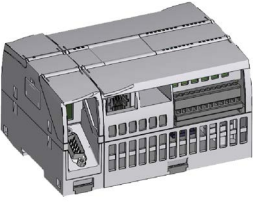
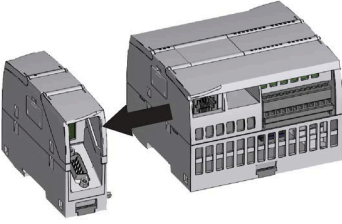
The RF120C communications module must be grounded via the shield.

Table 3- 2 Installing and connecting up an RF120C

Task	Procedure
	1. Remove the bus cover on the left of the CPU: – Insert a screwdriver into the slot above the bus cover. – Lever the cover up carefully out of its mounting. Remove the bus cover. Put the cover away for later use. 2. Connect the RF120C to the CPU: – Align the bus connector and the pins of the RF120C with the drill holes in the CPU. – Press the components together firmly until the limit stop is reached.
	3. Fit the CPU with the connected modules onto the 35 mm DIN rail and secure the DIN rail. 4. Secure the power supply wires to the external power supply unit. 5. Secure the wires of the external power supply to the plug supplied with the RF120C and insert the plug in the socket on the top of the RF120C. The pinning is shown beside the socket on the top of the housing. You will also find this in the section "Pin assignment of the socket for the external power supply (Page 24)". 6. Connect the reader using the RF120C cable to the D-sub female connector of the RF120C. To do this, open the lower door in the housing. 7. Turn on the power supply. 8. Close the front covers of the module and keep them closed during operation. 9. The remaining steps in commissioning involve downloading the STEP 7 project data. The STEP 7 project data of the RF120C is transferred when you download to the station. To load the station, connect the engineering station on which the project data is located to the Ethernet interface of the CPU. You will find more detailed information on loading in the following sections of the STEP 7 online help: • "Loading project data" • "Using online and diagnostics functions"

3.3 Installing and commissioning the RF120C

Table 3- 3 Dismantling an RF120C

Task	Procedure
	1. Make sure that the CPU and all S7-1200 devices are disconnected from the electric power. 2. Remove the two plug-in connectors from the CPU and the RF120C. 3. Pull out the two DIN rail clamps on the CPU and the RF120C. 4. Remove the CPU and the RF120C from the DIN rail. 5. Hold the CPU and RF 120 firmly and pull them apart.
	

3.4 Connecting readers / serial devices

NOTICE

Correct usage

When connecting non-specified devices to the RF120C, it is possible that the connected device may be destroyed.

A pre-assembled cable therefore permits the optimum and simple connection of the reader. The standard version of the connecting cable is available in lengths 2 m, 5 m and 10 m.

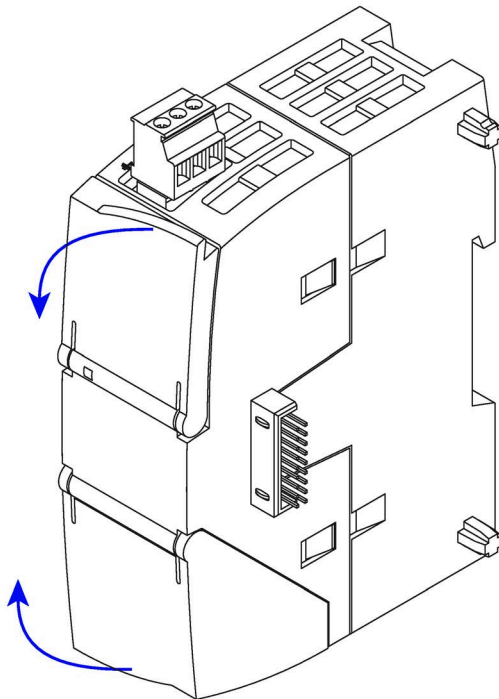


Figure 3-2 Opening the doors in the housing of the RF120C

To connect the cable, open the lower door in the housing as shown in the figure and connect the reader or serial device using the D-sub cable and the 9-pin D-sub socket of the communications module.

NOTICE

Attaching strain relief

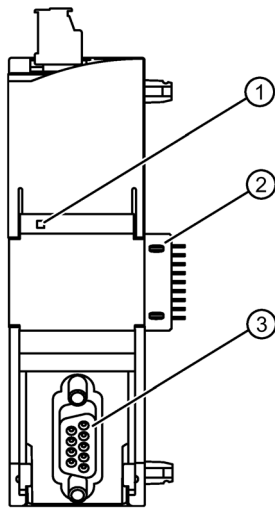
When a SIMATIC MV320 optical reader is connected to a communications module, you need to secure the MV320 connecting cable with strain relief. This strain relief can be provided by means of a cable clamp, for example. Secure the MV320 connecting cable by fixing the cable to the rack between the D-sub connector and the cable curve of the MV320 connecting cable using the strain relief.

At the top right behind the upper door in the housing of the module the version is printed as a placeholder "X". You require the version if you have questions for Support. In the example "X 2 3 4", the "X" is a placeholder for the version "1".

Note

Pulling and plugging the D-sub cable is allowed when the power is on

Pulling and plugging the D-sub is allowed when the power is on. After connecting a new reader, the "Reset_Reader" block must be called.



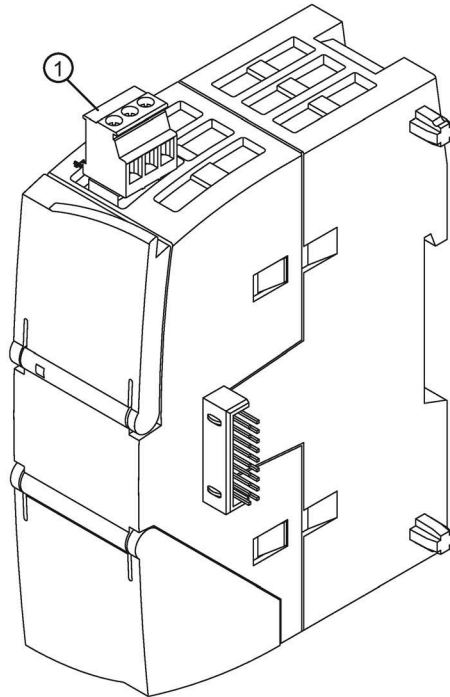
- ① Diagnostics LEDs
- ② Bus connector for connection to the controller
- ③ D-sub socket for connecting the reader / serial device

Figure 3-3 Sockets and LEDs of the RF120C communications module

3.5 External power supply

Power supply

The 3-pin socket for the external 24 VDC power supply is located on the top of the module. The reader is supplied with voltage via this power supply. The matching plug with screw terminals ships with the product. If there is overload, the RF120C turns off the power supply to the reader and signals this to the CPU.



① Mounted terminal block for the 24 VDC power supply of the reader

Figure 3-4 Terminal block for the 24 VDC power supply

The RF120C is supplied with power via the backplane bus and can also be addressed and commissioned without an external power supply from the SIMATIC S7-1200.

3.6 Pin assignment of the socket for the external power supply

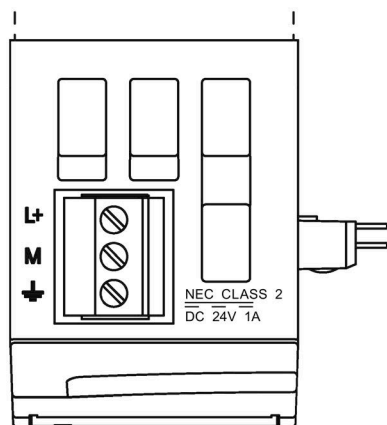


Figure 3-5 Socket for the external 24 VDC power supply (view from above)

Table 3- 4 Pin assignment of the socket for the external power supply

Pin	Labeling	Function
1	L+	+ 24 VDC (max. 1 A)
2	M	Ground reference for + 24 VDC
3		Ground connector

3.7 Pinout of the D-sub socket

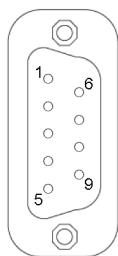


Table 3- 5 Pinout of the D-sub socket - RS422

Pin	Description	Pin	Description
1	24 VDC	6	-RxD
2	--	7	+RxD
3	--	8	-TxD
4	+TxD	9	--
5	GND	Enclosure	Ground connection

Table 3- 6 Pinout of the D-sub socket - RS232

Pin	Description	Pin	Description
1	-- (24 V DC)	6	--
2	RxD	7	--
3	TxD	8	--
4	5 V DC	9	--
5	GND	Housing	Ground connector

Configuration and parameter assignment

4.1 Hardware configuration

As of STEP 7 Basic/Professional V17, the communication module RF120C (V2.0) is integrated in the TIA Portal and can be integrated into SIMATIC automation systems via the SIMATIC S7-1200 controller. The basic configuration as well as operation of the communications module takes place via the Ident library of the TIA Portal.

4.2 Configuration

Requirement

STEP 7 Basic / Professional is installed and started, and a project is open. The communications module is installed in the SIMATIC S7-1200 controller and connected.

Procedure

Follow these steps to configure the communications module using the TIA Portal:

1. Change to the Project view.
2. Using the project tree, insert a SIMATIC S7-1200 controller in the project with the "Add new device" menu command.

The device view opens and the controller is displayed.

3. Drag the communications module from the hardware catalog into the controller.

You will find the RF120C module under the following path in the device configuration:

"SIMATIC S7-1200 > Communications modules > Identification systems > RF120C"

4. Configure the communications module.
5. Assign parameters to the communications module.
6. Save the configuration.

You can connect and configure a maximum of three RF120C modules per station.

4.3 Parameter assignment with the device configuration

You can set the basic parameters of the communication module using the properties window of the communication module. A more in-depth parameter assignment of the communication module RF120C (V2.0) as well as the devices connected to it, takes place via the technology object "SIMATIC Ident > TO_Ident" of the TIA Portal as of V17.

For reasons of compatibility with the communications modules (e.g. RF18xC), you also have the option of setting parameters for the RF120C using special Reset blocks. You can find detailed information on the Reset blocks in the function manual "Ident profile and Ident blocks, standard function for Ident systems (<https://support.industry.siemens.com/cs/ww/en/ps/14970/man>)".

The "Parameter" main menu item is divided into the following parameter groups:

- Module parameters
- Frame (only for "MOBY Mode = Freeport")

The parameters of the communication module RF120C as of V2.0 are described below.

4.3.1 "Module parameters" parameter group

In this parameter group, you can configure all module-specific parameters of the communication module.

Table 4- 1 Parameters in the "Module parameters" parameter group

Parameter	Parameter value	Default value	Description
User mode	Ident profile	Ident profile	Selection depends on the communications module and Ident system being used. With this parameter, you select the block: Ident profile: The program block for the Ident profile is used in the controller.
MOBY mode	RF200/RF300; MV400/MV500 Freeport MV320 RF1000	RF200/RF300; MV400/MV500	With this parameter, you set the mode of the communication module.
Transmission speed	19.2 kBd 57.6 kBd 115.2 kBd	115.2 kBd	Selection depends on the communications module and Ident system being used. Note that the value specified here is adopted automatically from the device configuration of the connected devices. With this parameter, you set the data transmission speed between the communications module and reader. When an RFID reader is connected: After changing the transmission speed, the reader must be turned off and on again (cycle power). When an optical reader is connected: The transmission speed selected here must match the transmission speed selected in the firmware of the reader.

Parameter	Parameter value	Default value	Description
Diagnostics messages	None Hard errors	Hard errors	With this parameter, you set whether hardware diagnostic messages will be reported. - None: Apart from standard diagnostics, no other alarms are generated. - Hard errors: Critical hardware errors/faults are reported by the S7 diagnostics.
Interface	RS422 RS232	RS232 / RS422	Selection of the interface type that the connected hardware (reader / optical readers) uses. The default value depends on the interface used. Note: This parameter is only shown when "MOBY Mode = Freeport" was selected.

4.3.2 "Frame" parameter group

In this parameter group, you can configure all parameters specific to the "Freeport". This parameter group is only displayed when you have selected the "Freeport" value in the "MOBY Mode" parameter.

Table 4- 2 Parameters in the "Frame" parameter group

Parameter	Parameter value	Default value	Description
Data bits	7 8	8	Selection of the number of bits on which a character is mapped.
Parity	None Odd Even	None	Parity selection A sequence of data bits can be expanded by a parity bit. With its value "0" or "1", the parity bit is added to the sum of all bits (data bits and parity bits) to form a defined status. This increases data reliability. - None: Data is sent without a parity bit. - Odd: The parity bit is set so that the sum of the data bits (including the parity bit) is odd when the signal state is "1". - Even: The parity bit is set so that the sum of the data bits (including the parity bit) is even when the signal state is "1".

4.3 Parameter assignment with the device configuration

Parameter	Parameter value	Default value	Description
Stop bits	1 2	1	Selection of the number of stop bits that indicate the end of a character. The stop bits are appended to every transferred character during transmission.
Specifying end detection	After character delay time elapses On receipt of fixed number of characters On receipt of the end delimiter(s)	After character delay time elapses	Specifies the end detection of a received frame: - After character delay time elapses: The frame has neither a fixed length nor defined end delimiters. The end of a frame is indicated by a gap in the character sequence. The size of this gap is specified by the character delay time. - On receipt of fixed number of characters: The length of the received frames is always the same. When data is received, the end of the frame is recognized when the set number of characters has been received. - On receipt of the end delimiter(s): At the end of the frame, there are one or two defined end delimiters. When data is received, the end of the frame is recognized when the configured end delimiter(s) is/are received.
No. of end delimiters	1 2	1	Selection of the number of end delimiters. A maximum of two end delimiters can be configured. When data is received, the end of the frame is recognized when the selected end delimiter combination is received.
1st end delimiter	0...255	3	Entry of the first end delimiter of a maximum of two end delimiters for the end criteria "On receipt of the end delimiter(s)". The selected end delimiter or the selected end delimiter combination limits the length of the frame. Parameter value depending on the "Data bits" parameter.
2nd end delimiter	0...255	0	Entry of the second end delimiter of a maximum of two end delimiters for the end criteria "On receipt of the end delimiter(s)". The selected end delimiter combination limits the length of the frame. Parameter value depending on the "Data bits" parameter.

Parameter	Parameter value	Default value	Description
Frame length	1...233	233	Entry of the frame length in bytes for the end criterion "On receipt of fixed number of characters".
Character delay time	0...65535	150	Entry of the time [ms] that can elapse until a frame end is recognized. Select the character delay time dependent on the sending behavior of your communication partner. Depending on the data transmission speed the character delay time is limited to a minimum value. Note that applications also pause between two frames during transmission.

4.4 Programming via SIMATIC controller

You can program and configure the SIMATIC RF120C communications modules using Ident instructions via a SIMATIC controller.

To configure Ident systems using STEP 7 Basic / Professional (TIA Portal), you need appropriate Ident instructions. The Ident library with the Ident profile and the Ident blocks is integrated in STEP 7 as of version V13. You can find a detailed description of the Ident profile and the Ident blocks in the "Ident profile and Ident blocks, standard function for Ident systems

(<https://support.industry.siemens.com/cs/ww/en/view/109781633>)" function manual.

Service and maintenance

5.1 LED status display on the RF120C

Position of the display elements and the electrical connectors

The LEDs for detailed display of the module statuses are located behind the upper door in the housing. Open the upper door in the housing by pulling it down. To allow this, the doors in the housing are extended to form a handle.

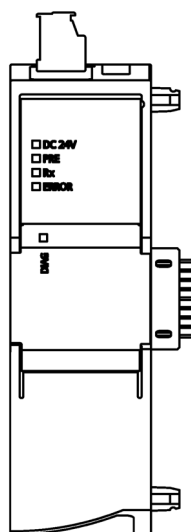


Figure 5-1 The LEDs of the RF120C

LED display of the module

The module has various LEDs for displaying the status:

- LED on the front panel

The "DIAG" LED that is always visible shows the basic statuses of the module.

- LEDs below the upper cover of the housing

Open the upper housing cover. The LEDs here provide more detailed information on the module status.

Table 5- 1 LEDs below the upper cover of the housing

LED / colors	Name	Meaning
 Lit green	DC 24 V	Indicates that voltage is being applied via the external 24 V power supply.
 Lit green	PRE	Indicates the presence of a transponder.
 Lit yellow	Rx	Indicates live communication with the reader.
 flashing red	ERROR	A flashing pattern indicates the last error to occur. The meaning of the flashing patterns is explained in the section "Error messages (Page 34)".

Note**LED colors when the module starts up**

When the module starts up, all its LEDs are lit for a short time. Multicolored LEDs display a color mixture. At this point in time, the color of the LEDs is not clear.

Display of the operating and communication status

The LEDs indicate the operating and communications status of the module according to the following scheme:

Table 5- 2 Display of the basic states of the module by the "DIAG" LED

DIAG (red / green)	Meaning	Comment
 Off	Power OFF	-
 Lit green	Module configured	Configuration was completed successfully and no error occurred.
 flashing green	- Startup - Module not configured - Firmware update	-
 flashing red	- Defect - Error - Alarm message	Check the ERROR LED and the 24 VDC LED for more detailed error diagnostics.
 Lit red	Module defective	Replace the module.

5.2 Diagnostics

NOTICE

The diagnostics options are limited

Error messages that the RF120C communications module forwards automatically to the SIMATIC controller are not evaluated by S7-1200 controllers with firmware version 4.0. For this reason error messages from the communications module are displayed neither on the controller nor in the TIA Portal. This error is eliminated by an update of the SIMATIC controller. The error display using the function block is not affected by this restriction in diagnostics.

You have the following diagnostics options available for the module:

- The LEDs of the module
For information on the LED displays, refer to the section "LED status display on the RF120C (Page 31)".
- STEP 7 Basic / Professional using the TIA Portal: Diagnostics functions in the "Online & diagnostics" menu
Here, you can obtain static information on the selected module:
 - General information on the module
 - Diagnostics status
- Evaluation with the standard "GET_DIAG" instruction
- Evaluation based on the "ERROR" and "STATUS" output parameters
You can find information on the parameters in the section "Error messages (Page 34)".

Diagnostics with the TIA Portal (STEP 7 Basic / Professional)

Requirements

STEP 7 Basic / Professional is installed and started, and a project is open. The communications module is installed in the SIMATIC S7-1200 controller and connected.

Procedure

Proceed as follows to read the diagnostic status of the RF120C using STEP 7 Basic / Professional (TIA Portal):

1. Change to the Project view.
2. Right-click on the desired communications module and click on "Online & Diagnostics" in the shortcut menu.
3. Select the "Diagnostics" option.

The diagnostics window provides you with the following options for diagnostics of the communications module:

- The identifier and the firmware version of the communications module are displayed under the "General" entry.
- Under the "Diagnostic status" entry, you can see current status information of the communications module.

5.3 Error messages

You can find a detailed description of all error messages and their possible causes and remedies in the "Ident profile and Ident blocks, standard function for Ident systems (<https://support.industry.siemens.com/cs/ww/en/view/109781633>)" Function Manual.

Error messages displayed via the "ERR" LED

The following error messages from the communications module are indicated by the flashing of the error LED:

Table 5- 3 Error evaluation via the "ERR" LED

Flashing of the "ERR" LED	Error in STATUS	Error description
1x	0xE4 FE 07	No error Communications module has started up and is waiting for an "init_run"
3x	0xE4 FE 03	Error in the connection to the reader; the reader is not answering.
5x	0xE6 FE 01	Unknown command (all product families); incorrect parameter assignment (RF600 only)
6x	0xE2 FE 01	Field disturbance on reader
17x	0xE4 FE 01	Voltage interruption, short-circuit or overload
18x	0xE4 FE 8D	Internal communication error of the communications module
19x	0xE4 FE 04	The reader does not have enough buffer on the communications module to store the command temporarily.
20x	0xE4 FE 8D	Internal monitoring error of the communications module
21x	0xE4 FE 15	Incorrect parameter assignment of the communications module

Flashing of the "ERR" LED	Error in STATUS	Error description
23x	0xE4 FE 8C 0xE5 FE 01 0xE5 FE 04	Communication error between Ident profile and communications module. Handshake error.
25x	0xE5 FE 08	An error has occurred that makes a WRITE-CONFIG with Config = 3 necessary.
30x	0xE5 FE 06 0xE6 FE 02 0xE6 FE 03	Error when processing the command

5.4 Module replacement

The configuration data of the RF120C is stored on the local CPU. When necessary, this allows simple replacement of this communications module without needing to re-load the project data on the module.

When the CM starts up again, the CPU automatically transfers the stored data to the CM.

You will find information on installing/removing a CM in the section "Installing and commissioning the RF120C (Page 16)".

Technical data

Table 6- 1 Technical specifications of the RF120C

6GT2002-0LA00	
Product type designation	SIMATIC RF120C
Transmission speed	
Maximum transmission speed on point-to-point connections (serial)	115.2 Kbps
Interfaces	
Design of the interface for point-to-point connection	RS422, RS232
Max. cable length	• RS422: 1000 m, reader-dependent • RS232: 15 m
Number of connectable readers	1
Electrical connection version	
• of the backplane bus	• S7-1200 backplane bus
• For supply voltage	• Screw terminals
Version of the interface (to the reader)	9-pin D-sub female
Max. block length	1 word cyclic / 240 bytes acyclic
Electrical data	
Supply voltage ¹⁾	
• Rated value	• 24 V DC
• Permissible range	• 20 to 30 VDC
Current consumption	
• via backplane bus	• typically 110 mA; max. 250 mA
• from ext. power supply, without devices connected	• typically 30 mA
• from ext. power supply, including connected devices ²⁾	• max. 1 A
Galvanic isolation	Yes

6GT2002-0LA00

Mechanical specifications

Material	Xantar MX 1094
Color	Ti-Grey 24L01
Dimensions (W x H x D)	30 x 100 x 75 mm
Weight	0.15 kg
Type of mounting	S7-1200 module rack
Maximum tightening torque of the screw for securing the equipment	0.45 Nm

Environmental conditions

Ambient temperature	
• during operation (horizontal installation)	• 0 ... +55 °C
• during operation (vertical installation)	• 0 ... +45 °C
• During transport and storage	• -40 ... +70 °C
Degree of protection	IP20
Shock resistance	to IEC 61131-2
Shock acceleration	300 m/s ²
Vibration acceleration	100 m/s ²

Product functions

LED display	4 LEDs for reader connection, 1 LED for device status
Function blocks SIMATIC S7-1200 and S7-1500	Library with function blocks: Read, Write, Read_EPC-ID, Write_EPC-ID, Set_Ant, Reset_Reader, AdvancedCmd
Transponder addressing	Direct access via addresses
Communications protocol	S7 communication
Commands	Initialize transponder, Read data from transponder, Write data to transponder, etc.

Standards, specifications, approvals

Approvals	CE, FCC, cULus (File E85972), KCC, C-Tick
MTBF (at 40 °C)	196 years

- ¹⁾ All supply and signal voltages must be safety extra-low voltage (SELV/PELV according to EN 60950 or IEC 62368)
24 V DC supply: Safe (electrical) isolation of low voltage (SELV / PELV acc. to EN 60950 or IEC 62368)
- ²⁾ The power supply must provide the required current of max. 1 A during brief power outages of ≤ 20 ms.

Dimension drawings

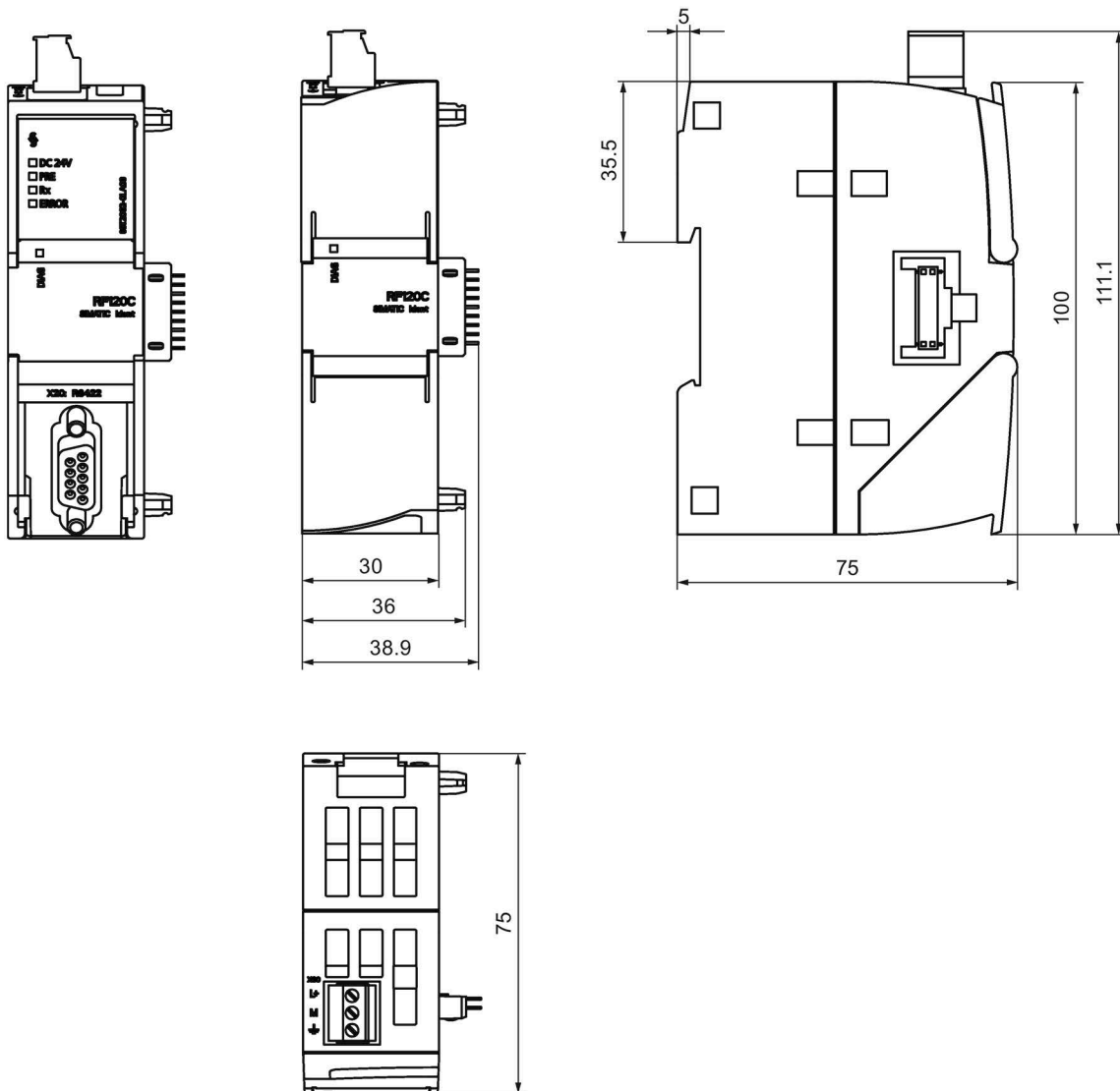


Figure 7-1 Dimension drawing RF120C communications module (dimensions in mm)

Appendix

A.1 Certificates & approvals

A.1.1 Approvals

Note**Issued approvals for the device**

The specified approvals apply only when the corresponding mark is printed on the product. You can check which of the following approvals have been granted for your product by the markings on the type plate.

Note**Type of protection of the device**

The devices are approved for various types of protection. You can find the type of protection of your device and the ATEX/IECEx/UKEx certificate number on the type plate.

Current approvals

SIMATIC NET/SIMATIC Ident products are regularly submitted to the authorities and approval centers for approvals relating to certain markets and applications.

Contact your Siemens representative if you need a list of the current approvals for the individual devices or check the Internet pages of Siemens Industry Online Support:

Current approvals (<https://support.industry.siemens.com/cs/ww/en/ps/15666>)

Go to the relevant product there and select the "Certificates" entry type from the "Entry list" tab.

EU Declaration of Conformity



The RF120C communications module meets the requirements and safety objectives of the following EU directives and it complies with the harmonized European standards (EN) for programmable logic controllers which are published in the official documentation of the European Union.

- 2014/30/EU "Electromagnetic Compatibility" (EMC Directive)
 - Immunity
EN 61000-6-2: Industrial area
 - Noise emission
EN 55011: Industrial, scientific and medical equipment - Radio-frequency disturbance characteristics (emission)
- 2011/65/EU "Restriction of the use of certain hazardous substances in electrical and electronic equipment" (RoHS)
- 2014/34/EU "Equipment and protective systems intended for use in potentially explosive atmospheres"

Address for declarations of conformity

The CE Declaration of Conformity is available for the responsible authorities at the following address:

Siemens Aktiengesellschaft
Digital Industries
D-76181 Karlsruhe
Germany

You will find the CE Declaration of Conformity for this product on the Internet at the following address:

CE declaration of conformity
(<https://support.industry.siemens.com/cs/ww/en/ps/15109/cert>)

UK Declaration of Conformity



The product meets the requirements of the following regulations:

- UKEX Regulations
SI 2016/1107 The Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres Regulations 2016, and related amendments
- EMC Regulations
SI 2016/1091 The Electromagnetic Compatibility Regulations 2016, and related amendments
- RoHS Regulations
SI 2012/3032 The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012, and related amendments

Importer UK

Siemens plc
Sir William Siemens House
Princess Road
Manchester
M20 2UR

ATEX / IECEx / UKEX / CCC-Ex approvals

Refer to the information in the document "Use of modules in a Zone 2 hazardous area (<https://support.industry.siemens.com/cs/ww/en/view/78381013>)".

The conditions must be met for safe usage of the product according to the section "Use of the communications module in hazardous areas (Page 14)". The product meets the explosion protection requirements outlined below.

Table A- 1 ATEX / IECEx / UKEX / CCC-Ex approvals

Marking	Description
	ATEX (ec) Classification: II 3G Ex ec IIC T4 Gc Certificate no.: DEKRA 18ATEX0028 X The product meets the requirements of the standards: • EN IEC 60079-0 - Explosive atmospheres - Part 0: Equipment - General requirements • EN 60079-7 - Explosive atmospheres - Part 7: Equipment protection by increased safety 'e'
	ATEX (nA) Classification: II 3G Ex nA IIC T4 Gc Certificate no.: KEMA 10ATEX0166 X The products meet the requirements of the standards: • EN IEC 60079-0 - Explosive atmospheres - Part 0: Equipment - General requirements • EN 60079-15 - Explosive atmospheres - Part 15: Equipment protection by type of protection "n"
	IECEx (ec) Classification: Ex ec IIC T4 Gc Certificate no.: IECEx DEK 18.0020X The product meets the requirements of the standards: • EN IEC 60079-0 - Explosive atmospheres - Part 0: Equipment - General requirements • EN 60079-7 - Explosive atmospheres - Part 7: Equipment protection by increased safety 'e'
	IECEx (nA) Classification: Ex nA IIC T4 Gc Certificate no.: IECEx DEK 14.0088X The products meet the requirements of the standards: • IEC 60079-0 - Explosive atmospheres - Part 0: Equipment - General requirements • IEC 60079-15 - Explosive atmospheres - Part 15: Equipment protection by type of protection "n"
	UKEX Classification: II 3 G Ex ec IIC T4 Gc Certificate no.: DEKRA 21UKEX0005 X The product meets the requirements of the standards: • EN IEC 60079-0 - Explosive atmospheres - Part 0: Equipment - General requirements • EN 60079-7 - Explosive atmospheres - Part 7: Equipment protection by increased safety 'e'

Marking	Description
	CCC-Ex Classification: Ex nA IIC T4 Gc Certificate no.: 2020322310002988 The product meets the requirements of the following standards: • GB 3836.1 Hazardous areas - Part 0: Equipment - General requirements • GB 3836.8 Explosive atmospheres - Part 15: Equipment protection by type of protection 'n'

EMC

The SIMATIC RF120C communications module meets the requirements of the following directives:

- EU directive 2014/30/EU "Electromagnetic Compatibility" (EMC directive)
- EMC Regulations SI 2016/1091 The Electromagnetic Compatibility Regulations 2016, and related amendments

Applied standards:

- EN 61000-6-2
Electromagnetic compatibility (EMC) - Generic standards - Immunity for industrial environments
- EN 55011
Electromagnetic compatibility (EMC) - Generic standards - Industrial, scientific and medical equipment - Radio-frequency disturbance characteristics (emission)

RoHS

The SIMATIC RF120C communications module meets the requirements of the following directives:

- EU directive 2011/65/EU "Restriction of the use of certain hazardous substances in electrical and electronic equipment"
- SI 2012/3032 The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012, and related amendments

Applied standard:

EN IEC 63000

Country-specific approvals

If the device has one of the following markings, the corresponding approval has been obtained.

Table A- 2 Country-specific approvals

Marking	Description
	c(UL)us Underwriters Laboratories Inc. UL 508 (Industrial Control Equipment)
	FM Factory Mutual Approval Standards: - Class 3600 - Class 3611 - Class 3810 - ANSI/ISA 61010-1 Report Number 3049847 Class I, Division 2, Group A, B, C, D, T4 Class I, Zone 2, Group IIC, T4 You will find the temperature class on the type plate on the module.
	RCM (Australia) The product meets the requirements of the standards according to AS/NZS 61000.6.4 (Class A). Additional information is available in the Operating Instructions "S7-1200 Programmable Controller".
Avis Canada	Avis (Canada) This class A digital device meets the requirements of the standard "Canadian ICES-003". AVIS CANADIEN Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.
	EAC (Eurasian Conformity) Eurasian Economic Union of Republic of Armenia, the Republic of Belarus, the Republic of Kazakhstan, the Kyrgyz Republic and the Russian Federation Declaration of conformity according to the technical regulations of the customs union (TR CU)
	KCC (South Korea); MSIP 요구사항 - For Korea only Korea Communications Commission Certificate of Broadcasting and Communication Equipments Republic of Korea A급 기기(업무용 방송통신기자재) 이 기기는 업무용(A급) 전자파 적합기기로서 판매자 또는 사용자는 이 점을 주의하시기 바라며, 가정 외의 지역에서 사용하는것을 목적으로 합니다. KCC-REM-S49-SIMATICRF

A.1.2 Standards and test regulations

Industrial environments

The product was developed for use in industrial environments.

Application	Requirements for emissions	Requirements for immunity
Industry	EN 61000-6-4	EN 61000-6-2

Electromagnetic compatibility (EMC)

The electromagnetic compatibility (EMC) of an electrical device is its capability of functioning as intended in an electromagnetic environment without emitting electromagnetic interference that could impair the operation of other electrical devices in the vicinity.

Table A- 3 Electromagnetic compatibility

Immunity	
EN 61000-4-2 Electrostatic discharge	8 kV air discharge to all surfaces 4 kV contact discharge to exposed conductive surfaces
EN 61000-4-3 Radiated electromagnetic field	80 ... 1 000 MHz, 10 V/m, 80% AM at 1 kHz 1.4 ... 2.0 GHz, 3 V/m, 80% AM at 1 kHz 2.0 ... 2.7 GHz, 1 V/m, 80% AM at 1 kHz
EN 61000-4-4 Fast transient bursts	2 kV, 5 kHz with coupling network to AC and DC system power 1 kV, 5 kHz with coupling clamp to inputs/outputs
EN 61000-4-5 Surge immunity	DC systems - 2 kV common mode, 1 kV push-pull For DC systems (I/O signals, DC power supplies), external protection is necessary.
EN 61000-4-6 Conducted disturbances	150 kHz to 80 MHz, 10 V RMS, 80 % AM at 1 kHz
Noise emission	
Conducted emissions EN 61000-6-4, class A 0.15 MHz to 5 MHz 5 MHz to 30 MHz	< 79 dB (μ V) quasi peak; <66 dB (μ V) average < 73 dB (μ V) quasi peak; <60 dB (μ V) average
Radiated emissions EN 61000-6-4, class A 30 MHz to 230 MHz 230 MHz to 1 GHz	< 40 dB (μ V/m) quasi peak; measured at 10 m < 47 dB (μ V/m) quasi peak; measured at a distance of 10 m

Environmental conditions

Environmental conditions - transportation and storage	
EN 60068-2-2, Test Bb, dry heat and EN 60068-2-1 Test Ab, cold	-40 °C ... +70 °C
EN 60068-2-30, Test Db, damp heat	25 °C to 55 °C, 95% humidity
EN 60068-2-14, Test Na, temperature shock	-40 °C to +70 °C, dwell time 3 hours, 2 cycles
EN 60068-2-32 Free fall	0.3 m, five times, in product packaging
Atmospheric pressure	1 080 hPa to 660 hPa (corresponds to an elevation of -1 000 to 3 500 m)
Environmental conditions - operation	
Ambient temperatures / air humidity (inlet air 25 mm below device)	0 °C to 55 °C for horizontal installation of the rack 0 °C to 45 °C for vertical installation of the rack 95% relative humidity, non-condensing
Atmospheric pressure	1080 ... 795 hPa (corresponds to an elevation of -1000 to 2000 m)
EN 60068-2-14, Test Nb, temperature change	5 °C to 55 °C, 3 ° C / minute
EN 60068-2-27 Mechanical shock	15 g, 11 ms pulse, 3 positive and 3 negative shocks in each of the 3 axes (half sine)
EN 60068-2-6 Sinusoidal vibration (DIN rail mount)	3.5 mm at 5 ... 8.4 Hz; 9.8 m/s ² at 8.4 ... 150 Hz; 10 sweep cycles per axis, 1 Octave/minute

Protection class

- Protection class III according to EN 61131-2 (protective conductor not required)

Degree of protection

- Mechanical protection to EN 60529: IP20

Protects against finger contact with high voltage as tested using a standard probe.
External protection required for dust, dirt, water and foreign objects of < 12.5 mm in diameter.

A.2 Connecting cable

A.2.1 Routing of standard cables

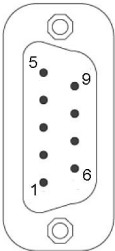
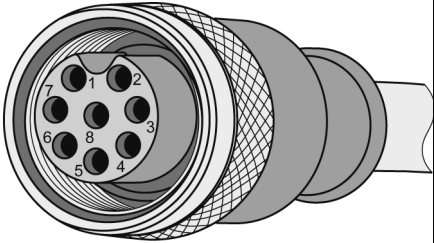
You can connect the various readers and optical readers using the following connecting cables.

- Connecting cable D-sub (RS422) ↔ M12

for RF200, RF300, MV400 and MV500

Length: 2 m, 5 m, 10 m

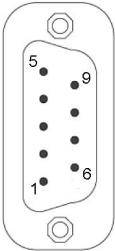
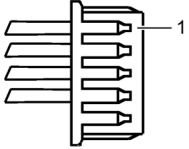
An additional CM adapter cable (6GF3500-8BA11 or 6GF3500-8BA12) is required to connect the MV500.

D-sub connector (male)		M12 connector (female)	
	1	1	
	2	-	
	3	-	
	4	5	
	5	3	
	6	2	
	7	4	
	8	6	
	9	8	
	-	7	

- Connecting cable D-sub (RS232) ↔ 5-pin socket housing (PicoBlade)

for RF1000

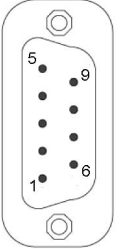
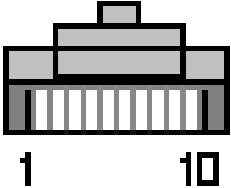
Length: 2 m

D-sub connector (male)		5-pin socket housing (PicoBlade)	
	1	-	
	2	4	
	3	3	
	4	1	
	5	2	
	6	-	
	7	-	
	8	-	
	9	-	

- Connecting cable D-sub (RS232) ↔ RJ50

for MV320

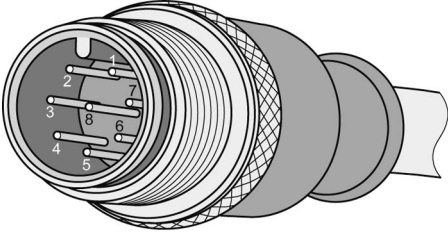
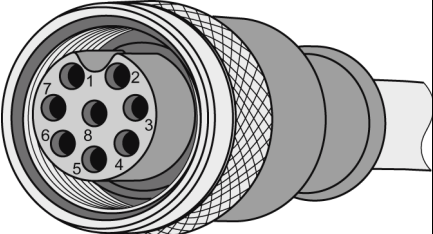
Length: 1.6 m coiled; can be extended to 4.0 m

D-sub connector (male)		RJ50 connector (female)	
	1	-	
	2	4	
	3	6	
	4	1	
	5	10	
	6	-	
	7	-	
	8	-	
	9	-	

- Extension cable M12 ↔ M12

for RF200, RF300 and MV400

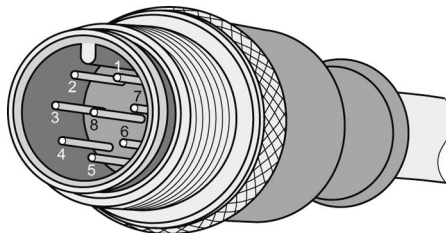
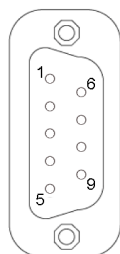
Length: 2 m, 5 m, 10 m, 20 m, 50 m

M12 connector (male)		M12 connector (female)	
	1	1	
	2	2	
	3	3	
	4	4	
	5	5	
	6	6	
	7	7	
	8	8	

- Connecting cable M12 ↔ D-sub
for MOBY D

Can only be used in conjunction with a connecting cable D-sub-D (RS422) ↔ M12 (6GT2091-4Lxxx).

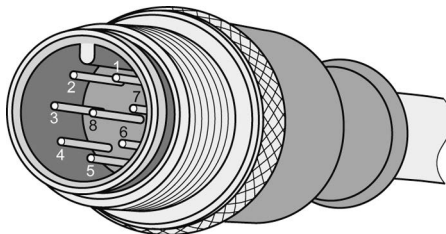
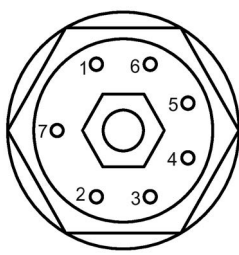
Length: 2 m

M12 connector (male)		D-sub connector (female)	
	1	-	
	2	5	
	3	7	
	4	3	
	5	2	
	6	6	
	7	-	
	8	1, 8	
Note: Reader with a D-sub connector must be supplied over an additional connector with 24 V DC.			

- Connecting cable M12 ↔ ES175201
for MOBY U

Can only be used in conjunction with a connecting cable D-sub-D (RS422) ↔ M12 (6GT2091-4Lxxx).

Length: 2 m, 5 m

M12 connector (male)		ES175201 connector (female)	
	1	2	
	2	5	
	3	3	
	4	4	
	5	6	
	6	1	
	7	-	
	8	7	

A.2.2 Self-assembled cables

As an alternative to the preassembled standard cables, you can assemble cables individually yourself. A reader connector with screw terminals is available for self-assembly (see the relevant system manual). Cables and reader connectors can be ordered using the TIA Selection Tool, the SIMATIC Ident Configuration Guide.

Maximum cable length

The readers (RS232) connected to the communication module can be operated with a maximum cable length of 15 m.

In some situations, longer connecting cables up to 1000 m are possible for connection via RS422. Please note that a transfer speed of 115.2 kBd can only be guaranteed for a max. cable length of 700 m. The current consumption of the connected reader must, however, be taken into account. You will find further information in the relevant system manuals.

Joining more than two cables to form a long cable should be avoided due to the additional contact resistances.

Requirements for cables and connectors

You will need cables of the following specifications for self-assembled cables:

- 6 x 0.25 mm²
- L-YC11Y 6 x 1 x 0.25
50 m: 6GT2090-4AN50
120 m: 6GT2090-4AT12
800 m: 6GT2090-4AT80

You can use the following M12 connectors:

- Reader-sided: M12/8-pin, female
6GT2090-0BD00

D-sub connectors can be obtained from the relevant specialist dealers.

Pin assignment

You will find the pin assignment in the section "Pinout of the D-sub socket (Page 24)".

A.3 Connection of serial devices via Freeport protocol

The manuals of the relevant devices contain information on the parameterization options for the devices stated in the following:

- SIMATIC MV320 (<https://support.industry.siemens.com/cs/ww/en/ps/15157/man>)
- SIMATIC RF1000 (<https://support.industry.siemens.com/cs/ww/en/ps/24223/man>)

You will find the parameter assignment options of other serial devices in the manuals of the respective device vendor.

A.3.1 Compatible Ident devices

The following Ident devices can be operated using the communication module via the Freeport protocol and the RS232/RS422 interface:

- SIMATIC MV320
- SIMATIC RF1040R/RF1070R

You can also connect any serial device to the communication module because the communication module can use the Freeport protocol to communicate with serial devices (e.g. bar code scanner, intelligent sensor or other automation components with serial connection).

A.3.2 Connecting handheld readers / access control readers / serial devices

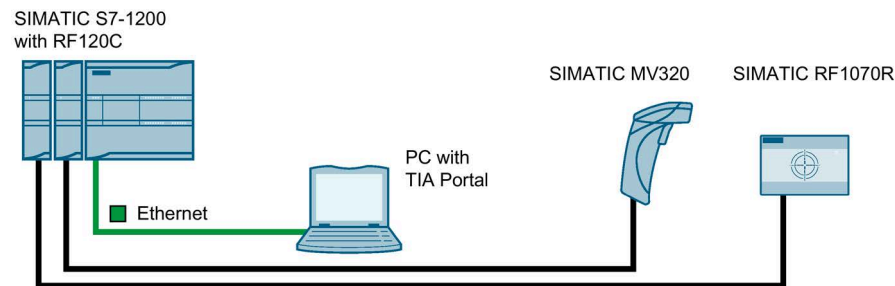


Figure A-1 Example of a cabling setup

The coiled connecting cable of the optical handheld readers SIMATIC MV320 has a length of 1.6 m. Due to its coiling, it can be extended to a length of 4 m during operation. A preassembled cable is also available for connection of the SIMATIC RF1040R/RF1070R readers.

When connecting general serial devices, you need to assemble the cable yourself for the specific device. You will find detailed information on this topic in section “Self-assembled cables (Page 52)”.

Power supply

The connected field device can be supplied with power via the communication module if the performance data of the communication module is not exceeded. Note the technical specifications of the RF120C in this respect: At 24 V max. 0.8 A or at 5 V max. 0.6 A.

A.3.3 Hardware configuration

The optical handheld readers and access control readers can be integrated into SIMATIC automation systems using STEP 7 Basic / Professional (TIA Portal) or STEP 7 Classic (SIMATIC Manager).

Below the configuration via the TIA Portal is described. Information on configuring other serial devices is available in the respective manuals.

Requirement

The optical handheld reader / the RF1040R/RF1070R is connected to the controller via the communication module and has started up. The TIA Portal has been started. A project with an S7-1200 and inserted RF120C was created.

Procedure

Proceed as follows to configure the communication module:

1. In the "Module parameters" parameter group, select the matching "MOBY Mode" (RF1000 or MV320).
2. Set all other parameters as required.

Please note the specifications in the next paragraph.

3. Download the configuration to the controller.

Configuring the optical handheld readers

To allow the operation of the optical handheld readers via the RS232 interface with the communication module you need to configure the handheld readers appropriately. This configuration can be achieved quickly and simply by scanning the relevant codes.

- SIMATIC MV320 ($\leq$ AS 2)



- SIMATIC MV320 ($\geq$ AS 3)



By scanning the code, all relevant parameters for the communication between the communication module and the optical handheld reader are set:

- Interface: RS-232
- Transmission speed: 115.2 kBd
- Data bits: 8
- Parity: None
- Stop bits: 1

Configuring the RF1040R/RF1070R reader

No further settings need to be made for the RF1040R/RF1070R reader. In its delivery state, the reader is set so that it can be operated both via USB as well as the R232 interface.

A.3.4 Functions and commands

You can communicate with the Ident devices using the Ident blocks / Ident profile. The "Write" command handles the sending of data and the "Read" command the receipt of data.

The following table shows the block-specific commands that you can execute with serial field devices.

Table A- 4 Overview of the commands

Command	Description
Read	Read data - Address "0x0000" The length of the valid data is entered in the first 2 bytes of the result. The user data is entered starting at the 3rd byte. Max. net data 231 bytes; no error message if the length is exceeded. - When the "On receipt of the end delimiter(s)" parameter is used, the result is increased by 1 or 2 bytes accordingly. - Address "0x0002" No length information in the result; max. net data 233 bytes
Write	Sending data The address must be specified as "0xFFFF". Max. net data 194 bytes (without length information); no error message if the length is exceeded
Reader_Status	Reads status information from the reader. Identifier of the status modes / possible entries: - RF1000: 0x8E - MV320: 0x8D
Reset_Univ	Reset the communication between CM and device and empty the buffer. The 11th byte ("option_1") of parameter "PARAM" can be occupied by "0x00" or "0x02". The value "0x04" must be entered in the 1st byte, and "0x0A" in the 6th byte. When using the technology object, the command "Reset_Reader" can be used as an alternative.
Reset_Reader	As an alternative to the "Reset_Univ" command, this command can be used with using the technology object "SIMATIC Ident > TO_Ident".

You can find detailed information on the commands and error messages of the RF1040R/RF1070R in the "Programming" section of the "SIMATIC RF1000" manual. The system job frames displayed must be stored in the data area for the "Write" command. The answer message frames are output in the data block following a "Read" command.

Notes on the commands and functions

Reset_*

Communication with the CM is initialized with the Reset command. The Reset command does not have reader-specific parameters and triggers the deletion of the buffers.

The communication module is ready for operation after the "Reset_*".

Read

When the "Read" command is started, the data that the CM has already received is transferred to the controller.

If the "Read" command is started before the CM has received data, the command remains active until the CM has received data that is then transferred to the controller. An active "Read" command can be canceled with a "Reset_*"/"Write_Config" command.

The presence bit ("TP") indicates that the CM has received new data and that this data is available for fetching with a "Read" command. After data transmission to the controller, the presence bit is reset unless new data has already been received.

When doing this, note the buffer size and the buffer overflow. If the receive buffer of the CM is full, existing data is overwritten by newly received data.

Reader_Status

The device status of the optical handheld reader can be obtained with the "Reader_Status" command (ATTRIBUTE "0x8D"). The following information is contained in the acknowledgment of the status command sent by the CM (response of the handheld reader):

Table A- 5 Structure of the "Status" acknowledgment frame of the optical handheld reader

Indicates that data contains the zero-terminated Reader information string (of printable ASCII characters and TAB) in the following format: IVVVVWWWWXXXXSSSSSSSSSSAOODYYYYHHIIIIJJJKKKKLLLL<TAB>Z...Z	
0xD	is reserved
I	indicates 'I' string output
VVVV	is the application firmware version number
WWWW	is the core application firmware version number
XXXX	is reserved
SSSSSSSSSS	is the Reader's serial number (ten digits)
A	is the current execution state: "A" means core is running
OO	is the OEM identifier
D	is the display type: "0" is no display device
YYYY	is reserved
HH	is the hardware revision
IIII	is the hardware type identifier: Reports the value in register "0x21b"
JJJJ	is the boot application version
KKKK	is the operating system kernel version
LLLL	is the root file-system version

<TAB>	is the ASCII TAB character
Z...Z	is the OEM decoder version: a null terminated string of printable ASCII characters

A.3.5 Block-specific error messages

The following table lists the block-specific error codes that can occur when working with optical handheld readers, access control readers or serial devices.

Table A- 6 Block-specific error messages

Error ID	Meaning
0xE1FE0300	Address error in command (≠ "0x0000", "0x0002", "0xFFFF")
0xE2FE0100	Negative acknowledgment or bad frame from the reader
0xE4FE0400	New data was received before existing data was fetched. Scan operation: The newest data is lost. With the "Write" command, the oldest acknowledgments are lost without an error message being generated.
0xE4FE8D00	Internal communication error
0xE5FE0400	Invalid data block number (DBN) on the reader/communication module
0xE6FE0100	Unknown command, incorrect command parameters or unauthorized command chaining (incorrect length specification)
0xE6FE0500	"Reset_Reader" necessary

A.4 Ordering data

A.4.1 Ordering data for RF120C

Table A- 7 Ordering data

	Article number
RF120C communications module	6GT2002-0LA00

Table A- 8 Ordering data - Accessories

		Article number
Connecting cable D-sub (RS422) ↔ M12; for RF200/RF300, MV400/MV500	2 m	6GT2091-4LH20
	5 m	6GT2091-4LH50
	10 m	6GT2091-4LN10
CM adapter cable for MV500 (M12, 12-pin ↔ M12, 8-pin)	0.5 m	6GF3500-8BA11
	5 m	6GF3500-8BA12
Connecting cable D-sub (RS232) ↔ 5-pole bush housing (PicoBlade); for RF1000	2 m	6GT2891-6UH20
Connecting cable D-sub (RS232) ↔ RJ50 for MV320 cable is coiled and can be extended up to 4.0 m	1.6 m	6GT2191-1BH50
Extension cable M12 ↔ M12 for RF200/RF300, MV400	2 m	6GT2891-4FH20
	5 m	6GT2891-4FH50
	10 m	6GT2891-4FN10
	20 m	6GT2891-4FN20
	50 m	6GT2891-4FN50
Extension cable M12 ↔ M12; for RF200/RF300, MV400 connector angled on reader side	2 m	6GT2891-4JH20
	5 m	6GT2891-4JH50
	10 m	6GT2891-4JN50
Connecting cable M12 ↔ Sub-D; for MOBY D only in combination with the connecting cable D-sub (RS422) ↔ M12	2 m	6GT2691-4FH20
Connecting cable M12 ↔ ES175201; for MOBY U only in combination with the connecting cable D-sub (RS422) ↔ M12	2 m	6GT2091-4FH20
	5 m	6GT2091-4FH50
Terminal block (5 units) 3-pin terminal block for power supply for S7-1200 CPs		6GK5980-1CB00-0DA5

A.4.2 Ordering data for SIMATIC S7-1200 accessories

You will find the complete ordering overview for the SIMATIC S7-1200

- in the Operating Instructions "S7-1200 Programmable Controller" or
- in the catalog "ST 70, Totally Integrated Automation and Micro Automation".

A.4.3 Further ordering data

Table A- 9 SIMATIC manual collection

Name	Article number	Content
SIMATIC manual collection	6ES7998-8XC01-8YE0	Contains all SIMATIC manuals in electronic format

Service & Support

Industry Online Support

In addition to the product documentation, you are supported by the comprehensive online information platform of Siemens Industry Online Support at the following Internet address:

Link: (<https://support.industry.siemens.com/cs/de/en/>)

Apart from news, you will also find the following there:

- Project information: Manuals, FAQs, downloads, application examples etc.
- Contacts, Technical Forum
- The option to submit a support request:
Link: (<https://support.industry.siemens.com/My/ww/en/requests>)
- Our service offer:

Right across our products and systems, we provide numerous services that support you in every phase of the life of your machine or system - from planning and implementation to commissioning, through to maintenance and modernization.

You will find contact data on the Internet at the following address:

Link: (https://www.automation.siemens.com/aspa_app/?ci=yes&lang=en)

"Industrial Identification" homepage

You can find the latest general information about our identification systems on the Internet at our Homepage (www.siemens.com/ident).

Online catalog and ordering system

The online catalog and the online ordering system can also be found on the Industry Mall home page (<https://mall.industry.siemens.com>).

SITRAIN - Training for Industry

The training offer includes more than 300 courses on basic topics, extended knowledge and special knowledge as well as advanced training for individual sectors - available at more than 130 locations. Courses can also be organized individually and held locally at your location.

You will find detailed information on the training curriculum and how to contact our customer consultants at the following Internet address:

Link: (<https://new.siemens.com/global/en/products/services/industry/sitrain.html>)

