SIEMENS

SIMATIC Ident

RFID systems
RF170C communication module

Operating Instructions

Introduction 1

Description 2

Mounting 3

Connection 4

Parameter settings 5

Service and maintenance 6

Diagnostics and error messages 7

Technical data 8

Dimension drawings 9

Appendix A

06/2016

J31069-D0176-U001-A5-7618

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.

Siemens AG
Division Process Industries and Drives
Postfach 48 48
90026 NÜRNBERG
GERMANY

J31069-D0176-U001-A5-7618
℗ 07/2016 Subject to change

Copyright © Siemens AG 2006 - 2016.
All rights reserved

Table of contents

1 Introduction 5
2 Description 9
2.1 Area of application and features 9
2.2 Design 11
2.2.1 Configuration 11
2.2.2 Components of the ET 200pro distributed IO device with RF170C 14
2.2.3 Maximum configuration 16
2.3 Galvanic isolation 17
2.4 Integration 18
2.5 Planning data throughput 19
3 Mounting 21
3.1 Installing the interface module 21
3.2 Installing the RF170C communication module 23
3.3 Mounting the terminating module 24
3.4 Set the PROFIBUS address and the terminating resistor 24
4 Connection 25
4.1 Connecting readers 26
4.2 Connect the RF170C with the connection module 27
5 Parameter settings 29
5.1 Hardware configuration 29
5.2 Configuration via STEP 7 (Basic/Professional) 29
5.2.1 Parameter assignment with the device configuration 30
5.2.2 "Module parameters" parameter group 30
5.2.3 "Frame" parameter group 33
5.3 Parameter setting by means of GSD/GSDML file 36
5.4 Overview of the Ident blocks 36
5.5 Parameters and commands of the Ident profile 37
5.6 Parameters and commands of FB 45 39
6 Service and maintenance 41
6.1 Degree of protection IP65, IP66 and IP67 41
6.2 Removing, inserting and replacing modules of the ET 200pro 41
6.3 Removing and inserting the RF170C 42
6.4 Firmware update 43

7 Diagnostics and error messages 45
7.1 LED displays on the interface module 45
7.2 LED displays on the RF170C communication module 45
7.3 Identification and maintenance data (I&M data) 47
7.4 Parameterization of the diagnostics 48
7.5 Diagnostics of the RF170C communications module 50
8 Technical data 51
9 Dimension drawings 53
9.1 Interface module with connection module 53
9.2 RF170C with connection module 53
A Appendix 55
A.1 Connecting cables 55
A.1.1 Routing of standard cables 55
A.1.2 Self-assembled cables 59
A.2 Connection of optical handheld readers or serial devices 60
A.2.1 Compatible optical handheld readers 60
A.2.2 Connecting handheld readers / serial devices 60
A.2.3 Hardware configuration 61
A.2.4 Functions and commands of optical handheld readers 63
A.2.5 Functions and commands of serial devices 66
A.2.6 MOBY mode-specific error messages 68
A.3 Ordering data 70
A.3.1 Article numbers RF170C 70
A.3.2 Article numbers accessories ET 200pro 71
A.3.3 Further article numbers 71
A.4 Standards and certifications 72
A.5 Service & Support 72
Index 75

Introduction

1

Purpose of these operating instructions

The information contained in these operating instructions enables you to start up and operate the ET 200pro with the RF170C communication module:

- on the PROFIBUS DP as DP Slave
- on PROFINET as a PROFINET IO device
- as central I/O with an ET 200pro interface module

  (IM 154-1 DP, IM 154-2 DP High Feature, IM 154-4 PN High Feature, IM 154-6 PN High Feature, IM 154-8 CPU)

Basic knowledge required

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

Scope of the manual

The operating instructions apply to the RF170C communications module with interface RS-422/RS-232 (article number “6GT2002-0HD01”). If you are using the RF170C with article number "6GT2002-0HD00” please use the operating instructions version 10/2009.

Position in the information landscape

- In addition to these operating instructions, you need:
  - the operating instructions for the DP Master used
  - or PROFINET IO controller
  - or the operating instructions of the ET 200pro interface module being used.
- For information on programming the communications module and for a full error description, refer to the manuals "FB 45 for MOBY U, MOBY D, RF200, RF300” and “Ident profile and Ident blocks”.
- You will find further instructions for installation and commissioning in the operating instructions of the ET 200pro distributed I/O device.
- The manual of the particular RFID system contains information on the readers to be connected.
- Special information on parameter assignment of the RF620R/RF630R readers in conjunction with the RF170C communications module can be found in the "Configuration Manual RF620R/RF630R".

You will find the current manuals on the pages of the "Siemens Industry Online Support (https://support.industry.siemens.com/cs/ww/en/ps/14970/man)".

Conventions

The following terms/abbreviations are used synonymously in this document:

Reader	Write/read device (SLG). optical handheld reader
Transponder, tag	Data carrier, mobile data storage, MDS
Communications module, CM	Interface module, IM

Registered trademarks

SIMATIC ®, SIMATIC RF ®, MOBY ®, RF MANAGER ® and SIMATIC Sensors ® are registered trademarks of Siemens AG.

Guide

These operating instructions describe the hardware of the RF170C communication module. They comprise introductory chapters and reference chapters (e.g. technical data).

The operating instructions include the following subject areas:

- Installing and connecting the RF170C communication module
- Parameterizing the RF170C communication module
- Description of the firmware update
- Display elements of the RF170C communication module
- Diagnostics information
- Technical data as well as dimension drawings of the RF170C communication module
- Ordering data

Recycling and disposal

- The RF170C communication module is environmentally friendly and is thus recyclable.
- Contact a certified electronic-waste disposal company to recycle and dispose of your old equipment in an environment-friendly manner.

Security information

Siemens provides products and solutions with industrial security functions that support the secure operation of plants, solutions, machines, equipment and/or networks. They are important components in a holistic industrial security concept. With this in mind, Siemens' products and solutions undergo continuous development. Siemens recommends strongly that you regularly check for product updates.

For the secure operation of Siemens products and solutions, it is necessary to take suitable preventive action (e.g. cell protection concept) and integrate each component into a holistic, state-of-the-art industrial security concept. Third-party products that may be in use should also be considered. You will find more information about Industrial Security in:
Industrial security (http://www.siemens.com/industrialsecurity)

To stay informed about product updates as they occur, sign up for a product-specific newsletter. You will find more information about this in
Product support (https://support.industry.siemens.com/cs/ww/en/ps/15247/pm)

Description

2

2.1 Area of application and features

Area of application

The RF170C communication module is a SIMATIC S7 module. It can be plugged into the ET 200pro distributed I/O station. The ET 200pro is operated via PROFIBUS DP V1 or PROFINET IO. An S7-300/-400/-1200/-1500 can be used as the controller.

Via the interface module of the ET 200pro, the RF170C can communicate will all DP masters that behave according to the standard IEC 61784-1:2002 Ed1 CP 3/1. The DP master must support DP-V1 (acyclic services).

The RF170C can be used as a central I/O device in an ET 200pro with a suitable interface module. Thanks to its degree of protection IP67, the RF170C can be installed and operated direct at the process without any additional protective housing.



Figure 2-1 RF170C communication module

When operating the communications modules on a SIMATIC S7, convenient function blocks are available to you.

The following RFID devices and optical readers can be operated with the RF170C:

- RF200 (normal addressing)
- RF300 (standard addressing)
- RF600 (RF620R/RF630R)
- MOBY D
- MOBY E
- MOBY I (normal addressing)

- MOBY U (normal addressing)
- MV400
- MV320, MV340
- Any serial devices via RS-232/RS-422 (Freeport protocol) (in preparation)

Features

Operation of the RF170C requires an ET 200pro interface module (IM 154-1 DP, IM 154-2 DP High Feature, IM 154-4 PN High Feature, IM 154-8 CPU).

Via the RF170C, the data on the transponders can be physically addressed (normal addressing)

The following blocks are available to you in SIMATIC S7.

- FB 45 / FB 55 for normal addressing
- Ident profile/Ident blocks

  Note: At this time, the block does not support chained commands.

The functions provide you with an interface that features numerous commands and is easy to operate.

The hardware configuration of the RF170C is made using a hardware support package (HSP) which must be integrated in the SIMATIC Manager or TIA Portal or using the GSD file.

Other features

- Up to nine RF170Cs can be operated at the same time in an ET 200 station.
- Any other I/O modules from the ET 200pro range can be operated in parallel with an RF170C.
- Degree of protection IP67
- Integration into the plant with standard cables or user-assembled cables using via
  - PROFIBUS: ECOFAST, M12, 7/8" or direct connection (PG threaded joint)
  - PROFINET: M12, 7/8", push pull (RJ-45 or SCRJ FO)
- Firmware update of the RF170C
- Diagnostics data can be enabled/diabled
- Support for I&M functionality

  I&M is a mechanism for reading out information via the module and saving system information such as function, installation date, installation location, and comments.

2.2 Design

2.2.1 Configuration

This chapter describes a sample configuration of an ET 200pro with RF170C.

Structure

The ET 200pro is installed on a rack and consists basically of the following:

- an interface module that transfers data to the DP master or IO controller,
- or a CPU,
- up to 9 RF170C modules,
- Connection modules for an interface module in various designs for
  - Interface modules (PROFIBUS DP, PROFINET IO, power supply)
  - Communications modules

This allows you create the setup precisely the meet your local requirements.

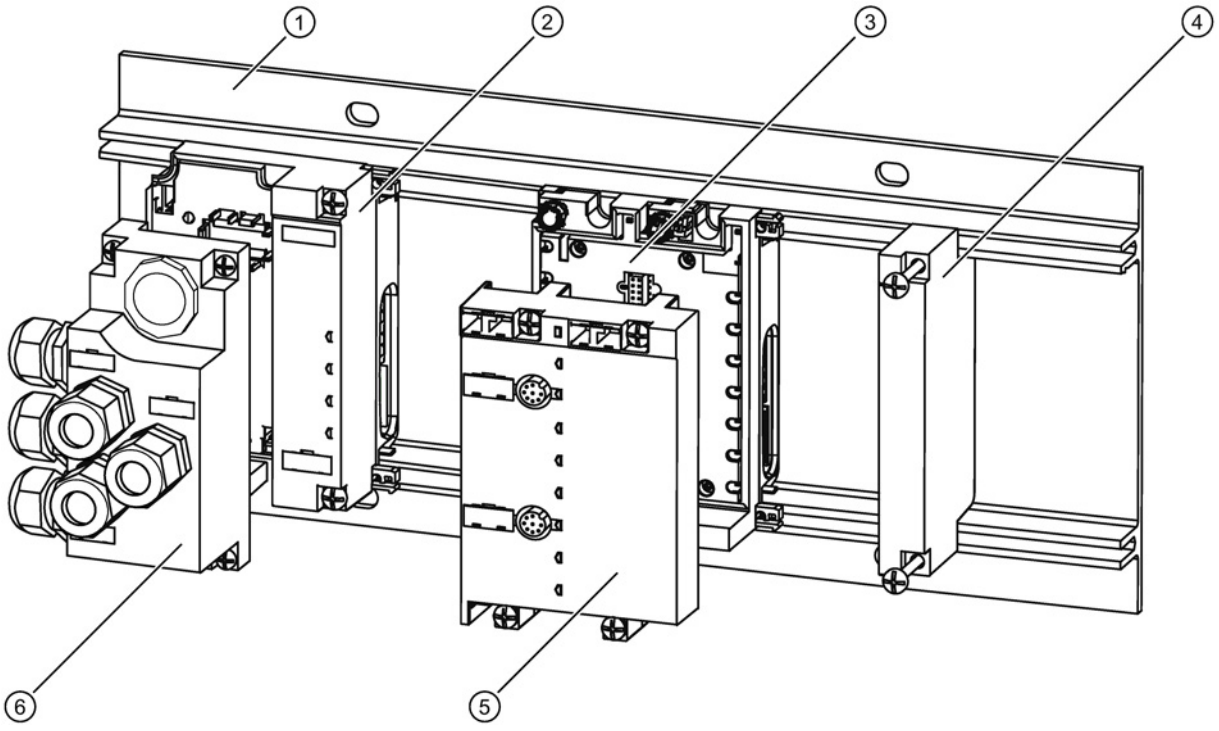
The simple handling of the ET 200pro ensures fast commissioning and easy maintenance.

Note

Configuring the ET 200pro

The maximum electrical setup can be checked with the TIA Selection Tool. We recommend use of the tool because the maximum setup cannot be achieved with all reader configurations.

You will find the tool on the Internet on the page of the “Siemens homepage (http://w3.siemens.com/mcms/topics/en/simatic/tia-selection-tool/Pages/tab.aspx)“.



① Module rack
② Interface module with bus module
③ RF170C communications module (comprising electronic module and bus module)
④ Connection module
⑤ RF170C connection module
⑥ Connection module for interface module

Figure 2-2 ET 200pro with RF170C

As the interface module an IM 154-1 DP, IM 154-2 DP High Feature, IM 154-4 PN High Feature, IM 154-6 PN High Feature or IM 154-8 CPU can be plugged in.

Configuration

In the figures below, the ET 200pro with the CM IM DP Direct connection module represents an example of the interface module.

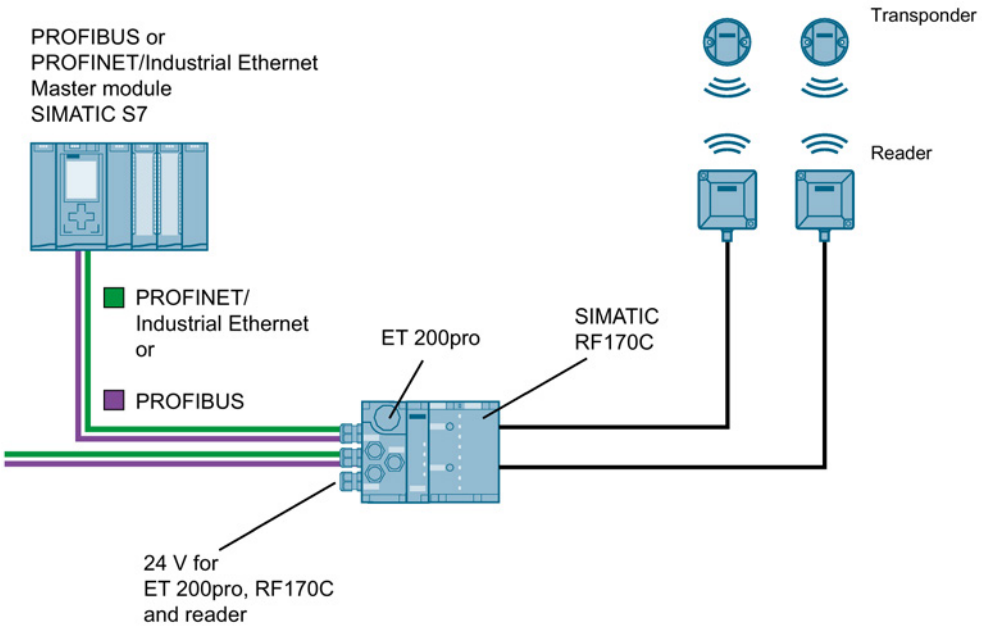


Figure 2-3 Configuration example

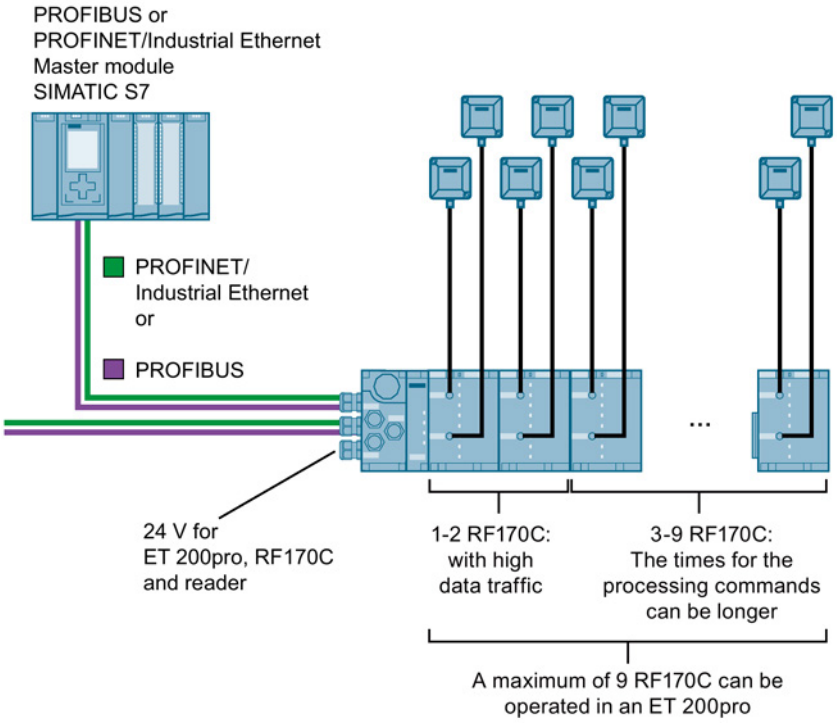


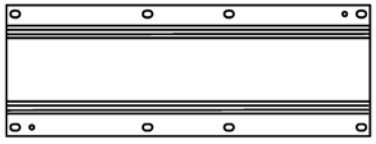
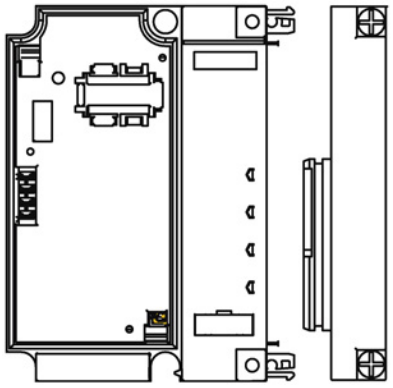
Figure 2-4 Maximum configuration of RF170C on an ET 200pro

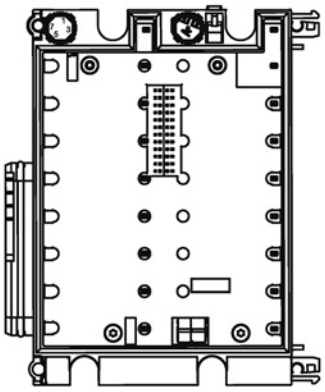
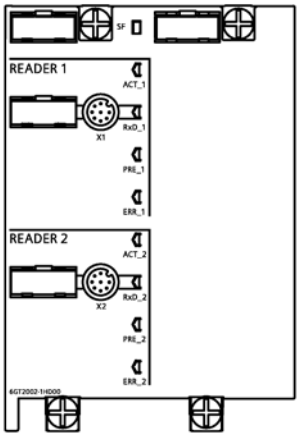
2.2.2 Components of the ET 200pro distributed IO device with RF170C

Components of the ET 200pro distributed I/O device with RF170C (extract)

The following table lists the most important components of the ET 200pro.

Table 2- 1 Components of ET 200pro

Component	Function	Figure
Module rack	The ET 200pro is mounted on the rack. The rack is available in several versions with different lengths: • Rack, narrow	
Interface module for PROFIBUS , PROFNET or CPU functionality with bus module and terminating module	The interface module connects the ET 200pro to the DP master and prepares the data for the communications modules. The unit is delivered with the terminating module and the interface module is already mounted on the bus module. The following interface modules are available: • PROFIBUS – IM 154-1 DP – IM 154-2 DP High Feature • PROFINET – IM 154-4 PN High Feature – IM 154-6 PN High Feature • CPU functionality – IM 154-8 CPU	
Connection modules for interface modules	The connection modules are mounted on the interface modules. Depending on the interface module you are using, different variants of the connection module are available.	--

Component	Function	Figure
Communications module RF170C	The unit is supplied with the communications module mounted on the bus module. The bus module is the mechanical and electrical connection element between the various ET 200pro modules.	
RF170C connection module	The connection modules are mounted on the communications modules. They are used for connecting readers.	

2.2.3 Maximum configuration

Mechanical maximum configuration

The maximum configuration of an ET 200pro is reached when one of the rules outlined below applies:

Table 2- 2 Mechanical maximum configuration

Properties	Rule
Number of modules	Maximum 9 RF170Cs
Width of the ET 200pro	max. 1 meter mounting width (without rack)

Electrical maximum configuration

Electronics+/encoder supply 1L+

- Supplies power to the internal electronics of the modules and to readers connected externally
- Electrically isolated from the backplane bus of the ET 200pro and PROFIBUS DP

Table 2- 3 Electrical maximum configuration

Properties	Rule
Electronics+ / encoder supply 1L+	max. 5 A per ET 200pro station (must not be exceeded with connected readers)

Note

Configuring the ET 200pro

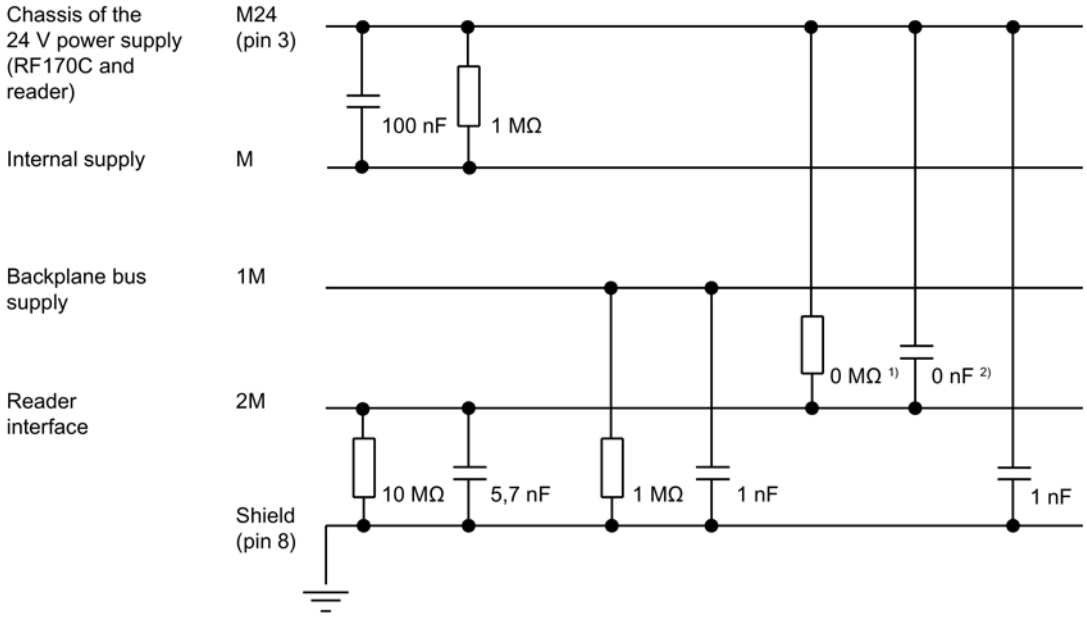
The maximum electrical setup can be checked with the TIA Selection Tool. We recommend use of the tool because the maximum setup cannot be achieved with all reader configurations.

You will find the tool on the Internet on the page of the “Siemens homepage (http://w3.siemens.com/mcms/topics/en/simatic/tia-selection-tool/Pages/tab.aspx)“.

2.3 Galvanic isolation

Electrical isolation

ET 200pro with RF170C enables ungrounded setup of a system. The following circuit shows the internal relationships of the reference potentials.



1) As of hardware version "02" (6GT2002-0HD01)
With hardware version "01" (6GT2002-0HD01) the resistance is 1 MΩ.

2: As of hardware version "2" (6GT2002-0HD01)
With hardware version "1" (6GT2002-0HD01) the capacitance is 1 22 nF.

Figure 2-5 Electrical isolation for RF170C (ground to shield)

2.4 Integration

Integration

The following figure shows how the ET200pro with RF170C is integrated in an automation system.

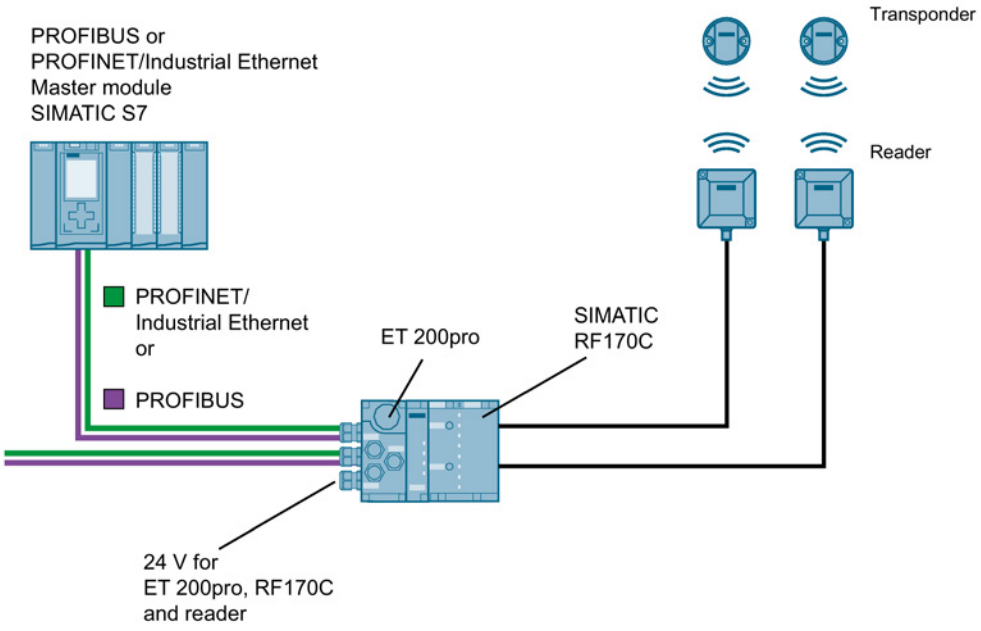


Figure 2-6 Example of integration

The RF170C is integrated in the hardware configuration by using a Hardware Support Package (HSP) or the GSD/GSDML file of the interface module. The RF170C can then be configured using the device configuration of STEP 7 Basic/Professional (TIA Portal), Hardware Config of the SIMATIC Manager or another engineering system. The HSP or the GSD/GSDML file are available to you on the DVD "RFID Systems Software & Documentation" or on the pages of "Siemens Industry Online Support".

2.5 Planning data throughput

You will find a throughput calculation tool on the “Ident Systems Software & Documentation" DVD in the path for the RF170C module in the "Tools" subfolder. You can use this tool on planning a system to check whether the throughput for the planned configuration meets your expectations.

Requirements

If one or more of the following conditions apply, we recommend that you run this check:

- You are working with readers of a high-speed Ident system (e.g. RF300)
- When you want to process large blocks of data on the transponder (e.g. > 100 bytes)
- When you want to use several RF170C modules each with 2 readers in a distributed ET 200pro structure.
- When your application is extremely time-critical

User interface

The throughput calculation tool is shown in the figure below. It is very easy to use. The input fields are commented to guide you with the entries.

Note

The throughput tool cannot be used for MV3xx.

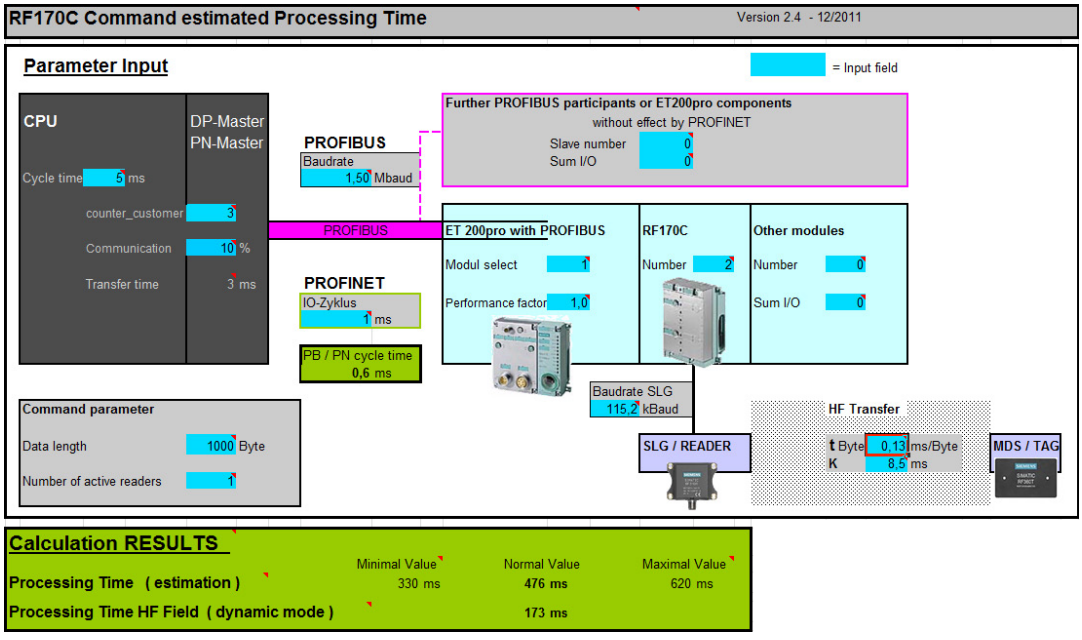


Figure 2-7 Data throughput calculation tool

Mounting

3

You will find detailed information on mounting the RF170C in an ET 200pro in the operating instructions “ET 200pro distributed I/O device (https://support.industry.siemens.com/cs/ww/en/view/21210852)“.

Below is an overview of the installation steps.

3.1 Installing the interface module

Introduction

The interface module connects the ET 200pro to PROFIBUS DP / PROFINET IO and supplies power to the RF170C.

Requirements

When using the interface module for PROFIBUS DP

- The terminating module is removed from the interface module.
- The rack has been mounted.

When using the interface module for PROFIBUS IO

- The terminating module is removed from the interface module.
- The SIMATIC Micro Memory Card is inserted (module dependent).
- The rack has been mounted.

Procedure

Follow the steps below to mount the interface module:

1. Plug the interface module onto the rack until it locks in place, then slide the module into the correct position.
2. Screw the Interface module to the rack.
   - Interface modules for PROFIBUS DP (without connection module):
     2 cross-head screws on the front: top and bottom, tightening torque 1.5 N/m
   - Interface module for PROFINET IO:
     6 cross-head screws on the front: top and bottom, tightening torque 1.5 N/m

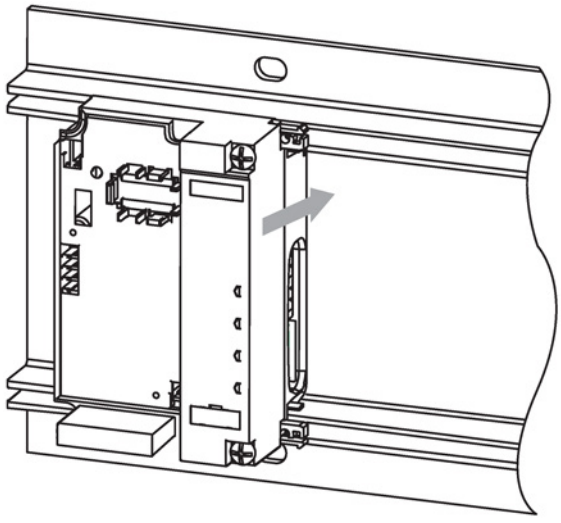


Figure 3-1 Example: Mounting the interface module for PROFIBUS DP

3.2 Installing the RF170C communication module

Introduction

The RF170C communications module determines the function of the reader outputs. The connection module is mounted on the communications module.

Requirements

- The interface module is mounted on the rack.
- All communications modules are installed to the right beside the interface module.
- The communications module is plugged into the relevant bus module (delivery state).

Procedure

Follow the steps below to mount the communications module RF170C:

1. Plug the communications module onto the rack until it locks in place.
2. Push the communications module to the left until it engages the interface module or the previous communications module.

   When sliding the RF170C communications module remember that the connection must not yet be mounted.

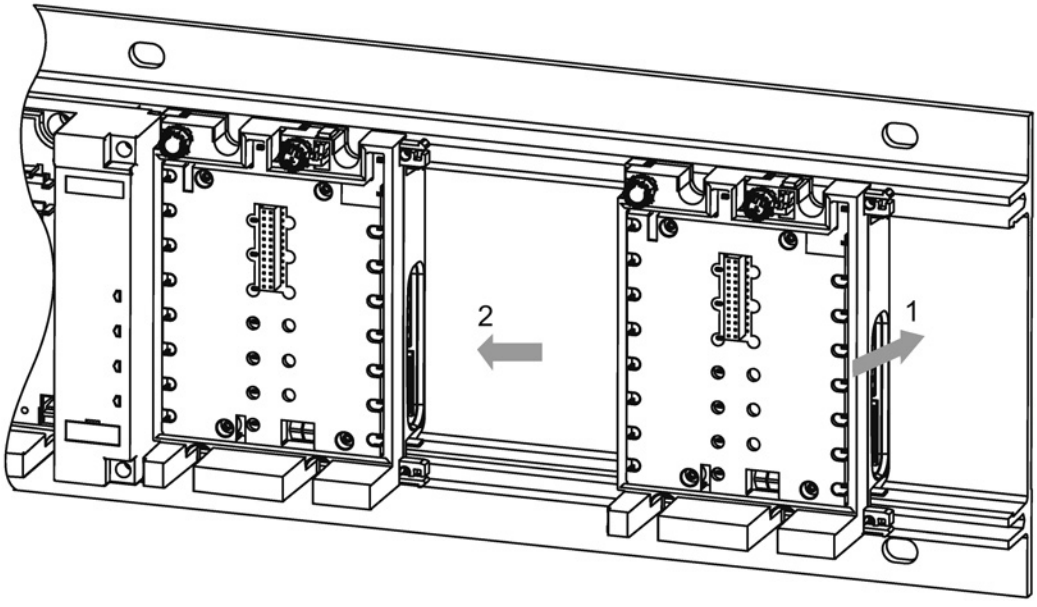


Figure 3-2 Mounting the communications module

3.3 Mounting the terminating module

Introduction

The ET 200pro is terminated with the terminating module. To operate the ET 200pro the terminating module must be mounted.

Requirements

- The last communications module of the ET 200pro has been mounted.
- All communications modules are screwed onto the rack.

Procedure

Follow the steps below to mount the terminating module:

1. Plug the terminating module onto the rack.
2. Move the terminating module to the left to the last communications module.

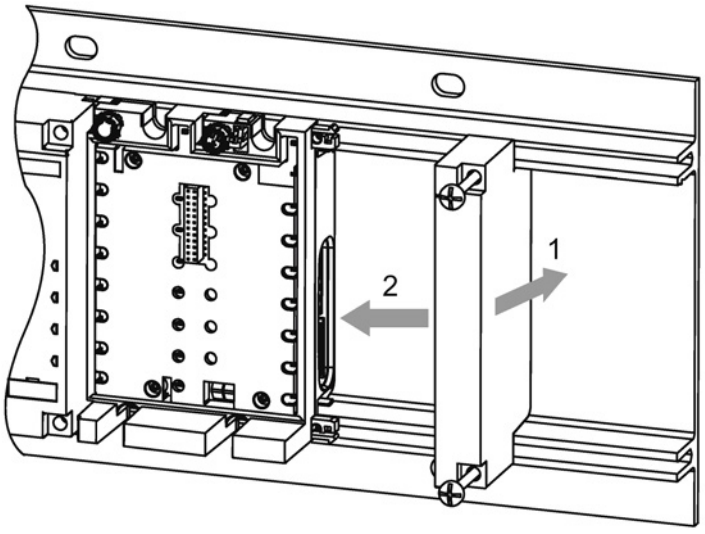


Figure 3-3 Mounting the terminating module

3. Screw the terminating module onto the rack (2 cross-head screws on the fronte, torque 1.5 Nm).

   Make sure that all other connection modules are already screwed to the communications modules.

3.4 Set the PROFIBUS address and the terminating resistor

You will find detailed information on setting the terminating resistor in the “ET 200pro distributed I/O device (https://support.industry.siemens.com/cs/ww/en/view/21210852)“ operating instructions.

Connection

4

NOTICE
Proper use When connecting non-specified devices to the ET 200pro, remember that the connected device may be destroyed.

PROFIBUS/PROFINET connection system

You will find detailed information on connecting the ET 200pro to PROFIBUS DP or PROFINET IO in the “ET 200pro Distributed I/O Device” operating instructions. The network components are also described here.

You will find Information on connecting an ET 200pro with IM 154-8 CPU in the operating instructions “ET 200pro Interface Module IM 154-8 CPU”. When operating with interface module IM 154-8 the connection can be omitted.

4.1 Connecting readers

Reader connector system

Every reader connected to an RF 170C occupies one of the two M12 connector sockets (X1, X2). A pre-assembled cable permits simple connection of the reader. Various cable lengths are available.

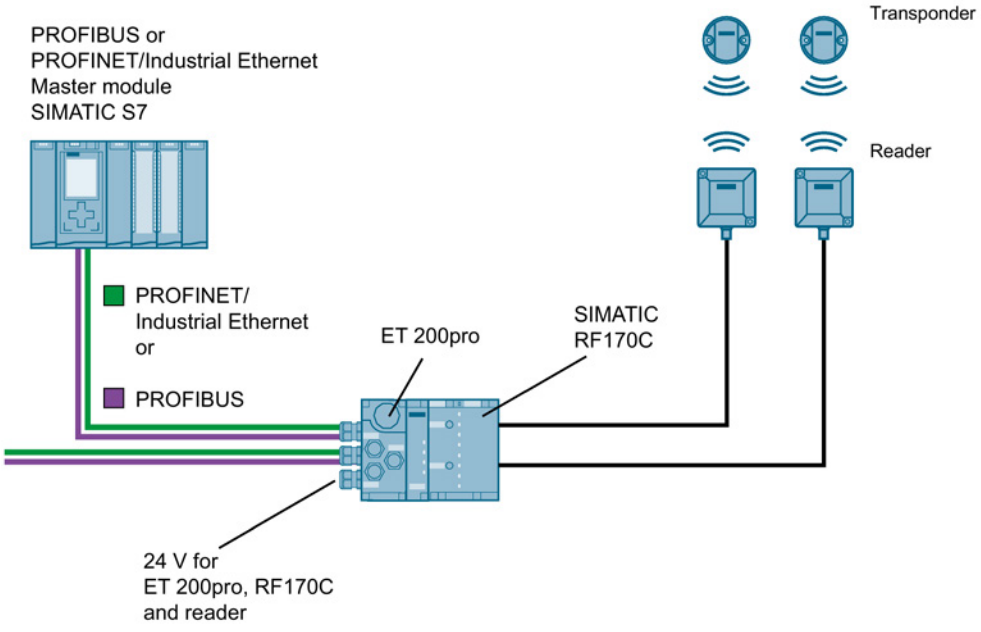


Figure 4-1 Overview of cabling

4.2 Connect the RF170C with the connection module

Introduction

The readers are connected to the connection module RF170C using the connecting cable via the 8-pin round sockets (X1, X2). If you want to configure the cable yourself you can use an 8-pin M12 connector and a suitable cable,
If you do this note the cable configurations in section “Connecting cables (Page 55)“ and in the system manuals of the relevant RFID families.

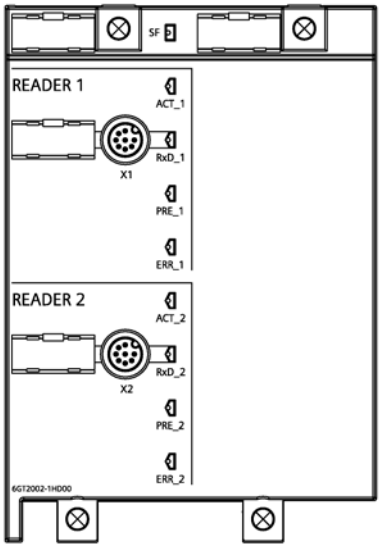


Figure 4-2 Sockets and LEDs of the RF170C connection module

Requirements

Before you start to wire the RF170C connection module, switch off the supply voltage, or de-install the connection module.

Accessories required for the RF170C

- Preassembled cable with 8-pin M12 connector
- alternatively: Shielded 7-core Cu cable, flexible, conductor cross-section ≤ 0.75 mm^2 and 8-pin M12 connector

Connecting the M12 connector

Follow the steps below to connect the M12 plug:

1. Plug the connector into the relevant round socket of the RF170C connection module.

   Make sure the connectors and sockets are properly interlocked (tongue and groove).
2. Tighten the knurled screw of the connector (torque = 1.5 N/m).

Connecting the RF170C connection module

Follow the steps below to connect the connection module:

1. Insert the RF170C connection module into the RF170C communications module.
2. Screw the connection module onto the rack.

   4 cross-head screws on the front: top and bottom, tightening torque 1.5 Nm

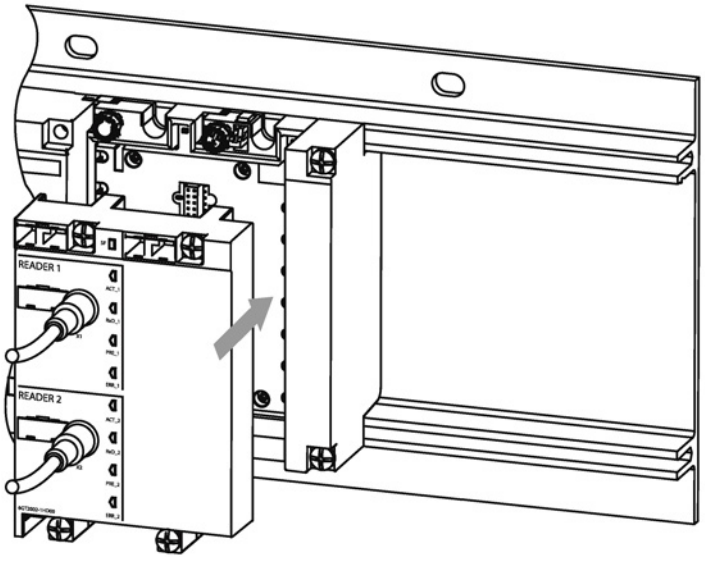


Figure 4-3 Connecting the RF170C connection module

Closing unused sockets

Always close all unused round sockets using M12 caps in order to achieve the degree of protection IP65, IP66 or IP67.

Parameter settings

5

5.1 Hardware configuration

Hardware configuration

As default the RF170C communications module is not included in the device configuration of the TIP Portal (STEP 7) or the hardware configuration of the SIMATIC Manager. You can include the CM later using an HSP file in TIA or in the SIMATIC Manager-

If you work with other configuration software. a GSD / GSDML file is available for the configuration. You will find the relevant GSD/GSDML files in Siemens Industry Online Support for the ET 200pro.

5.2 Configuration via STEP 7 (Basic/Professional)

Configuration with the TIA Portal

You configure the RF170C is using the TIA Portal. To do this, drag the required ET 200pro module (interface module/central module) to the device configuration from the hardware catalog. Then drag the RF170C to the module. Note that the communications module can only be operated in conjunction with an interface module or a central module.

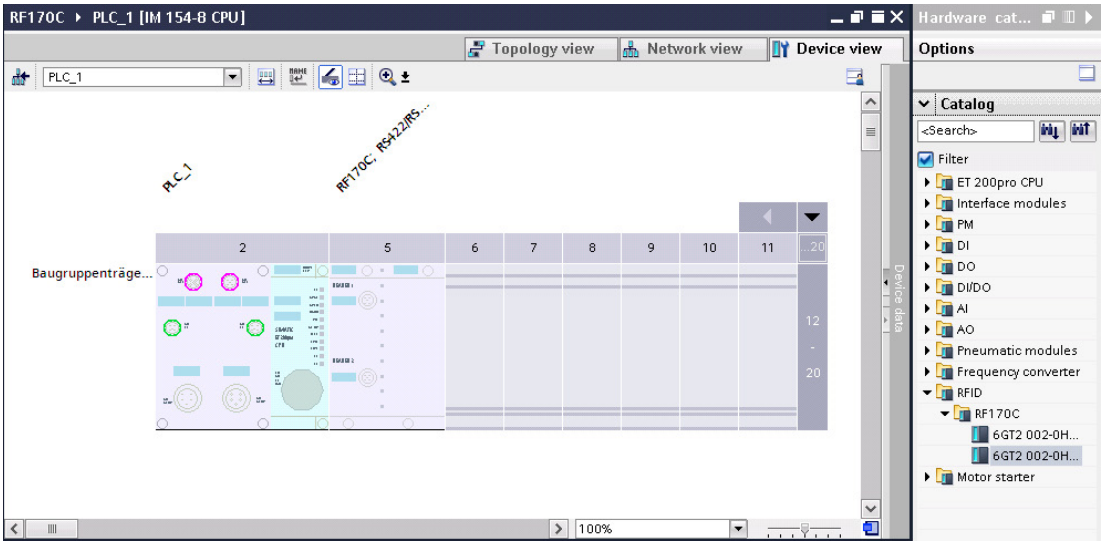


Figure 5-1 Adding the RF170C in the device configuration

5.2.1 Parameter assignment with the device configuration

You can set the parameters of the RF170C and the parameters of the reader connected to the RF170C in the properties window of the RF170C. Via the parameter group “Module parameters", you can configure all module-specific parameters.

5.2.2 "Module parameters" parameter group

In this parameter group, you can configure all module-specific parameters of the RF170C RS-422/RS-232.

The “Module parameters“ parameter group contains the following parameters:

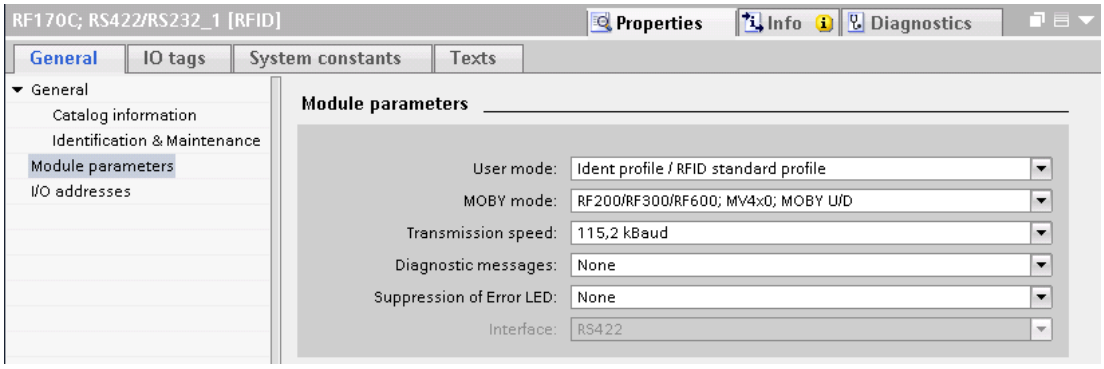


Figure 5-2 Parameters in the "Module parameters" parameter group

Table 5- 1 Parameters in the "Module parameters" parameter group

Parameter	Parameter value	Default value	Description
User Mode	Ident profile/RFID standard profile FB 45 / FC 45 FB 55 / FC 55	Ident profile/RFID standard profile	Selection depends on the communications module and Ident system being used. With this parameter you select the block: • Ident profile/RFID standard profile: The program block for the Ident profile/RFID standard profile is used on the controller. • FB 45 / FC 45: Single tag mode FB 45 (PROFIBUS/PROFINET) or FC 45 (PROFIBUS) is used on the controller. • FB 55 / FC 55: Multitag mode. FB 55 (PROFIBUS/PROFINET) or FC 55 (PROFIBUS) is used on the controller.
MOBY Mode	RF200/RF300/RF600; MV4x0; MOBY U/D MOBY I/E MV3xx Freeport protocol (in preparation) RF300 filehandler	RF200/RF300/RF600; MV4x0; MOBY U/D	Selection depends on the communications module and Ident system being used. With this parameter, you set the mode of the communications module. • RF200/RF300/RF600; MV4x0; MOBY U/D • MOBY I/E • MV3xx • Freeport protocol • RF300 filehandler[1)] Normal addressing: The transponder is addressed with physical addresses. Filehandler: Prior to use, the transponder needs to be formatted.
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. With this parameter you set the transmission speed between the communications module and reader. When the 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	None	Selection depends on the communications module and Ident system being used. With this parameter you set whether hardware diagnostics messages will be reported. • None: Apart from standard diagnostics, no other alarms are generated. • Hard errors: Critical hardware errors are reported by the S7 diagnostics.
Suppression of Error LED	None Channel 1 Channel 2	None	Disabling the Error LED (ERR) of a channel. The communications module has two channels to which the readers / optical readers can be connected. The Error LED of the other channel flashes permanently when only one of the channels is being used. With the help of the suppression, you can disable the Error LED of the unused channel.
Interface	RS-232 RS-422	-- [2]	Selection of the interface type that the connected hardware (reader / optical reader) uses. This parameter only needs to be set if the MOBY mode “Freeport protocol” was selected.

[1] The MOBY mode “RF300 filehandler” is not supported by the RF170C communications module.

[2] The default value depends on the set MOBY mode.

5.2.3 "Frame" parameter group

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

The “Frame“ parameter group contains the following parameters:

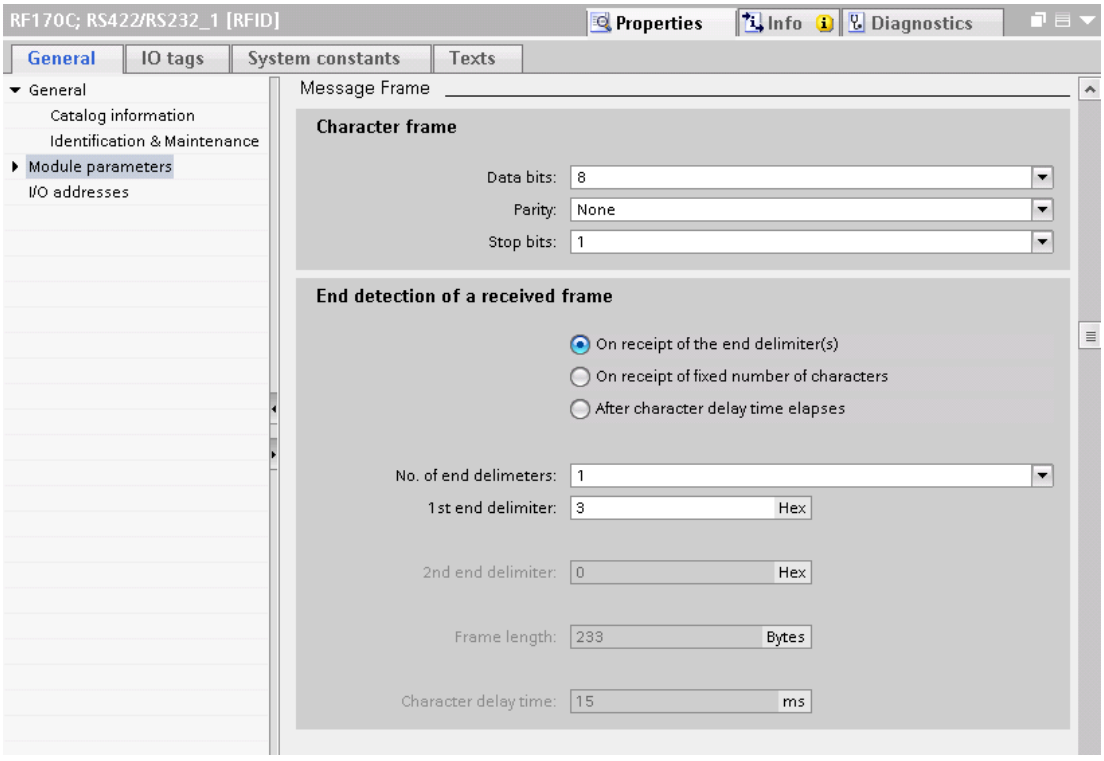


Figure 5-3 Parameters in the "Frame" parameter group

Table 5- 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 represented.
Parity	None Odd Even Fixed value 1 Fixed value 0	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". • Fixed value 1: The parity bit is set permanently to the value "1". • Fixed value 0: The parity bit is set permanently to the value "0".
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.

Parameter	Parameter value	Default value	Description
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 frame 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 set end delimiter is received.
No. of end delimiters	1 2	1	Selection of the number of end delimiters. A maximum of 2 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...7F / 0...FF	3	Input of the 1st end delimiter of maximum two end delimiters for 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...7F / 0...FF	0	Input of the 2nd end delimiter of maximum two end delimiters for 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.
Frame length	1...233 (with FB 45) 1...229 (with Ident profile)	233	Entry of the frame length in bytes for the end criterion "On receipt of fixed number of characters".
Character delay time	0...65535	15	Entry of the time that may elapse until a frame end is recognized. Select the character delay time dependent on the send behavior of your communications partner. Depending on the data transmission speed the character delay time is limited to a minimum value. Note that the ASCII driver pauses between two frames when sending.

5.3 Parameter setting by means of GSD/GSDML file

In addition to the PROFIBUS-relevant control parameters, several RFID-relevant control parameters are also defined for the RF170C in the GSD/GSDML file. The relevant parameters are set using the "Object properties" of the slave in HW Config or the TIA Portal.

The parameters of the GSD file are identical to those described in the sections ""Module parameters" parameter group (Page 30)“ and ""Frame" parameter group (Page 33)“.

5.4 Overview of the Ident blocks

The following table provides an overview of the currently available blocks.

Table 5- 3 Overview of the Ident library

Position			Symbolic name	Description
Instructions/ blocks	Ident blocks	Basic blocks	Read	Using these blocks, it is simple to program communication with the Ident systems. The basic blocks include all the blocks that are used often.
			Write	
			Reset_Reader	
			Read_MV	
			Set_MV_Program	
		Extended blocks	Config_Download	Using these blocks, it is simple to program communication with the Ident systems. The extended blocks provide functions that are required less often for operating the Ident system.
			Config_Upload	
			Inventory	
			Read_EPC_Mem	
			Read_TID	
			Read_UID	
			Set_ANT_RF300	
			Set_ANT_RF600	
			Set_Param	
			Write_EPC_ID	
			Write_EPC_Mem	
			AdvancedCmd	Advanced command set. With the "AdvancedCmd" block it is possible to access other commands from the Ident command set and to execute chained commands.
		Status blocks	Reader_Status	Using the status blocks you obtain information onthe reader or transponder.
			Tag_Status	
		Reset blocks	Reset_MOBY_D	Using these blocks, it is simple to program communication with the Ident systems. The reset blocks are used for simple initialization of the Ident systems if the "Reset_Reader" block is not supported by the Ident system.
			Reset_MOBY_U	
			Reset_MV	
			Reset_RF200	
			Reset_RF300	
			Reset_RF600	
			Reset_Univ	

Position		Symbolic name	Description
	Ident profile	Ident_Profile	These blocks are available for experts to be able to include complex command structures in their own program sequence. It is also possible to use repeat commands and chaining.

5.5 Parameters and commands of the Ident profile

Parameters of the Ident profile

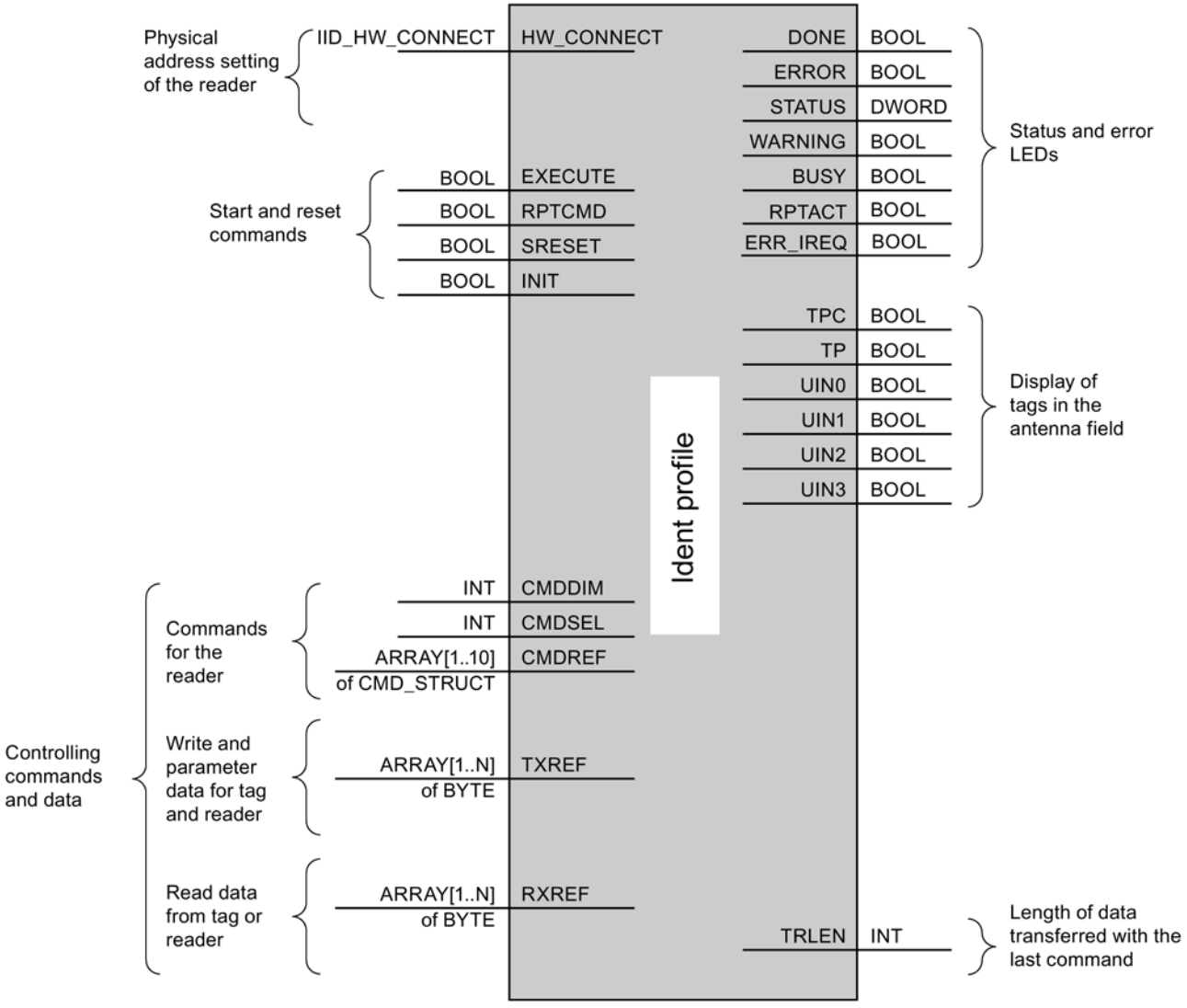


Figure 5-4 Parameters of the Ident profile

Command table of the Ident profile

The following table contains all the commands supported by the Ident profile and the "AdvancedCMD" block.

Table 5- 4 Commands of the Ident profile

Command	Command code		Parameters used	Description
	HEX	ASCII		
PHYSICAL-READ	70	'p'	OFFSETBUFFER, EPCID_UID, LEN_ID, LEN_DATA, ADR_TAG, MEM_BANK, PSWD	Reads data from a transponder / optical reader system by specifying the physical start address, the length and the password.
PHYSICAL-WRITE	71	'q'	OFFSETBUFFER, EPCID_UID, LEN_ID, LEN_DATA, ADR_TAG, MEM_BANK, PSWD	Writes data to a transponder by specifying the physical start address, the length and the password.
READER-STATUS	74	't'	OFFSETBUFFER, ATTRIBUTES	Reads out the status of the reader.
TAG-STATUS	73	's'	OFFSETBUFFER, EPCID_UID, LEN_ID, ATTRIBUTES	Reads out the status of a transponder.
INVENTORY	69	'i'	OFFSETBUFFER, ATTRIBUTES, DURATION, DUR_UNIT	Requests a list of all currently accessible transponders within the antenna range.
FORMAT	66	'f'	OFFSETBUFFER, EPCID_UID, LEN_ID, LEN_DATA	Initializes the transponder.
PUT	65	'e'	OFFSETBUFFER, EPCID_UID, LEN_ID, LEN_DATA	Transfers further commands not specified in the standard profile. To this end, a corresponding data structure is defined in the send data buffer for each command.
WRITE-ID	67	‘g‘	OFFSETBUFFER, EPCID_UID, LEN_ID, NEW-LEN_ID, PSWD	RF680R/RF685R: Writes a new EPC-ID to the transponder.
KILL-TAG	6A	‘j‘	EPCID_UID, LEN_ID, PSWD	RF680R/RF685R: The transponder is permanently deactivated.
LOCK-TAG-BANK	79	‘y‘	EPCID_UID, LEN_ID, PSWD, ACTION, MASK	RF680R/RF685R: The corresponding memory area of the transponder is blocked as specified.
EDIT-BLACKLIST	7A	‘z‘	EPCID_UID, LEN_ID, MODE	RF680R/RF685R: The black list is processed. The current transponder can be added, all identified transponders added, individual transponders deleted or all transponders deleted.
GET-BLACKLIST	6C	‘l‘	OFFSETBUFFER	RF680R/RF685R: The entire TagIDs are read out from the black list.

Command	Command code		Parameters used	Description
	HEX	ASCII		
READ-CONFIG	61	'a'	--	Reads out the parameters from the communications module/reader.
WRITE-CONFIG	78	'x'	LEN_DATA, CONFIG	Sends new parameters to the communications module or reader.

You will find detailed information on parameters of the Ident profle in the manual “Ident Profile and Ident Blocks” in the section “Commands of the Ident profile".

5.6 Parameters and commands of FB 45

Parameters of FB 45

Assignment is made in UDT 10.

Table 5- 5 Parameters of FB 45

Address	Name	Permissible values	Comment
+0.0	ASM_address	256, 260, 264, 268, ...	Each RF170C occupies four bytes of I/O in the I/O area of the control unit
+2.0	ASM_channel	1, 2	
+8.0	MDS_control	B#16#0, 1	0 = no presence check 1 = presence check
+9.0	ECC_mode	TRUE, FALSE	
+9.1	RESET_long	TRUE, FALSE	TRUE, if MOBY mode = 5 (MOBY U/D, RF300)
+10.0	MOBY_mode	B#16#1, 4, 5, 6, 7, 8, 9, A, B	Special features of the MOBY I dialog (8): • Write/read device must be type SLG4x. • The VMDS memory size is 16KB. The INIT command for the VMDS must be specified using 4000 hex.
+11.0	scanning_time	MOBY I: B#16#00 ... FF	A value not equal to 00 is only practical if MOBY mode has been parameterized accordingly. MOBY D, RF300 reserved (00)
		MOBY U: B#16#00 ... C8	
+12.0	option_1	B#16#00, 02, 04	
+13.0	distance_limiting	MOBY U (normal output power): B#16#05, 0A, 0F, 14, 19, 1E, 23	MOBY U / D
		MOBY U (reduced output power): B#16#85, 8A, 8F, 94, 99, 9E, A3	
		MOBY D, RF290R: B#16#02 ... 28	
		RF380R: B#16#02 ... 08	
+14.0	multitag	B#16#1	MOBY U/D, RF300
+15.0	field_ON_control	MOBY U: B#16#0, 1, 2, 3	MOBY U/D, RF300
		MOBY D, RF300: B#16#0	

Address	Name	Permissible values	Comment
+16.0	field_ON_time	MOBY U: B#16#00 ... FF MOBY D: B#16#00, 01	MOBY U/D RF300 reserved (00)

You will find detailed information on the parameters of FB 45 in combination with the RF620R/RF630R readers in the section “Parameter assignment > Parameter assignment RF620R/RF630R with FB 45 > Input parameters" in the "Configuration Manual RF620R/RF630R".

Command table of Fb 45 (normal addressing)

The assignment is made in UDT 20 using the "command" variable.

Table 5- 6 Commands of FB 45

Command code		Description	available in the RFID system
normal	chained*		
01	41	Write to transponder	all
02	42	Read transponder; read fixed code	all
03	43	Initialize transponder	all
04	44	Reader status	RF300 / RF600 / MOBY U / D
08	48	Turn off transponder	U
0A	4A	Switch antenna on/off	RF300 / RF600 / MOBY U / D
0B	4B	Transponder status	RF300 / RF600 / MOBY U / D
*) Chained commands are not supported by all readers / write/read devices. Please note the relevant information in the RFID system manuals.			

Service and maintenance

6

6.1 Degree of protection IP65, IP66 and IP67

CAUTION
Ensuring the degree of protection IP65, IP66, IP67 Degree of protection IP65, IP66 and IP67 is not ensured if one of the ET 200pro components listed below is removed, or is not secured by screws as specified: • Connection module for the interface module or RF170C • Terminating module • Interface module or RF170C • ECOFAST cable connectors, 7/8" cable connectors, M12 connectors • Screwed cable glands on connection module CM IM DP Direct • Cover caps Degree of protection IP65, IP66 and IP67 may also be impaired due to damage of the sheath of any cable connected to the ET 200pro.

6.2 Removing, inserting and replacing modules of the ET 200pro

Introduction

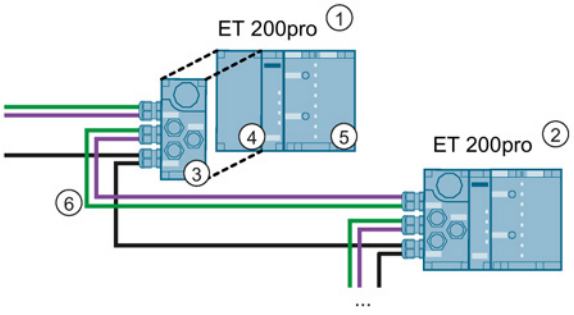
The ET 200pro consists of different modules (bus modules, electronic modules and connection modules). Every module in an ET 200pro can be replaced. Various modules can be removed and replaced during operation.

NOTICE
Removing connection modules In order to prevent damage to your ET 200pro, always deactivate the outputs (no power) before you remove any connection modules.

Removing the connection module from the interface module

Removing the connection module from the interface module has the following consequences.

- The ET 200pro fails.
- The following ET 200 modules ② remain operational.



① ET 200pro including modules
② ET 200pro including modules
③ Connection module
④ Interface module
⑤ RF170C communications module
⑥ PROFINET/PROFIBUS and the supply voltages are fed in to the connection module and looped through.

Figure 6-1 Removing the connection module from the interface module

6.3 Removing and inserting the RF170C

Introduction

The ET 200pro distributed I/O device supports the removal and insertion of an RF170C during operation (RUN mode). If the CM RF170C is removed, the ET 200pro remains in RUN mode. If you remove more than one RF170C, this leads to an ET 200pro station failure.

Requirements

- Removal and insertion must be supported by the CPU used.
- Removing and inserting RF170C modules during operation (RUN mode) is possible only if you have enabled the parameter “Operation in Desired ↔ Actual Configuration” on the interface module.
- Only one RF170C may be removed at any given time.

Replacing a (defective) RF170C

Follow the steps below to replace the CM RF170C:

1. Loosen the 4 screws on the front panel of the connection module (top and bottom) using the cross-head screwdriver.
2. Remove the connection module with the RF170C from the bus module.
3. Press the release button on the top of the RF170C while at the same time pulling the connection module up and off the electronic module.
4. Remove one half of the coding element from the new RF170C (top left).
5. Insert the connection module onto the new RF170C.
6. Insert the connection module with the RF170C onto the bus module and secure it with the screws.

Note

Removing/plugging in the reader cable

Removal and insertion of the reader cable is permissible under power. An "init_run" is required after connecting a new reader.

NOTICE
Do not make any changes to the coding during the replacement. Do not make any changes to the coding during the replacement to make sure that your system continues to run free of errors..

NOTICE
Configuring the modules with the article number "6GT2002-0HD00" The modules with article number "6GT2002-0HD00" will be completely replaced by the modules with article number "6GT2002-0HD01". Note that if you configure the old modules with one of the new modes (e.g. Freeport protocol) the modules will be inoperable. If the old modules are configured with a new mode, no “desired/actual” error message will be generated. Instead a parameter assignment error iis reported when the module starts up.

6.4 Firmware update

The firmware of the RF170C can be updated. The update takes place via STEP 7 (TIA Portal) or the SIMATIC Manager.

You will find detailed information on the update in the operating instructions “ET 200pro distributed I/O device (https://support.industry.siemens.com/cs/ww/en/view/21210852)“.

You will find the latest firmware version on the page of Siemens Industry Online Support (https://support.industry.siemens.com/cs/ww/en/view/24512084).

Diagnostics and error messages

7

7.1 LED displays on the interface module

You will detailed information on the LED display of the interface module in the ET 200pro distributed I/O device (https://support.industry.siemens.com/cs/ww/en/view/21210852) operating instructions.

7.2 LED displays on the RF170C communication module

LED display

The figure below shows the position and arrangement of the LED display on the connection module RF170C.

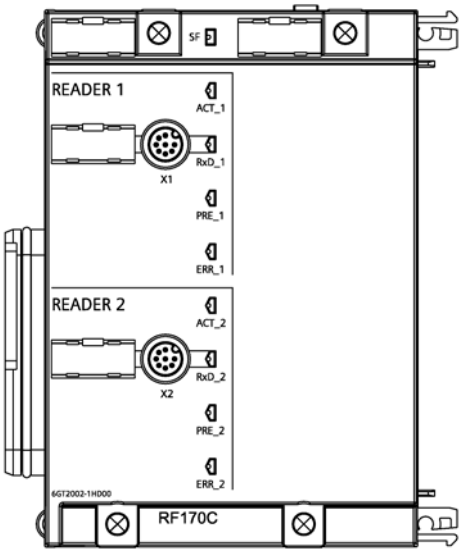


Figure 7-1 LED display on the RF170C communication module

Status and error LEDs on the RF170C connection module

Table 7- 1 Status and error LEDs for RF170C

LED	Meaning
SF	Group error
ACT_1, ACT_2	The corresponding reader is active processing a user command. (MOBY only)
ERR_1, ERR_2 [1)]	A flashing pattern indicates the last error to occur.
PRE_1, PRE_2 [2)]	Indicates the presence of a transponder.
RxD_1, RxD_2	Indicates live communication with the reader. May also indicate malfunctions on the reader.

1) The meaning of the individual flashing pattern is described in the relevant FB documentation. There, you will also find the relevant error descriptions.

2) In the case of multitag operation, this LED uses a flashing interval to indicate the number of data carriers currently within the range of the reader.

After start-up or updating the firmware, the LEDs SF, PRE, ERR and ACT indicate the operating status or errorss of the RF170C:

Table 7- 2 Operating states

SF	PRE_1	ERR_1	ACT_1	PRE_2	ERR_2	ACT_2	Description
Off	Off	Off	On	Off	Off	Off	Startup active
On	Off	On	Off	Off	Off	Off	Checksum error at startup *
On	Off	Off	Off	Off	On	Off	Firmware invalid *
On	On	On	On	On	On	On	LED test for approximately 4 seconds; otherwise firmware error *
On	Off	On	On	Off	On	On	Checksum error at startup *
On	On	On	On	Off	On	On	Checksum error of the firmware *
On	Off	On	On	On	On	On	External RAM defective *
On	On	Off	On	On	On	On	ESSA3 defective *
On	Off	On	On	On	Off	On	ID error firmware *
–	Off	1 x flash every 3 s	Off	Off	1 x flash every 3 s	Off	RF170C successfully started up, waiting for reset command
–	–	n x flash every 3 s	–	–	m x flash every 3 s	–	The last reported error in the channel can be seen from the number of flashes (n, m).
–	–	Flashing	Rapid flashing	–	Flashing	Rapid flashing	Firmware update; alternate flashing of the error LEDs at approximately 1 Hz

– = not relevant

* If this fault recurs, the module is defective and must be replaced.

7.3 Identification and maintenance data (I&M data)

Definition and features

Identification data (I data) is information on the module, some of which is printed on the module housing. I data is for reading only.

Maintenance data (M data) is plant-dependent information such as installation location, installation date etc. M data is created during configuration and written onto the module.

Identification and maintenance data (I&M) is information stored in a module to support you when

- Checking the plant configuration
- Locating hardware modifications in a plant
- Correcting errors in a plant

Modules can be uniquely identified online by means of the I&M data. For the RF170C, this data is available on the ET 200pro.

Reading the I&M data

You will a detailed description “ET 200pro Distributed I/O device” operating instructions.

Structure of I&M data

Table 7- 3 Structure of I&M data

I&M data	Access	Default	Explanation
Identification data 0: Index 1 (data record 231 or =xAFF0)			
MANUFACTURER_ID	Read (2 bytes)	2A hex (= 42 dec)	The vendor name is stored here. (42 dec = SIEMENS AG)
ORDER_ID	read (20 bytes)	Dependent on module	Order number of the module
SERIAL_NUMBER	read (16 bytes)	Dependent on module	Electronic type plate
HARDWARE_REVISION	Read (2 bytes)	Dependent on module	Electronic type plate
SOFTWARE_REVISION	Read (4 bytes)	Firmware	Provides information about the firmware of the module.
REVISION_COUNTER	Read (2 bytes)	-	Provides information about the parameter changes on the module.
PROFILE_ID	Read (2 bytes)	5B00 hex	RFID systems
PROFILE_SPECIFIC_TYPE	Read (2 bytes)	0000 hex	RFID systems
IM_VERSION	Read (2 bytes)	101 hex	Provides information about the version of the identification data (0001 hex = Version 1.1)
IM_SUPPORTED	Read (2 bytes)	000F hex	Provides information about the available identification data (Index 2 to 4)

I&M data	Access	Default	Explanation
Maintenance data 1: Index 2 (data record 232 or =0xAFF1)			
TAG_FUNCTION	read / write (32 bytes)	-	Here, enter an ID for the module here that is unique in the entire plant.
TAG_LOCATION	read / write (22 bytes)	-	Here enter the installation location of the module.
Maintenance data 2: Index 3 (data record 233 or =0xAFF2)			
INSTALLATION_DATE	read / write (16 bytes)	-	Here, enter the installation date of the module.
RESERVED	read / write (38 bytes)	-	Reserved
Maintenance data 3: Index 4 (data record 234 or =0xAFF3)			
DESCRIPTOR	read / write (54 bytes)	-	Here, enter a comment describing the module.

7.4 Parameterization of the diagnostics

In addition to the PROFIBUS / PROFINET standard diagnostics, the RF170C offers user-specific diagnostics data integrated in the diagnostics of the interface module.

The diagnostics data can be read out as follows:

- as plain text in the STEP 7 user interface
- on PROFIBUS DP
  - Read out with SFC 13 slave diagnostics and store in the data area of the application
- on PROFINET IO
  - Read data records from the IO device with SFB 52
  - Receive alarms from the IO device with SFB 54
- Evaluation with FB 125 or FC 125

Parameter assignment options

- **None**

  No other diagnostics data is reported, apart from standard diagnostics.

- **Hard errors**

  Extended diagnostics messages are generated in the case of the following events.

  – Hardware fault (memory test)

  – Firmware error (checksum)

  – Connection to reader lost

  – Short-circuit fault/interruption, if supported by hardware

  – Firmware update (message at start/end)

  In the case of this diagnostics, the “Ext_Diag” bit is set, that is, it is treated as high-priority diagnostics information in the controller (SF-LED is lit)

Diagnostics alarms

With the diagnostics alarms, a distinction is made between incoming and outgoing diagnostics.

Incoming diagnostics
An event occurs and triggers a diagnostics alarm. Depending on the parameter assignment, the "Ext_Diag" bit is set.

Outgoing diagnostics
The event is no longer pending and a diagnostics alarm is output without a set “Ext_Diag” bit. In the case of events that are only pending for a moment, cancellation is delayed by 3 seconds.

The hard errors are supported by text messages stored in the GSD/GSDML file.

7.5 Diagnostics of the RF170C communications module

Diagnostics data of the RF170C is mapped to the channel-related diagnostics of the ET 200pro.

The data in the table below apply for the RF170C:

Table 7- 4 Diagnostics of the RF170C

Content	Value	Meaning
Channel assign-ment	80h	Reader 1
	81h	Reader 2
Channel type	11_B	Input/output channel
Channel resolution	101_B	Word
Error type	00001_B	Short-circuit (voltage supply to the reader has a short circuit)
	00110_B	Wire break (connection to the reader is interrupted)
	01001_B	Error (internal module error has occurred on the RF170C)
	10000_B	Parameter assignment error (RF170C does not have parameters)
	10001_B	No encoder voltage or load voltage (supply voltages not present or too low)

Technical data

8

Table 8- 1 Technical specifications for RF170C

	6GT2002-0HD01
Product type designation	SIMATIC RF170C
Technical specifications - interfaces	
Serial interface to the user	PROFIBUS DP-V1, PROFINET IO
Interface to the ET 200pro	ET 200pro backplane bus
Connector system	See “ET 200pro” operating instructions
Transmission speed	See “ET 200pro” operating instructions
Max. block length	2 words cyclic/240 bytes acyclic (per channel)
Serial interface to the reader	
Connector	2 x M12 connector plug
Max. cable length	
• RS-422	1000 m, dependent on reader (preassembled cables 2..50 m for other standard cables and self-assembled cables, refer to the section "Connecting cables")
• RS-232	30 m
Connectable readers	2 x reader
Software functions	
Programming	Depending on the PROFIBUS DP master
SIMATIC S7 function blocks	Ident profile/Ident blocks/RFID standard profile FB 45 / FB 55
Transponder addressing	Direct access via addresses

	6GT2002-0HD01
Electrical data	
Supply voltage[1]	
• Rated value	24 VDC
• Permitted range	20 to 30 VDC
Current consumption [2]	Max. 1 A; typ. 130 mA (without reader)
Current taken from reader outputs	
• RS-422	max 800 mA at 24 VDC (in total for one or two readers.)
• RS-232	max 1200 mA at 5 VDC (in total for one or two readers.)
Electrical isolation	yes
Mechanical data	
Dimensions (W x H x D) in mm	
• Electronic module RF170C	90 x 130 x 35
• RF170C connection module	90 x 130 x 60
Weight	
• Electronic module RF170C	approx. 270 g
• RF170C connection module	approx. 500 g
Environmental conditions	
Ambient temperature	
• During operation	–25 to +55 °C
• During transportation and storage	–40 to +70 °C
Degree of protection	IP67
MTBF (at 40°C)	77.5 years
Approvals	cULus (File E248953)

[1] All supply and signal voltages must be safety extra low voltage (SELV/PELV according to EN 60950) 24 VDC). Reliable (electrical) isolation of low voltage (SELV / PELV acc. to EN 60950)

[2] The power supply must provide the required current of max. 1 A during brief power outages of ≤ 20 ms.

Dimension drawings

9

9.1 Interface module with connection module

You will find the dimension drawings in the “ET 200pro Distributed I/O device” operating instructions.

9.2 RF170C with connection module

RF170C with connection module

The dimension drawing for an RF170C communication module with plugged-in connection module is shown below.

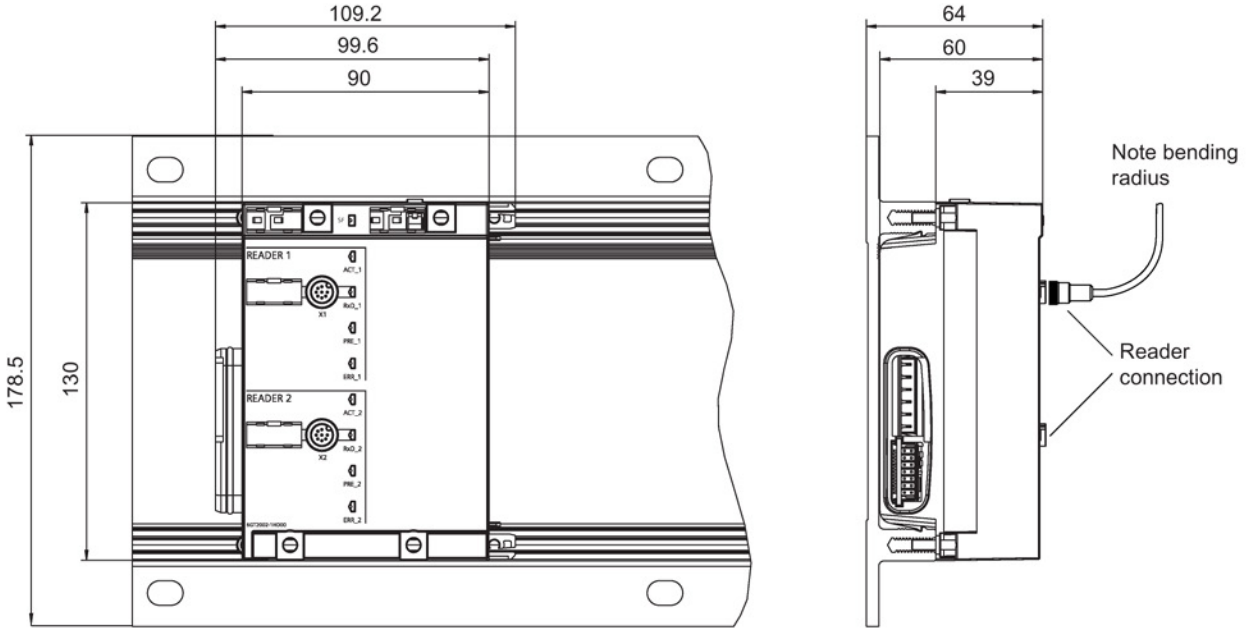


Figure 9-1 Dimension drawing for RF170C communication module with connection module on mounting rack, narrow

Appendix

A

A.1 Connecting cables

A.1.1 Routing of standard cables

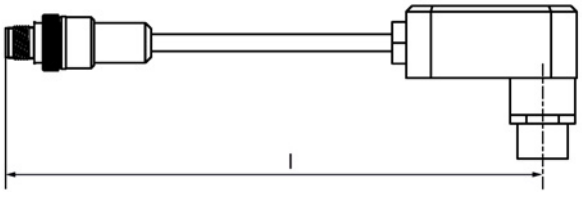


Figure A-1 Connecting cable M12 ↔ Reader (MOBY I / E / U) l = 2 m, 5 m

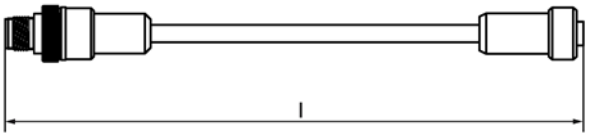


Figure A-2 Connecting cable/extension cable M12 ↔ M12; l = 2 m, 5 m, 10 m, 20 m, 50 m

- RF300/RF600 connecting cable
- Extension cable for all RFID systems

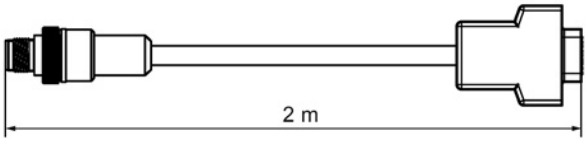


Figure A-3 Connecting cable M12 ↔ sub-D (MOBY D)

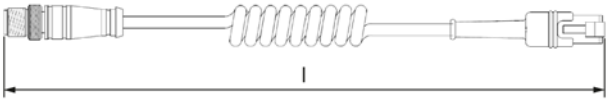


Figure A-4 Connecting cable M12 ↔ RJ-50 (MV320); l = 1.6 - 4 m

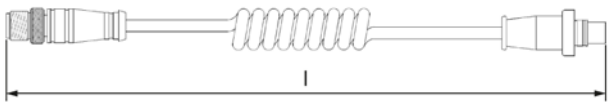


Figure A-5 Connecting cablel M12 ↔ Mini DIN (MV340); l = 1.6 - 4 m

Maximum cable length with RS-422

The RF170C can be operated with every reader configuration with the maximum cable length of 50 m. In some situations, longer connecting cables up to 1000 m are possible. 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 2 cables to form a long cable should be avoided due to the additional contact resistances.

Maximum cable length with RS-232

For RS-232 devices, the maximum cable length is 30m. If the RS-232 device is supplied with the 5 V voltage from the RF170C device the maximum cable length is reduced to 5 m.

Pin assignment

Table A- 1 Connecting cable M12 ↔ reader (MOBY I / E / U)

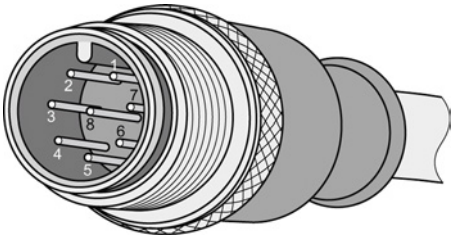
M12 connector (male)		Reader connector (female)
	1	2
	2	5
	3	3
	4	4
	5	6
	6	1
	7	–
	8	7
		

Table A- 2 Connecting cable/extension cable M12 ↔ M12

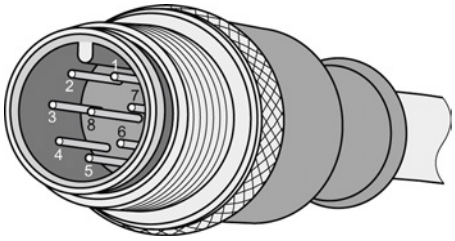
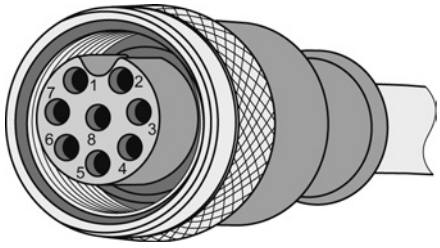
M12 connector (male)		M12 connector (female)
	1	1
	2	2
	3	3
	4	4
	5	5
	6	6
	7	7
	8	8
		

Table A- 3 Connecting cable M12 ↔ D-sub, 9-pin (MOBY D)

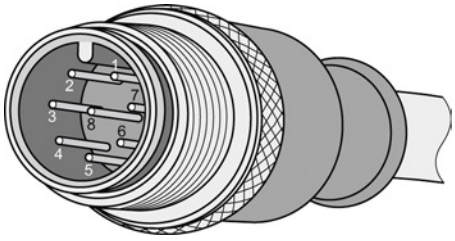
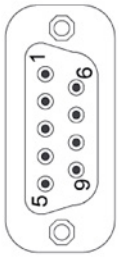
M12 connector (male)		D-sub connector (female)
	1	-
	2	5
	3	7
	4	3
	5	2
	6	6
	7	-
	8	1.8
		
Note that the reader with D-sub connectors must be supplied with 24 VDC via an additional connector.		

Table A- 4 Connecting cable M12 ↔ RJ50 (MV320)

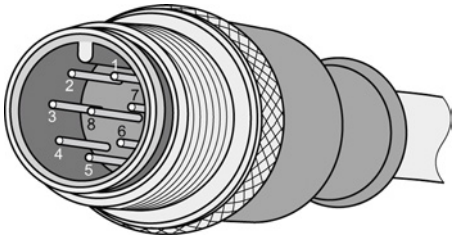
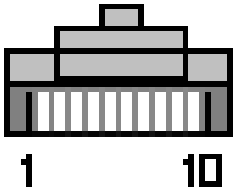
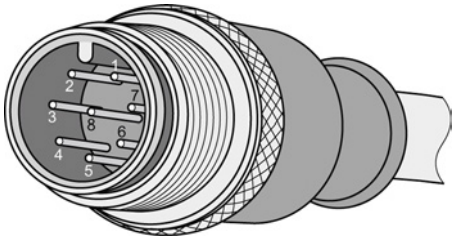
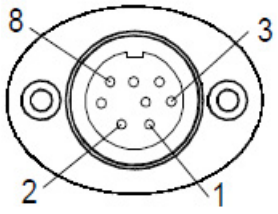
M12 connector (male)		RJ50 connector (female)	
	1	-	
	2	-	
	3	10	
	4	4	
	5	1	
	6	-	
	7	6	
	8	-	

Table A- 5 Connecting cable M12 ↔ Mini-DIN (MV340)

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

A.1.2 Self-assembled cables

If you want to assemble your cable yourself a reader cable connector with screw-type terminals is available. Assembling the reader connector M12, 8-pin is described in this section. For all other RFID families, you will find the description of the reader connectors in the relevant system manual.

Cables and reader connectors can be ordered from the catalog "D 10 “Industrial Identification Systems".

Cable structure

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

- 6 x 0.25 mm^2
- LiYC11Y 6 x 0.25

Connectors

You can order the M12 connectors with the following article numbers:

- M12, 8-pin, male for RF170C

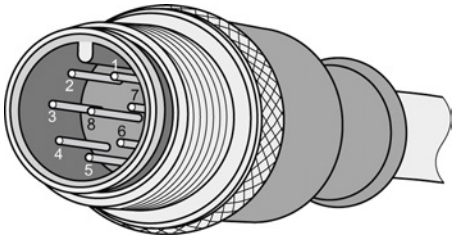
  6GT2090-0BE00
- M12, 8-pin, female for reader

  6GT2090-0BD00

Pin assignment

The pin assignment of the reader connector M12, 8-pin is described in the following table.

Table A- 6 The pin assignment of the reader connector M12, 8-pin.

M12 connector (male)	Pin	RS-422	RS-232	Wire color
	1	+24 V	+24 V	Note the data sheet provided by cable manufacturer
	2	-RxD	--	
	3	GND	GND	
	4	+RxD	RxD	
	5	+TxD	+5 V	
	6	-TxD	--	
	7	--	TxD	
	8	Shield	Shield	

A.2 Connection of optical handheld readers or serial devices

The parameter assignment options of the optical handheld readers are described in the manuals of the relevant devices. You will find the manuals on the optical handheld readers from Siemens in Siemens Industry Online Support (https://support.industry.siemens.com/cs/ww/en/ps/15157/man).

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

A.2.1 Compatible optical handheld readers

The following optical handheld readers can be operated via the communications module RF170C RS-422/RS-232:

- SIMATIC MV340
- SIMATIC MV320
- SIMATIC MV325 (in preparation)

With the RF170C (6GT2002-0HD01) you can operate the optical handheld readers via the RS-232 interface.

A.2.2 Connecting handheld readers / serial devices

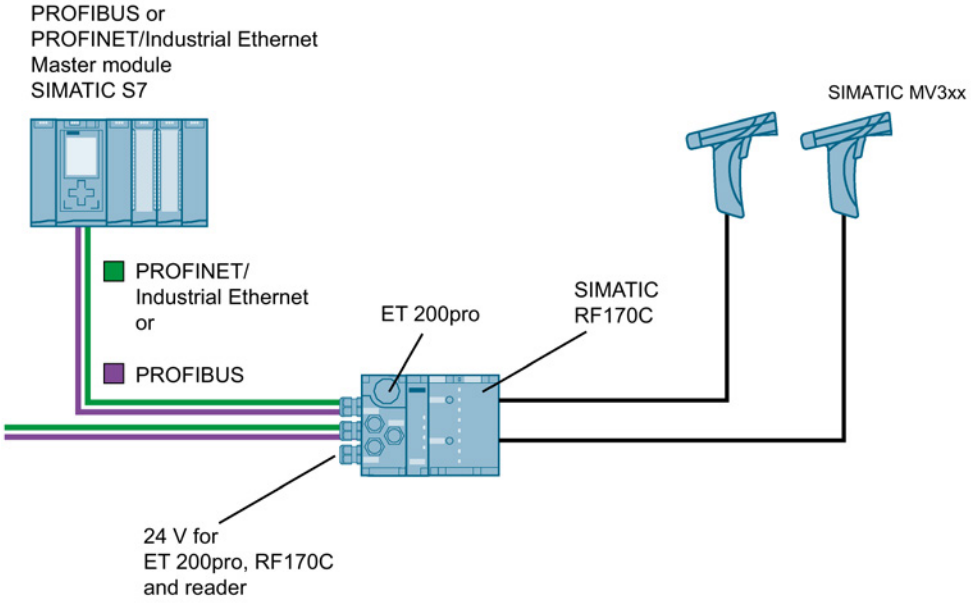


Figure A-6 Example of a cabling setup

The coiled connecting cable of the optical handheld readers SIMATIC MV320, MV325 and MV340 has a length of 1.6 m. Due to its coiling, it can be extended to a length of 4 m during operation.

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 59)“.

A.2.3 Hardware configuration

The optical handheld readers can be integrated in SIMATIC automation systems with the aid of STEP 7 Basic / Professional (TIA Portal) or STEP 7 Classic (SIMATIC Manager). The connection is via the ET 200 pro module.

Below the configuration of the communications module RF170C RS-422/RS-232 for operation with the optical handheld readers via the TIA Portal is described.

Requirement

The optical handheld reader is connected to the controller via the RF170C RS-422/RS-232 and has started up. The TIA Portal has been started. You have created a project.

Procedure

Follow these steps to configure the RF170C RS-422/RS-232 for operation with the optical handheld readers.

1. In the module parameters of the RF170C select the suitable MOBY mode:
   - for SIMATIC MV340: MV3xx
   - for SIMATIC MV320: MV3xx
   - for SIMATIC MV325: Freeport protocol
   - for other serial devices Freeport protocol

NOTICE
Changing to the RS-232 interface By selecting “MV3xx”, the communications module automatically switches to the RS-232 interface. If you select the Freeport protocol, you need to change the interface to RS-232 manually and set the interface parameters.

2. Select the user mode “FB 45 / FC 45” or “Ident profile”.
3. Set all other parameters as required and download the configuration to the controller.

Configuring the optical handheld readers

To allow operation of the optical handheld readers via the RS-232 interface with the RF170C RS-422/RS-232 you need to configure the handheld readers appropriately. This configuration can be achieved quickly and simply by scanning the relevant codes.

With the handheld reader MV340, you can also create the configuration using the program “ESP” on a PC.

Note

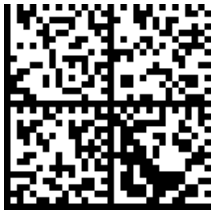
Product information contains codes

The optical handheld readers and the connecting cable are supplied with product information with the codes.

- SIMATIC MV320



- SIMATIC MV340



By scanning the code, all relevant parameters for the communication between the RF170C RS-422/RS-232 communications module and the optical handheld reader are set.

- Interface: RS-232
- Transmission speed: 115.2 kBd
- Data bits: 8
- Parity: None
- Stop bits: 1
- Protocol format: Packet mode (not supported by the MV325)

A.2.4 Functions and commands of optical handheld readers

The optical handheld readers can be operated with the following controllers/program blocks via the RF170C RS-422/RS-232:

Table A- 7 Compatible controllers/program blocks

Program blocks	Controllers		
	S7-300 / S7-400 and STEP 7 V5.5	S7-1200 and STEP 7 Basic/Professional	S7-1500 and STEP 7 Basic/Professional
FB 45	Yes	No	Yes [1]
Ident profile/Ident blocks as of V2.0	Yes	Yes	Yes

[1] Via application example; in preparation

Overview of the commands

The following table shows the block-specific commands that you can execute with the optical handheld readers.

Table A- 8 Overview of the commands

Program blocks	Command / bit	Description
FB 45	Init_run	The parameter “option 1” can be set to “0” or “2”. Further input is unnecessary.
	Read	Reading optical data • Address "0x0000" 2 bytes for length information is reported in the result, max. net data 231 bytes; no error message if the length is exceeded • Address “0x0002" No length information in the result; mx. net data 233 bytes • Address “0xFFFF" For reading the acknowledgement of a write commnd
	Write	Send command to the device • Address “0xFFFF" A write command with the length "3" and the data "0x23, 0x01, 0xNN" has the effect that the device vibrates "NN" times or outputs signal tones. Note that if there is memory overflow the oldest acknowledgements are lost.
	SLG-Status	Fetch the status from the optical handheld reader (sub-command “13”) The type of the optical handheld reader is displayed.

Program blocks	Command / bit	Description
Ident blocks	Read	Reading optical data • Address "0x0000" 2 bytes for length information is reported in the result, max. net data 227 bytes; no error message if the length is exceeded • Address "0x0002" No length information in the result; max. net data 229 bytes • Address "0xFFFF" For reading the acknowledgement of a write commnd
	Write	Send command to the device • Address "0xFFFF" A write command with the length "3" and the data "0x23, 0x01, 0xNN" has the effect that the device vibrates "NN" times or outputs signal tones. Note that if there is memory overflow the oldest acknowledgements are lost.
	Reset_MV	The input value for the "Program" parameter is unnecessary.
	Reader_Status	Fetch the status from the optical handheld reader (ATTRIBUTE "0x8D") The type of the optical handheld reader is displayed.

You will find more information on programming in the function manual "FB 45".

Notes on the commands and functions

Init_run

With "Init-run" (RESET command) the connection to the optical handheld reader is established. In the instance DB of the Ident profile or MOBY_DB you can read out the firmware version of the RF170C. A successful connection establishment is indicated by 3 signal tones of the optical handheld reader. The RESET command does not have reader-specific parameters and triggers deletion of the buffers on the optical handheld reader.

After the "Init_run" the handheld reader is ready for operation.

If the connection is not established or the connection attempt is incorrect, the FB outputs the error message "Error_MOBY = 03" or "0xE4FE03" with the Ident profile.

Read

If the "Read" command is started, the data that the RF170C has already received from the handheld reader is transferred to the controller in the Read aknowledgment.

If no "Read" has yet been sent, the presence bit ("TP" or "ANZ_MDS_present") informs that new data has been scanned in and is available to be fetched with a "Read" command on the RF170C.

SLG-Status/Reader_Status

With "SLG-Status" (sub-command "13") or "Reader_Status" (ATTRIBIUTE "0x8D") the device status of the optical handheld reader can be obtained. The following information is contained in the acknowledgment of the status command sent by the CM (response of the handheld reader):

Table A- 9 Structure of the “Status” acknowledgment frame of the optical handheld reader

Indicates that data contains the zero-terminated Reader information string (ofprintable ASCII characters and TAB) in the following format: iVVVVWWWWXXXXSSSSSSSSSSAOODYYYYHHIIIIJJJJKKKKLLLL<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

Note

Connection error to the reader

With the MV340, if the trigger button of the reader is pressed for longer than 30 seconds, a message appears on the controller indicating an unconnected optical handheld reader. The message is no longer reported when the trigger button is released.

See also

Migration of an RFID project with FB 45 from S7-300/400 to S7-1500 (https://support.industry.siemens.com/cs/ww/en/view/77467630)

A.2.5 Functions and commands of serial devices

With the “Freeport protocol” the communications module RF170C RS-422/RS-232 has a further interface setting. The “Freeport protocol” allows communication between any serial field device (e.g. barcode scanner, intelligent sensor or other serially connected automation component) and the Et 200pro. One or two field devices of the same type can be operated with an RF170C via RS-232 or RS-422.

The parameter assignment options for the protocol are descried in section ""Module parameters" parameter group (Page 30)".

Functions and commands

Communication can be achieved using the function block FB 45. The “Write” command handles the sending of data and the “Read” command the reception. The maximum length of the frames (header and data) is 233 bytes or 229 bytes with the Ident profile.

Table A- 10 Compatible controllers/program blocks

Program blocks	Controllers		
	S7-300 / S7-400 and STEP 7 V5.5	S7-1200 and STEP 7 Basic/Professional	S7-1500 and STEP 7 Basic/Professional
FB 45	Yes	No	Yes [1]
Ident profile/Ident blocks as of V2.0	Yes	Yes	Yes

[1] Via application example; in preparation

Table A- 11 Overview of the commands

Program blocks	Command	Description
FB 45	Init_run	The parameter “option 1” can be set to “0” or “2”. Further input is unnecessary.
	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 third byte. Max. net data 231 bytes; no error message if the length is exceeded
	Write	The address must be specified as “0xFFFF”. Max. net data 233 bytes (without length information); no error message if the length is exceeded

Program blocks	Command	Description
Ident blocks	Read	Read data • Address "0x0000” 2 bytes for length information is reported in the result, max. net data 227 bytes; no error message if the length is exceeded • Address “0x0002” No length information in the result; max. net data 229 bytes
	Write	The address must be specified as “0xFFFF”. Max. net data 194 bytes (without length information); no error message if the length is exceeded
	Reset_Reader	-

You will find more information on programming in the function manual “FB 45".

Connecting

Cabling

For cabling any devices, you will find the pin assignment in section “Connecting cables (Page 55)“. Suitable connectors and cables for self assembly can be ordered according to section “Article numbers RF170C (Page 70)“. Connectors that may be needed on the field devices must be obtained from electrical retailers or the vendor of the device.

Power supply

The connected field device can be supplied with power via the RF170C if the performance data of the RF170C is not exceeded. Note the technical specifications of the RF170C in this respect: 24 V max. 0.8 A or 5 V max. 1.2 A.

See also

Migration of an RFID project with FB45 from S7-300/400 to S7-1500 (https://support.industry.siemens.com/cs/ww/en/view/77467630)

A.2.6 MOBY mode-specific error messages

The following table provides an overview of the of the specific error messages with the MOBY mode “MV3xx”.

Table A- 12 MOBY mode-specific error messages

MOBY Mode	Block	Error ID	Meaning
MV3xx	FB 45	0x03	Connection error to the reader
		0x06	Negative acknowledgment or bad frame from the reader
		0x05	Unknown command, incorrect command parameters or forbidden command chaining (wrong length information)
		0x0D	Address error in the command (≠ "0x0000", "0x0002", "0xFFFF)
		0x12	Internal communication error
		0x13	New data was received before existing data was fetched. • Scan operation: The newest data is lost. With the "Write" command the oldest acknowledgements are lost without an error message being generated.
		0x18	"Init_Run" necessary
		0x19	The command was not executed. Possible causes: • Previous command still active. • Data from the reader exists ("Reader_Status").
		0x1F	Active command was canceled by "Reset" (init_run) or bus connector was unplugged
	Ident profile	0xE4FE03	Connection error to the reader
		0xE2FE01	Negative acknowledgment or bad frame from the reader
		0xE6FE01	Unknown command, incorrect command parameters or forbidden command chaining (wrong length information)
		0xE1FE03	Address error in the command (≠ "0x0000", "0x0002", "0xFFFF)
		0xE4FE8D	Internal communication error
		0xE4FE04	New data was received before existing data was fetched. • Scan operation: The newest data is lost. With the "Write" command the oldest acknowledgements are lost without an error message being generated.
		0xE6FE05	"Reset_Reader" necessary

MOBY Mode	Block	Error ID	Meaning
		0xE5FE08	The command was not executed. Possible causes: • Previous command still active. • Data from the reader exists ("Reader_Status").
		0xE5FE04	Invalid data block number (DBN) on the reader/communications module

Note

Connection error to the reader

With the MV340, if the trigger button of the reader is pressed for longer than 30 seconds, a message appears on the controller indicating an unconnected optical handheld reader. The message is no longer reported when the trigger button is released.

A.3 Ordering data

A.3.1 Article numbers RF170C

Communication module and connection module

Table A- 13 Communications module and connection module

Name	Article number
RF170C communications module, pack of 1	6GT2002-0HD01
RF170C connection block, pack of 1	6GT2002-1HD00

RF170C connection module accessories

Table A- 14 RF170C connection module

Name		Article number
Reader connecting cable MOBY I / E / U	2 m	6GT2091-4FH20
	5 m	6GT2091-4FH50
Reader connecting cable MOBY D	2 m	6GT2691-4FH20
Reader connecting cable RF200 / RF300, RF600 / MV400 extension cable RF200 / RF300 / RF600 / MV400 / MOBY I / E / U / D	2 m	6GT2891-4FH20
	5 m	6GT2891-4FH50
	10 m	6GT2891-4FN10
	20 m	6GT2891-4FN20
	50 m	6GT2891-4FN50
Reader connecting cable RF200 / RF300M connector on reader at an angle	2 m	6GT2891-4JH20
	5 m	6GT2891-4JH50
	10 m	6GT2891-4JN10
Connecting cable coiled for MV320 1.6 to 4 m		6GT2191-0BH50
Connecting cable coiled for MV325/MV340 1.6 to 4 m		6GT2191-0AH50

Table A- 15 Connectors and cables for self assembly

Name		Article number
Connecting cable, communication module - reader, without connector	50 m	6GT2090-4AN50
	120 m	6GT2090-4AT12
	800 m	6GT2090-4AT80

Name	Article number
Connector M12, 8-pin, with screw connectors, male for RF170C	6GT2090-0BE00
Connector M12, 8-pin, with screw connectors, female for reader	6GT2090-0BD00

A.3.2 Article numbers accessories ET 200pro

You willl find the complete ordering overview for the ET 200pro

- in the “ET 200pro Distributed I/O device” operating instructions
- in the “Siemens Industry Mall (https://mall.industry.siemens.com)“ or
- in the “TIA Selection Tool (http://w3.siemens.com/mcms/topics/en/simatic/tia-selection-tool/Pages/tab.aspx)“.

A.3.3 Further article numbers

Table A- 16 Further article numbers

Name	Article number	Contents
SIMATIC Manual Collection	6ES7998-8XC01-8YE0	Contains all SIMATIC manuals in electronic format
DVD "Ident Systems Software & Documentation"	6GT2080-2AA20	• FB for SIMATIC • 3964R driver for DOS/Windows 95/NT/2000/XP / 7 • C libraries • PC demo program • RFID documentation • Throughput calculation tool

A.4 Standards and certifications

Introduction

The general technical specifications contain the standards and test values that RF170C communications module meets in the ET 200pro distributed I/O device and which test criteria the RF170C was tested with.

CE approval

The RF170C communications module meets the general and safety-related requirements of the following EC directives and conforms to the harmonized European standards (EN) for programmable controllers published in the official gazettes of the European Union:

- 89/336/EEC "Electromagnetic Compatibility" (EMC Directive)

Approval

Underwriters Laboratories Inc. in accordance with

- UL 508 (Industrial Control Equipment)
- CSA C22.2 No. 142 (Process Control Equipment)

A.5 Service & Support

Technical Support

You can reach technical support for all PD projects as follows:

- Phone: + 49 (0) 911 895 7222
- Fax: + 49 (0) 911 895 7223
- Web form for support request (https://support.industry.siemens.com/My/ww/en/requests)
- Internet: E-mail (mailto:support.automation@siemens.com)

Contacts

If you have any further questions on the use of our products, please contact one of our representatives at your local Siemens office.

The addresses are found on the following pages:

- On the Internet (http://w3.siemens.com/aspa_app)
- In Catalog CA 01
- In the catalog ID 10 specially for Industrial Identification Systems

Service & Support for Process Industries and Drives

On the Internet, on the Support home page (https://support.industry.siemens.com/cs/de/en/) of Process Industries and Drives (PD), you will find various services.

There you will find the following information, for example:

- Our newsletter containing up-to-date information on your products.
- Relevant documentation for your application, which you can access via the search function in "Product Support".
- A forum for global information exchange by users and specialists.
- Your local contact for PD.
- Information about on-site service, repairs, and spare parts. Much more can be found under "Our service offer".

RFID homepage

For general information about our identification systems, visit RFID home page (http://w3.siemens.com/mcms/identification-systems/).

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).

Training center

We offer appropriate courses to get you started. Please contact your local training center or the central training center in

D-90327 Nuremberg.

Phone: +49 (0) 180 523 56 11
(€ 0.14 /min. from the German landline network, deviating mobile communications prices are possible)

For information about courses, see the SITRAIN home page (http://sitrain.automation.siemens.com/sitrainworld/).

Index

A

Approvals
  CE, 72
  CSA, 72
  Standards, 72

C

CE
  Approval, 72
Components
  Overview:, 14
Contacts, 72
Courses, 73
CSA
  Approval, 72

D

Degrees of protection IP65, IP66, IP67
  M12 caps, 28
  Warranty conditions, 41
Diagnostics with LED display
  RF170C, 45
Dimension drawing
  RF170C with connection module, 53
Disassembly
  RF170C, 43

G

General technical specifications, 72

H

Hot swapping, 42

I

I&M data, 47
Identification data, 47

L

LED display
  RF170C, 45

M

Maintenance data, 47
Maximum configuration
  electrical, 16
  Mechanical, 16

O

Ordering data
  Communication module, 70
  Connection module, 70

R

Removing and inserting
  RF170C, 42
RF170C
  Accessories, 27
  Connecting, 27
  LED display, 46
  mounting, 23
  Removing and inserting, 42
  Replacing, 43
  Status and error LEDs, 46
RF170C communications module
  LED display, 45
  mounting, 23
  Removing and inserting, 42
  Replacing, 43
RF170C with connection module
  Dimension drawing, 53

S

Standards and approvals, 72
Status and error displays
  RF170C, 46

T

Technical Support, 72
Terminating module
    mounting, 24
Training, 73