SIEMENS

# SIMATIC Sensors

# RFID systems
# RF170C communication module

Operating Instructions




10/2009
J31069-D0176-U001-A3-7618

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### 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.

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**NOTICE**

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# Table of contents

# 1 Introduction

## 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

The RF170C can be used as a central I/O device in an ET 200pro with 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 communication module.

## Changes since the previous version

These operating instructions are version 12/2006.

## Position in the information landscape

- In addition to these operating instructions, you need:
  - the operating instructions for the DP Master used
  - or the PROFINET IO controller
  - or the operating instructions for the ET200pro interface module IM 154-8 CPU.
- You can find information on programming the communication module, and a complete description of faults, in the descriptions of the function blocks FB 45/56 or FC 45/55/56, as well as in the RFID standard profile.
- You can find further instructions for installation and commissioning in the operating instructions of the *ET 200pro distributed I/O device*.
- The manual of the relevant RFID system contains information on the readers / write/read devices to be connected.
- Special information on parameterizing the RF620R/RF630R readers in conjunction with the RF170C communication module can be found in the "Configuration Manual RF620R/RF630R (http://support.automation.siemens.com/WW/view/en/33287195)".

## 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.

# 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 by the user over PROFIBUS DP V1 or PROFINET IO. An S7-300 or S7-400 with integrated PROFIBUS/PROFINET connection can be used as the controller.

The ET 200pro with RF170C can communicate with all DP masters compliant with the IEC 61784-1:2002 Ed1 CP 3/1 standard. 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 IM 154-8 CPU. 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 communication modules on a SIMATIC S7, convenient function blocks are made available to the user.

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

- MOBY D
- MOBY U
- RF300
- RF600 (RF620R and RF630R)
- MOBY E
- MOBY I
- MV400 code readers

## 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) or
- addressed by means of a DOS-like file management system (filehandler).

Functions are available in SIMATIC S7 for both access methods:

- FC 45/FB 45 and FC 55 for normal addressing
- FC 56 / FB 56 for filehandler

The functions provide the S7 user with an interface that features powerful commands and is easy to operate. In addition, the functions offer command chaining and S7 data structures via UDTs.

The hardware of the RF170C is configured with an object manager (OM) integrated into the SIMATIC Manager, or with the GSD file.

## Other features

- Up to 9 RF170Cs can be operated simultaneously in one ET 200pro 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 ECOFAST, M12, 7/8" or direct connection (heavy-gauge threaded joint)
- T functionality, that is, a component can be replaced without adversely affecting the bus communication and voltage supply of the other modules.
- Standardized PROFIBUS user interface for identification systems with RFID standard profile (available soon)
- Firmware update of the RF170C is
  - possible via PROFIBUS DP
  - possible via IM 154-8 CPU
  - currently not possible via PROFINET IO
  - not possible via GSD file
- Parameterizable diagnostics data
- 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.

### Configuration

The ET 200pro is designed for rack mounting and always features

- 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)
  - Communication modules

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

The comfortable handling features of ET 200pro ensure quick commissioning and easy maintenance.

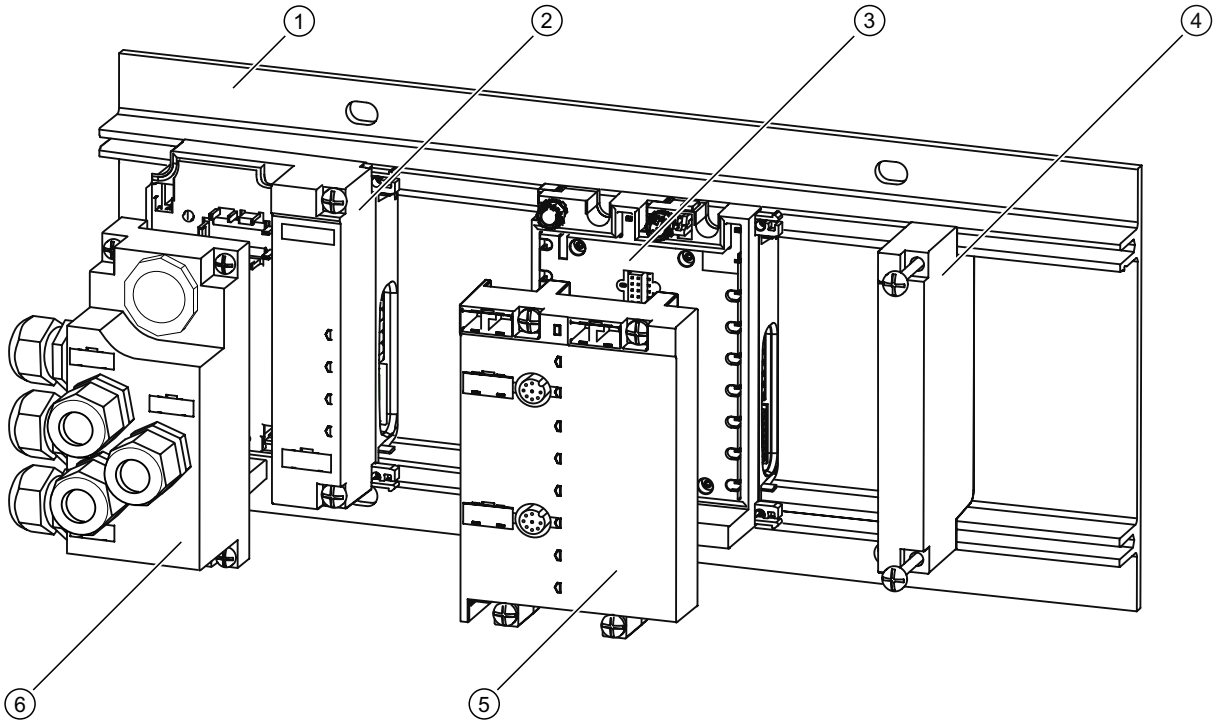
**Note**

A tool called *SIMATIC ET 200 Configurator* is available for configuring the ET 200pro.

You will find the tool on the Internet at:

`http://www.siemens.com/automation/service&support`

Search for the entry with the number 22614936.




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

Figure 2-2 ET 200pro with RF170C

It is also possible to plug in an IM 154-8 CPU as an interface module.

## Configuration

**Note**

In the following figures, the ET 200pro with the CM IM DP Direct connection module is shown as an example of the interface module.

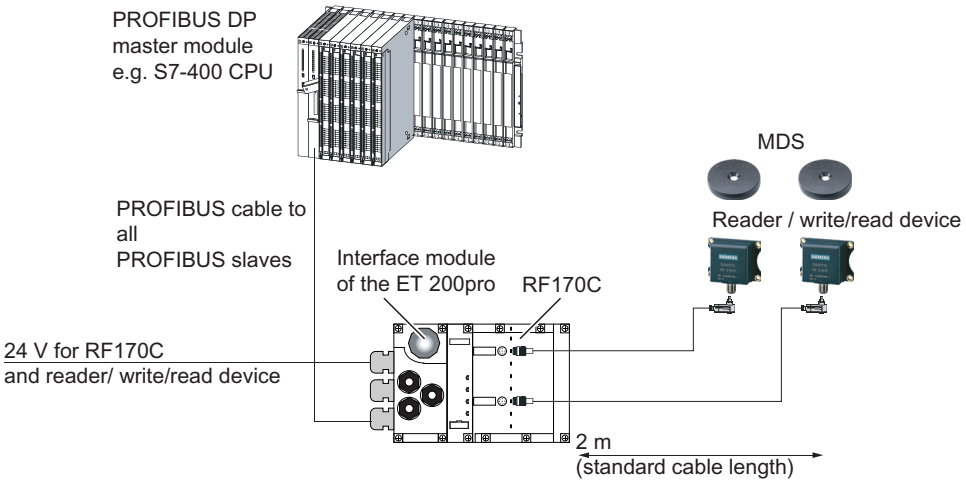



Figure 2-3 Configurator for an RF170C

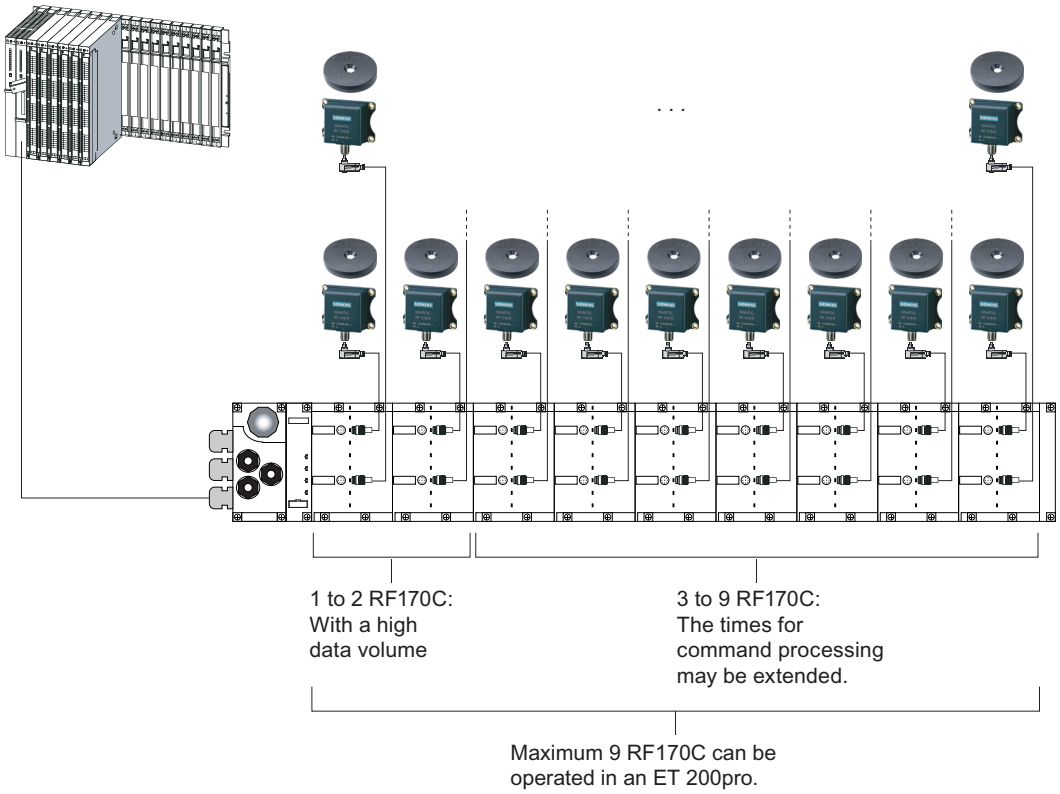


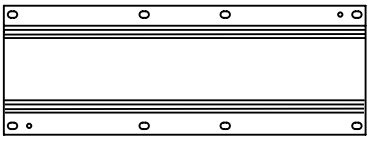
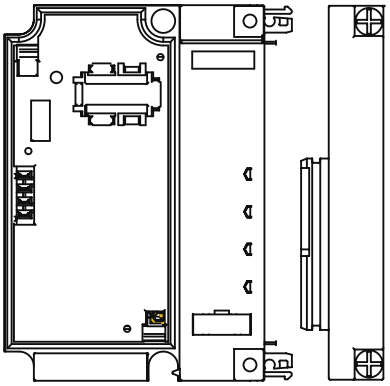
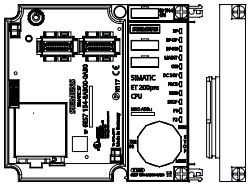

Figure 2-4 Maximum configuration of RF170C on an ET 200pro

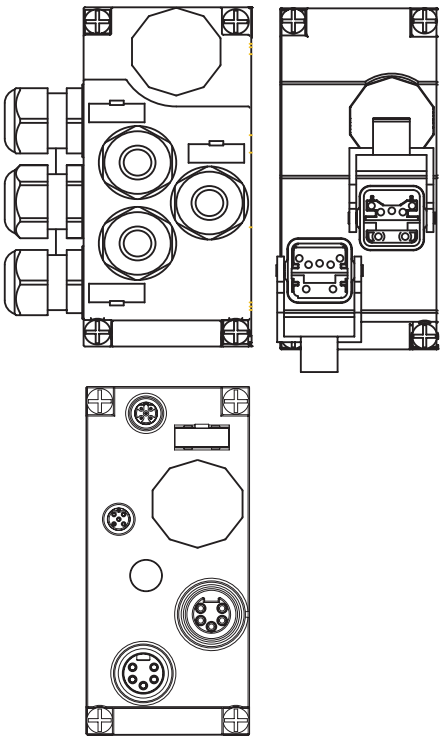
## 2.2.2 Components of the ET 200pro distributed IO device with RF170C

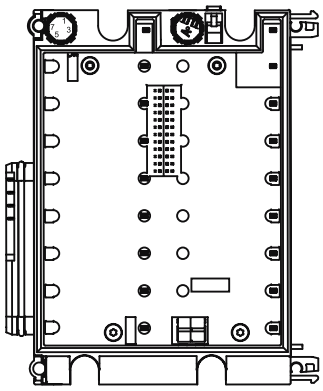
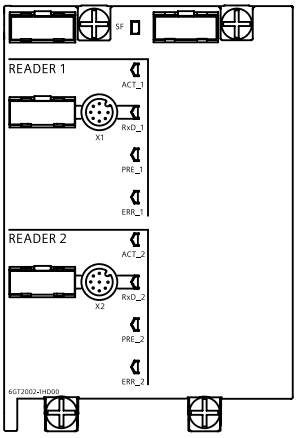
### Components of the ET 200pro distributed I/O device with RF170C (extract)

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

Table 2- 1 Components of ET 200pro

| Component | Function | View |
|---|---|---|
| Module rack | The ET 200pro is mounted onto the rack.<br>The rack is available in several versions of different lengths:<br>• Rack, narrow |  |
| Interface module for PROFIBUS DP, with bus module and terminator module | The interface module interconnects the ET 200pro with the DP master and prepares the data for the communication modules.<br>The unit is delivered with the terminating module, and the interface module is already mounted on the bus module.<br>• The bus module is the mechanical and electrical connection element between the various ET 200pro modules.<br>• The terminating module terminates the ET 200pro.<br>The following interface modules are available for PROFIBUS DP:<br>• IM 154-1 DP<br>• IM 154-2 DP High Feature |  |
| Alternative:<br>IM 154-8 CPU | The unit is delivered with the terminating module, and the interface module is already mounted on the bus module.<br>The IM 154-8 CPU also provides PLC functionality and can control lower-level bus systems. |  |

| Component | Function | View |
|---|---|---|
| Connection modules for interface modules | The connection modules are mounted on the interface modules. They are used to connect PROFIBUS DP, and the electronics/encoder and load voltage supply.<br>Available connection modules:<br>• Direct connection: CM IM DP Direct<br>• ECOFAST: CM IM DP ECOFAST Cu<br>• CM IM DP M12, 7/8" |  |

| Component | Function | View |
|---|---|---|
| RF170C communication module | The unit is supplied with the communication 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 communication 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 ET 200pro | max. 1 m mounting width (without rack) |

### Electrical maximum configuration

- Electronics / encoder supply 1L+:
  - Supplies power to the internal electronic circuit of the modules and to external readers or write/read devices
  - Electrically isolated to the backplane bus of ET 200pro and to PROFIBUS DP

Table 2- 3 Electrical maximum configuration

| Properties | Rule |
|---|---|
| Electronics / encoder supply 1L+ | max. 5 A per ET 200pro station<br>(must not be exceeded with connected readers / write/read devices) |

**Note**

The maximum electrical configuration can be checked with the tool *SIMATIC ET 200 Configurator*. We urgently recommend use of the tool because the maximum configuration cannot be achieved with all reader configurations.

You will find the tool on the Internet at:

`http://www.siemens.com/automation/service&support`

Search for the entry with the number 22614936.

# 2.3 Galvanic isolation

## Galvanic isolation

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

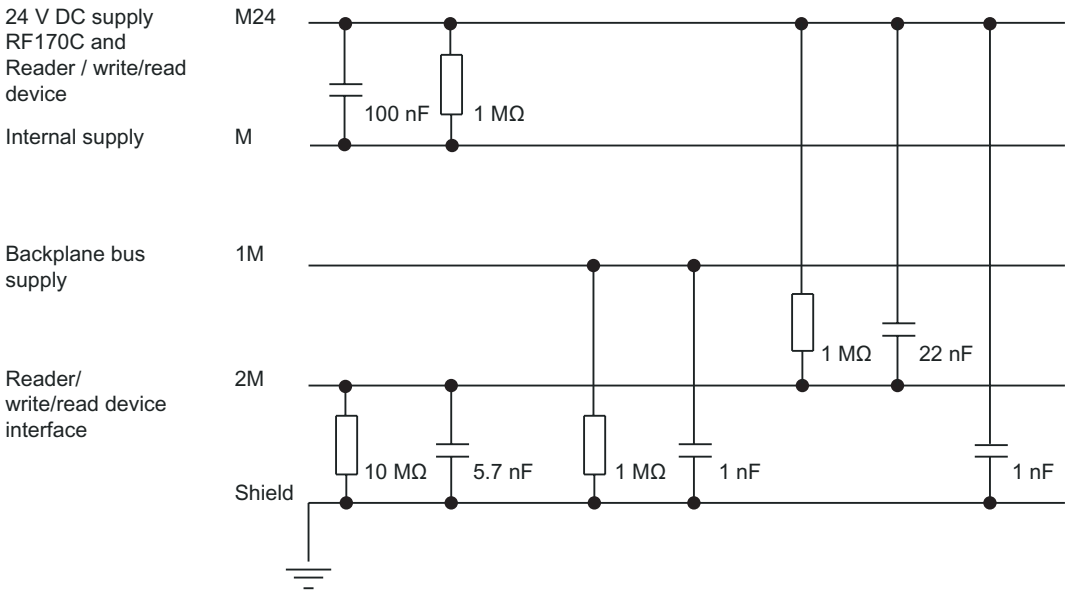



Figure 2-5 Galvanic isolation for RF170C (ground to shield)

# 2.4 Integration

## Integration

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

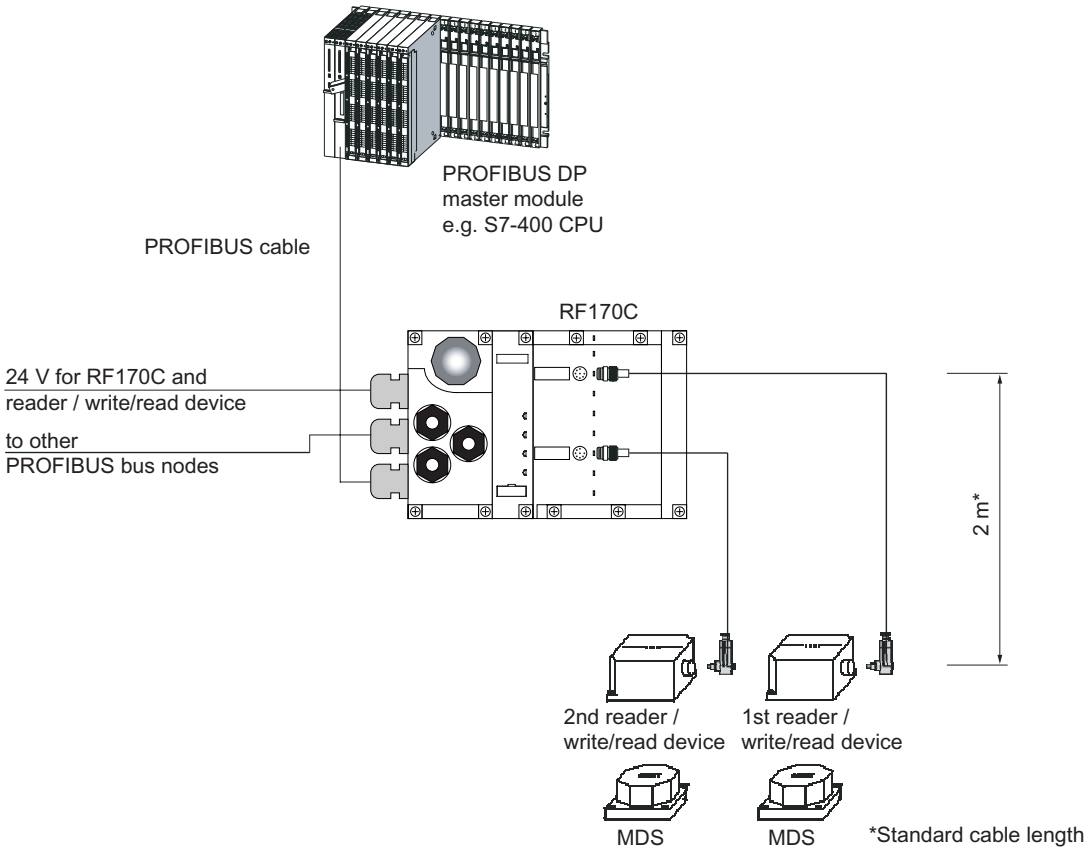



Figure 2-6 ET 200pro Configurator with RF170C

The RF170C is integrated into the ET200pro hardware configuration by means of an object manager and the GSD file of the interface module. The RF170C can then be configured using HW Config of SIMATIC Manager or another PROFIBUS tool (e.g. operating mode). The object manager or the GSD file can be found on the CD *RFID Systems Software & Documentation* or on the Internet.

The following figure shows how the ET200pro with IM 154-8 CPU and RF170C is integrated into an automation system.

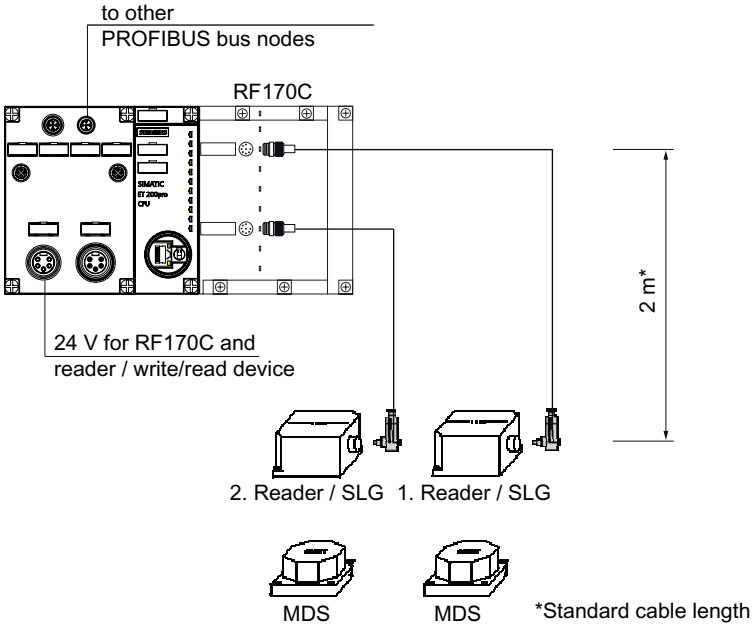



Figure 2-7 ET 200pro configurator with IM 154-8 CPU and RF170C

## See also

Service & Support (Page 81)

# 2.5 Planning data throughput

You will find a throughput calculation tool on the "Software & Documentation" CD 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

This check is recommended if one or more of the following limitations/secondary conditions apply:

- When you are working with readers of a high-speed identification system (e.g. RF300)
- When you want to process large blocks of data on the tag (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.

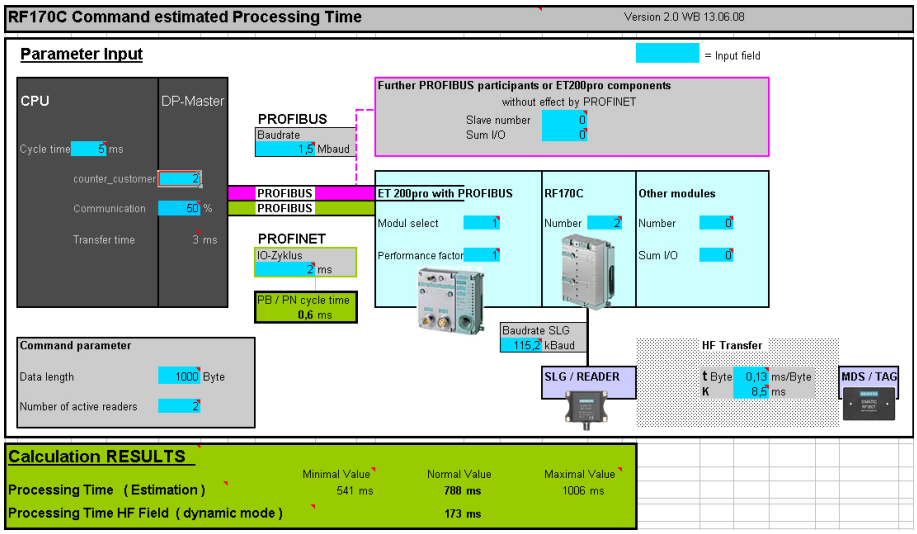



Figure 2-8 Data throughput calculation tool

# Mounting

# 3

Detailed information on installing the RF170C in an ET 200pro can be found in the *ET 200pro distributed I/O device* operating instructions .

You will find the product information on the Internet at:

`http://www.siemens.com/automation/service&support`

Search for the entry with the number 21210852.

Below is an overview of the installation steps.

## 3.2 Installing the interface module

### Introduction

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

### Requirements

- Interface module for PROFIBUS DP
  - The terminating module is removed from the interface module.
  - The rack has been mounted.
- Interface module for PROFINET IO
  - The terminating module is removed from the interface module.
  - The SIMATIC Micro Memory Card is inserted.
  - The rack has been mounted.

## Procedure

1. Snap-mount the interface module onto the rack, then slide it into the correct position
2. Screw-mount the interface module onto the rack.

   Interface module 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

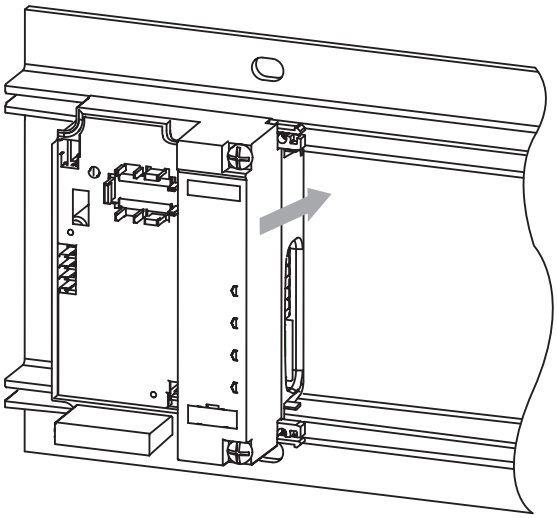


Figure 3-1 Installing the interface module for PROFIBUS DP (example)

# 3.3 Installing the RF170C communication module

## Introduction

The RF170C communication module determines the function of the reader outputs. The RF170C connection module is mounted onto the communication module.

## Requirements

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

## Procedure

1. Snap-mount the communication module onto the rack.
2. Push the communication module to the left until it engages into the interface module or the previous communication module.

**Note**

The RF170C connection module must not be installed when you slide the RF170C communication module.

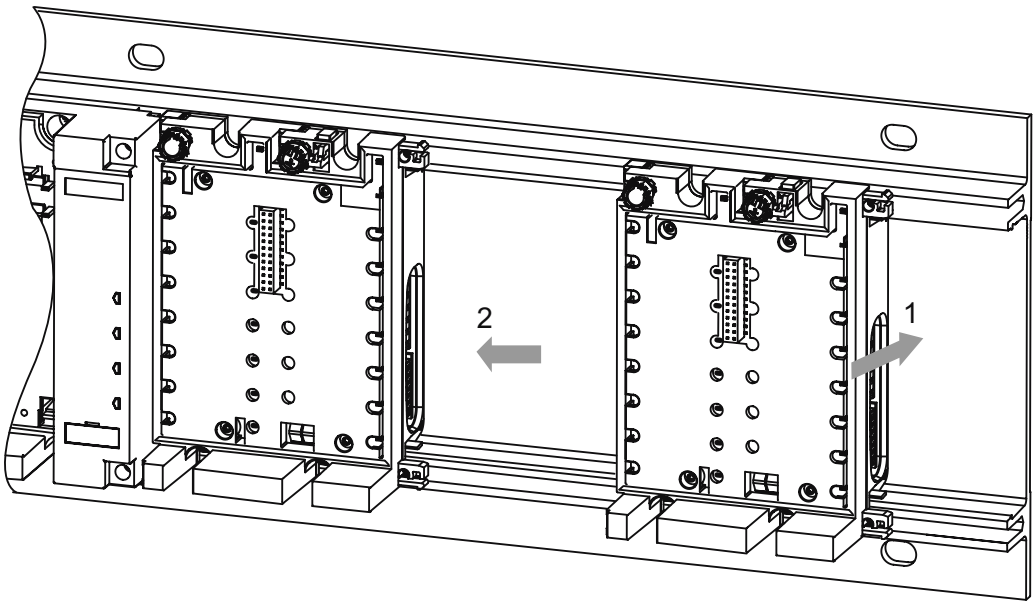



Figure 3-2 Install the communication module

## Reference

*ET 200pro Distributed I/O device* operating instructions, Section

- *Commissioning ET 200pro*
- *Replacing a bus module*

# 3.4 Mounting the terminating module

## Introduction

The ET 200pro is terminated with the terminating module. Operation of the ET 200pro requires installation of the terminating module.

## Requirements

- The last communication module of the ET 200pro has been installed.
- All communication modules are screwed onto the mounting rack.

## Procedure

1. Mount the terminating module onto the rack.
2. Move the terminating module to the left to the last communication module.

**Note**

Screw the terminating module first to the mounting rack (2 cross-head screws on the front, tightening torque 1.5 Nm) when all RF170C connection modules have been screwed to the communication modules.

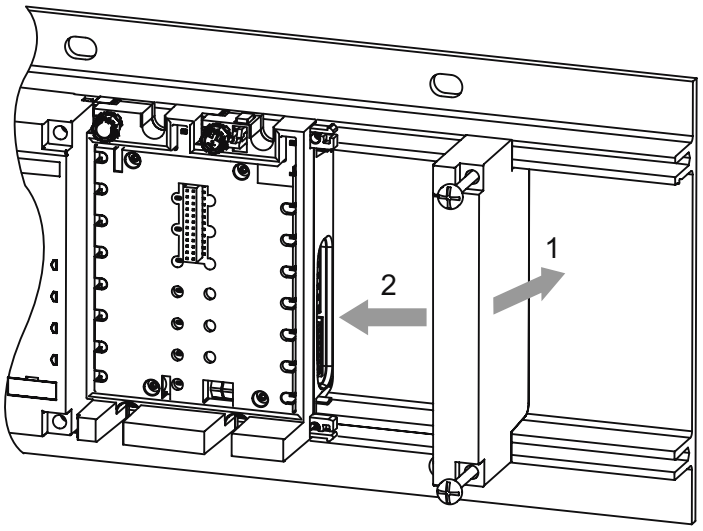



Figure 3-3 Mounting the terminating module

## Reference

*ET 200pro Distributed I/O device* operating instructions, Section *Commissioning ET 200pro*

# 3.5 Installation of IM 154-8 CPU interface module and connection module

## Introduction

The IM 154-8 CPU interface module interconnects the ET 200pro with PROFIBUS DP / PROFINET and supplies power to the electronics modules.

## Requirements

- The terminating module is removed from the IM 154-8 CPU interface module.
- The module rack is installed (please refer to the operating instructions for the *ET 200pro distributed I/O device*).

## Required tool

Cross-head screwdriver, size 2

## Procedure

1. Snap-mount the IM 154-8 CPU interface module onto the rack, then slide it into the correct position.
2. Screw-mount the IM 154-8 CPU interface module onto the rack.

   2 cross-head screws on the front: top and bottom, tightening torque 1.5 Nm.
3. Insert an empty SIMATIC Micro Memory Card or one that contains the correct user program into the module slot.

   Information on this can be found in the operating instructions for the *ET 200pro interface module IM 154-8 CPU*.
4. Plug the CM IM DP M12, 7/8" connection module onto the IM 154-8 CPU.
5. Screw-mount the connection module onto the rack.

   4 cross-head screws on the front, torque 1.5 Nm.
6. Install the I/O modules (electronics modules).
7. Install the terminating module (please refer to the operating instructions for the *ET 200pro distributed I/O device*).

# 3.6 Set the PROFIBUS address and the terminating resistor

## Introduction

Set the PROFIBUS DP address and terminating resistor at the connection module for the interface module.

- The PROFIBUS DP address defines the point of access to the ET 200pro on PROFIBUS DP.
- A PROFIBUS DP segment must be terminated at both ends, i.e. on the first and last segment node, with its characteristic impedance. Enable the integrated terminating resistor if the ET 200pro is the last node on PROFIBUS DP.

| NOTICE |
| --- |
| **Connection modules CM IM DP ECOFAST Cu and CM IM DP M12, 7/8"** |
| CM IM DP ECOFAST Cu and CM IM DP M12, 7/8" connection modules are equipped with a switched terminating resistor. You may not install an external terminating resistor. |

## Requirements

- Valid PROFIBUS DP addresses are 1 to 125.
- All PROFIBUS DP addresses must be unique.
- The set PROFIBUS DP address must correspond with the definition in the configuration software of this ET 200pro.

## Setting the PROFIBUS DP address at the connection module and activating the terminating resistor

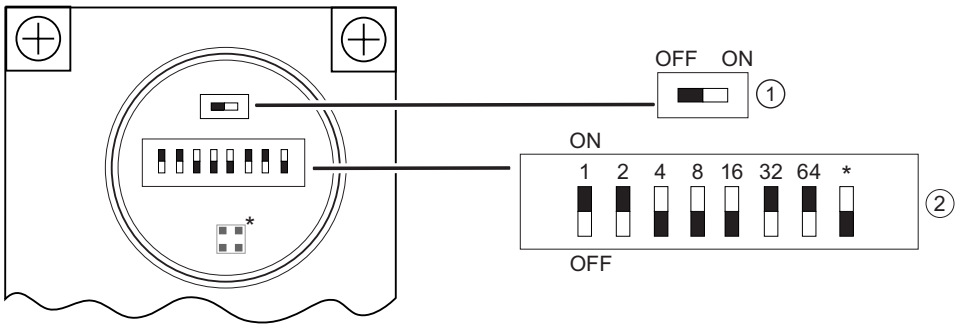
1. Remove the screw cap from the connection module.
2. Set the PROFIBUS DP address using the DIL switches (see the example below.)
3. If this ET 200pro is the last node on PROFIBUS DP, enable the terminating resistor using the DIL switch.

   **Note**

   Enable the terminator to terminate the PROFIBUS DP network at this end point.

4. Turn the cap on the connection module again (torque: 1 Nm to 1.5 Nm.)

## Example




① Enabling and disabling the terminator
② Setting PROFIBUS DP address 1 to 125
* Reserved

PROFIBUS DP address set on the DIL switch: 1 + 2 + 32 + 64 = 99

| 1 | 2 | 4 | 8 | 16 | 32 | 64 |
|---|---|---|---|---|---|---|
| ON | ON | OFF | OFF | OFF | ON | ON |

**Note**

Any modification of the PROFIBUS DP address is not validated unless you cycle the electronics/encoder power supply 1L+ off and on.

# Connection

# 4

## 4.1 Connection

### Correct usage

When connecting non-specified devices to the ET 200pro, it is possible that the connected device may be destroyed.

### PROFIBUS / PROFINET connection system (not applicable for operation with IM 154-8 CPU)

Detailed information on connecting the ET 200pro to PROFIBUS DP or PROFINET IO can be found in the operating instructions for the *ET 200pro distributed I/O device*. Network components are also described here.

Information on connecting an ET 200pro with IM 154-8 CPU can be found in the operating instructions for the *ET 200pro interface module IM 154-8 CPU*.

## Reader/SLG connection system

One reader / write/read device (SLG) always occupies one M12 connection socket on the RF170C. A preassembled cable therefore provides the optimum easy connection for the reader/SLG. The connection cable is 2 m long in the standard version.

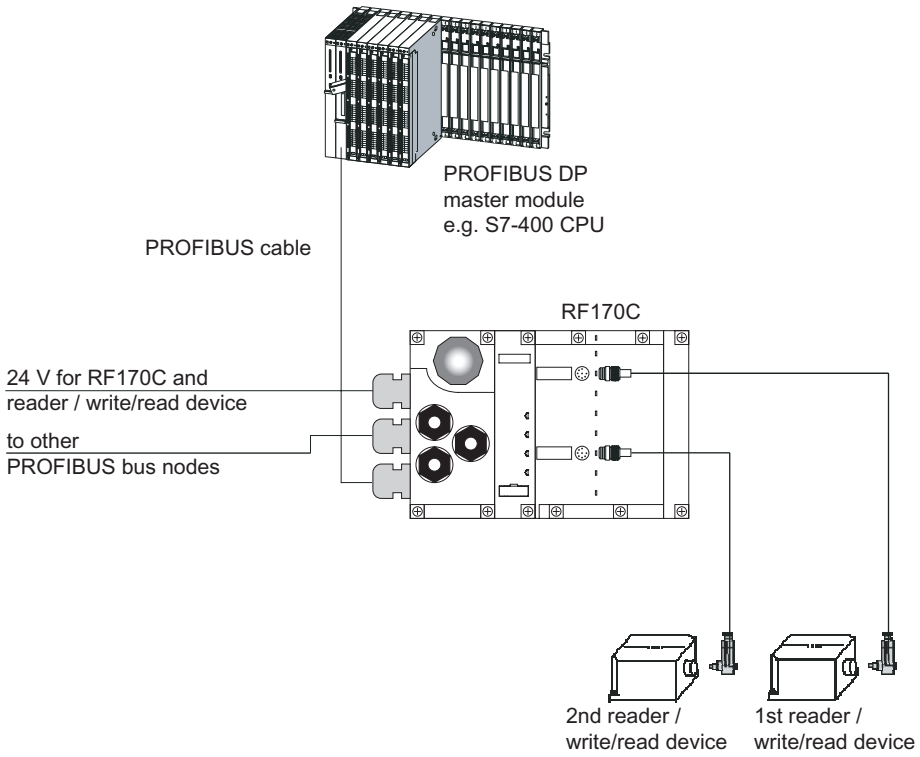



Figure 4-1 Overview of wiring

# 4.2 Connect the RF170C with the connection module

## Introduction

On the RF170C connection module, you connect the cable to the readers / write/read devices using 8-pin round sockets. Use an 8-pin M12 connector and a corresponding cable if you prefer to produce a customized cable.
In doing so, please comply with the cable configurator in the system manuals of the RFID families.

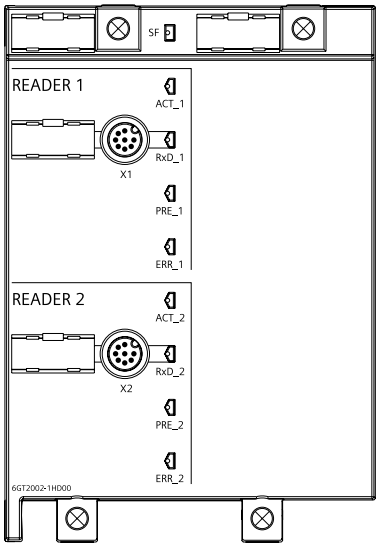



Figure 4-2 Sockets and LEDs of the RF170C connection module

## Requirements

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

**Note**

It is easier to wire the RF170C connection module after you have removed it from the communication module.

## Accessories required for the RF170C

- Patch 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 M12 connectors

1. Plug the connector into the relevant socket of the RF170C connection module. Make sure the connector and socket are properly interlocked (groove and spring).
2. Tighten the knurled screws of the connector (torque = 1.5 Nm.)

## Connect RF170C connection module

1. Insert the RF170C connection module into the communication module.
2. Screw the connection module onto the rack (4 cross-head screws on the front: top and bottom, tightening torque 1.5 Nm)

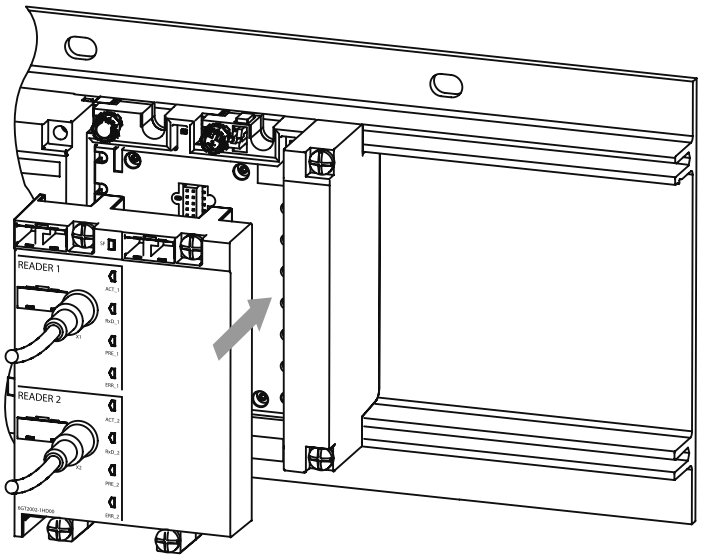



Figure 4-3 Connect RF170C connection module

## Sealing unused sockets

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

## Reference

*ET 200pro Distributed I/O device* operating instructions, Section *Electrical configuration of ET 200pro*

## See also

RF170C order numbers (Page 75)

Order numbers of ET 200pro accessories (extract) (Page 76)

# Parameter settings

# 5

## 5.1 Hardware configuration

### Hardware configuration

The RF170C is integrated into the Hardware Configuration of the SIMATIC Manager preferably via the Object Manager. The object manager can be found on the CD *RFID Systems Software & Documentation* from Edition 03/2006 (6GT2080-2AA10) as SETUP.exe. The object manager provides the functions for PROFIBUS DP and PROFINET IO.

Integration into the PROFIBUS master is carried out by means of a GSD file:

- SIEM8118.GSD for ET 200pro with IM 154-1
- SIEM8119.GSD for ET 200pro with IM 154-2 High Feature

The GSD file can be optionally incorporated into HW Config of the SIMATIC Manager using the function **Tools > Install new GSD …** . You will find the file under Support and ET 200pro.

Integration into other PROFINET IO controllers is carried out by means of a GSDML file:

- GSDML V1.1 SIEMENS ET200pro "Date in the format yyyymmdd".xml for ET 200pro with IM 154-PN High Feature

The RF170C module can be found following installation in the following path in HW Config: **ET 200pro > IM modules > RFID > RF170C**

**Note**

After modifying the parameterization of an RF170C, the ET 200pro must be switched off and on again.

### Parameterization of the interface module of the ET 200pro

To be able to operate the RF170C communication module, you must enable the alarms for DP V1 operation when parameterizing the interface module of the ET 200pro.

# 5.2 Parameter setting by means of GSD file

## Parameter setting by means of GSD file

In addition to the PROFIBUS-relevant control parameters, several RFID-relevant control parameters are also defined for the RF170C in the GSD file. The RFID-relevant parameters are set via the **object properties** of the slave in HW Config. Please consult the function manual of the FC or FB used for a description of the parameters. The following table shows the possible settings:

Table 5- 1 Setting of RFID-relevant parameters

| Parameter name | Value | Remark |
|---|---|---|
| USER_Mode | FB 45 / FC 45 | Default |
| | FC 55 | |
| | FB 56 / FC 56 | |
| | RFID standard profile | available soon |
| MOBY_Mode | MOBY I, E normal addressing | Default |
| | MOBY I file handler | only with FB 56/FC 56 |
| | RF300 / MOBY U/D normal addressing | |
| | MOBY U file handler | only with FB 56/FC 56 (multitag) |
| Data transfer rate write/read device RF300/MOBY U/D | 19.2 kbaud | |
| | 57.6 kbaud | [1] |
| | 115.2 kbaud | Default [1] |
| Diagnosis with diagnostics messages | None | Standard diagnostics only |
| | Hard errors | Hardware-related messages only |
| [1] not permitted with MOBY D with write/read device D11S/D12S | | |

## See also

Diagnoses from the RF170C communication module (Page 63)

# 5.3 Assigning device names to the PROFINET IO device

## Introduction

The information in this chapter is required for operation of the RF170C in an ET 200pro with IM 154-4 PN High Feature.

Each PROFINET IO device is assigned a unique device ID by the manufacturer (MAC address).

Each ET 200pro I/O device is addressed by its device name during configuration and in the user program.

For detailed information on addressing in PROFINET IO, refer to the *PROFINET System Description*.

## Requirements

- IM 154-4 PN High Feature interface module
- SIMATIC Micro Memory Card, 64K memory or more
- Cross-head screwdriver, size 2
- The programming device must be online on PROFINET to the I/O device to let you assign a device name to the interface module.
- The IO device is configured in HW Config and assigned an IP address.

## Assigning device names

1. Loosen the six screws on the front panel of the interface module, then remove the interface module from the bus module.
2. Insert a blank SIMATIC Micro Memory Card into the module slot on the bottom side of the interface module.
3. Insert the interface module into the bus module and secure it with the screws.
4. Switch on the supply voltages on the IM 154-4 PN High Feature.
5. In HW Config, open the **Properties - IM 154-4 PN High Feature** dialog box, enter the device name of the IO device, and then confirm your entry with **OK**.
   Do not use the device name "noname."

## Transfer the device name to the interface module.

1. In HW Config select **PLC > Ethernet > Assign Device Names**.
2. Click the **Assign Name** button in the **Assign Device Names** window.

## Result

The device name is saved to the SIMATIC Micro Memory Card of the interface module.

### Forwarding the device name on replacement of the interface module

The device name of the I/O device is saved to the SIMATIC Micro Memory Card.

To pass the device name to a replaced IM 154-4 PN High Feature, simply move the SIMATIC Micro Memory Card from the "old" interface module to the "new" one.

The IO device accepts the device name from the SIMATIC Micro Memory Card after you cycled power off and on. The station can be addressed again and will operate as before the replacement.

### Node flash test

If you use more than one IO device, the **Assigning Device Names** dialog also displays more than one IO device. In this case, you should compare the MAC address of the device with the indicated MAC address and select the proper IO device.

The identification of I/O devices in a system is facilitated by a node flash test. To activate the flash test:

1. In the **Assign Device Names** dialog, select one of the indicated IO devices.
2. Select the flash period you want to use.
3. Click the **Flash On** button.

The LINK LED of the selected IO device flashes. If PROFINET IO is looped, both LINK LEDs will flash.

# 5.4 Input parameters for RF170C

## Input parameters for RF170C with FB 45 / FC 45

Assignment is made in UDT 10.

Table 5- 2 Input parameters for RF170C

| 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<br>1 = presence check |
| +9.0 | ECC_mode | TRUE, FALSE | |
| +9.1 | RESET_long | TRUE, FALSE | TRUE,<br>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):<br>• Write/read device must be type SLG4x.<br>• The VMDS memory size is 16KB. The INIT command for the VMDS must be specified using 4000 hex. |
| +11.0 | scanning_time | MOBY I:<br>B#16#00 ... FF | A value not equal to 00 is only practical if MOBY_mode has been parameterized accordingly.<br>MOBY D, RF300 reserved (00) |
| | | MOBY U:<br>B#16#00 ... C8 | |
| +12.0 | option_1 | B#16#00, 02, 04 | |
| +13.0 | distance_limiting | MOBY U (normal output power):<br>B#16#05, 0A, 0F, 14, 19, 1E, 23 | MOBY U / D<br>RF300 reserved (00) |
| | | MOBY U (reduced output power):<br>B#16#85, 8A, 8F, 94, 99, 9E, A3 | |
| | | MOBY D:<br>B#16#02 ... 28 | |
| +14.0 | multitag | B#16#1 | MOBY U/D, RF300 |
| +15.0 | field_ON_control | MOBY U:<br>B#16#0, 1, 2, 3 | MOBY U/D, RF300 |
| | | MOBY D, RF300:<br>B#16#0 | |
| +16.0 | field_ON_time | MOBY U:<br>B#16#00 ... FF | MOBY U/D<br>RF300 reserved (00) |
| | | MOBY D:<br>B#16#00, 01 | |

You will find special information on the input parameters for RF170C with FB45 in combination with the RF620R/RF630R readers in the section "Parameterizing > Parameterizing RF620R/RF630R with FB 45 > Input parameters" in the "Configuration Manual RF620R/RF630R".

## Input parameters for RF170C with FC 55

Assignment is made in UDT 10.

Table 5- 3 Input parameters for RF170C with FC 55

| Address | Name | Permissible values | Comment |
|---|---|---|---|
| +0.0 | ASM_address | 0, 4, 8, 12, ... | Automatic or manual address assignment.<br>Each RF170C occupies 4 bytes of I/O in the I/O area of the controller |
| +2.0 | ASM_channel | 1 | 1 channel per ASM |
| +8.0 | MDS_control | B#16#0, 1 | Enable/disable presence check |
| +9.1 | RESET_long | TRUE | TRUE<br>if MOBY mode = 6, 7 (MOBY U/D), RF300 |
| +10.0 | MOBY_mode | B#16#6, 7 | MOBY U/D, RF300 |
| +11.0 | scanning_time | MOBY U:<br>B#16#00 ... C8 | A value not equal to 00 is only practical if MOBY_mode has been parameterized accordingly.<br>MOBY D, RF300 reserved (00) |
| +12.0 | option_1 | B#16#00, 02, 04, ... | |
| +13.0 | distance_limiting | MOBY U (normal output_power):<br>B#16#05, 0A, 0F, 14, 19, 1E, 23 | MOBY U/D<br>RF300 reserved (00) |
| | | MOBY U (reduced output_power):<br>B#16#85, 8A, 8F, 94, 99, 9E, A3 | |
| | | MOBY D:<br>B#16#02 ... 28 | |
| +14.0 | multitag | MOBY U:<br>B#16#01 ... 0C | MOBY U/D, RF300 |
| | | MOBY D:<br>B#16#01 ... 1C | |
| +15.0 | field_ON_control | MOBY U:<br>B#16#0, 1, 2 | MOBY U/D, RF300 |
| | | MOBY D, RF300:<br>B#16#0 | |
| +16.0 | field_ON_time | MOBY U:<br>B#16#00 ... FF | MOBY U/D<br>RF300 reserved (00) |
| | | MOBY D:<br>B#16#00, 01 | |

You will find special information on the input parameters for RF170C with FC55 in combination with the RF620R/RF630R readers in the section "Parameterizing > Parameterizing RF620R/RF630R with FC 55 > Input parameters" in the "Configuration Manual RF620R/RF630R".

## Input parameters for RF170C with FB/FC 56

Assignment is made in UDT 10.

Table 5- 4 Input parameters for RF170C with FB/FC 56

| Address | Name | Permissible values | Comment |
|---|---|---|---|
| +0.0 | ASM_address | 0, 4, 8, 12, ... | Each RF170C occupies four bytes of I/O in the I/O area of the control unit |
| +2.0 | ASM_channel | 1 | 1 channel per ASM |
| +8.0 | MDS_IO control | B#16#0, 1, 4, 5 | Enable/disable presence check |
| +9.0 | ECC_mode | TRUE, FALSE | TRUE is only permitted when MOBY_mode is parameterized with 1 |
| +9.2 | priority_RW | TRUE, FALSE | |
| +9.3 | priority_RWD | TRUE, FALSE | |
| +10.0 | MOBY mode | B#16#1, 4, 5, 6 | MOBY I/U |
| +11.0 | scanning_time | MOBY I: B#16#00 ... FF | A value not equal to 00 is only of any use if MOBY_mode has been parameterized accordingly |
| | | MOBY U: B#16#00 ... C8 | |
| +12.0 | SLG_number | B#16#0001 ... FFFF | With FFFF, the test function is switched on |
| +14.0 | distance_limiting | B#16#05, 0A, 0F, 14, 19, 1E, 23 | MOBY U |
| +15.0 | multitag | MOBY I: B#16#1 | MOBY I/U |
| | | MOBY U: B#16#01 ... 0C | |
| +16.0 | field_ON_control | B#16#0, 1, 2 | MOBY U |
| +17.0 | field_ON_time | B#16#00 ... FF | MOBY U |

## Input parameters for RF170C with FB 101/116/132 (RFID standard profile) (available soon)

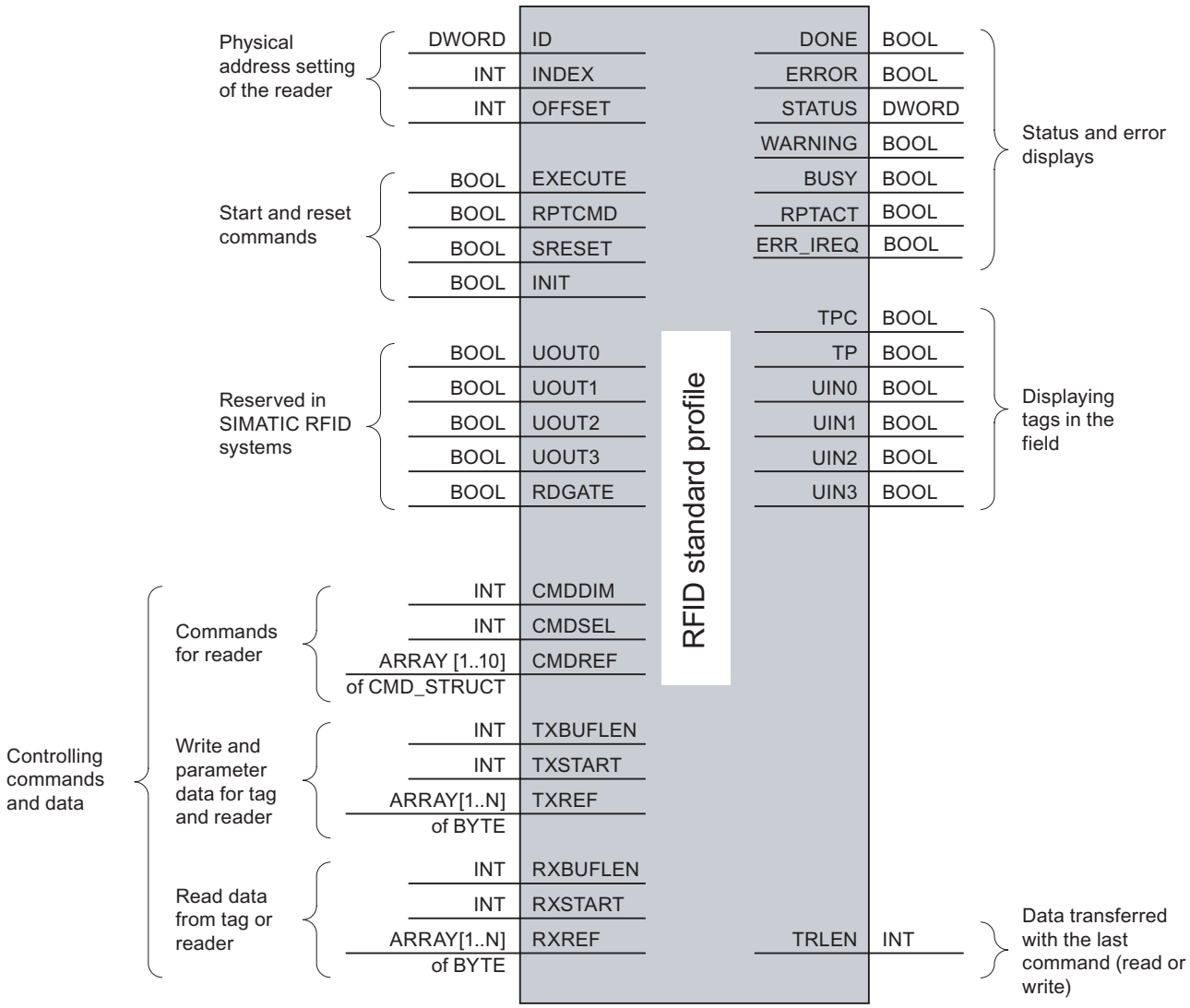



Figure 5-1 Input parameters for RF170C with FB 101/116/132 (RFID standard profile)

# 5.5 Command table of the RF170C

## Command table of the RF170C for normal addressing (FB 45 / FC 45 / FC 55)

Assignment is made in the UDT 20 using the **command** variable.

Table 5- 5 Commands of the RF170C

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

## RF170C command table for file RFID standard profile (FB 101/116/132) (available soon)

Assignment is made in the UDT 1 by means of the "command" variable.

Table 5- 6 RF170C commands with RFID standard profile

| Command | Command code | | Description |
|---|---|---|---|
| | HEX | ASCII | |
| CREATE | 68 | 'h' | Creates a new file. |
| DELETE | 64 | 'd' | Deletes a file form the tag |
| DEV-STATUS | 74 | 't' | Reads out the status of a communication module |
| FORMAT | 66 | 'f' | Initializes the tag |
| GET-DIRECTORY | 6D | 'm' | Reads the directory from the tag |
| INVENTORY | 69 | 'i' | Requests a list of all currently accessible tags within the antenna range |
| MEM-STATUS | 73 | 's' | Reads out the status of a tag |
| NEXT | 6E | 'n' | Does not permit any more operations on a tag |
| PHYSICAL-READ | 70 | 'p' | Reads data from a tag by specifying the physical starting address and the length |
| READ | 72 | 'r' | Reads the data of a file |
| READ-CONFIG | 61 | 'a' | Reads from the communication module |
| SET-ATTRIBUTE | 6F | 'o' | Sets/modifies the attributes belonging to a file |
| UPDATE | 75 | 'u' | Writes data to a file |
| WRITE | 77 | 'w' | Writes data to a file |
| WRITE -CONFIG | 78 | 'x' | Sends new parameters to the communication module |

## RF170C command table for filehandler addressing (FB/FC 56)

Assignment is made in the UDT 50 by means of the "command" variable.

Table 5- 7 RF170C commands for filehandler addressing

| Command | Meaning | command | MOBY system |
|---|---|---|---|
| FORMAT CREATE | Formatting of the MDS | "I" | I/U |
| | Create a new file on the formatted MDS | "B" | I/U |
| QUEUE-WRITE | Completely initialize the data carrier | "Q" | I/U |
| QUEUE-READ | Read several files with one command | "E" | I/U |
| UPDATE | Write data in file (update file length) | "U" | I/U |
| | Write data in file | | |
| WRITE | Read data from file | "W" | I/U |
| READ | | "R" | I/U |
| DELETE | Delete file on MDS | "D" | I/U |
| ATTRIB | Give file attribute | "Y" | I/U |
| COVER | Protect MDS structure | "C" | I/U |
| DIR | Read MDS directory | "G" | I/U |
| MDS-STATUS | Request MDS status | "F" | I/U |
| END | Terminate communication with MDS | "K" | U |
| TRACE | Absolute reading of the MDS | "T" | I/U |
| MOVE | Save system data (DIR + FAT + checksum) in data block | "M" | I |
| LOAD | Transfer system data to ASM | "O" | I |
| GET | Read out UID of all MDS | "P" | U |
| SET-ANT | Switch antenna of write/read device ON/OFF | "A" | U |
| ASM/SLG-STATUS | Request ASM or write/read status | "S" | I/U |
| RESET | Reset ASM/filehandler; this command is initiated by setting init_run | "X" | I/U |
| NEXT | Machine next MDS | "N" | I |

# Service and maintenance

# 6

## 6.1 Degree of protection IP65, IP66 and IP67

### Degree of protection IP65, IP66, IP67 warranty

**CAUTION**

The 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 connector, M12, 7/8" connectors
- Screwed cable glands on connection module CM IM DP Direct
- Caps

Degree of protection IP65, IP66 and IP67 may also be impaired due to damage of the sheath of any cable connected to 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.

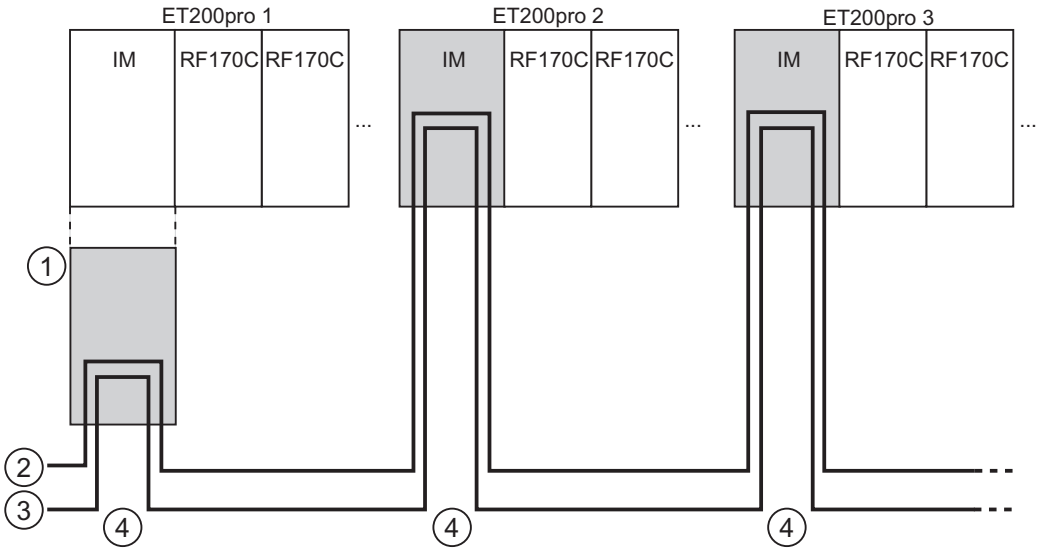
**CAUTION**

In order to prevent damage to your ET 200pro, always shut down the outputs (off power) before you remove any connection modules.

## Function principle Removing the connection module from the interface module

Result:

- ET 200pro 1 fails.
- ET 200pro 2 and ET 200pro 3 remain in operation.




① The connection module is removed from the interface module.
② PROFIBUS DP
③ Supply voltages 1L+, 2L+
④ PROFIBUS DP and the supply voltages are supplied and looped.

## Reference

- *ET 200pro Distributed I/O device* operating instructions, Section *Removing and inserting electronic modules*
- *ET 200pro Motor Starters* manual

  You will find the manual on the Internet at the following address:

  `http://www.siemens.com/automation/service&support`

  Search for the entry with the ID number 22332388.

# 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 only one 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

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 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 RF170C.
6. Insert the connection module with the RF170C into the bus module and secure it with the screws.

**Note**

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

**DANGER**

If you make changes to the coding, this can lead to dangerous states in your plant.

## Reference

*ET 200pro Distributed I/O device* operating instructions, Section *Removing and inserting connection modules of the interface modules*

# 6.4 Firmware update

## 6.4.1 Overview

The firmware of the RF170C can be updated via PROFIBUS DP in conjunction with the interface modules IM 154-1 DP, IM 154-2 DP High Feature or IM 154-8 CPU.
The update is carried out using the SIMATIC Manager.

Detailed information on this is to be found in the *ET 200pro Distributed I/O device* operating instructions.

Below is an overview of updating via PROFIBUS DP.

## 6.4.2 Update via PROFIBUS DP

### Requirements

- The ET 200pro with RF170C is on PROFIBUS DP. The DP communication functions (basic communication only, no application required).
- The RF170C must be configured via the object manager in HW Config.
- The controller must be suitable for the download.
- The files with the current (new) firmware version must be available in a folder on your PG/PC.

## Sample configuration

### Update from PG/PC via PROFIBUS DP and CPU

The PG/PC with the update files is connected to the MPI interface of the CPU. The IM 154-1 DP or IM 154-2 DP High Feature is connected to the 2nd interface of the CPU via PROFIBUS DP (see the following figure). In the STEP 7 project, the IM 154-1 DP or IM 154-2 DP High Feature must be linked to the CPU (e.g. CPU 315 2 DP).

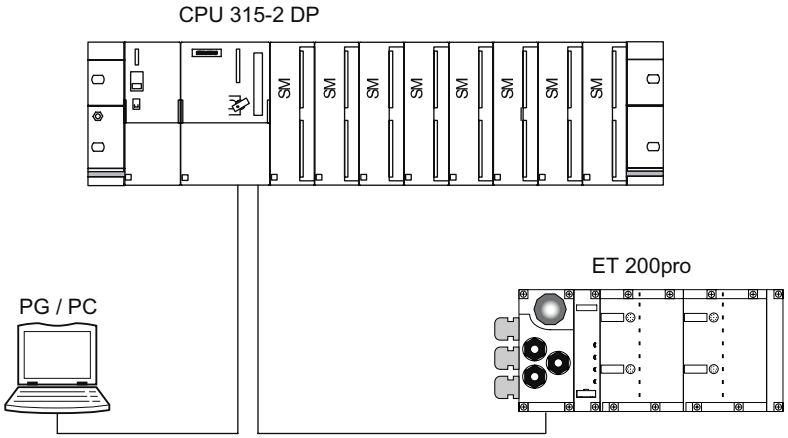



Figure 6-1 Update via PROFIBUS DP (PG/PC via CPU to the IM 154 -1 DP or IM 154-2 DP High Feature)

## Procedure

1. In the hardware manager of *STEP 7*, select the interface module of the ET 200pro with the RF170C that is to be updated.
2. Select the directory with the update files (.upd) under the folder **PLC > Update Firmware**.
3. Select the file **CPU_HD.upd** or **Header.upd**.
4. In the checkbox **Activate Firmware after Loading** on the *STEP 7* user interface, define whether the RF170C with the new firmware
   - is to restart immediately after the update or
   - the next time the supply voltage is switched off/on.
5. Start the firmware upgrade

   The new firmware is forwarded to the RF170C by the ET 200pro interface module (IM 154-1 DP, IM 154-2 DP High Feature, IM 154-8 CPU).

You can also find further information about the procedure in the *STEP 7* Online Help.

During the update, the LEDs ERR_1 and ERR_2 flash alternately at approximately 1 Hz, and the LEDs ACT_1 and ACT_2 flash rapidly.

The update can be made either with or without a running application.
If an application is running, both the update and command execution may be slower.

### Activation of the new firmware

After a successful update, the new firmware is activated following the next restart. Depending on the option (**Activate Firmware after Loading**), restart will occur automatically after the update or after the next switching off/on of the power supply.
Commands that are being executed on the RF170C will be aborted by the power-up.

| NOTICE |
| --- |
| The restart of the RF170C has a temporary adverse effect on the functioning of other modules of the ET 200pro (brief bus interruption). |

If the update fails, the RF170C communication module will always restart with its current ("old") firmware after the supply voltage has been switched off/on.

### See also

LED displays on the RF170C communication module (Page 57)

## 6.4.3 Update via PROFINET IO

Firmware update via an IM 154-4 PN on PROFINET IO is currently not possible.

If a firmware update is necessary, plug the RF170C into an ET 200pro with a PROFIBUS interface module (IM 154-1 DP, IM 154-2 DP High Feature, IM 154-8 CPU). Then you can carry out the update as described in the Chapter *Update via PROFIBUS DP*.

### See also

Update via PROFIBUS DP (Page 49)

# Functions

# 7

## 7.1 Identification and maintenance data (I&M data)

### Definition and properties

Identification data (I data) is information on the module, some of which is also printed on the module housing. I data are "read-only".

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

Identification and maintenance data (I&M) is information that is stored in a module for the purpose of providing you with support when

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

I&M data can be used to identify modules uniquely on the network. For the RF170C, these data are available on the ET 200pro.

### Reading the I&M data

See the *ET 200pro Distributed I/O device* operating instructions, Chapter *Identification data*

### Structure of the I&M data

Table 7- 1 Structure of the I&M data

| I&M data | Access | Default setting | Explanation |
|---|---|---|---|
| **Identification data 0: Index 1 (data record 231)** | | | |
| 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 rating plate |
| HARDWARE_REVISION | Read (2 bytes) | Dependent on module | Electronic rating plate |
| SOFTWARE_REVISION | Read (4 bytes) | Firmware | Provides information about the firmware of the module. |
| REVISION_COUNTER | Read (2 bytes) | - | Provides information about the parameterized 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) | 0001 hex | Provides information about the version of the identification data<br>(0001 hex = Version 1.1) |

| I&M data | Access | Default setting | Explanation |
|---|---|---|---|
| IM_SUPPORTED | Read (2 bytes) | 000F hex | Provides information about the available identification data (Index 2 to 4) |
| **Maintenance data 1: Index 2 (data record 232)** | | | |
| TAG_FUNCTION | read / write (32 bytes) | - | Enter an ID for the module here that is unique in the entire plant. |
| TAG_LOCATION | read / write (22 bytes) | - | Define the mounting location of the module in this record. |
| **Maintenance data 2: Index 3 (data record 233)** | | | |
| INSTALLATION_DATE | read / write (16 bytes) | - | Define the mounting date of the module in this record. |
| RESERVED | read / write (38 bytes) | - | Reserved |
| **Maintenance data 3: Index 4 (data record 234)** | | | |
| DESCRIPTOR | read / write (54 bytes) | - | Define a comment describing the module in this record. |

# Interrupt, error and system messages

# 8

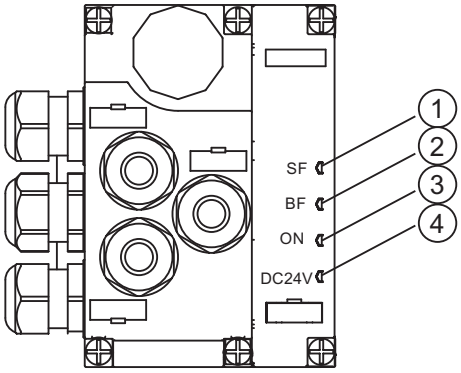
## 8.1 LED displays on the interface module

### Introduction

The interface modules of the ET 200pro have largely the same displays and system messages. We deal below with the IM 154-1 DP and IM 154-2 DP High Feature interface modules.

### LED displays

The figure below shows the position and layout of the LED displays on the IM 154-1 DP and IM 154-2 DP High Feature interface modules.




① SF: Group error (red LED)

② BF: Bus error (red LED)

③ ON: Electronic/encoder supply 1L+ (green LED)

④ DC24V: Load voltage supply 2L+ (green LED)

## Status and error displays ON, SF, BF

Table 8- 1 Status and error displays of IM 154-1 DP and IM 154-2 DP High Feature

| LEDs | | | Meaning | Remedy |
|---|---|---|---|---|
| SF | BF | ON | | |
| Off | Off | On | No error in current data exchange between the DP slave and the DP master. Voltage (electronic/encoder) present at the interface module. | --- |
| Off | Off | Off | Electronic/encoder supply missing or too low at the interface module. | Switch on the electronic/encoder supply to the DP slave. |
| | | | Defective hardware. | Replace the interface module. |
| * | On | On | DP slave in startup mode. | --- |
| | | | Connection to DP master failed. | Check the PROFIBUS DP connection. |
| | | | DP slave cannot detect the transmission rate. | Check the DP master. |
| | | | Bus interrupt | Check all cables on your PROFIBUS DP network. |
| | | | DP slave is out of service | Check whether the PROFIBUS DP connectors are firmly mounted on the connection module. |
| On | Off | On | There is a diagnostic message. | Evaluate the diagnostics. |
| | | | ET 200pro hardware fault. | Replace the defective module. |
| On | Flashing | On | The configuration data sent to the DP slave by the DP master does not match the actual configuration of the DP slave. | Check the DP slave configuration (I/O, PROFIBUS DP address) |
| Off | Flashing | On | The DP slave has detected the transmission rate, but is not addressed by the DP master. | Check the PROFIBUS DP address of the DP slave. |
| | | | The DP slave is not configured. | Check the DP slave configuration (station type.) |
| | | | Illegal PROFIBUS DP address. | Select a valid PROFIBUS DP address.[1] |

* Not relevant

[1] After editing the PROFIBUS DP address, cycle the electronics/encoder power supply 1L+ off and on. The new PROFIBUS DP address is applied when you return power.

## Status display DC24V

The LED DC24V shows a green light if the 2L+ load voltage supply is connected. Otherwise, check whether the power supply is switched on, or whether the fuse has tripped.

## Reference

*ET 200pro Distributed I/O device* operating instructions, Section

- *Evaluation of Interrupts*
- *Evaluating diagnostics messages*
- *Channel-specific diagnostics*

# 8.2 LED displays on the RF170C communication module

## LED display

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

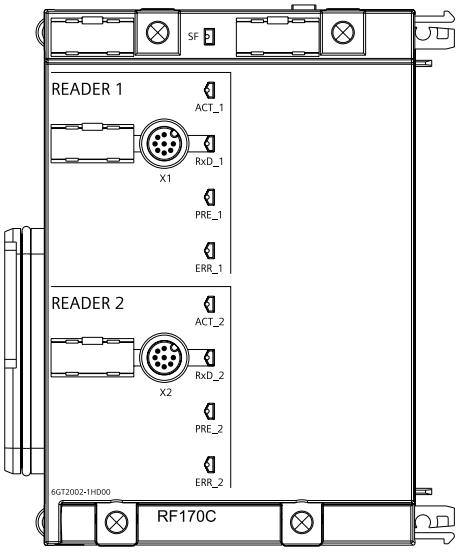



Figure 8-1 LED display on the RF170C communication module

## Status and error LEDs on the RF170C connection module

Table 8- 2 Status and error LEDs for RF170C

| LEDs | Meaning* |
|---|---|
| SF | Group errors |
| ACT_1, ACT_2 | The corresponding reader / (write/read device) is active in processing a user command. (MOBY I only) |
| ERR_1, ERR_2 * | A flashing pattern indicates the last error to occur. |
| PRE_1, PRE_2 ** | Indicates the presence of a transponder/MDS. |
| RxD_1, RxD_2 | Indicates live communication with the reader / write/read device. May also indicate malfunctions on the reader / write/read device. |
| * The meaning of the individual flashing pattern is described in the relevant FB and FC documentation. That documentation also includes the associated error descriptions.<br>** 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 / write/read device. | |

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

| SF | PRE_1 | ERR_1 | ACT_1 | PRE_2 | ERR_2 | ACT_2 | Description |
|---|---|---|---|---|---|---|---|
| Off | Off | Off | On | Off | Off | Off | Start-up active |
| On | Off | On | Off | Off | Off | Off | Checksum error at start-up * |
| On | Off | Off | Off | Off | On | Off | Firmware invalid * |
| On | On | On | On | On | On | On | LED test for approximately 4 seconds; otherwise firmware fault * |
| On | Off | On | On | Off | On | On | Checksum error at start-up * |
| 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 number of flashes (n, m) indicates the last reported error on a given channel. |
| – | – | Flashing | Rapid flashing | – | Flashing | Rapid flashing | Firmware update; alternate flashing of the error LEDs at approximately 1 Hz |

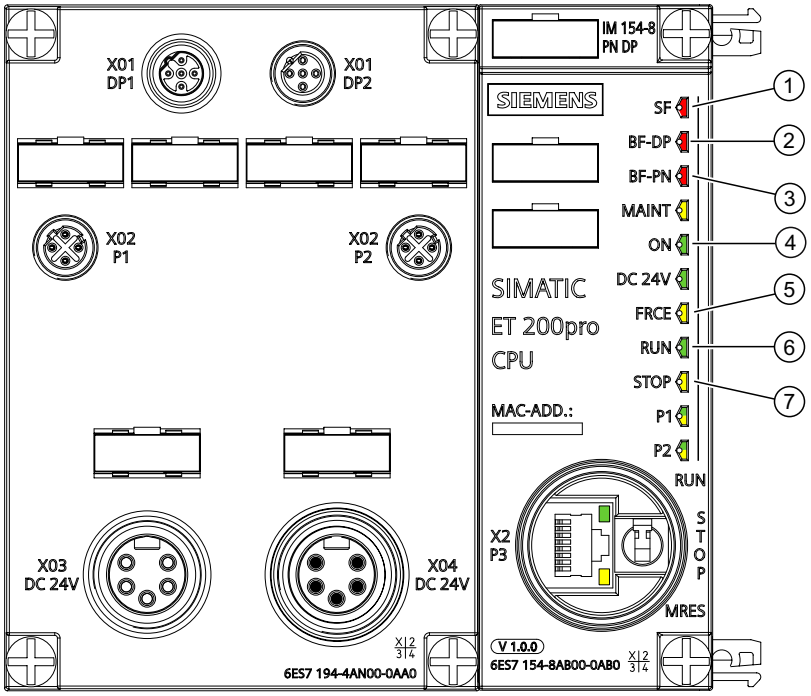
– = not relevant

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

# 8.3 LEDs of the IM 154-8 CPU

## LED

The following figure shows the position and layout of the LED displays on the IM 154-8 CPU.




① SF: Group error for hardware or software error

② BF-DP: Bus error on PROFIBUS DP

③ BF-PN: Bus error on PROFINET

④ ON: Electronic / transducer power supply 1L+ for IM 154-8 CPU

⑤ FRCE:
LED is on: Active force job

LED flashes at 2 Hz: Node flash test function

⑥ RUN:
IM 154-8 CPU in RUN mode

The LED flashes during STARTUP at a rate of 2 Hz, and in HOLD state at 0.5 Hz.

⑦ STOP:
IM 154-8 CPU in STOP, or HOLD, or STARTUP.

The LED flashes at 0.5 Hz when the CPU requests a memory reset, and during the reset at 2 Hz.

Figure 8-2 LEDs of the IM 154-8 CPU

## Status and error displays of the IM 154-8 CPU

| LEDs | | | | | Meaning |
|---|---|---|---|---|---|
| **SF** | **ON** | **FRCE** | **RUN** | **STOP** | |
| Off | Off | Off | Off | Off | The IM 154-8 CPU is without power.<br>Remedy:<br>Check whether the power supply is connected to mains and switched on. |
| Off | On | X | Off | On | The IM 154-8 CPU is in STOP mode.<br>Remedy: Start the IM 154-8 CPU. |
| On | On | X | Off | On | The IM 154-8 CPU is in STOP mode as a result of an error.<br>Remedy: refer to the tables below, evaluation of the SF LED |
| X | On | X | Off | Flashes (0.5 Hz) | The IM 154-8 CPU requests memory reset. |
| X | On | X | Off | Flashes (2 Hz) | The IM 154-8 CPU performs a memory reset. |
| X | On | X | Flashes (2 Hz) | On | The IM 154-8 CPU is in start-up mode. |
| X | On | X | Flashes (0.5 Hz) | On | The IM 154-8 CPU was halted by a programmed break point.<br>For details, please refer to the Programming Manual *Programming with STEP 7*. |
| On | On | X | X | X | Hardware or software error<br>Remedy: refer to the tables below, evaluation of the SF LED |
| X | X | On | X | X | You enabled the Force function<br>For details, please refer to the Programming Manual *Programming with STEP 7*. |
| X | X | Flashes (2 Hz) | X | X | Node flashing test was activated. |
| Flashes | Flashes | Flashes | Flashes | Flashes | Your IM 154-8 CPU has an internal system error. Please proceed as follows:<br>1. Set the mode selector switch to STOP.<br>2. Switch the 1L+ power supply off and on again.<br>3. Read the diagnostics buffer with *STEP 7*.<br>4. Contact your local SIEMENS partner. |
| X = This status is irrelevant for the current function of the IM 154-8 CPU. | | | | | |

## Explanation of the BF-DP LED

Table 8- 3 BF-DP LED

| Meaning | | | |
|---|---|---|---|
| **SF** | **ON** | **BF-DP** | |
| ON | On | On / flashes | PROFIBUS DP interface error.<br>Remedy: See the tables below |

## Explanation of the BF-PN LED

| LED | LED status | Description of the status |
|---|---|---|
| BF-PN | Lit[1] | PROFINET interface error, no communication possible any more<br>Remedy: See the table below |
| | Flashes | PROFINET interface error (for example, due to a station failure in one or more I/O devices)<br>Remedy: See the table below |
| | Not lit | No error on the PROFINET interface |

## 8.4 Parameterization of the diagnostics

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

The diagnostics data can be read out as follows:

- As plain text at 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 with SFB 52 data records from the IO device
  - Receive SFB 54 interrupts from the IO device
- Evaluation with FB 125 or FC 125

### Parameterizing possibilities

- **None**

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

- **Hard errors**

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

  - Hardware fault (memory test)
  - Firmware fault (checksum)
  - Break in connection to reader
  - Short-circuit / break, if supported by hardware

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

### Diagnostic messages

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

**Incoming diagnosis**
An event occurs and triggers a diagnostics message. The Ext_Diag bit is set depending on parameterization.

**Outgoing diagnosis**
The event is no longer pending, and a diagnostics message is output without the Ext_Diag bit being set.
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 file.

### See also

Parameter setting by means of GSD file (Page 34)

## 8.5 Diagnoses from the RF170C communication module

Diagnoses from the RF170C are represented in the channel-related diagnostics of the ET 200pro.

The data in the table below apply for the RF170C:

Table 8- 4 Diagnoses of the RF170C

| Contents | Value | Meaning |
|---|---|---|
| Channel type | $11_B$ | Input/output channel |
| Channel resolution | $101_B$ | Word |
| Fault type | $00001_B$ | Short-circuit<br>(voltage supply to the reader / write/read device has a short circuit) |
| | $00110_B$ | Wire break<br>(connection to the reader / write/read device is interrupted) |
| | $01001_B$ | Fault<br>(internal module fault of the RF170C has occurred) |
| | $10000_B$ | Parameterization error<br>(RF170C not parameterized) |
| | $10001_B$ | No encoder voltage or load voltage<br>(supply voltage not present or too low) |

The diagnoses have the following channel assignments:

- Channel 0 → Reader/SLG 1
- Channel 1 → Reader/SLG 2

### Reference

You can find detailed information on the ET 200pro diagnostics in the *ET 200pro Distributed I/O device* operating instructions, Section *Alarm, error and system messages*.

# Technical data

# 9

## 9.1 Standards and certifications

### Introduction

The general technical specifications contain the standards, test values and test criteria applicable to the RF170C communication module in the ET 200pro distributed I/O device.

### CE approval

The RF170C communication 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)

### Reference

*ET 200pro Distributed I/O device* operating instructions, Section *General technical data*

# 9.2 Technical data for RF170C

Table 9- 1 Technical specifications for RF170C

| | Normal addressing | Filehandler |
|---|---|---|
| Serial interface to the user | PROFIBUS DP-V1/PROFINET IO | |
| Interface to the ET 200pro | ET 200pro backplane bus | |
| Connection method | See *ET 200pro* operating instructions | |
| Transmission rate | See *ET 200pro* operating instructions | |
| Max. block length | 2 words cyclic/240 bytes acyclic (per channel) | |
| Serial interface to the reader/ write/read device | | |
| Connector | 2 x M12 coupler plug | |
| Max. cable length | 1000 m, dependent on reader / write/read device (2 m = standard length; for other standard cables and self-assembled cables, refer to Section *Connecting cables*) | |
| Connectable readers / write/read devices | 2x reader / write/read devices | |
| Software functions | | |
| Programming | Depending on the PROFIBUS DP master | Depending on the PROFIBUS DP master |
| SIMATIC S7 function blocks | FB 45 / FC 45 (normal addressing without multitag)<br>FC 55 (normal addressing with multitag) | FB 56 / FC 56 (filehandler, with and without multitag) |
| MDS addressing | Direct access via addresses | Access via DOS-like file system |
| Commands | Initialize MDS, read data from MDS, write data to MDS, etc. | Format MDS, read file, write file, etc |
| MOBY I dialog: | | |
| Normal station/VMDS<br>Memory size VMDS | Yes/Yes<br>16KB | No/No<br>– |
| Power supply [1] | | |
| • Rated value | 24 V DC | |
| • Permissible range | 20 V to 30 V DC | |
| Current consumption [2] | Max. 1 A; typ. 130 mA (without reader / write/read device) | |
| Current taken from reader outputs | max. 800 mA (for one or 2 readers / write/read devices) | |
| Galvanic isolation | Yes | |
| Ambient temperature | | |
| • During operation | –25 to +55°C | |
| • During transport and storage | –40 to +70°C | |

| | Normal addressing | Filehandler |
|---|---|---|
| Dimensions (W x H x D) in mm | | |
| • RF170C (electronic and bus module) | 90 x 130 x 35 | |
| • RF170C with connection module | 90 x 130 x 60 | |
| Weight | | |
| • RF170C communication module | Approx. 270 g | |
| • RF170C connection module | Approx. 500 g | |
| Degree of protection | IP67 | |
| MTBF (at 40°C) | 129 years | |
| Approvals | cULus (file E116536) | |

[1]) All supply and signal voltages must be low level protective voltage (SELV/PELV acc. to EN 60950) 24 V DC supply: Safety (electrical) isolation of low voltage (SELV / PELV acc. to EN 60950)

[2]) The current supply must provide the current required (max. 1 A) for intermittent periods of failed voltage ≤ 20 ms.

# Dimension drawings

# 10

## 10.1 Interface module with connection module

You can find the dimension drawings in the *ET 200pro Distributed I/O device* operating instructions.

## 10.2 RF170C with connection module

### RF170C with connection module

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

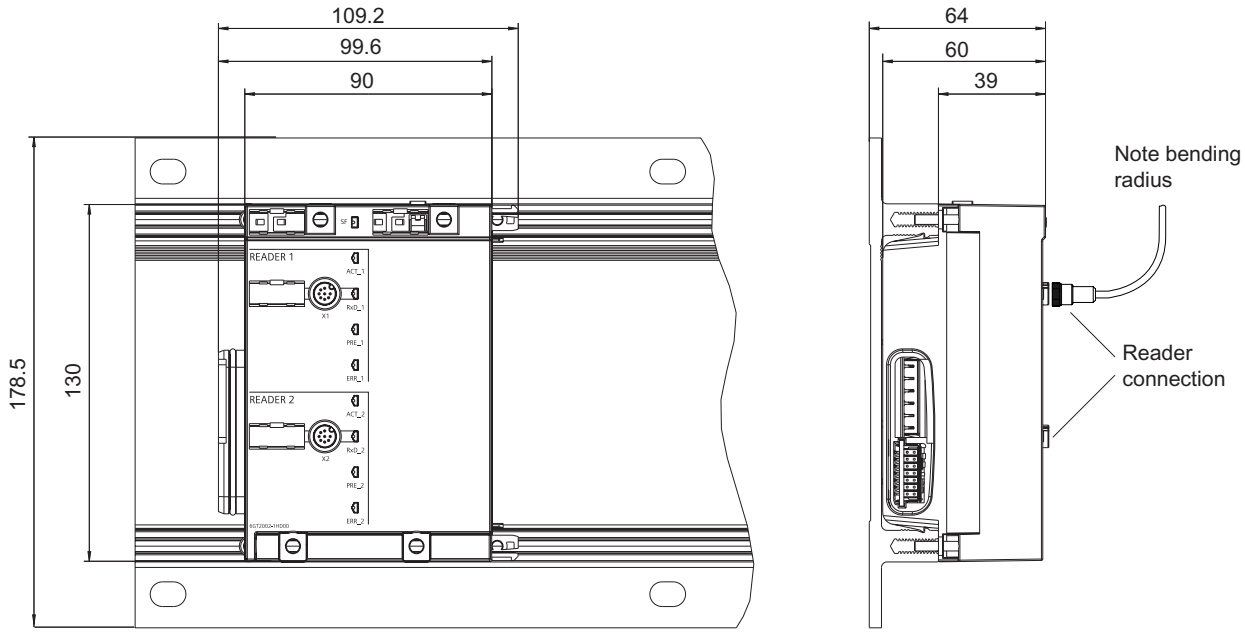



Figure 10-1 Dimension drawing for RF170C communication module with connection module on mounting rack, narrow

# Connecting cables

# 11

## 11.1 Routing of standard cables

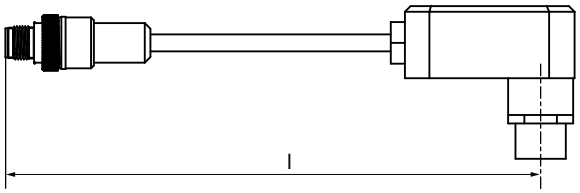



Figure 11-1 Connecting cable M12 ↔ SLG; l = 2 m, 5 m (MOBY I/E/U)

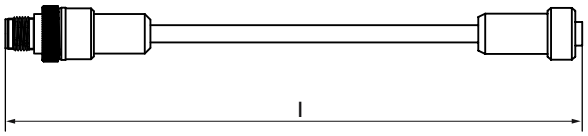



Figure 11-2 Connecting cable/extension cable M12 ↔ M12; l = 2 m, 5 m, 10 m, 20 m, 50 m

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

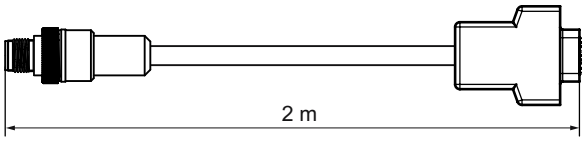



Figure 11-3 Connecting cable M12 ↔ sub-D (MOBY D)

### Maximum cable length

The RF170C can be operated with any reader / write/read device configuration with a maximum cable length of 50 m.
Longer connecting cables of up to 1000 m are possible in some instances. The current consumption of the connected reader/ write/read device must however be taken into account. You will find information in the relevant system manuals.
Sequential arrangement of more than 2 sub-sections to form a long section of cable should be avoided due to the additional contact resistances.

## Pin assignment

Table 11- 1 Connecting cable M12 ↔ write/read device

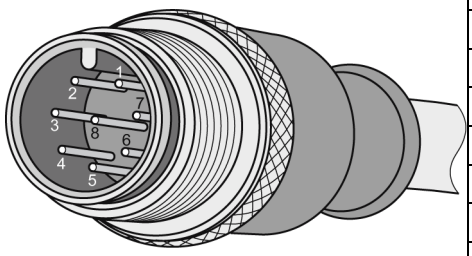
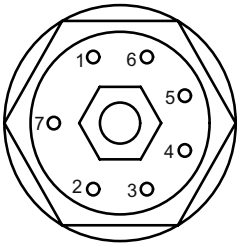
| M12 connector (male) | | Write/read device connector (female) | |
|---|---|---|---|
|  | 1 | 2 |  |
| | 2 | 5 | |
| | 3 | 3 | |
| | 4 | 4 | |
| | 5 | 6 | |
| | 6 | 1 | |
| | 7 | – | |
| | 8 | 7 | |

Table 11- 2 Connecting cable/extension cable M12 ↔ M12

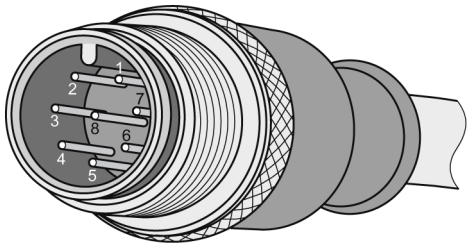
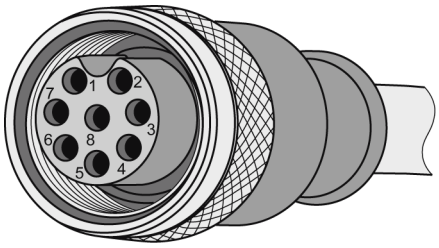
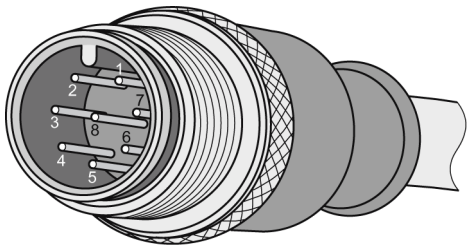
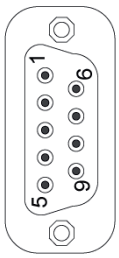
| M12 connector (male) | | M12 connector (female) | |
|---|---|---|---|
|  | 1 | 1 |  |
| | 2 | 2 | |
| | 3 | 3 | |
| | 4 | 4 | |
| | 5 | 5 | |
| | 6 | 6 | |
| | 7 | 7 | |
| | 8 | 8 | |

Table 11- 3 Connecting cable M12 ↔ sub-D 9-pin

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

Note:
Reader with Sub-D connector must be supplied over an additional connector with 24 V DC.

## 11.2 Self-assembled cables

A reader/ write/read device connector plug with screw terminals is provided for users who want to individually pre-assemble their own cables (refer to the relevant system manual). Cables and reader / write/read device connector plugs can be ordered from the Catalog *FS 10 Factory Automation Sensors*.

### Cable structure

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

7 x 0.25 $mm^2$
LiYC11Y 7 x 0.25

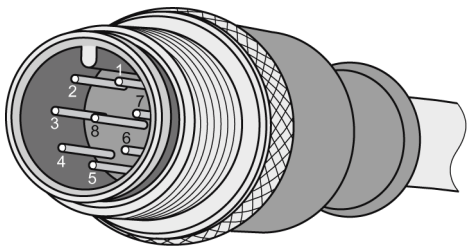
### Connectors

M12 connectors can be obtained from the relevant specialist dealers (e.g. Binder).

### Pin assignment

The pin assignment is listed in the following table.

Table 11- 4 Pin assignment

| M12 connector (male) | Pin | Signal | Core color |
|---|---|---|---|
|  | 1 | +24 V | Note data sheet provided by cable manufacturer |
| | 2 | −RxD | |
| | 3 | 0 V | |
| | 4 | RxD | |
| | 5 | TxD | |
| | 6 | −TxD | |
| | 7 | Free | |
| | 8 | PE / shield | |

# Order numbers

# 12

## 12.1 RF170C order numbers

### Communication module and connection module

Table 12- 1 Communication module and connection module order numbers

| Name | Order number |
|---|---|
| RF170C communication module, 1 unit | 6GT2002-0HD00 |
| RF170C connection module, 1 unit | 6GT2002-1HD00 |

### RF170C connection module accessories

Table 12- 2 Order numbers for RF170C connection module accessories

| Name | | Order number |
|---|---|---|
| Write/read device cable MOBY I / E / U | 2.0 m | 6GT2091-0FH20 |
| | 5.0 m | 6GT2091-0FH50 |
| Write/read device cable MOBY D | 2.0 m | 6GT2691-0FH20 |
| Reader cable RF300, RF600 extension cable RF300/RF600/MOBY I/E/U/D | 2.0 m | 6GT2891-0FH20 |
| | 5.0 m | 6GT2891-0FH50 |
| | 10.0 m | 6GT2891-0FN10 |
| | 20.0 m | 6GT2891-0FN20 |
| | 50.0 m | 6GT2891-0FN50 |
| Reader cable RF300; connector on the reader is angled | 2 m | 6GT2891-0JH20 |

# 12.2 Order numbers of ET 200pro accessories (extract)

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

- in the *ET 200pro Distributed I/O device* operating instructions, or
- the *Catalog IK PI - Industrial Communication for Automation and Drives*.

## ET 200pro accessories

Table 12- 3 Order numbers of ET 200pro accessories

| Name | Order number |
|---|---|
| Rack, narrow type, length 500 mm (ready for installation), 1 unit | 6ES7194-4GA00-0AA0 |
| Rack, narrow type, length 1000 mm (ready for installation), 1 unit | 6ES7194-4GA10-0AA0 |
| IM154-1 DP interface module with terminating module, 1 unit | 6ES7154-1AA00-0AB0 |
| IM 154-2 PN High Feature interface module with terminating module, 1 unit | 6ES7154-2AA00-0AB0 |
| Interface module IM 154-4 PN High Feature with terminating module, 1 unit | 6ES7154-4AB00-0AB0 |
| CM IM DP Direct, 1 unit | 6ES7194-4AC00-0AA0 |
| CM IM DP ECOFAST Cu, 1 unit | 6ES7194-4AA00-0AA0 |
| CM IM DP M12 / 7/8", 1 unit | 6ES7194-4AD00-0AA0 |
| Labels<br>20 x 7 mm, pale turquoise, 340 items per pack | 3RT1900-1SB20 |

## Accessories for connection module CM IM DP Direct

Table 12- 4 Accessories CM IM DP Direct connection module, order numbers

| Name | Order number |
|---|---|
| PB Hybrid Robust Cable<br>PUR sheath, 4-wire, suitable for cable carriers<br>Sold by meter, min. ordering quantity 20 m<br>Delivery unit max. 1000 m, 1 m | 6XV1860-2S |
| PROFIBUS FC cable<br>FC robust cable (PUR sheath)<br>Sold by meter, min. ordering quantity 20 m<br>Delivery unit max. 1000 m, 1 m | 6XV1830-0JH10 |
| Energy Cable<br>Power cable, suitable for cable carriers, 5 x 1.5 $mm^2$<br>Sold by meter, min. ordering quantity 20 m,<br>Delivery unit max. 1000 m, 1 m | 6XV1830-8AH10 |

## Accessories for connection module CM IM DP ECOFAST Cu

Table 12- 5 Accessories for connection module CM IM DP ECOFAST Cu

| Name | | Order number |
|---|---|---|
| PROFIBUS ECOFAST Hybrid Cable<br>suitable for cable carriers (PUR sheath), with 2 shielded Cu wires for PROFIBUS DP and 4 Cu wires 1.5 mm²<br>• Pre-assembled at both ends with ECOFAST Hybrid Plug 180, fixed lengths, 1 unit | 1.5 m | 6XV1830-7BH15 |
| | 3.0 m | 6XV1830-7BH30 |
| | 5.0 m | 6XV1830-7BH50 |
| | 10.0 m | 6XV1830-7BN10 |
| | 15.0 m | 6XV1830-7BN15 |
| | 20.0 m | 6XV1830-7BN20 |
| | 25.0 m | 6XV1830-7BN25 |
| | 30.0 m | 6XV1830-7BN30 |
| | 35.0 m | 6XV1830-7BN35 |
| | 40.0 m | 6XV1830-7BN40 |
| | 45.0 m | 6XV1830-7BN45 |
| | 50.0 m | 6XV1830-7BN50 |
| **Non-assembled cables and connectors:** | | |
| PROFIBUS ECOFAST Hybrid Plug 180 (ECOFAST Cu), with female insert (Hanbrid connector)<br>5 items/package, 1 unit | | 6GK1905-0CB00 |
| PROFIBUS ECOFAST Hybrid Plug 180 (ECOFAST Cu), with male insert (Hanbrid connector)<br>5 items/package, 1 unit | | 6GK1905-0CA00 |
| PROFIBUS ECOFAST Hybrid Cable<br>suitable for cable carriers (PUR sheath), with 2 shielded Cu wires for PROFIBUS DP and 4 Cu wires 1.5 mm²<br>Non-assembled cable<br>Cable coil, 1 unit<br>for further lengths, refer to catalog *IK PI* | 123,456 mm | 6XV1830-7AN50 |
| | 100.0 m | 6XV1830-7AT10 |
| Protective caps for unused ECOFAST sockets, 10 items/package, 1 unit | | 6ES7194-1JB10-0XA0 |

## Accessories for connection module CM IM DP M12, 7/8"

Table 12- 6 Accessories for connection module CM IM DP M12, 7/8", order numbers

| Name | | Order number |
|---|---|---|
| PROFIBUS M12 patch cable<br>suitable for cable carriers, 2-wire<br>• patch cable with PROFIBUS M12 connectors 180 at both ends, fixed lengths, 1 unit: | 1.5 m | 6XV1830-3DH15 |
| | 2.0 m | 6XV1830-3DH20 |
| | 3.0 m | 6XV1830-3DH30 |
| | 5.0 m | 6XV1830-3DH50 |
| | 10.0 m | 6XV1830-3DN10 |
| | 15.0 m | 6XV1830-3DN15 |
| 7/8" power patch cable<br>suitable for cable carriers, 5 x 1.5 $mm^2$,<br>• patch cable with 7/8" connectors 180 at both ends, fixed lengths, 1 unit: | 1.5 m | 6XV1822-5BH15 |
| | 2.0 m | 6XV1822-5BH20 |
| | 3.0 m | 6XV1822-5BH30 |
| | 5.0 m | 6XV1822-5BH50 |
| | 10.0 m | 6XV1822-5BN10 |
| | 15.0 m | 6XV1822-5BN15 |
| Non-assembled cables and connectors: | | |
| PROFIBUS M12 connector, male insert<br>5 items/package | | 6GK1905-0EA00 |
| PROFIBUS M12 connector, female insert<br>5 items/package | | 6GK1905-0EB00 |
| 7/8" connector (screw technique), male insert<br>5 items/package | | 6GK1905-0FA00 |
| 7/8" connector (screw technique), female insert<br>5 items/package | | 6GK1905-0FB00 |
| PROFIBUS FC cable<br>FC robust cable (PUR sheath)<br>Sold by meter, min. ordering quantity 20 m,<br>Delivery unit max. 1000 m, 1 m | | 6XV1830-0JH10 |
| Energy Cable<br>power cable suitable for cable carriers, 5 x 1.5 $mm^2$<br>Sold by meter, min. ordering quantity 20 m,<br>Delivery unit max. 1000 m, 1 m | | 6XV1830-8AH10 |
| M12 caps<br>10 items/package, 10 items | | 3RX9802-0AA00 |
| 7/8" caps<br>10 items/package, 1 unit | | 6ES7194-3JA00-0AA0 |

## Accessories for IM 154-4 PN High Feature interface module

Table 12- 7 Accessories for the IM 154-4 PN High Feature interface module, order numbers

| Name | | Order number |
|---|---|---|
| PROFIBUS IE M12 patch cable<br>suitable for cable carriers<br>• patch cable with PROFIBUS M12 connectors 180 at both ends, fixed lengths, 1 unit: | 0.3 m | 6XV1870-8AE30 |
| | 0.5 m | 6XV1870-8AE50 |
| | 1.0 m | 6XV1870-8AH10 |
| | 1.5 m | 6XV1870-8AH15 |
| | 2.0 m | 6XV1870-8AH20 |
| | 3.0 m | 6XV1870-8AH30 |
| | 5.0 m | 6XV1870-8AH50 |
| | 10.0 m | 6XV1870-8AN10 |
| | 15.0 m | 6XV1870-8AN15 |
| 7/8" power patch cable<br>suitable for cable carriers, 5 x 1.5 $mm^2$,<br>• patch cable with 7/8" connectors 180 at both ends, fixed lengths, 1 unit: | 1.5 m | 6XV1822-5BH15 |
| | 2.0 m | 6XV1822-5BH20 |
| | 3.0 m | 6XV1822-5BH30 |
| | 5.0 m | 6XV1822-5BH50 |
| | 10.0 m | 6XV1822-5BN10 |
| | 15.0 m | 6XV1822-5BN15 |
| M12 caps<br>10 items/package, 10 items | | 3RX9802-0AA00 |
| 7/8" caps<br>10 items/package, 1 unit | | 6ES7194-3JA00-0AA0 |
| SIMATIC Micro Memory Card 128k | | 6ES7953-8LG11-0AA0 |

## 12.3 Other order numbers

### SIMATIC manual collection

| Name | Order number | Contents |
|---|---|---|
| *SIMATIC manual collection* | 6ES7998-8XC01-8YE0 | Contains all SIMATIC manuals in electronic format |

### RFID accessories

| Name | Order number | Contents |
|---|---|---|
| CD *RFID Systems Software & Documentation* | 6GT2080-2AA10 | • FBs/FCs for SIMATIC<br>• 3964R driver for DOS/Windows 95/NT/2000/XP<br>• C libraries<br>• PC demo program<br>• RFID documentation<br>• Throughput calculation tool |

# Service & Support

# 13

## Technical support

The technical support specialists advise and assist customers by responding to their queries on the functions of our RFID products and how to work with them.

You can reach us worldwide Mon. to Fri. during office hours: 8 a.m. - 5 p.m. CET on:

| | |
|---|---|
| Telephone: | ++49 (0) 180 5050-222 |
| Fax: | ++49 (0) 180 5050-223 |

## Internet

Visit our site on the Internet at:

`http://www.siemens.com/automation/service&support`

You can send a support query to:

`http://www.siemens.com/automation/support-request`

General information on new features of the RF170C and an overview of our other identification systems can be found on the Internet at:

`http://www.siemens.com/simatic-sensors/rfid`

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