

ID 200, Function Blocks
Siemens S7 PROFIBUS / PROFINET

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Programming Manual



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This manual was originally written in German.

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1 About this manual

This manual provides a brief guide to commissioning of the communication module ID 200 on a SIMATIC S7 (Step7) controller via PROFIBUS or PROFINET.

- ▶ Be sure to read this manual thoroughly. Familiarize yourself with the communication module before assembling, installing and starting to use it.
- ▶ Pay particular attention to the "Basic safety instructions" chapter when working with the device.

1.1 Other useful documentation

- ▶ Refer to the underlying user manuals "ID 200 PROFIBUS" 3 842 540 398 (ID 200/C-PDP) and "ID 200 Ethernet" 3 842 540 400 (ID 200/C-ETH).
- ▶ Please also note the instructions for the other system components.
- ▶ Furthermore, please adhere to all generally applicable, statutory and otherwise binding regulations under European or national law, as well as regulations pertaining to accident prevention and protection of the environment.

2 Declaration of Conformity

CE conformity: This product was developed and manufactured in accordance with applicable European standards and directives. A Declaration of Conformity can be requested from the manufacturer.



The manufacturer of this product has a quality assurance system that is certified to ISO 9001.

3 Basic safety information

The device was manufactured in accordance with generally recognized technical rules and standards. There is nevertheless a risk of personal injury or damage to property if you fail to observe the following basic safety instructions.

Read this manual thoroughly and completely before starting to use the device. Always pass on the manual together with the device when transferring it to third parties.

3.1 Proper use

The ID 200/C-... is a communication module for identification systems, and has PROFIBUS and Ethernet interfaces. You can use the device as a cabinet module or for field applications. You can connect suitable inductive antennas, microwave antennas or trigger sensors to the

ID 200/C-.... When doing so, you must use cabling that is suitable for the system design.

The device is a component (sub-assembly) under the terms of the EU Machinery Directive 98/37/EC. It is not a ready-to-use complete machine under the terms of the EU Machinery Directive. The product/component is designed solely to be installed in a machine or system, or to be joined with other components to form a machine or system. The product may only be put into operation once it has been installed in the machine/system for which it is intended, and this machine/system fully satisfies the requirements of the EU Machinery Directive.

Adhere to the operating conditions and operating limits specified in the technical data.

The device is an item of technical equipment and not intended for private use.

Proper use also requires that you have fully read and understood this manual, particularly the section "Basic safety information".

3.2 Improper use

Non-regulation use means that you are using the device for purposes other than those specified in the "Regulation use" chapter.

3.3 Qualification of personnel

Assembly, commissioning, operation, disassembly and maintenance (including service and care) require basic computer skills and knowledge of the relevant specialist terms. Therefore, in order to guarantee operational safety, the above activities may only be performed by a qualified specialist or an instructed person under the guidance of a specialist.

Specialist personnel in this context refers to personnel who, based on their professional training, knowledge and experience, as well as by virtue of their familiarity with the relevant rules and regulations, are able to assess the work assigned to them, identify potential dangers and take appropriate safety precautions. Specialist personnel must comply with the relevant technical rules and regulations.

3.4 Duties of the owner

The owner of products from Bosch Rexroth must regularly train his personnel in the following areas:

- Compliance with and use of the operating instructions and legal provisions
- Proper use of the Bosch Rexroth product
- Compliance with health and safety instructions and the owner's work instructions
- What to do in an emergency



Bosch Rexroth offers supportive training measures in specific fields. You can find an overview of available course contents on the Internet at <http://www.boschrexroth.de/didactic>.

4 Setting device parameters, ID 200/C-PDP (PROFIBUS)

The device parameters are set after integration of the GSD file in the Hardware Manager of the Step7 tools. By doubleclicking on the device icon of the ID 200, the following window opens:

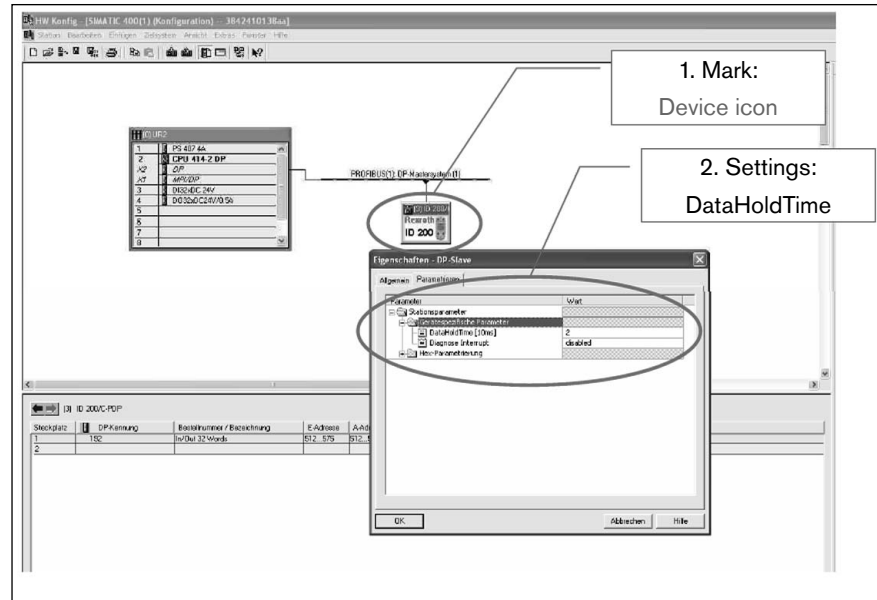


Fig. 1

The device-specific parameter "Data Hold Time" (DHT) describes the data hold time within the output data field of the ID 200.

The default setting of the data hold time is "0". The data hold time is set in increments of 10 ms. The value range is 0 ... 2550 ms. Certain values mean that ID 200/C-PDP does not start the PROFIBUS communication. The LED BusError is illuminated and ID 200/C-PDP is not found by the controller. All "data hold time" values which displayed in binary code represent xxxx x1xx result in this error.

Permissible values are 0, 1, 2, 3, 8, 9, 10, 11, 16, 17, 18, ...

Non-permissible values are 4, 5, 6, 7, 12, 13, 14, 15, 20, 21, 22, ...

The DHT should have double the value of the controller's cycle time.

5 Setting device parameters, ID 200/C-ETH (PROFINET)

Once the associated GSDML file is integrated, the device parameters of the ID 200/C-ETH can be configured. By marking the associated device icon followed by right-clicking on slot 0 of the I/O table, the following window is opened:

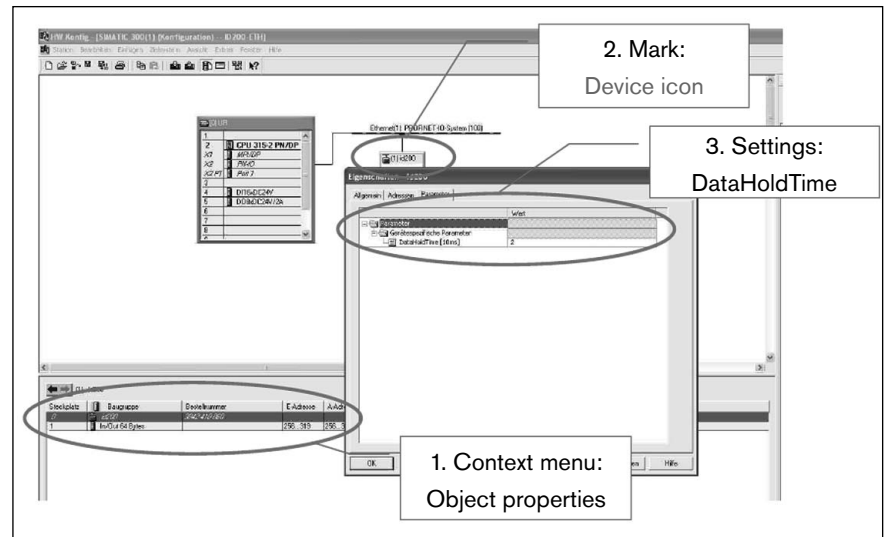


Fig. 2

- ▶ Analog to the PROFIBUS communication module ID 200/C-PDP, the device-specific parameter “Data Hold Time” (DHT) describes the data hold time within the output data field of the ID 200.
The DHT should have double the value of the controller's cycle time.
For PROFIBUS the DHT values are limited, see chapter 4. This does not apply to PROFINET.
- ▶ A PROFINET name must be assigned to the participant. By doubleclicking on the device icon of the ID 200, the following dialog opens:

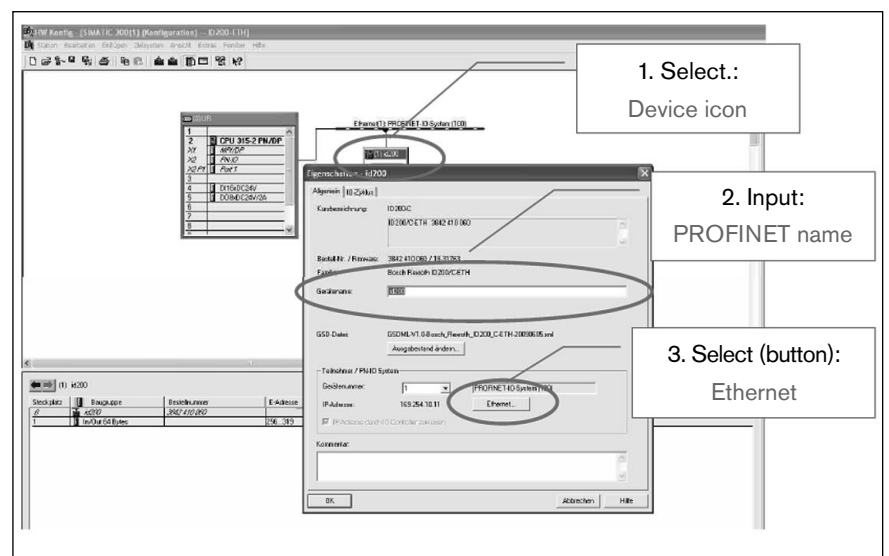


Fig. 3

- ▶ The IP address of the participant can be changed with the “Ethernet” button.

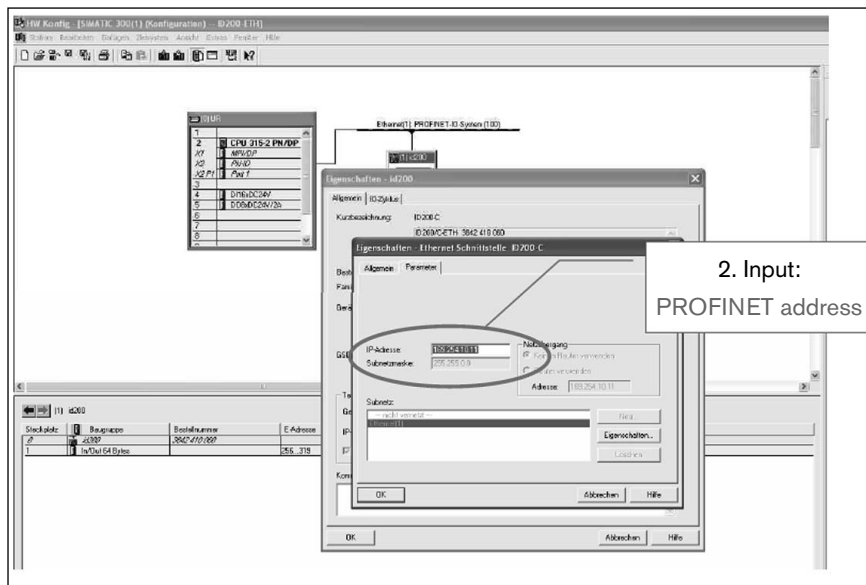


Fig. 4

- The details in the PROFINET name and IP address in the Step7 project work must precisely match the settings in the web interface of the ID 200/C-ETH. The respective procedure for configuring the PROFINET name and IP address in the web interface can be found in the associated user manual of the ID 200/C-ETH.

6 Request Siemens FB32 (version 2.1) ID 200

The following illustration shows the function block request in STEP7 for controlling the communication module ID 200. The function block can be used for the communication module ID 200/C-PDP (PROFIBUS), as well as for the communication module ID 200/C-ETH (PROFINET).

```
CALL "ID200" , "InstDB"
  IC_INPUT_Address      :=W#16#200
  IC_OUTPUT_Address    :=W#16#200
  Length_IN            :=64
  Length_OUT           :=64
  Timeout              :=T#2S
  Head1DataFixcode     :="Head1DataFixcode"
  Head2DataFixcode     :="Head2DataFixcode"
  Head1SingleEnhanced :="Head1SingleEnhanced"
  Head2SingleEnhanced :="Head2SingleEnhanced"
  Head1SpecialCommand :="Head1SpecialCommand"
  Head2SpecialCommand :="Head2SpecialCommand"
  Head1Read            :="Head1Read"
  Head2Read           :="Head2Read"
  Head1Write          :="Head1Write"
  Head2Write          :="Head2Write"
  Head1Quit           :="Head1Quit"
  Head2Quit           :="Head2Quit"
  QuitErrorHead1      :="QuitErrorHead1"
  QuitErrorHead2      :="QuitErrorHead2"
  IC_Command_on_Head1:= "IC_Command_on_Head1"
  Head1WordNum        :=4
  Head2WordNum        :=4
  Head1WordAddress    :=W#16#0
  Head2WordAddress    :=W#16#0
  Head1TagType        :=W#16#3333
  Head2TagType        :=W#16#3333
  Head1Done           :="Head1Done"
  Head2Done           :="Head2Done"
  Head1NoDataCarrier :="Head1NoDataCarrier"
  Head2NoDataCarrier :="Head2NoDataCarrier"
  Head1Error          :="Head1Error"
  Head2Error          :="Head2Error"
  Head1Busy           :="Head1Busy"
  Head2Busy           :="Head2Busy"
  Head1Status         :=
  Head2Status         :=
  Head1ReplyCounter   :=
  Head2ReplyCounter   :=
  InitFinish          :="InitFinish"
  SetRestart          :="SetRestart"
```

Fig. 5

7 Parameter description

Function block request ID 200

Name	Data type	Function
IC_INPUT_Address	WORD	Start address of the communication module in the process image of the inputs (I-address) => Specification see Hardware Manager
IC_OUTPUT_Address	WORD	Start address of the communication module in the process image of the outputs (O-address) => Specification see Hardware Manager
Length_IN	INT	Length of the input image in byte (length of the PROFIBUS telegrams received) => Specification see Hardware Manager
Length_OUT	INT	Length of the output image in byte (length of the PROFIBUS telegrams sent) => Specification see Hardware Manager
Timeout	TIME	Timer for monitoring the response time of the communication module
Head1DataFixcode	BOOL	Access antenna 1 to 0:=data range 1:=Fixcode
Head2DataFixcode	BOOL	Access antenna 2 to 0:=data range 1:=Fixcode
Head1SingleEnhanced	BOOL	Execution on antenna 1 of 0:=Single 1:=Enhanced command
Head2SingleEnhanced	BOOL	Execution on antenna 2 of 0:=Single 1:=Enhanced command
Head1SpecialCommand	BOOL	Execution SpecialCommand on antenna 1 (edge positive); specify command parameters beforehand in structure Head_1.SpecialCommand; useful data received can be found in structure Head_1.InData
Head2SpecialCommand	BOOL	Execution SpecialCommand on antenna 2 (edge positive); specify command parameters beforehand in structure Head_2.SpecialCommand; useful data received can be found in structure Head_2.InData
Head1Read	BOOL	Execution Read command on antenna 1 (edge positive); specify command parameters Head1WordNum and Head1WordAddress; useful data received can be found in structure Head_1.InData
Head2Read	BOOL	Execution Read command on antenna 2 (edge positive); specify command parameters Head2WordNum and Head2WordAddress; useful data received can be found in structure Head_2.InData
Head1Write	BOOL	Execution Write command on antenna 1 (edge positive); specify command parameters Head1WordNum and Head1WordAddress; specify attributing useful data beforehand in structure Head_1.OutData.DW1...15
Head2Write	BOOL	Execution Write command on antenna 2 (edge positive); specify command parameters Head2WordNum and Head2WordAddress; specify attributing useful data beforehand in structure Head_2.OutData.DW1...15
Head1Quit	BOOL	Execution Quit command on antenna 1 (edge positive) to cancel an Enhanced command

Name	Data type	Function
Head2Quit	BOOL	Execution Quit command on antenna 2 (edge positive) to cancel an Enhanced command
QuitErrorHead1	BOOL	Acknowledge error on antenna 1 (edge positive)
QuitErrorHead2	BOOL	Acknowledge error on antenna 2 (edge positive)
ID200_Command_Head1	BOOL	Execution of a SpecialCommand of the communication module (edge positive); command is sent to antenna 1; specify command parameters beforehand in structure Head_1.SpecialCommand; useful data received can be found in structure Head_1.InData
Head1WordNum	INT	Number of data blocks addressed on antenna 1 (value depends on the planned I/O module in the Hardware Manager and the tag type used)
Head2WordNum	INT	Number of data blocks addressed on antenna 2 (value depends on the planned I/O module in the Hardware Manager and the tag type used)
Head1WordAddress	WORD	Start address of the memory area of the data tag addressed on antenna 1
Head2WordAddress	WORD	Start address of the memory area of the data tag addressed on antenna 2
Head1TagType	WORD	Data tag type antenna 1 (enter value in HEX format => see table data tag types)
Head2TagType	WORD	Data tag type antenna 2 (enter value in HEX format => see table data tag types)
Head1Done	BOOL	New data available on antenna 1 (Enhanced command) or command quit (i.a. Single command)
Head2Done	BOOL	New data available on antenna 2 (Enhanced command) or command quit (i.a. Single command)
Head1NoDataCarrier	BOOL	No data tag available at command execution time on antenna 1
Head2NoDataCarrier	BOOL	No data tag available at command execution time on antenna 2
Head1Status	Byte	Status antenna 1
Head2Status	Byte	Status antenna 2
Head1ReplyCounter	Byte	Response counter number of telegrams of communication module antenna 1
Head2ReplyCounter	Byte	Response counter number of telegrams of communication module antenna 2
InitFinish	BOOL	Initialization finished (edge positive)
SetRestart	BOOL	Execution initialization communication module (edge positive) => Assignment must not permanently keep parameter at 0 or 1

Example for setting the I/O configuration:

In the hardware configuration (Hardware Manager), the I/O module "32In / 4 Out Words" is used for example. The process image of the inputs (I-address) starts with address 256 and ends with address 319 and thus has a length of 64 byte. The process image of the outputs (O-address) starts with address 512 and ends with address 519 (length: 8 bytes). This results in the following parameterization for the function block:

```

IC_INPUT_Address      :=W#16#100
IC_OUTPUT_Address     :=W#16#200
Length_IN              :=64
Length_OUT             :=8

```

Note:

Combined activation of the inputs "HeadxSingleEnhanced" and "HeadxWrite" is not permissible, as "Enhanced Write" commands are not supported (x = 1 or 2).

8 Table data tag types

Name	TagType	Access	Fixed code	Data	Frequency range	Frequency
MDTxx/28-L	"15" (ASCII) 3135 (HEX)	Read Fixcode Write Fixcode	5 Bytes			125kHz
MDTxx/112-H	"21" (ASCII) 3231 (HEX)	Read Fixcode Read Words Write Words	8 Bytes	112 Bytes	0000...001B (HEX)	13.56MHz
MDTxx/2K-H	"33" (ASCII) 3333 (HEX)	Read Fixcode Read Words Write Words	8 Bytes	2000 Bytes	0000...00F9 (HEX)	13.56MHz

9 Input/output data field ID 200

Following instantiation of the function block FB 32 (communication module ID 200 controller), amongst others an input as well as output data field are created in the associated data block per antenna. Assembly of the input or output data field is shown in the following illustration.

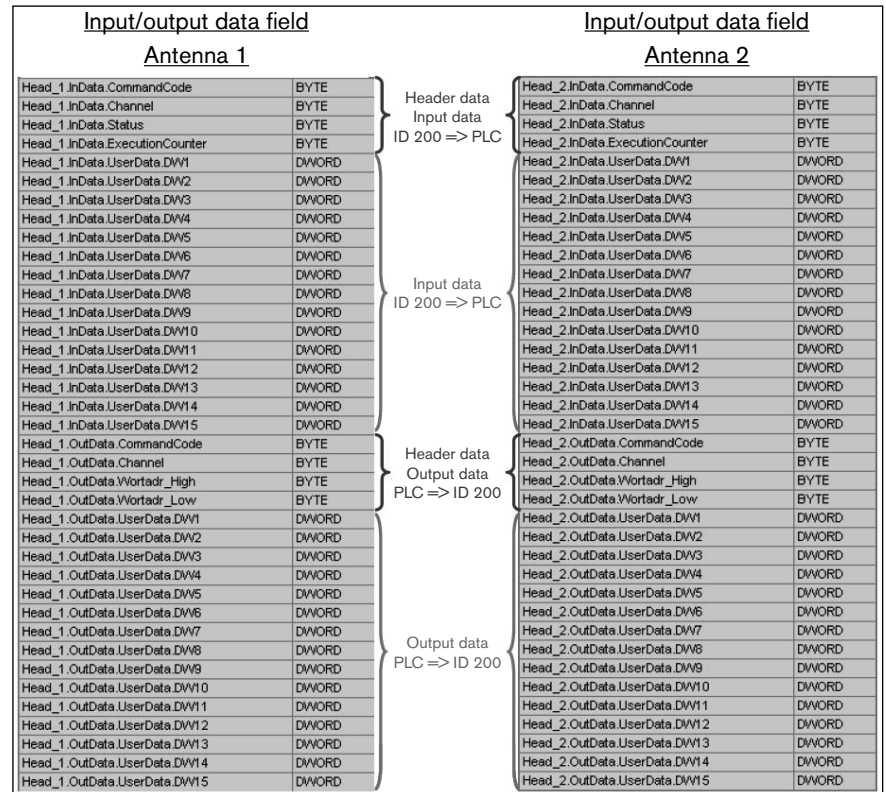


Fig. 6

The output data field of an antenna always consists of 4 byte header data as well as 60 byte useful data. Depending on the command and its associated parameters, the header data of the output field are described with values by the function block when actuating the control bits. Data originating from the PLC to be written to an MDT via ID 200 are to be entered in the output data before the command is executed. The input data field of an antenna also consists of 4 byte header data as well as 60 byte useful data. The header data of the input data field include the command response of ID 200, which are received by the PLC once a command is issued. The input data are only described by values if useful data or fixcode are read out from an MDT.

10 Special Command

With a special command a command can be parameterized independently. A special command can primarily be used to execute commands which cannot be executed with the existing control bits of the function block FB 32. Standard commands, e.g. single-read or single-write etc. can also be executed with a special command. Before a special command is executed, the command parameters must be handed over to a data field which is especially provided for this purpose within the instance data block (see the following illustration).

<u>Special Command</u> <u>Antenna 1</u>		<u>Special Command</u> <u>Antenna 2</u>	
Head_1.SpecialCommand.Code	BYTE	Head_2.SpecialCommand.Code	BYTE
Head_1.SpecialCommand.Channel	BYTE	Head_2.SpecialCommand.Channel	BYTE
Head_1.SpecialCommand.Parameter1	BYTE	Head_2.SpecialCommand.Parameter1	BYTE
Head_1.SpecialCommand.Parameter2	BYTE	Head_2.SpecialCommand.Parameter2	BYTE
Head_1.SpecialCommand.Parameter3	BYTE	Head_2.SpecialCommand.Parameter3	BYTE
Head_1.SpecialCommand.Parameter4	BYTE	Head_2.SpecialCommand.Parameter4	BYTE
Head_1.SpecialCommand.Parameter5	BYTE	Head_2.SpecialCommand.Parameter5	BYTE
Head_1.SpecialCommand.Parameter6	BYTE	Head_2.SpecialCommand.Parameter6	BYTE
Head_1.SpecialCommand.Parameter7	BYTE	Head_2.SpecialCommand.Parameter7	BYTE
Head_1.SpecialCommand.Parameter8	BYTE	Head_2.SpecialCommand.Parameter8	BYTE
Head_1.SpecialCommand.Parameter9	BYTE	Head_2.SpecialCommand.Parameter9	BYTE
Head_1.SpecialCommand.Parameter10	BYTE	Head_2.SpecialCommand.Parameter10	BYTE

Fig. 7

The special command is executed with a function block parameter "Head1SpecialCommand" or "Head2SpecialCommand". The associated command response is stored in the respective input data field. More information about the individual special commands can be found in the associated user manual of the PROFIBUS version (ID 200/C-PDP) or Ethernet version (ID 200/C-ETH).

11 Command execution and flowcharts

11.1 Initialization

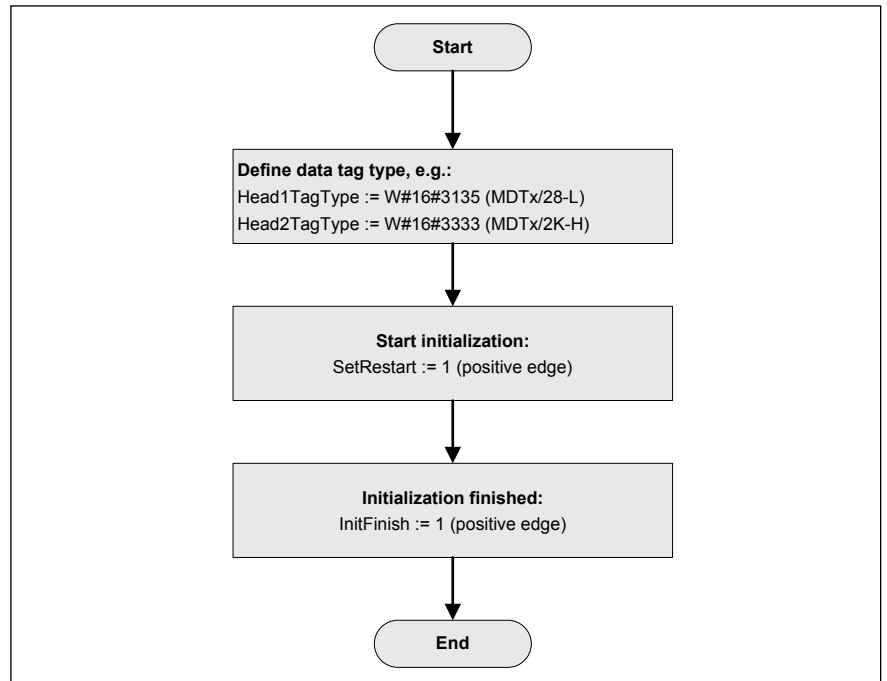


Fig. 8

Flowchart:

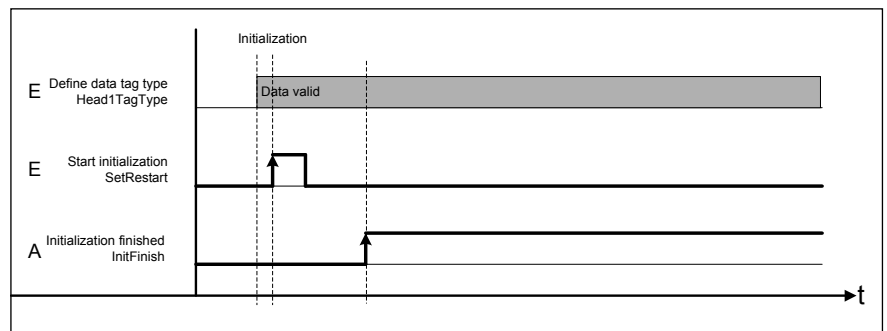


Fig. 9

Note: Initialization causes the antennae connected to the communication module ID 200 as well as the used MDT of the controller to be disclosed. Initialization is mandatory in order for the antennae to function correctly. If an antenna should be faulty or none is connected, the status (Head1/2Status):=0x06 is returned. If the parameterized data tag type (Head1/2TagType) does not match the connected antenna, the status (Head1/2Status) := 0x04 is returned.

More status messages can be found in the associated User Manual of the PROFIBUS- (ID 200/C-PDP) or Ethernet version (ID 200/C-ETH).

11.2 Single Read Data

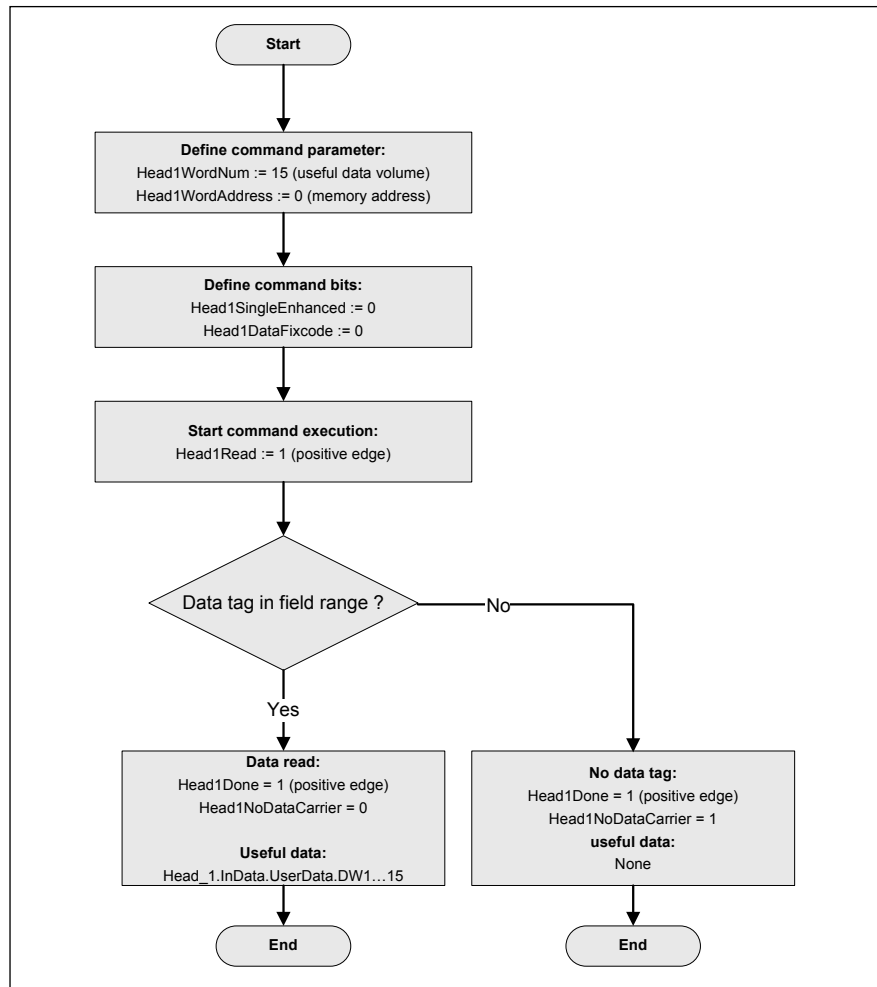


Fig. 10

Flowchart:

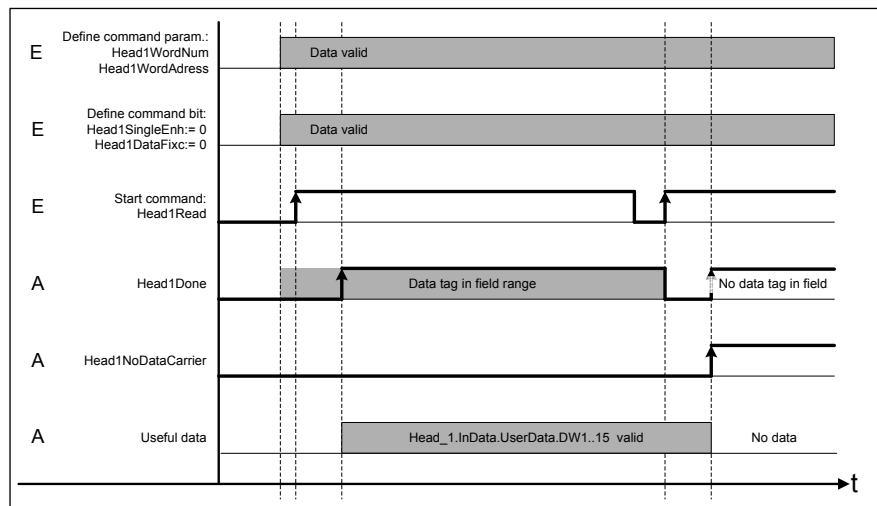


Fig. 11

Note: The "Single Read Data" command attempts once to read-in Head1/2WordNum data blocks from the address Head1/2WordAddress. The end of command execution is signaled by BitHead1/2Done = 1. If there is no data tag in the detection range of the respective antenna, the respective bit Head1/2NoDataCarrier is set. An error during command execution signals the respective error bit (Head1/2Error = 1).

When reading out MDT data to the PLC it must be ensured that the data range to be read in must be completely within the valid data range of the MDT.

Following successful execution of the command, the read-in useful data (Head_1. InData.UserData.DW1...15) can be processed further.

11.3 Single Write Data

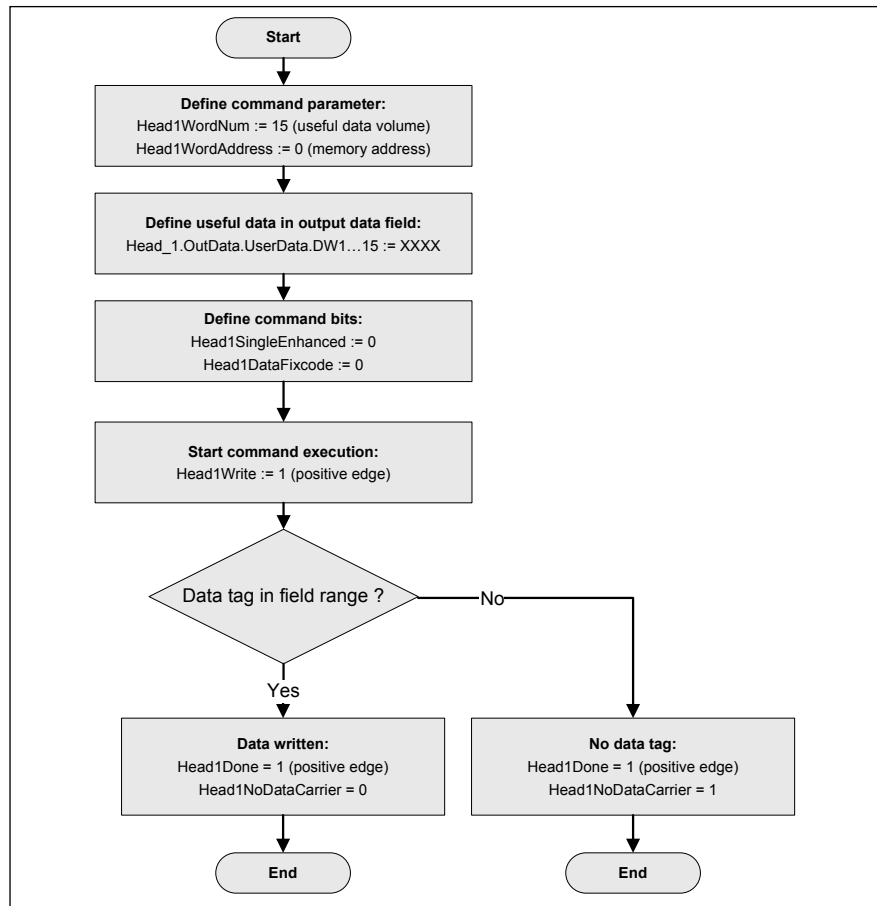


Fig. 12

Flowchart:

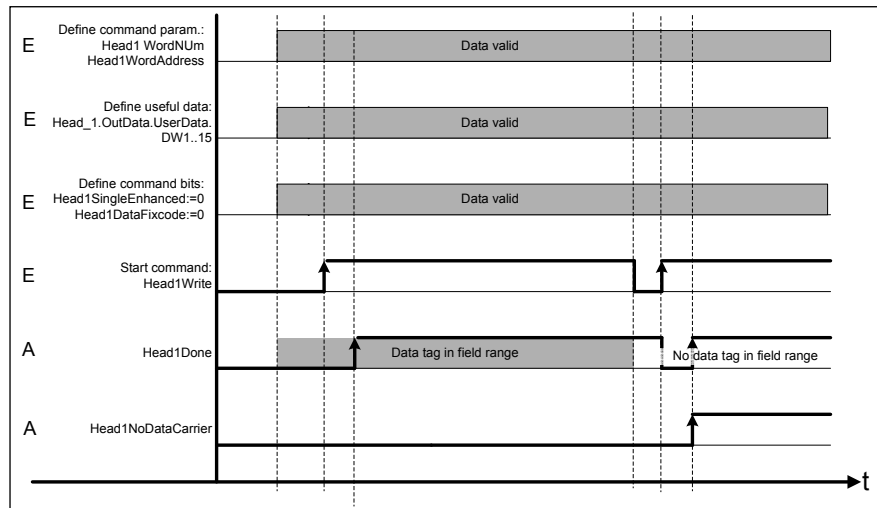


Fig. 13

Note:

The "Single Write Data" command attempts once to write Head1/2WordNum data blocks from the address Head1/2WordAddress to the mobile data tag. Before command execution (Head1/2Write) is started the useful data (Head_1.OutData. UserData.DW1...15) to be written must be entered. If there is no data tag in the detection range of the respective antenna, the respective bit Head1/2NoDataCarrier is set. An error during command execution signals the respective error bit (Head1/2Error = 1).

When writing data to the mobile data tags it must be ensured that the data to be written can be completely stored in the valid data range of the mobile data tags.

11.4 Enhanced Read Data

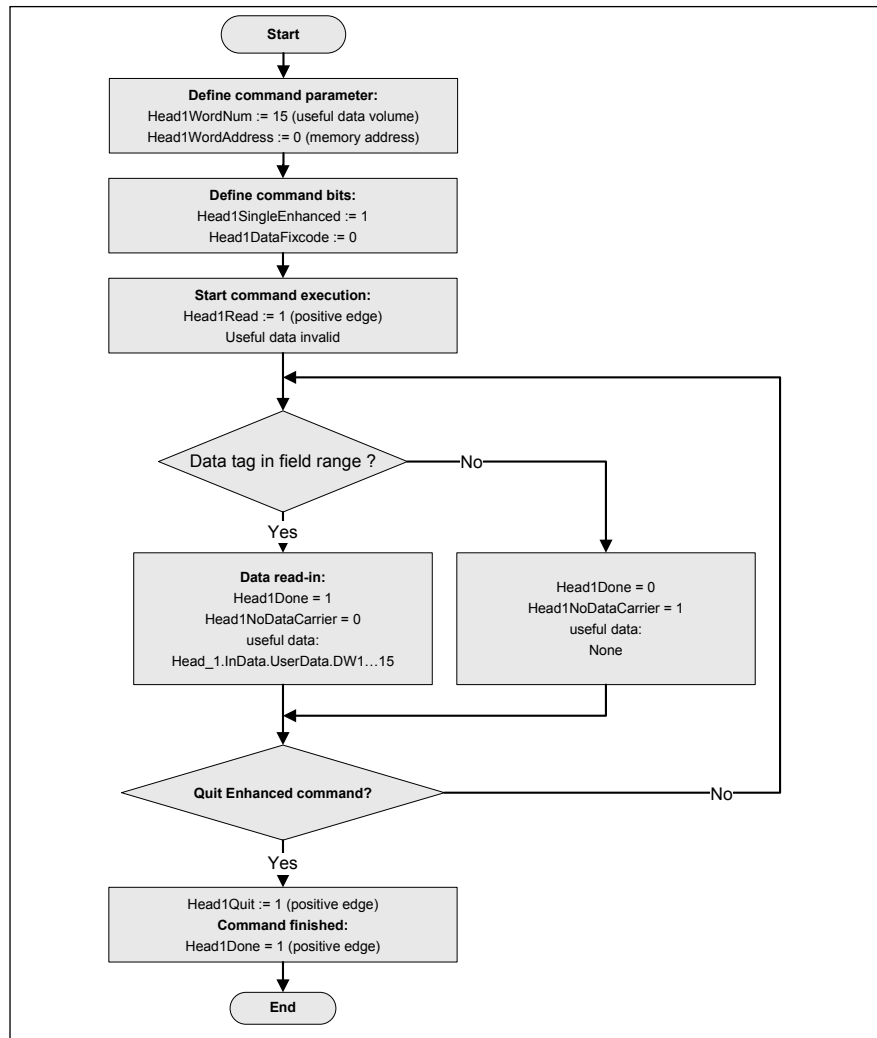


Fig. 14

Flowchart:

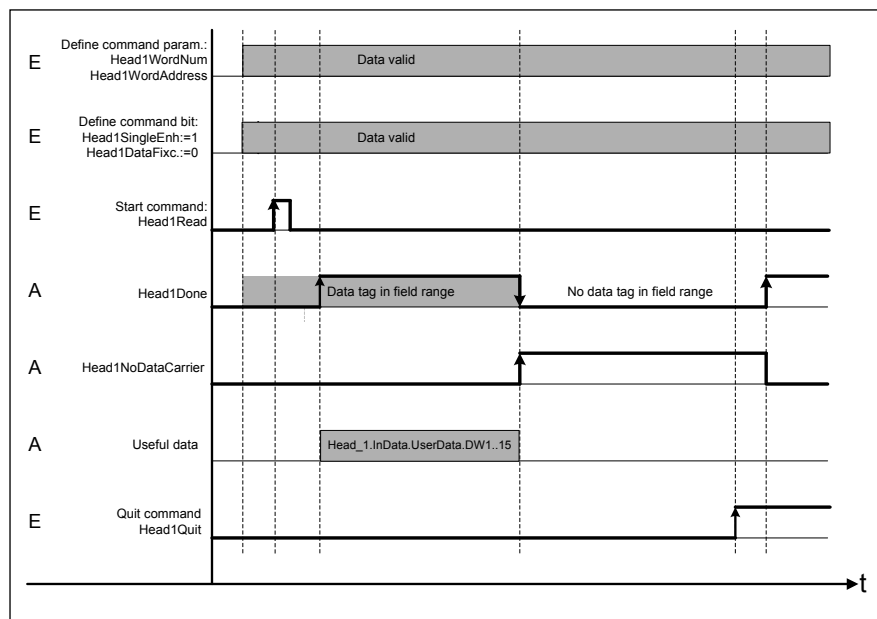


Fig. 15

Note: The "Enhanced Read Data" command attempts continuously to read-in Head1/2WordNum data blocks from the address Head1/2WordAddress. The command remains active until it is aborted by a Quit command (Head1/2Quit). The data are read in if a positive edge change of the respective Head1/2Done bit occurs with active Enhanced command. The read in useful data (Head_1.InData.UserData.DW1 ... 15) can now be further processed. The MDT has moved out of the detection range if there is a positive edge change at Head1/2NoDataCarrier with active Enhanced command.

11.5 Special Command

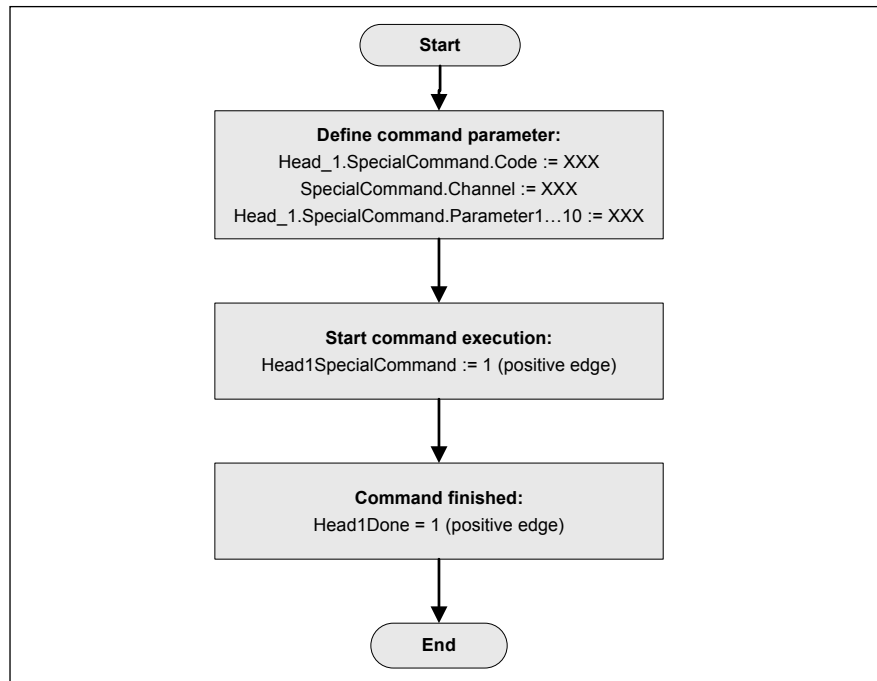


Fig. 16

Flowchart:

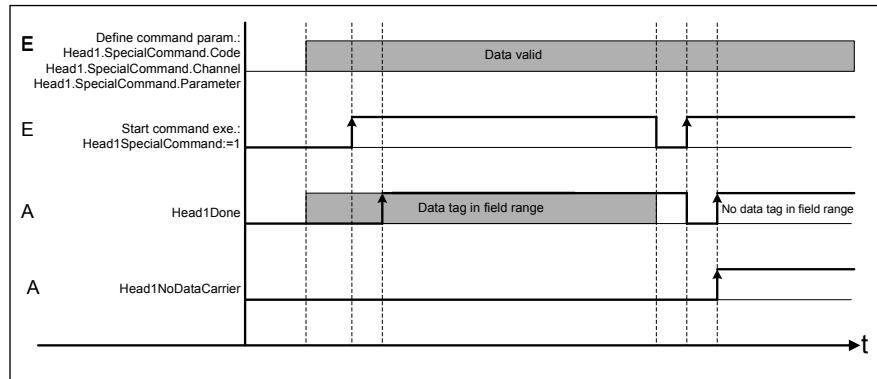


Fig. 17

Note:

The original special command "Enhanced Write Fixcode" is no longer supported.

