

ID 200, function modules  
Siemens TIA Portal

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EN

Version **1.0**

Programming manual



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This manual was created in German.

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# 1 About this manual

This manual is a brief guide to commissioning the ID 200 communication module on a Siemens control system using the TIA Portal.

- ▶ Please read this manual carefully. Familiarize yourself with the unit before assembling, installing and operating it.
- ▶ Read this entire document, especially the “Safety instructions” section, before using this unit.

## 1.1 Further documentation

This unit is a system component.

- ▶ Refer to the related user manuals “ID 200 PROFIBUS” 3 842 540 398 (ID 200/C-PDP) or “ID 200 Ethernet” 3 842 540 400 (ID 200/C-ETH).
- ▶ Also refer to the manuals for the other system components.
- ▶ In addition, observe any generally applicable legal or other compulsory regulations in European or national legislation as well as regulations on accident prevention and environmental protection.

# 2 Declaration of conformity

CE conformity: This product was designed and manufactured in accordance with applicable European and standards and guidelines. A declaration of conformity can be requested from the manufacturer.



The manufacturer of this product has an ISO 9001-certified quality assurance system.

# 3 General safety instructions

This unit has been manufactured using state-of-the-art technology. Nevertheless, there is a risk of personal injury and property damage if you do not observe the following basic safety instructions.

Read this manual thoroughly and completely before you start using the unit. Always include the manual when transferring this product to third parties.

### **3.1 Intended use**

The ID 200/C-... is a communication module for identification systems and features a PROFIBUS or Ethernet interface. You can use the unit as a control cabinet assembly or for field applications. You can connect compatible inductive antennas or trigger sensors to the ID 200/C-... In this case, you must use wiring that is compatible with the system concept.

The unit is a component (partial machine) in accordance with the EU Machinery Directive 2006/42/EC. It is not considered a machine that is ready for use according to the EU Machinery Directive. The product/component is designed solely to be installed in a machine or system or to be combined with other components to build a machine or system. The product may not be operated until it has been installed in the machine for which it is intended and the machine/system fully meets the requirements of the EU Machinery Directive.

Observe the operating conditions and performance limits in the technical specifications.

This unit is technical equipment and not intended for personal use.

Intended use also includes having read and understood this manual, especially the “Basic safety information” section.

### **3.2 Improper use**

It is considered improper use if you use the unit differently than described in the “Intended use” section.

### **3.3 Personnel qualification**

Basic IT skills and familiarity with IT terminology are required for assembly, commissioning and operation, disassembly, maintenance (including service and care). To ensure safe operation, these activities may only be performed by a specialist or personnel under the direction of a specialist.

“Specialist” refers to a person who can recognize potential hazards and take appropriate safety measures due to their technical training, knowledge and experience, and understanding of the relevant regulations pertaining to the work being performed. Qualified personnel must observe all relevant technical rules.

### 3.4 Owner obligations

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

- Observing and using operating instructions as well as legal requirements
- Intended operation of the Bosch Rexroth product
- Observing plant security instructions as well as the owner's operating instructions
- Behavior in case of emergency



Bosch Rexroth offers training to support activities in specific areas. You can find an overview of the training content online at <http://www.boschrexroth.de/didactic>.

## 4 Setting communication parameters via web interface

The ID 200 is not assigned to a **profinet devicename** by default. The name of the device can be set using the device web page.

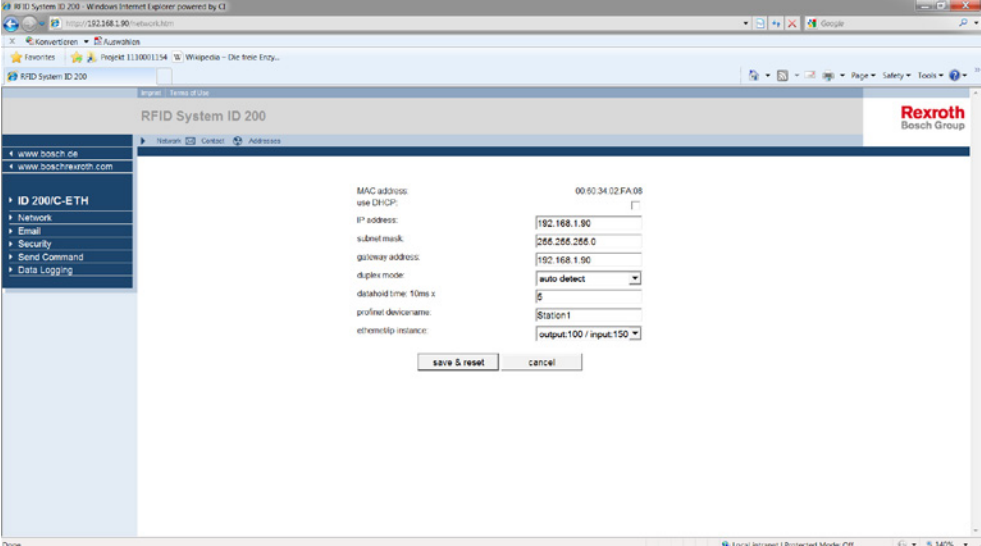
The default IP address is **169.254.10.12**.



The screenshot shows the web interface for the RFID System ID 200. The left sidebar contains a navigation menu with options: ID 200/C-ETH, Network, Email, Security, Send Command, and Data Logging. The main content area displays a table with device information and a small image of the physical unit.

Device	Information
Communication Module	Version: ID 200/C-ETH 3842 410 060 1831753 24.03.09
RFID CH1	Version: ID 200A-HR 3842 410 003 1831676 16.03.10 Operation: NOT ACTIVE Connect: CONNECTED TAG-Type: 33
RFID CH2	Version: - Operation: NOT ACTIVE Connect: NOT CONNECTED TAG-Type: 33

- **Communication parameters** and the **profinet devicename** can be parameterized under **Network**.



The screenshot shows the web interface for the RFID System ID 200, specifically the network configuration page. The left sidebar is the same as in the previous screenshot. The main content area displays various network parameters with input fields and dropdown menus.

MAC address:	00:60:34:02:FA:08
use DHCP:	<input type="checkbox"/>
IP address:	192.168.1.90
subnet mask:	255.255.255.0
gateway address:	192.168.1.90
duplex mode:	auto detect
distahold time: 10ms x	5
profinet devicename:	Station1
ethernet/ip instance:	output:100 / input:150

Buttons: save & reset, cancel

- Choose **save & reset** to copy the parameterization to the unit.

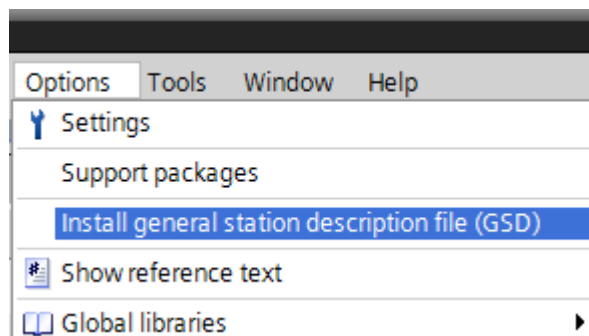
The unit then automatically restarts. The new configuration is activated once the rotary switch on the back side of the unit is set to position **0**.

## 5 Setting device parameters for ID 200/C-PDP (PROFIBUS)

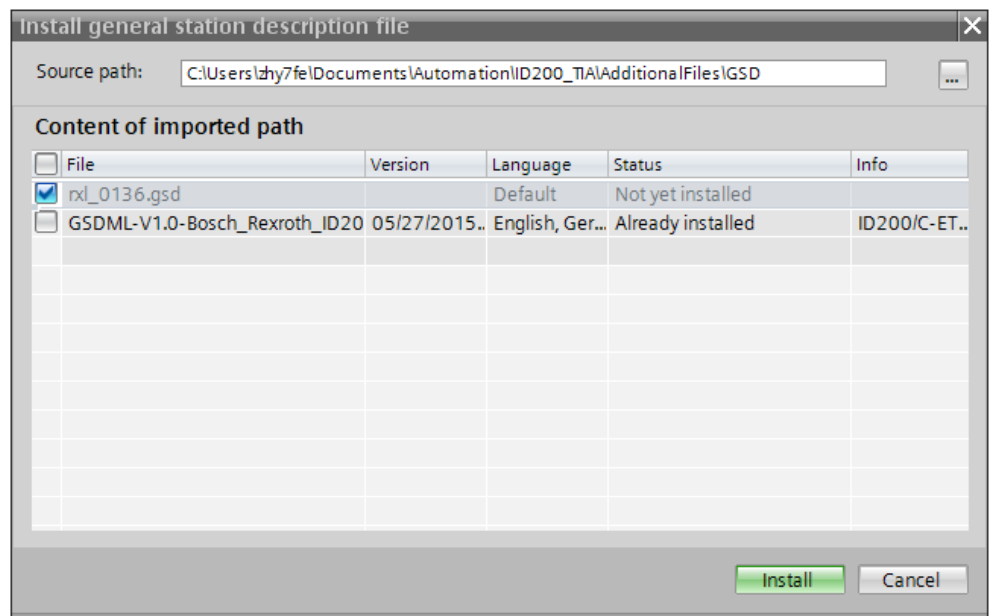
### 5.1 Installing the GSD file

The **GSD file** must be installed before commissioning the ID 200/C-PDP identification system.

- ▶ To do this, go to the **TIA Portal hardware configuration** and choose:  
**Options ▶ Install general station description file (GSD)**



- ▶ Select the correct **GSD file** from the source directory and install it.



## 5.2 Hardware configuration

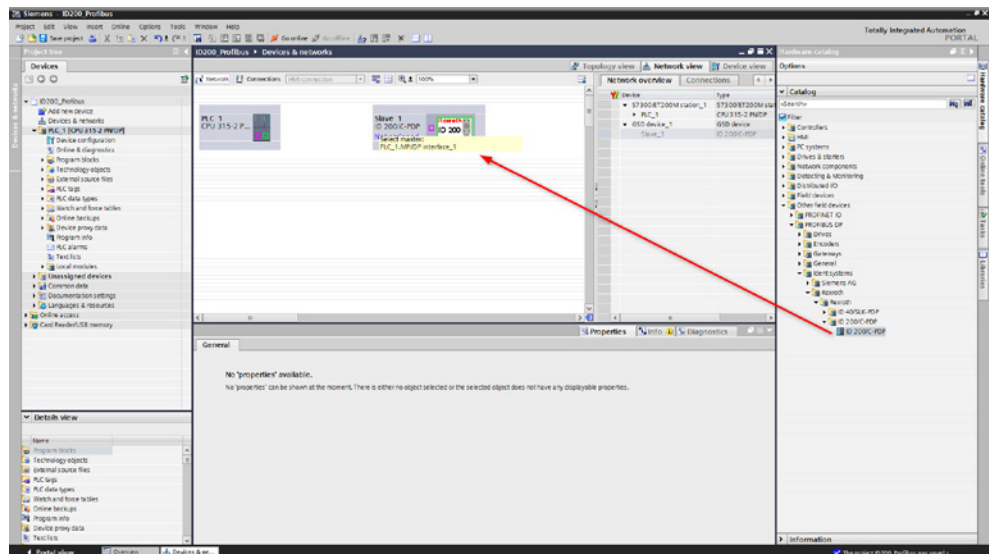
Existing modules must be parameterized within the hardware configuration.

- In the **Hardware catalog**, select:

**Other field devices ► PROFIBUS DP ► Ident systems ► Rexroth ► Rexroth ► ID 200/C-PDP ► ID 200/C-PDP**

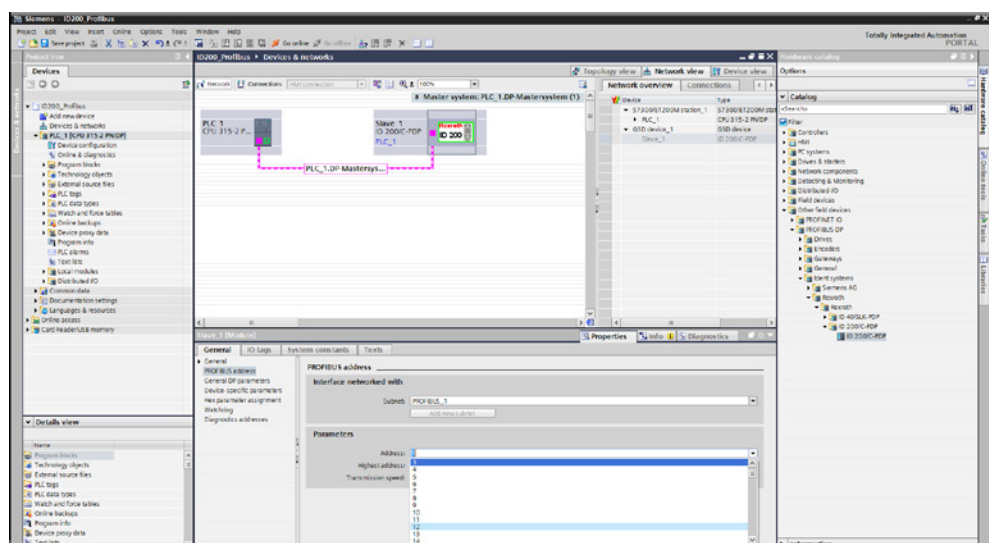
and drag it to the **master system**.

The ID 200 is then connected to the Profibus DP system.

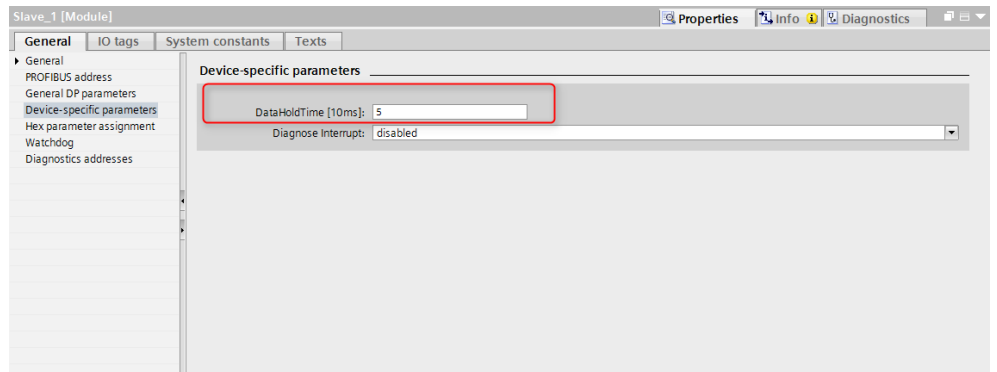


- Click the icon for the **ID 200** under **Network view**.

The **Properties window** opens at the bottom of the screen in the **PROFIBUS address** menu. You can change the **PROFIBUS address** here.



The **DataHoldTime** (DHT) can be changed in the **Device-specific parameters** menu. The device-specific module parameter **DHT** indicates the data retention time in the output data field of the ID 200. The DHT should be twice the cycle time of the controller.

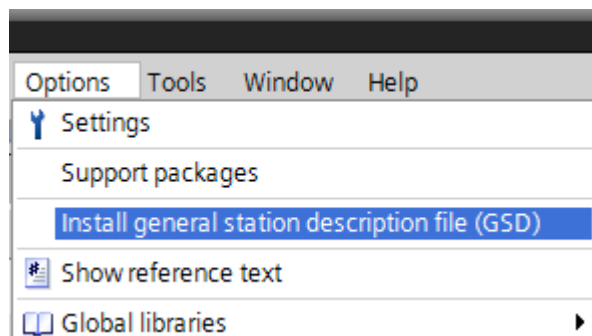


## 6 Setting device parameters for ID 200/C-ETH (PROFINET)

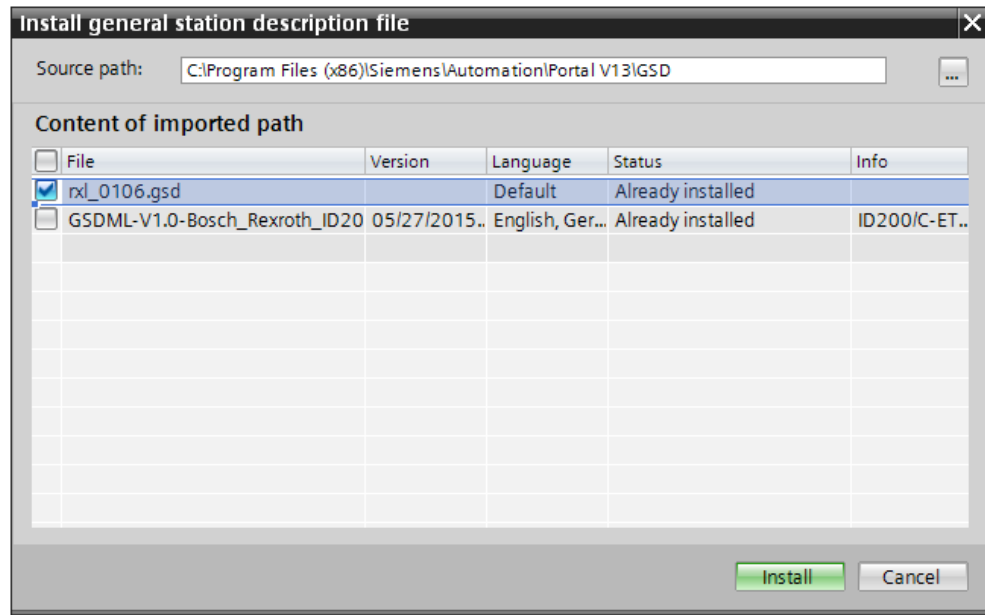
### 6.1 Installing the GSDML file

The **GSDML file** must be installed before commissioning the ID 200/C-ETH identification system.

- ▶ To do this, go to the TIA Portal for hardware configuration and choose:
  - Options ▶ Install general station description file (GSD)**

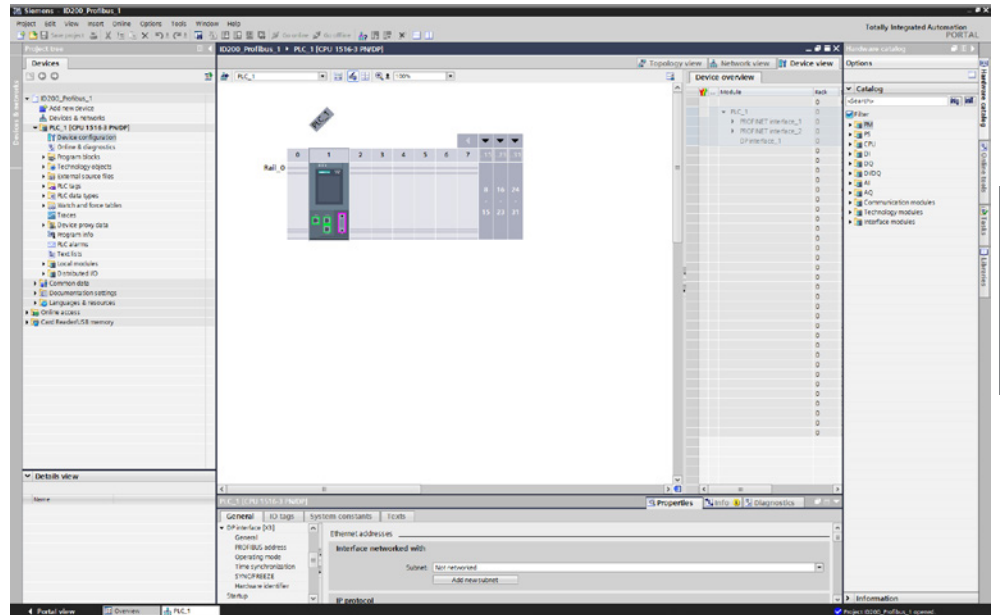


- ▶ Then select the **GSDML file** from the source directory.



## 6.2 Hardware configuration

Existing modules must be parameterized within the hardware configuration.



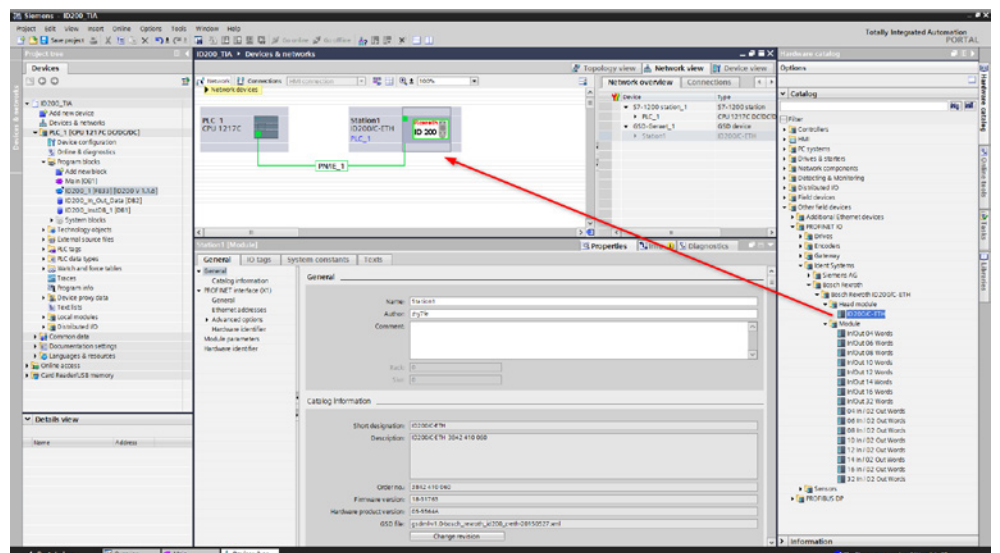
► Right-click the **PROFINETport** to insert a PROFINET IO system.

► The ID 200 is then connected to the PROFINET IO system.

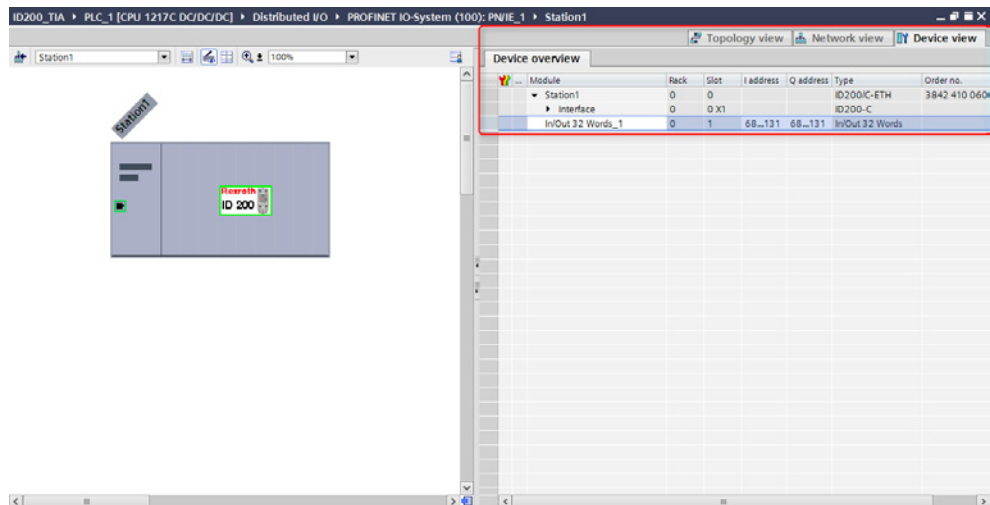
In the **Hardware catalog**, select:

**Other field devices ► PROFINET IO ► Ident Systems ► Bosch Rexroth ► Bosch Rexroth ID 200/C-ETH ► Head Module ► ID 200/C-ETH**

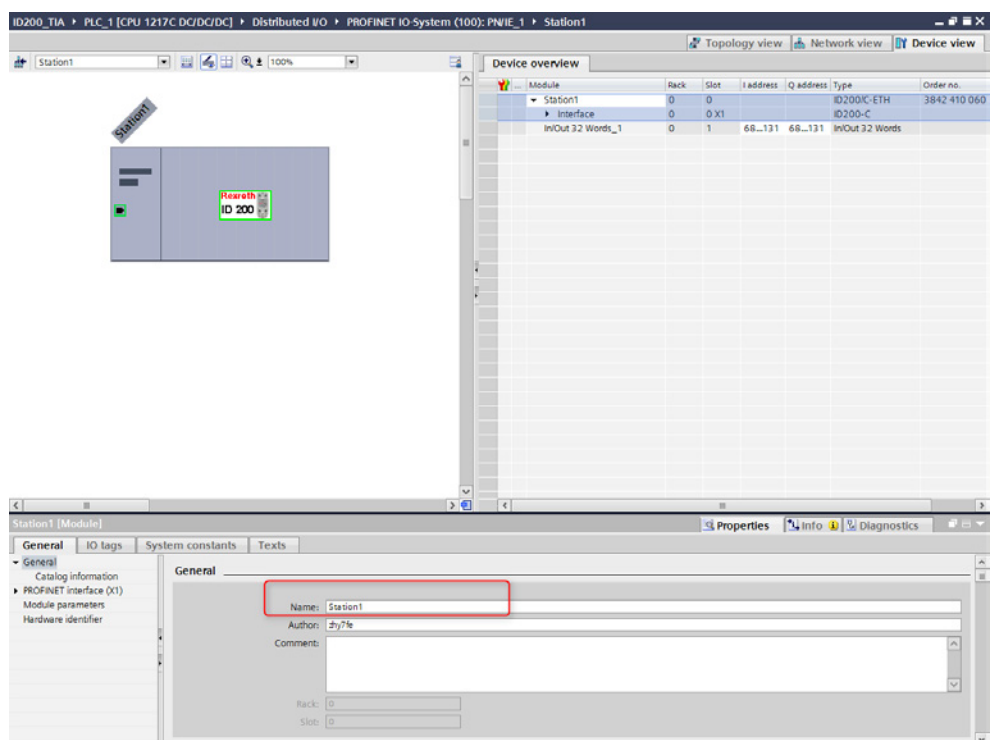
and drag it to the **master system**.



- ▶ The communication modules (e.g. **In/Out 32 Words**) are then defined. The module must be assigned to a slot.



- ▶ Double-click the **icon for the ID 200** to open a window displaying the properties of the PROFINET device.
- ▶ You can change the name of the PROFINET device here (in this case: Station1) because the name must be defined via the **Web interface**, exactly as before.



The properties window of the PROFINET device opens at the bottom of the screen in the **PROFINET Interface (X1)** menu.

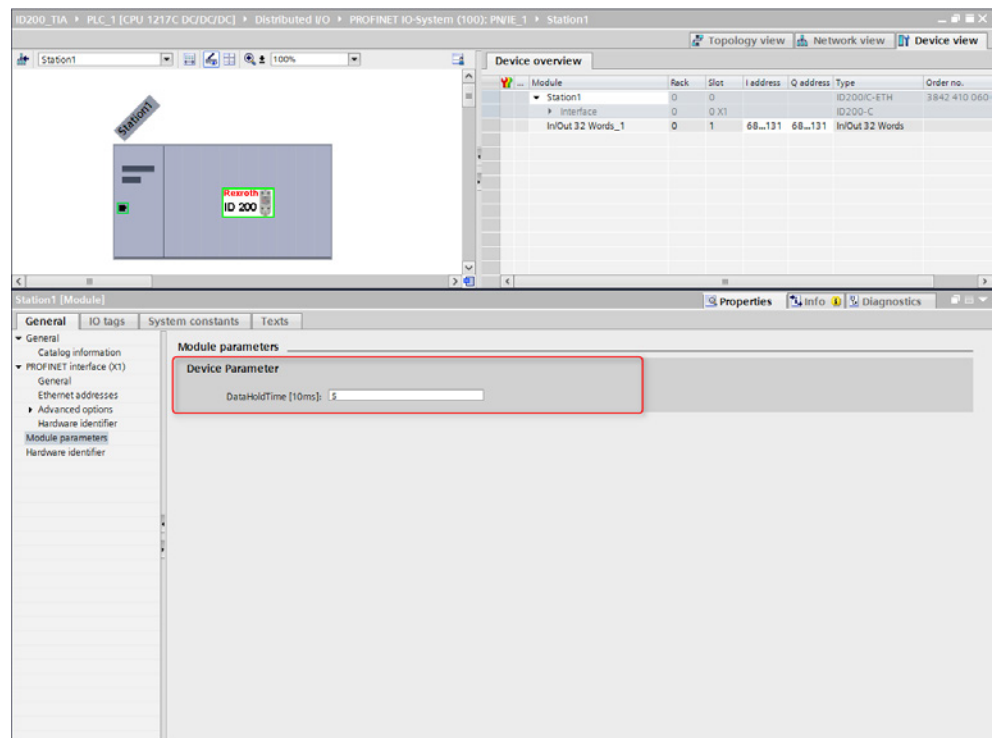
The screenshot displays the SIMATIC Manager interface. At the top, a rack diagram shows a 'Rexroth ID 200' module. Below it, the 'Device overview' table lists the modules:

Module	Rack	Slot	I address	Q address	Type	Order no.
Station1	0	0			ID 200/C-ETH	3842 410 060
Interface	0	0.X1			ID 200-C	
In/Out 32 Words_1	0	1	68...131	68...131	In/Out 32 Words	

The 'Properties' dialog for 'Station1' is open, showing the 'Ethernet addresses' section. The 'Interface networked with' is set to 'PNIE\_1'. The 'IP protocol' section is checked, and the 'Set IP address in the project' radio button is selected. The IP address is set to '192.168.1.90' and the subnet mask is '255.255.255.0'. The 'PROFINET' section has 'Generate PROFINET device name automatically' checked, with the device name 'station1' and device number '1'.

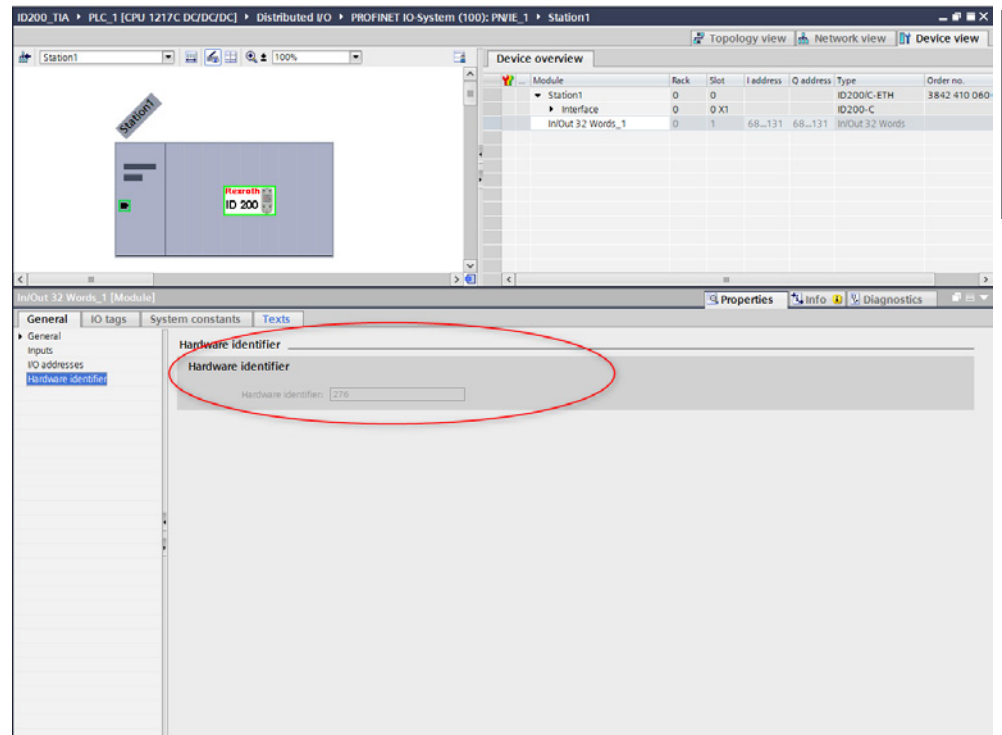
► Here you can change the IP address in the **Ethernet addresses** section.

Module parameters are found in the **Module parameters** menu. The device-specific module parameter **DataHoldTime** (DHT) indicates the data retention time in the output data field of the ID 200. The **DHT** should be twice the cycle time of the controller.



The hardware identifier (HW-ID) of the PROFINET device is used for addressing and identifying the module. It is automatically assigned in addition to E addresses and A addresses.

You can find it in the **Hardware identifier** menu in the **Device view** of the communication module. To do so, click the selected module of the **Ident interface** (here: **In/Out 32 Words\_1**).



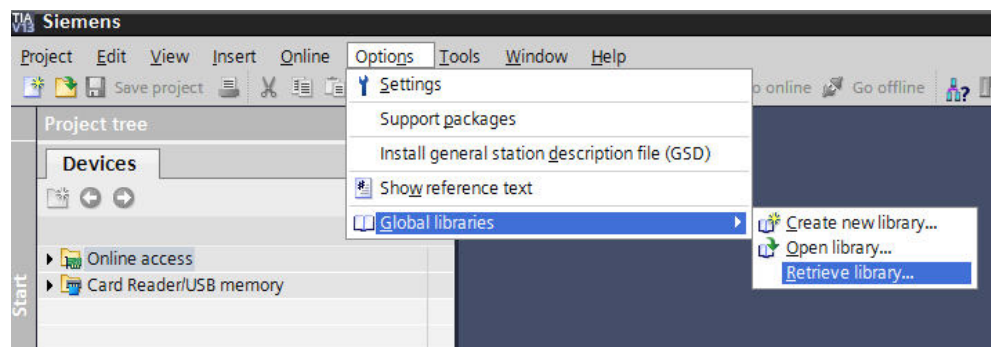
## 7 Function module F33 "ID200"

### 7.1 Installing the library

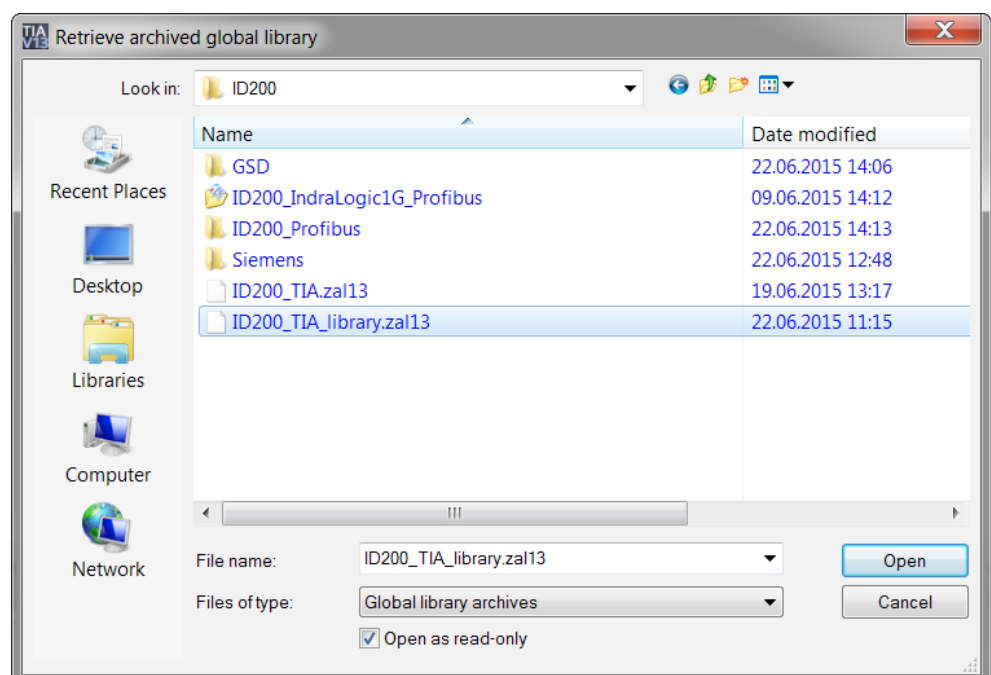
The library must first be extracted and installed before installing the user program.

- ▶ Then go to the TIA Portal and select

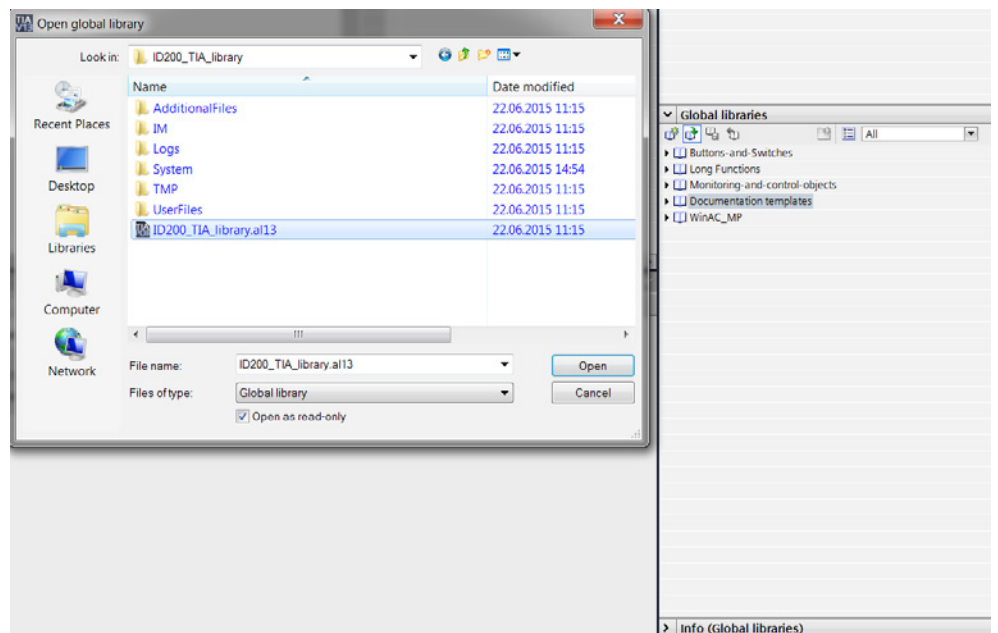
**Options ▶ Global libraries ▶ Retrieve library...**



- ▶ Select and open the **ID200\_TIA\_library.zal13** library.
- ▶ Then enter the folder where you want to save the extracted library.



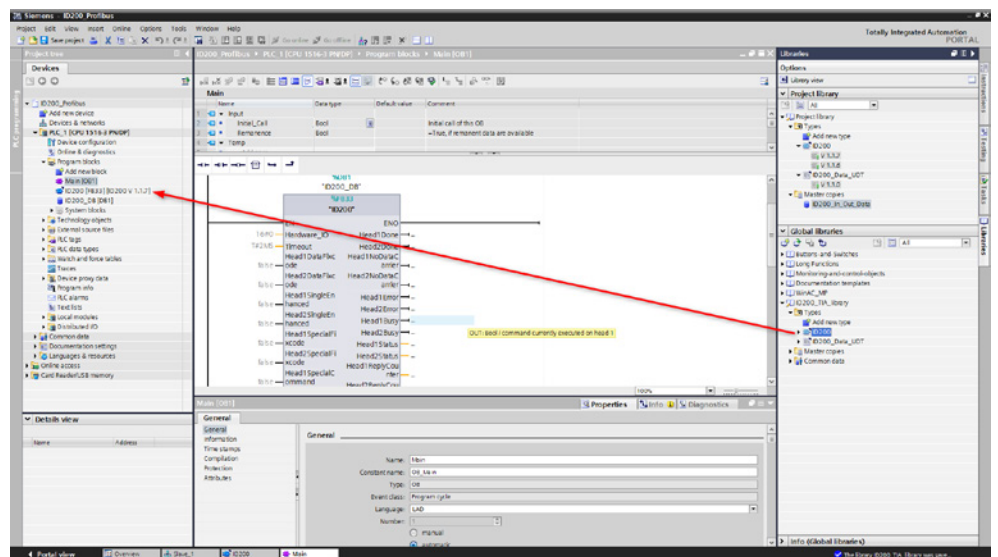
- ▶ Open the library in the **Global libraries** tab.



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## 7.2 Calling the function module

Copy the function module from the **ID200\_TIA\_library** library to the desired project. The attached UDTs are automatically implemented in the project.



The functions **single read words**, **enhanced read words** and **single write words** operate only with **MDT../2K-H** mobile data carriers. Not with **MDT../28-L** data carriers.

The following figure shows the function call and the variables to be parameterized:

1	CALL	"IDENTControl", "InstDB33"
2	Hardware_IO	:=268
3	Timeout	:=T#5s
4	Head1DataFixcode	:= "Head1DataFixcode"
5	Head2DataFixcode	:= "Head2DataFixcode"
6	Head1SingleEnhanced	:= "Head1SingleEnhanced"
7	Head2SingleEnhanced	:= "Head2SingleEnhanced"
8	Head1SpecialFixcode	:= "Head1SpecialFixcode"
9	Head2SpecialFixcode	:= "Head2SpecialFixcode"
10	Head1SpecialCommand	:= "Head1SpecialCommand"
11	Head2SpecialCommand	:= "Head2SpecialCommand"
12	Head1Read	:= "Head1Read"
13	Head2Read	:= "Head2Read"
14	Head1Write	:= "Head1Write"
15	Head2Write	:= "Head2Write"
16	Head1Quit	:= "Head1Quit"
17	Head2Quit	:= "Head2Quit"
18	QuitErrorHead1	:= "QuitErrorHead1"
19	QuitErrorHead2	:= "QuitErrorHead2"
20	Head1WordNum	:=10
21	Head2WordNum	:=10
22	Head1WordAddress	:=0
23	Head2WordAddress	:=0
24	Head1TagType	:=W#16#3033
25	Head2TagType	:=W#16#3530
26	Head1Done	:= "Head1Done"
27	Head2Done	:= "Head2Done"
28	Head1NoDataCarrier	:= "Head1NoDataCarrier"
29	Head2NoDataCarrier	:= "Head2NoDataCarrier"
30	Head1Error	:= "Head1Error"
31	Head2Error	:= "Head2Error"
32	Head1Busy	:= "Head1Busy"
33	Head2Busy	:= "Head2Busy"
34	Head1Status	:= "Head1Status"
35	Head2Status	:= "Head2Status"
36	Head1ReplyCounter	:= "Head1ReplyCounter"
37	Head2ReplyCounter	:= "Head2ReplyCounter"
38	InitFinish	:= "InitFinish"
39	SetRestart	:= "SetRestart"
40	Data	:= "IDENTControl_Data".Data
41		

Resetting the inlet bits after each function module call:

```

42 //Reset start-bits
43 ////Head1
44 IF "Head1Read" THEN "Head1Read":=False; END_IF;
45 IF "Head1Write" THEN "Head1Write":=False; END_IF;
46 IF "Head1Quit" THEN "Head1Quit":=False; END_IF;
47 IF "QuitErrorHead1" THEN "QuitErrorHead1":=False; END_IF;
48 IF "Head1SpecialCommand" THEN "Head1SpecialCommand":=False; END_IF;
49
50 ////Head2
51 IF "Head2Read" THEN "Head2Read":=False; END_IF;
52 IF "Head2Write" THEN "Head2Write":=False; END_IF;
53 IF "Head2Quit" THEN "Head2Quit":=False; END_IF;
54 IF "QuitErrorHead2" THEN "QuitErrorHead2":=False; END_IF;
55 IF "Head2SpecialCommand" THEN "Head2SpecialCommand":=False; END_IF;

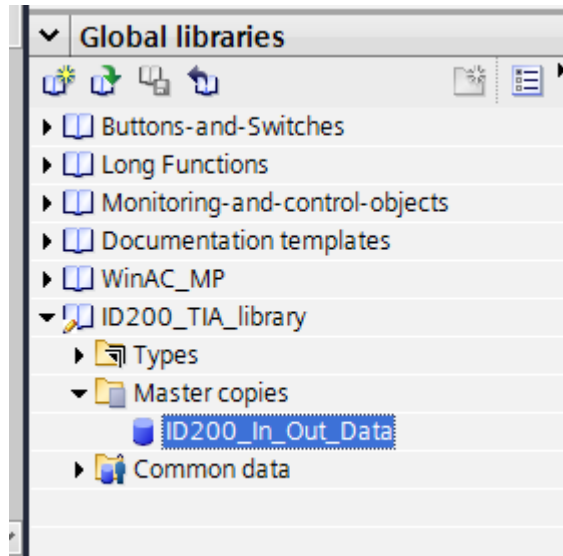
```

Name	Declaration	Data type	Description
Hardware_IO	Input	HW_IO	Module addressing and identification (hardware identification)
Timeout	Input	TIME	Timer for monitoring the response time of the communication module
Head1DataFixcode	Input	BOOL	Access antenna CH1 on 0:=Fixcode 1:=data range
Head2DataFixcode	Input	BOOL	Access antenna CH2 on 0:=Fixcode 1:=data range
Head1SingleEnhanced	Input	BOOL	Execution on antenna CH1 of 0:=Single 1:=Enhanced command
Head2SingleEnhanced	Input	BOOL	Execution on antenna CH2 of 0:=Single 1:=Enhanced command
Head1SpecialCommand	Input	BOOL	Executes SpecialCommand on antenna CH1 (positive edge); define command parameters beforehand in Head_1.SpecialCommand structure; incoming user data are in the Head_1.InData structure
Head2SpecialCommand	Input	BOOL	Executes SpecialCommand on antenna CH2 (positive edge); define command parameters beforehand in Head_2.SpecialCommand structure; incoming user data are in the Head_2.InData structure
Head1Read	Input	BOOL	Executes read command on antenna CH1 (positive edge); define Head1WordNum and Head1Wordaddress command parameters; incoming user data are in the Head_1.InData structure
Head2Read	Input	BOOL	Executes read command on antenna CH2 (positive edge); define Head2WordNum and Head2Wordaddress command parameters; incoming user data are in the Head_2.InData structure
Head1Write	Input	BOOL	Executes read command on antenna CH1 (positive edge); define Head1WordNum and Head1Wordaddress command parameters; define outgoing user data beforehand in the Head_1.OutData.DW1...15 structure

Head2Write	Input	BOOL	Executes read command on antenna CH2 (positive edge); define Head2WordNum and Head1Wordaddress command parameters; define outgoing user data beforehand in the Head_2.OutData.DW1...15 structure
Head1Quit	Input	BOOL	Executes Quit command on header 1 to cancel Enhanced command (positive edge)
Head2Quit	Input	BOOL	Executes Quit command on header 2 to cancel Enhanced command (positive edge)
QuitErrorHead1	Input	BOOL	Executes error routine on antenna CH1 (positive edge)
QuitErrorHead2	Input	BOOL	Executes error routine on antenna CH2 (positive edge)
IC_Command_Head1	Input	BOOL	Executes a SpecialCommand on communication module (positive edge); command is sent to channel 0; define command parameters beforehand in Head_1.SpecialCommand structure; incoming user data are in the Head_1.InData structure
Head1WordNum	Input	INT	Number of data blocks addressed on antenna CH1
Head2WordNum	Input	INT	Number of data blocks addressed on antenna CH2
Head1WordAddress	Input	WORD	Start address of memory area on data carrier addressed on channel 1
Head2WordAddress	Input	WORD	Start address of memory area on data carrier addressed on channel 2
Head1TagType	Input	WORD	Channel 1 data carrier type (table of data carrier types)
Head2TagType	Input	WORD	Channel 2 data carrier type (table of data carrier types)
Head1Done	Output	BOOL	New data available (Enhanced) or command ended (Single) on channel 1 (positive edge)
Head2Done	Output	BOOL	New data available (Enhanced) or command ended (Single) on channel 2 (positive edge)
Head1NoDataCarrier	Output	BOOL	No data carrier present at the time of execution of a command on channel 1
Head2NoDataCarrier	Output	BOOL	No data carrier present at the time of execution of a command on channel 2
Head1Error	Output	BOOL	Error occurred on channel 1 (positive edge)
Head2Error	Output	BOOL	Error occurred on channel 2 (positive edge)
Head1Busy	Output	BOOL	Command in progress on channel 1
Head2Busy	Output	BOOL	Command in progress on channel 2
Head1Status	Output	BYTE	Channel 1 status value
Head2Status	Output	BYTE	Channel 2 status value
Head1ReplyCounter	Output	BYTE	Channel 1 response value counter
Head2ReplyCounter	Output	BYTE	Channel 2 response value counter
InitFinish	InOut	BOOL	Initialization ended (positive edge)
SetRestart	InOut	BOOL	Executes initialization of communication module (positive edge)
Data	InOut	UDT	Memory of input/output telegrams

The library **ID200\_TIA\_library** contains a template for the data element to be used for the **Data** in/output:

**Global libraries** ▶ **ID200\_TIA\_library** ▶ **Master copies** ▶ **ID200\_In\_Out\_Data**



- ▶ Copy the templates to the project and parameterize them to the specified outputs. Rename them, if necessary (see Section 7.2 Calling the function module on page 19).

## 8 Error or device diagnosis

Most errors occur during initialization of the component. If the InitFinish bit is not automatically set after the initialization is started (positive edge on SetRestart), an error has occurred during initialization. This is mainly caused by different parameterization of the hardware configuration within the TIA Portal hardware manager and the parameterization of the I/O area or the telegram length in the function module. The set data carrier type (Head1(2)TagType) must also be checked. An error may also occur when commands are executed. The Head1(2)Error bit is set as soon as an error occurs here. A diagnosis can then be performed using the error table provided. Errors can be caused by incorrect command parameters (especially SpecialCommand) or an incorrectly set data carrier type. An incorrect command parameter is indicated by the (Head1(2)Status) 0x04 status value.

Name	Data type	Description	Remedy
Head1(2)Error	BOOL	Error on antenna CH1(2)	
Head_1(2).InvalidResponse	BOOL	Sent and received command telegram are identical	Check Data Hold Time. Check I/O configuration
Head_1(2).TimeoutOccured	BOOL	Timer for communication monitoring expired. Slave sent no response during the time window.	Increase timeout variable for long cycle times.
Head_1(2).Error_SFC_14	BOOL	Error importing data from process map	Check variable Head_1(2).Ret_Val_SFC14. Check parameterized I/O address and telegram length
Head_1(2).Error_SFC_15	BOOL	Error writing data to the process map	Check variable Head_1(2).Ret_Val_SFC15. Check parameterized I/O address and telegram length.
Head_1(2).Ret_Val_SFC14	WORD	Error code during execution of SFC14	W#16#8090 W#16#80B1 Check parameterized I/O address and telegram length (see system help for SFC14 for more information)
Head_1(2).Ret_Val_SFC15	INT	Error code during execution of SFC14 (Conversion to HEX format necessary)	W#16#8090 W#16#80B1 Check parameterized I/O address and telegram length (see system help for SFC15 for more information)
Head1(2)Status	BYTE	Status of data most recently imported on channel 1(2)	See table of status values
Memory.InData.Status	BYTE	Status of most recently imported data telegram	See table of status values

## 9 Examples of commands

### 9.1 Initialization (with MDT../28-L data carrier)

Determination of data carrier type:

Head1TagType := W#16#3135

Head2TagType := W#16#3135

Start of initialization:

SetRestart := 1 (positive edge)

Initialization in progress:

Head1Busy := 1

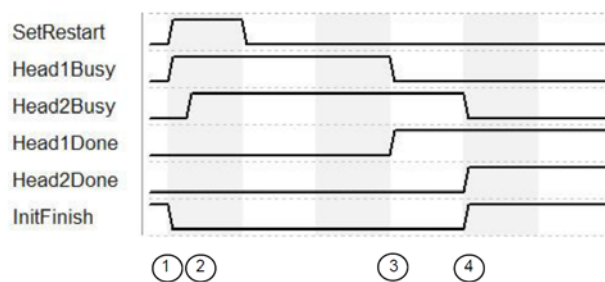
Head2Busy := 1

Initialization ended:

InitFinish := 1 (positive edge)

Head1Done := 1

Head2Done := 1



1. **SetRestart** triggers initialization phase. Initialization runs on antenna CH1 **Head1Busy**.
2. Antenna CH2 is initialized **Head2Busy** as soon as antenna CH1 has sent a confirmation that antenna CH2 is to be initialized.
3. Initialization finished on antenna CH1 **Head1Done**.
4. **Head1Done** and **Head2Done** set to TRUE.  
Initialization finished, **InitFinish** changes to TRUE.

## 9.2 Single Read Fixcode (antenna CH1)

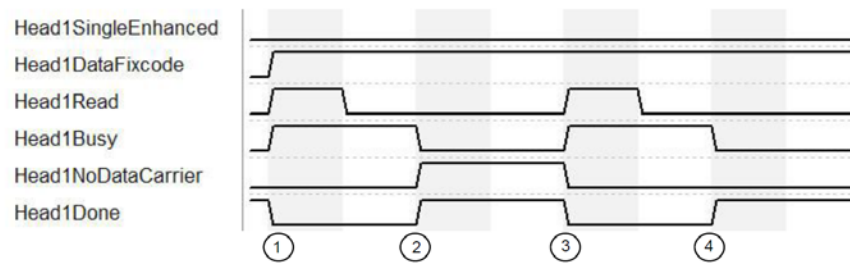
Determination of command parameters:  
 Head1SingleEnhanced := 0  
 Head1DataFixcode := 1

Start command execution:  
 Head1Read := 1 (positive edge)

Command in progress:  
 Head1Busy := 1

Command finished ⇒ Data imported  
 Head1Busy := 0  
 Head1NoDataCarrier := 0  
 Head1Done := 1 (positive edge)  
 User data: Head\_1.InData.UserData

Command finished ⇒ No data carrier  
 Head1Busy := 0  
 Head1NoDataCarrier := 1 (positive Flanke)  
 Head1Done := 1 (positive edge)  
 User data: None



1. **Head1SingleEnhanced** is inactive in order to initiate a single command. **Head1DataFixcode** is TRUE in order to access the Fixcode/TID. Single Read Fixcode is started when **Head1Read** changes to TRUE. **Head1Busy** changes to TRUE, **Head1Done** simultaneously changes to FALSE.
2. After the command is executed, **Head1Busy** is inactive again and **Head1Done** changes back to TRUE. There was no data carrier in the coverage area at the time of reading and **Head1NoDataCarrier** changes to TRUE.
3. Single Read Fixcode is started when **Head1Read** changes to TRUE. **Head1Busy** changes to TRUE, **Head1Done** simultaneously changes to FALSE. **Head1NoDataCarrier** becomes FALSE.
4. After the command is executed, **Head1Busy** is inactive again and **Head1Done** changes back to TRUE. There was no data carrier in the detection range at the time of reading and **Head1NoDataCarrier** remains inactive.

### 9.3 Enhanced Read Fixcode (antenna CH1)

Determination of command parameters:

```
Head1SingleEnhanced := 1
Head1DataFixcode := 1
```

Start command execution:

```
Head1Read := 1 (positive edge)
```

Command in progress:

```
Head1Busy := 1
```

Data imported and command active

```
Head1Busy := 1
Head1NoDataCarrier := 0
Head1Done := 1 (positive edge)
User data: Head_1.InData.UserData
```

Not data carrier present and command active:

```
Head1Busy := 1
Head1NoDataCarrier := 1
Head1Done := 0 (positive edge)
User data: None
```

Data carrier moves out of the reading range  
and no data carrier present:

```
Head1Busy := 1
Head1NoDataCarrier := 1
Head1Done := 0 (positive edge)
User data: DB32
```

Data carrier moves into the reading range  
and data are imported:

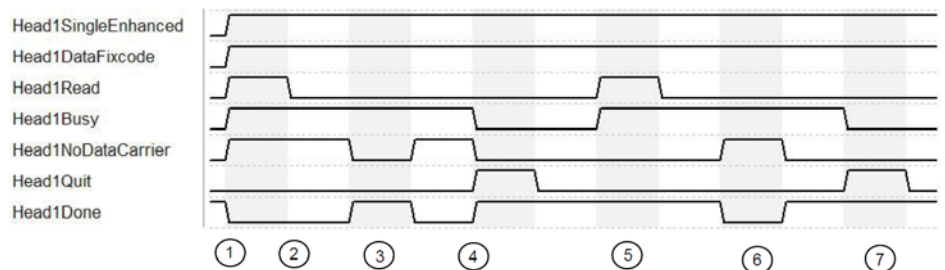
```
Head1Busy := 1
Head1NoDataCarrier := 0
Head1Done := 1 (positive edge)
User data: Head_1.InData.UserData
```

End Enhanced command:

```
Head1Quit := 1
```

Command ended:

```
Head1Done := 1 (positive edge)
Head1Busy := 0
```



1. **Head1SingleEnhanced** is TRUE in order to initialize an Enhanced command. **Head1DataFixcode** is true in order to access the Fixcode/TID. Enhanced Read Fixcode is started when **Head1Read** is TRUE. **Head1Busy** changes to TRUE, **Head1Done** simultaneously changes to FALSE.

2. **Head1NoDataCarrier** is TRUE because there is no data carrier in the field at this time.
3. Data carrier moves into the detection range. **Head1NoDataCarrier** changes to FALSE. **Head1Done** changes to TRUE. The data carrier leaves the field shortly thereafter.
4. **Head1Quit** stops continuous reading.  
**Head1Busy** changes to FALSE.  
**Head1Done** is now TRUE.
5. New Enhanced Read Fixcode command started. Data carrier is detected  
**Head1NoDataCarrier** is FALSE.  
**Head1Done** is active.
6. **Head1Done** is FALSE since there is no data carrier in the field.  
**Head1NoDataCarrier** is TRUE. Data carrier returns to detection range shortly thereafter.
7. Command stopped with **Head1Quit**.

## 9.4 Single Read Words (antenna CH1; 15 blocks starting with address 0)

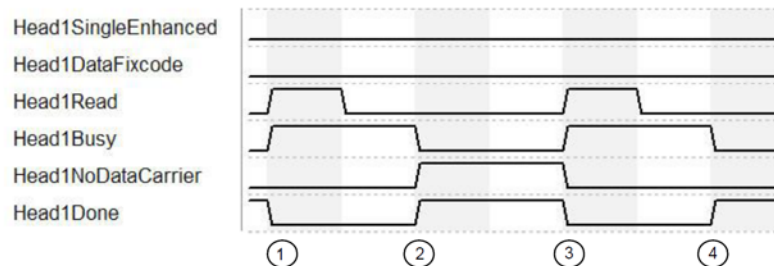
Determination of command parameters:  
 Head1WordNum := 15 (number of user data)  
 Head1WordAddress := 0 (memory address)  
 Head1SingleEnhanced := 0  
 Head1DataFixcode := 0

Start command execution:  
 Head1Read := 1 (positive edge)

Command in progress:  
 Head1Busy := 1

Data imported:  
 Head1Busy := 0  
 Head1NoDataCarrier := 0  
 Head1Done := 1 (positive edge)  
 User data: Head\_1.InData.UserData

No data carrier:  
 Head1Busy := 0  
 Head1NoDataCarrier := 1 (positive edge)  
 Head1Done := 1 (positive edge)  
 User data: None



1. **Head1SingleEnhanced** is inactive in order to initialize a single command. **Head1DataFixcode** is FALSE in order to access Words/User-Data. Single Read Words is started when **Head1Read** changes to TRUE. **Head1Busy** changes to TRUE, **Head1Done** simultaneously changes to FALSE.
2. After the command is executed, **Head1Busy** is inactive again and **Head1Done** changes back to TRUE.
3. There was no data carrier in the detection range at the time of reading and **Head1NoDataCarrier** changes to TRUE.
4. Single Read Words is started when **Head1Read** changes to TRUE. **Head1Busy** changes to TRUE, **Head1Done** simultaneously changes to FALSE. **Head1NoDataCarrier** becomes FALSE.
5. After the command is executed, **Head1Busy** is inactive again and **Head1Done** changes back to TRUE. There was no data carrier in the detection range at the time of reading and **Head1NoDataCarrier** remains inactive.

### 9.5 Enhanced Read Words (antenna CH1; 15 blocks starting with address 0)

Determination of command parameters:  
 Head1WordNum := 15 (number of user data)  
 Head1WordAddress := 0 (memory address)  
 Head1SingleEnhanced := 1  
 Head1DataFixcode := 0

Start command execution:  
 Head1Read := 1 (positive edge)

Command in progress:  
 Head1Busy := 1

Data imported and command active:  
 Head1Busy := 1  
 Head1NoDataCarrier := 0  
 Head1Done := 1 (positive edge)  
 User data: Head\_1.InData.UserData

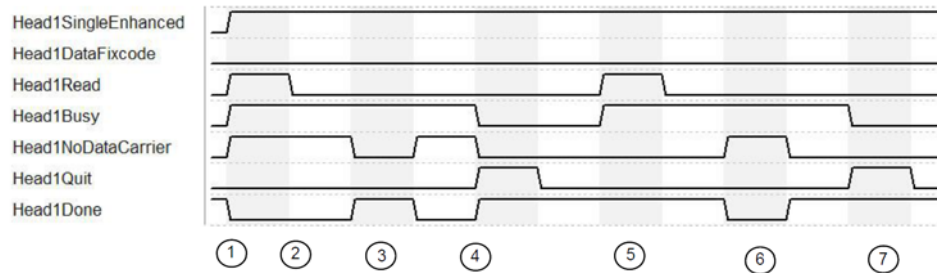
Not data carrier present and command active:  
 Head1Busy := 1  
 Head1NoDataCarrier := 1  
 Head1Done := 0 (positive edge)  
 User data: None

Data carrier moves out of the reading range  
 and no data carrier present:  
 Head1Busy := 1  
 Head1NoDataCarrier := 1  
 Head1Done := 0 (positive edge)  
 User data: None

Data carrier moves into the reading range  
 and data are imported:  
 Head1Busy := 1  
 Head1NoDataCarrier := 0  
 Head1Done := 1 (positive edge)  
 User data: Head\_1.InData.UserData

End Enhanced command:  
 Head1Quit := 1

Command ended:  
 Head1Done := 1 (positive edge)  
 Head1Busy := 0



1. **Head1SingleEnhanced** is TRUE in order to initialize an Enhanced command.  
**Head1DataFixcode** is FALSE in order to access Words/User-Data. Enhanced Read Fixcode is started when **Head1Read** is TRUE.  
**Head1Busy** changes to TRUE, **Head1Done** simultaneously changes to FALSE.
2. **Head1NoDataCarrier** is TRUE because there is no data carrier in the field at this time.
3. Data carrier moves into the detection range.  
**Head1NoDataCarrier** changes to FALSE.  
**Head1Done** changes to TRUE. The data carrier leaves the field shortly thereafter.
4. **Head1Quit** stops continuous reading. **Head1Busy** changes to FALSE. **Head1Done** is now TRUE.
5. New Enhanced Read Words command is started. Data carrier is detected  
**Head1NoDataCarrier** is FALSE. **Head1Done** is active.
6. **Head1Done** is FALSE because there is no data carrier in the field.  
**Head1NoDataCarrier** is TRUE. Data carrier returns to detection range shortly thereafter.
7. Command stopped with **Head1Quit**.

## 9.6 Single Write Words (antenna CH1; blocks starting from address 0)

Determination of command parameters:  
 Head1WordNum := 15 (number of user data)  
 Head1WordAddress := 0 (memory address)  
 Head1SingleEnhanced := 0  
 Head1DataFixcode := 0

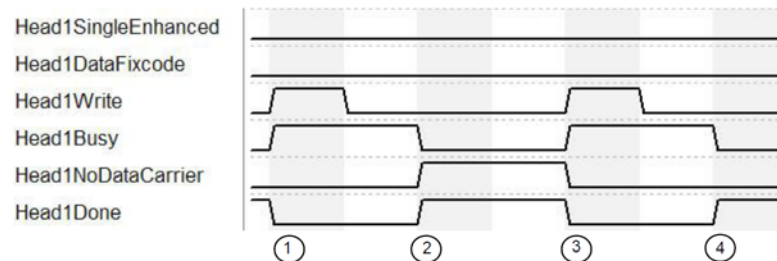
Determination of user data in output data field:  
 Head\_1.OutData.UserData := XXXX

Start command execution:  
 Head1Write := 1 (positive edge)

Command in progress:  
 Head1Busy := 1

Data written:  
 Head1Busy := 0  
 Head1NoDataCarrier := 0  
 Head1Done := 1 (positive edge)

No data carrier:  
 Head1Busy := 0  
 Head1NoDataCarrier := 1  
 Head1Done := 1 (positive edge)



1. **Head1SingleEnhanced** is inactive in order to initialize a single command. **Head1DataFixcode** is FALSE in order to access Words/User-Data. Single Write Words is started when **Head1Write** changes to TRUE. **Head1Busy** changes to TRUE, **Head1Done** simultaneously changes to FALSE.
2. After the command is executed, **Head1Busy** is inactive again and **Head1Done** changes back to TRUE. There was no data carrier in the detection range at the time of writing. **Head1NoDataCarrier** switches to TRUE.
3. Single Write Words is started when **Head1Write** changes to TRUE. **Head1Busy** changes to TRUE. **Head1Done** changes to FALSE. **Head1NoDataCarrier** becomes FALSE.

4. After the command is executed, **Head1Busy** is inactive again and **Head1Done** changes back to TRUE.  
There was no data carrier in the detection range at the time of writing and **Head1NoDataCarrier** remains inactive.

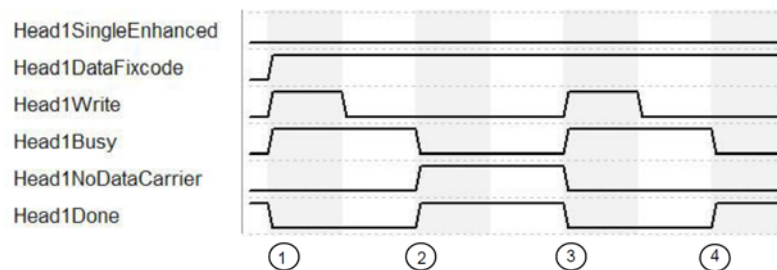
## 9.7 Single Write Fixcode (antenna CH1; with MDT../28-L)

Determination of command parameters:  
 Head\_1.SpecialCommand.CommandCode := 0x1F  
 Head\_1.SpecialCommand.Channel := 0x50 (Fixcode length)  
 Head\_1.SpecialCommand.Parameter1 := FixType (High Byte)  
 Head\_1.SpecialCommand.Parameter2 := FixType (Low Byte)  
 Head\_1.SpecialCommand.Parameter3 := FixCode Byte 1  
 Head\_1.SpecialCommand.Parameter4 := FixCode Byte 2  
 Head\_1.SpecialCommand.Parameter5 := FixCode Byte 3  
 Head\_1.SpecialCommand.Parameter6 := FixCode Byte 4  
 Head\_1.SpecialCommand.Parameter7 := FixCode Byte 5

Start command execution:  
 Head1SpecialCommand := 1 (positive edge)

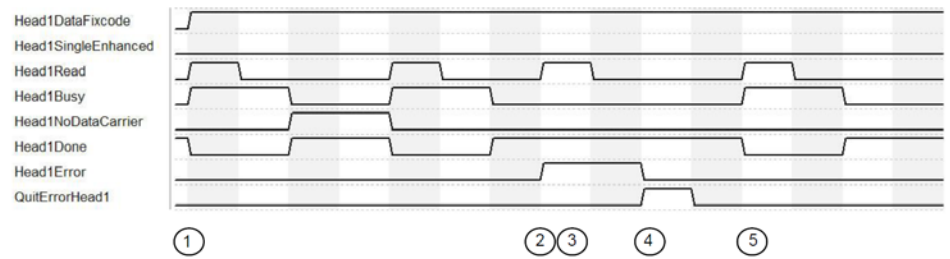
Command in progress:  
 Head1Busy := 1

Command ended:  
 Head1Done := 1 (positive edge)  
 Head1Busy := 0



1. **Head1SingleEnhanced** is inactive in order to initialize a single command. **Head1DataFixcode** is TRUE in order to access the Fixcode/TID. Single Write Fixcode is started when **Head1Write** changes to TRUE. **Head1Busy** changes to TRUE. **Head1Done** changes to FALSE.
2. After the command is executed, **Head1Busy** is inactive again and **Head1Done** changes back to TRUE. There was no data carrier in the detection range at the time of writing and **Head1NoDataCarrier** changes to TRUE.
3. Single Write Fixcode is started when **Head1Write** changes to TRUE. **Head1Busy** changes to TRUE, **Head1Done** simultaneously changes to FALSE. **Head1NoDataCarrier** becomes FALSE.
4. **Head1Busy** becomes inactive again after the command is executed. **Head1Done** changes back to TRUE. There was no data carrier in the detection range at the time of writing and **Head1NoDataCarrier** remains inactive.

## 9.8 Error Handling (antenna CH1)



1. Random command execution started.
2. An error occurred after second read command, **Head1Error** is TRUE.
3. Errors lock the entire component. The component ignores subsequent commands. **Head1Read** has no effect as long as **Head1Error** is TRUE.
4. **QuitErrorHead1** acknowledges the error and unlocks the component.
5. Normal command execution is possible again.

## 10 Data carrier table

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

# 11 Status value table

Head1(2)Status	Meaning	Action
0x00	Command was executed correctly.	None; a new command was sent to this channel.
0xFF	Command in progress.	Command currently in progress on this channel; A command can be sent to another channel (not the same channel).
0x02	Power-on message: Reset command was executed	Communication module is ready for command execution.
0x04	Incorrect or incomplete command; Command parameter not in valid range.	Check command parameters and data carrier type (MDTx/2K-H only has even-numbered multiples of WordNum) Check installation of antenna (is antenna grounded, was insulated cable used?).
0x05	No data carrier in the detection range.	Check distance between data carrier and antenna; Check installation of antenna (is antenna grounded, was insulated cable used?).
0x06	Hardware error; no antenna connected to this channel; Antenna is defective.	Check antenna cable (insulated cable V1-G-XM-PUR ABG-V1-W); Check LED of antenna (switched off: antenna defective, flashing: initialization required; stationary; antenna is OK)
0x07	Internal device error.	Overflow of external memory (reduction of Data Hold Time).
0x09	Parameterized data carrier type does not match connected antenna.	Check defined data carrier type.
0x0A	More than one transponder in the detection range.	Ensure that only one transponder is in the detection range when the command is executed.
0x0B	Additional telegram when IF parameter is activated.	None; telegram with additional information was sent.
0x0F	Last telegram in multiframe mode.	None; after a Single command, number of transponders read in the field in ASCII.
0x20	Power-on message: Reset command was executed.	Error was sent by the bus interface; Communication module is ready for command execution.
0x40	Incorrect or incomplete command; Command parameter not in valid range.	Error was sent by the bus interface; Check command parameters and data carrier type (MDTx/2K-H only has even-numbered multiples of WordNum) Check installation of antenna (is antenna grounded, was insulated cable used?).
0x60	Hardware error; no antenna connected to this channel; Antenna is defective.	Error was sent by the bus interface; Check antenna cable (insulated cable); Check LED of antenna (switched off: antenna defective, flashing: initialization required; stationary; antenna is OK).
0x70	Internal device error.	Overflow of external memory (reduction of Data Hold Time).

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