Foreword, Table of Contents	
SIMEAS Q - PROFIBUS integration	1
Parameterizing SIMEAS Q for PROFIBUS DP	2
Configuration with SIMATIC STEP 7	3
Configuring the hardware	4
Configuring the software	5
Reading out SIMEAS Q	6
Error messages	7
Bibliography, Glossary, Index	

SIMEAS Software

SIMEAS Q Connecting SIMEAS Q to SIMATIC S7-300/400

Application Description

Release: 03.03.00 E50417-H1176-C122-A1



Notes on Safety

This manual does not constitute a complete catalog of all safety measures required for operating the respective equipment (module, device), since special operating conditions may require additional measures. However, it does contain notes which must be adhered to for your own personal safety and for avoiding property damage. These notes are highlighted with a warning triangle and different keywords indicating different degrees of danger:



Warning

means that death, severe injury or substantial property damage may occur if the appropriate safety measures are not taken.

Caution

means that minor injury or property damage may occur if the appropriate safety measures are not taken.



Qualified Personnel

Commissioning and operation of the equipment (module, device) described in this manual must be performed by qualified personnel only. In the sense of the safety notes contained in this manual, qualified personnel are those persons who are authorized to commission, release, ground and tag devices, systems and electrical circuits in accordance with safety standards.

Use for the Intended Purpose

The equipment (device, module) must not be used for any other purposes than those described in the Catalog and the technical description. If it is used together with third-party devices and components, these must be recommended or approved by Siemens.

Correct and safe operation of the product requires adequate transportation, storage, installation and mounting as well as appropriate use and maintenance.

During operation of electrical equipment, it is inevitable that certain parts of this equipment will be carrying dangerous current. Severe injury or property damage may occur if the appropriate measures are not taken:

- Before making any connections at all, ground the equipment at the PE terminal.
- Hazardous voltages may be present on all switching components connected to the power supply.
- Even after the supply voltage has been disconnected, hazardous voltages may still be present in the equipment (capacitor storage).
- Equipment with current transformer circuits may not be operated while open.

The limit values indicated in the manual or the operating instructions must not be exceeded; this also applies to testing and commissioning.

Disclaimer of liability

We have checked the contents of this publication and every effort has been made to ensure that the descriptions of both hardware and software are as accurate as possible. However, deviations from the description cannot be completely ruled out, so that no liability can be accepted for any errors or omissions contained in the information given

The data in this manual are checked regularly and the necessary corrections are included in subsequent editions. Any suggestions for improvement are welcome.

The contents of this manual are subject to change without prior notice.

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Foreword

Purpose of this manual	This manual describes device-specific information for connection of SIMEAS Q to a PROFIBUS DP/CP communications system.
Target group	This manual is aimed at users of SIMEAS Q.
	Basic knowledge of the operating systems Microsoft Windows 95/98 or Microsoft Windows NT 4.0 is required.
Scope of this manual	This manual is valid for SIMEAS Q and SIMEAS Q Parameterization , version V1.0 and higher, as well as SIMATIC STEP 7, version V5. Operation is also possible with version V4 of SIMATIC STEP 7.
	This version operates with SIMEAS Q devices of the current model /BB with the firmware version 1.03 and higher.

\boldsymbol{c}	Declaration of Conformity
	The product is herewith confirmed to comply with the requirements set out in the Council Directive on the Approximation of the Laws of the Mem- ber States relating to Electromagnetic Compatibility (EMC Directive 89/ 336/EWG)
	This conformity is the result of a test carried out by SIEMENS AG in accordance with article 10 of the directive which complies with the basic specifications of EN 50081-2 and EN 50082-2.
	The device has been developed and manufactured for industrial use to EMC standards.
	The evaluation has been carried out in accordance with the international standards of IEC series 255 and the national standard DIN 57 435/ Part 303 (corresponding to VDE 0435/Part 303).
Standards	Development of SIMEAS Q was carried out according to directives of ISO 9000.
Further support	If you have any queries regarding connection of SIMEAS Q to PROFIBUS DP/CP, please contact:
	Your nearest Siemens partner
	 The Siemens hotline (workdays from 7.30 to 17.00): +49 (0)180- 5247000
	□ Fax: +49 (0)180-5242471
	or
	e-mail: EVS-Serviceline@nbg6.Siemens.de



Table of contents

1	SIMEAS	S Q - PROFIBUS integration	1-1
	1.1	Capabilities	1-2
	1.2	The PROFIBUS DP system setup	1-3
	1.3	Communications procedure with SIMEAS Q	1-4
2	Parame	terizing SIMEAS Q for PROFIBUS DP	2-1
	2.1	Starting the parameterization software	2-2
	2.2	Linking the SIMEAS Q device with a PC	2-3
	2.3	Selecting the parameterization mode	2-5
	2.4	Setting/changing the PROFIBUS address	2-6
	2.5	Parameterizing measurement settings	2-7
	2.6	Sending parameterization data to the SIMEAS Q device	2-11
	2.7	Setting measuring / PROFIBUS mode	2-12
3	Configu	Iration with SIMATIC STEP 7	3-1
	3.1	Starting the SIMATIC STEP 7	3-2
	3.2	Creating a new project	3-3
	3.3	Defining SIMATIC S7 as a new station	3-5
4	Configu	Iring the hardware	4-1
	4.1	Start hardware configuration	4-2
	4.2	Integrating the GSD file	4-3



	4.3	Configuring the hardware	4-4
	4.4	Equipping the basic modules	4-5
	4.5	Creating a PROFIBUS system	4-6
	4.6	Integrating SIMEAS Q as PROFIBUS slave	4-9
5	Configu	ring the software	5-1
	5.1	Overview of software blocks used	5-2
	5.2	Functional overview	5-3
	5.3	Blocks for PROFIBUS DP	5-4
	5.4	Blocks for PROFIBUS DP with CP	5-5
6	Reading	out SIMEAS Q	6-1
	6.1	Program call	6-2
	6.2	Parameterizing measured values	6-5
	6.3	Setting recording options	6-8
7	Error me	essages	7-1
	7.1	Error messages of the SIMEAS Q device	7-2
	7.2	General communications errors	7-4
	7.3	Errors during data transmission	7-5

Bibliography

Glossary

Index





1

SIMEAS Q - PROFIBUS integration

Contents

This manual provides device-specific information on how to integrate SIMEAS Q into an existing PROFIBUS system.

SIMEAS Q can be integrated in a PROFIBUS DP system in recording mode. PROFIBUS is a fast bus whose variably definable telegram lengths enable application-orientated speed optimization. This ensures that the data volume which is gathered in SIMEAS Q in a very short time reference can continuously be read out.

1.1	Capabilities	1-2
1.2	The PROFIBUS DP system setup	1-3
1.3	Communications procedure with SIMEAS Q	1-4



1.1 Capabilities

Connection of the network quality recorder SIMEAS Q to PROFIBUS provides the following capabilities.

□ You can **parameterize** SIMEAS Q via PROFIBUS.

As a rule, SIMEAS Q is parameterized directly via a PC. Connection to a PROFIBUS supports the additional option of remote parameterization of the SIMEAS Q device. This procedure is described in the application description for the **SIMEAS Q network quality recorder**, Chapter 5, **File transfer via PROFIBUS**. You will find the required software included in delivery of the SIMEAS Q network quality recorder.

□ You can **read out** SIMEAS Q via PROFIBUS.

This manual covers all the steps required for connection of a SIMEAS Q device to a PROFIBUS system with a SIMATIC S7 as PROFIBUS master.

It also describes the possible measurement settings of SIMEAS Q when reading out through a SIMATIC S7-300/400.



1.2 The PROFIBUS DP system setup

A PROFIBUS DP system comprises at least one master which can be assigned up to 125 slaves. If more than one master is integrated in a system, this is called "multi-master operation". In multi-master operation, each slave is also uniquely assigned to one master.

PCs with an integrated PROFIBUS interface or **P**rogrammable Logic **C**ontrollers (PLC) can be used as PROFIBUS master. This manual tells you how to parameterize a SIMATIC S7-300/400 as PROFIBUS master.



Fig. 1-1 PROFIBUS DP system setup

The devices (e.g. SIMEAS Q) connected to the PROFIBUS are called slaves. Each slave must be assigned a unique address within a PROFIBUS system, via which it is activated directly.



1.3 Communications procedure with SIMEAS Q

Communication in the PROFIBUS system is controlled via telegrams, whereby the master assumes the active role. It sends request telegrams to which SIMEAS Q responds.

SIMEAS Q is always passive, i.e. it only communicates with the master when it receives a **request telegram**. The arrival of a so-called **response telegram** serves the master as an acknowledgment of a successful communication.

The data volume is not read out selectively, i.e. the data memory is read out in blocks and not according to individual data types. The maximum length of the user data fields defined by SIMEAS Q depends on the PROFIBUS **configuration telegram**, the creation of which is application-orientated, depending on the performance characteristics of the master.

Polling is carried out cyclically in ascending order of the PROFIBUS addresses, in accordance with the standard EN 50170. It may consist of several runs if the content of the data memory is greater than the permitted user data field length. This means that the master begins polling at the device with the lowest PROFIBUS address. Once it has reached the highest address, it starts all over again from the beginning until the data memory is completely read out.

In the master, the user data fields of the SIMEAS Q are collected and not released for further processing until the end of the polling cycle. The read-out measured values can be assigned by means of their unique **identification**.



Parameterizing SIMEAS Q for PROFIBUS DP 2

Overview	The following chapter describes presettings that you need to carry out on the SIMEAS Q measuring device in order to start controlling with the PLC SIMATIC S7-300/400.		
	The s SIME the s met, <i>reco</i> of the	settings need to be carried out with the parameterization pace EAS Q Parameterization. You will find instructions on how to oftware, and which hardware and software requirements need in the application description for the <i>SIMEAS Q network qui</i> <i>rder, Chapter 2, Getting started</i> . It contains a detailed desc as software.	kage install d to be a lity ription
Contents	2.1	Starting the parameterization software	2-2
	2.2	Linking the SIMEAS Q device with a PC	2-3
	2.3	Selecting the parameterization mode	2-5
	2.4	Setting/changing the PROFIBUS address	2-6
	2.5	Parameterizing measurement settings	2-7
	2.6	Sending parameterization data to the SIMEAS Q device	2-11
	2.7	Setting measuring / PROFIBUS mode	2-12



2.1 Starting the parameterization software

Program call Once you have successfully installed the **SIMEAS Q Parameterization** application, start the program.

• Double-click the program icon on your Windows desktop.

The main window appears on the screen.

📲 Untitled - SIMEAS Q Parameterization	
<u>File D</u> evice <u>V</u> iew <u>E</u> xtras <u>H</u> elp	
PROFIBUS DP 20 21 22 23 24 25 SIEMENS U <thu< th=""> <thu< th=""></thu<></thu<>	
7KG8000-8AB/BB U _μ =(11-230, V = 100-230, V = 100-2	
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	
Press E1 to get help	
Freest Free get help.	Haupt_02.gif

Bild 2-1 Main window of the SIMEAS Q parameterization software



2.2 Linking the SIMEAS Q device with a PC

The following section describes how to link the SIMEAS Q device with a PC via an RS232/RS485 connecting cable. You need to take the following steps:

PC interface On the PC side, one of the two serial interfaces COM1 or COM2 must be selected as the connection in the parameterization software.

• Select **Options** \rightarrow **Select PC Interface** from the menu.

This opens the Set PC Interface dialog box.

• Click either **COM1** or **COM2** to select as the interface to which the connecting cable is to be connected and confirm with **Close**.

Connecting cable	Connect the connecting cable supplied as shown in
	see Fig. 2-2.







Link the PC and SIMEAS Q measuring device with the RS232/RS485 connecting cable.

• When connecting, please heed the information on the connecting cable.

	Caution:
	The 9-pin Sub D plug must not be changed! The RS485 end must be con- nected to the SIMEAS Q and the RS232 end to the PC!

- Check that the cable is correctly connected. If the connecting cable is incorrectly connected, no parameterization data will be transmitted.
- Connect the 5 V power supply unit with a 230 V voltage source



2.3 Selecting the parameterization mode

For two minutes after the voltage supply is switched on, SIMEAS Q is in parameterization mode. It then switches automatically and permanently into recording mode.

The following applies:

- □ If there is **an** incoming parameterization telegram in this two minutes, SIMEAS Q stays permanently in parameterization mode.
- □ If there is **no** incoming parameterization telegram, then SIMEAS Q switches permanently to recording mode. To return to parameterization mode, SIMEAS Q needs to be switched off and back on again. It is then in parameterization mode for 2 minutes again.

The easiest way to go into parameterization mode is to use the function **Device** \rightarrow **Read Identification**. A parameterization telegram is sent to the SIMEAS Q device. Provided that the 2 minutes have not yet expired, the following information window appears:



Bild 2-3 Read Identification information window

As well as information on the device itself, this window contains the PRO-FIBUS address set in the device. Close this information window.



2.4 Setting/changing the PROFIBUS address

So that the device can be uniquely identified within the PROFIBUS DP system, it must be assigned a PROFIBUS address.

To apply the address to the device, proceed as follows:

- Select the menu item **Device** → **Set PROFIBUS Address**. This opens the **Set PC Interface** dialog box.
- Enter the desired address and click the **Send address** button.

If the function was correctly executed, this is confirmed by an information message.

• Click the **Close** button.

🔡 Example.sqd - SIMEAS Q Par	ameterization	
<u>File Device View Extras H</u> elp		
Measurement settings	Set Profibus address	
Set SIMEAS Q Clock Set Profibus address Calibrate	Please select the desired Profibus Address. Please take care that you did not use the same address more than once in the Profibus network and that the	
Read Identification Show Measurement Values	selected address correspondes to the setting made with the Profibus configuration software	
	Profibusaddress (0125)	
PRO		
SIME 7KG8		
U _{max} :	300 V 100-230 V+50/60 Hz	
φ ι.	$\begin{array}{c c c c c c c c c c c c c c c c c c c $	
Sets the Profibus address in the device		

Bild 2-4 Set PROFIBUS Address



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2.5 Parameterizing measurement settings

The following section shows you how to specify the measurement settings for the SIMEAS Q. To do this, you need to specify the following details:

- □ Which measured values do you want to record?
- □ How, and how often do you want to record these measured values?
- When do you want to begin recording the measurement data in SIMEAS Q?
- **Function test** The function test described below deals with a very small measuring task. In this example, the following measurement settings are to be defined for the SIMEAS Q:
 - □ The voltage UL1 is to be continuously measured over an averaging time of 1 s.
 - □ Recording is to begin directly.
 - Select the menu item **Device** → **Measurement Settings**. This opens the **Parameterize Measurement Settings** dialog box. The left pane with the folder structure is called the navigation window. The measurement settings are entered in data sheets which can be called in the navigation window.
 - In the navigation window, open the folder SIMEAS Q → Basic Settings
 → Other Settings.
 - Select **Other Settings** to show the settings on the right side.

The data sheet with the measurement settings is displayed on the right side.



Parameterizing the The basic settings include the general read-out options. **basic settings**

🗱 Parameterize measurement settings	×
E- 😋 SIMEAS Q E – 😋 Basic Settings □ – D Network settings	Calculate Flicker as:
Binary output 1 Binary output 2 Definition of the settings	Method for power Calculation
	Start of recording: directly from from to
	day monthyearhour min.Start of recording:20121999150End of recording:27121999140
	Time base for continuous recording with MIN/MAX 100 ms values for current and voltage
	Time base for continuous recording with MIN/MAX 1 s values for all other values
	overwriting © No O Yes
OK Cancel Help	

Bild 2-5 Navigation and data window for entering the measurement settings

- Under Start recording, select the option Directly.
- Under **Overwrite**, select the option **No.**



Parameterizing continuous measurement

For continuous recording, you need to define specific measuring periods (averaging times) for each selected measured value (except flicker). The averaging time provides an average value for the recorded current and voltage values. This is continuously filed in the memory with time stamp.

- In the navigation window, select SIMEAS $\mathbf{Q} \rightarrow \textbf{Continuous}$ Measurement.
- Double-click to open the folder.



Bild 2-6 Selection of measured values for continuous measurement

The folder structure contains all measured values that can be recorded using continuous measurement.

- Select the measured value Voltage.
- For the Averaging time, select 1 s.
- Under Voltage L1-N \rightarrow Measurement active, select the option Yes.
- Under Voltage L2-N \rightarrow Measurement active, select the option No.
- Under Voltage L3-N → Measurement active, select the option No.



Parameterizing
fault measurementIn order to select measured values for the fault measurement and define
the settings, proceed as follows:

- In the navigation window, select SIMEAS $\mathbf{Q} \to \textbf{Recording in event of Fault.}$
- Double-click on the **Recording in event of Fault** folder.

The folder structure contains all measured values that can be recorded using fault measurement.

• Open the data sheets for all measured values and disable all settings.

Parameterization of the measurement settings is completed.

• Confirm your input in the **Parameterize Measurement Settings** dialog by pressing **OK**.

This returns you to the main window **SIMEAS Q Parameterization** (see Fig. 2-1).



2.6 Sending parameterization data to the SIMEAS Q device

The measurement settings set in the previous chapter can now be sent to the SIMEAS Q device.

• To do this, select File \rightarrow Send Parameters.



Bild 2-7 Sending parameters

The specified parameters are now sent to the SIMEAS Q device.

The SIMEAS Q confirms receipt of the parameters with the message **The parameters were successfully sent to the device**.



2.7 Setting measuring / PROFIBUS mode

	To operate the SIMEAS Q device on PROFIBUS, set it back to measuring or PROFIBUS mode.		
•	To do this, switch the device off for approx. three seconds.		
•	Remove the parameterization cable (RS232/RS485 connecting cable).		
•	Connect SIMEAS Q to the PROFIBUS network.		
	Once it is switched back on, SIMEAS Q is initially back in parameteriza- tion mode for 2 minutes, during which it waits for a communications tele- gram from the parameterization software.		
	While these settings are being carried out, watch the LEDs on the front of the SIMEAS Q.		
	 The red LED display BF (bus failure) on the SIMEAS Q lights up for two minutes. This LED display should go out after two minutes. 		
	The second red LED display DIA does not light up. It is in the OFF state, indicating that SIMEAS Q is recording measurement data.		
	The device is now in recording mode and ready for the transmission of measurement data to the master station.		
Description of the preset settings	SIMEAS Q is now set for the small measuring task. As soon as SIMEAS Q goes into measuring or Profibus mode, it begins to measure and save voltage values of the Phase voltage UL1 .		
	A value complete with time stamp is stored every second. The setting Overwrite \rightarrow No means that the individual second values are stored one after the other in the SIMEAS Q data memory. They remain in this data memory until they are called during data transmission. If the maximum memory capacity of 10,000 measured values is exceeded, SIMEAS Q reports a storage overflow.		
	The setting Overwrite \rightarrow Yes means that each value is always overwritten by the next measured value. In this case, there is no storing of a series of values and there can therefore be no storage overflow when using this setting.		
	You will find detailed information on the measuring options and parame- terization of SIMEAS Q in the application description for the SIMEAS Q network quality recorder .		



Configuration with SIMATIC STEP 7

Overview	The S It ope mast Amou as Pl imple	The SIMEAS Q device is connected to the PROFIBUS DP system. It operates as a slave in a group with a maximum of 125 slaves and one master. Amongst others, programmable logic controllers (PLC) are implemented as PROFIBUS masters. In this case, a SIMATIC S7-300/400 is implemented as a PLC.			
	In the following section, the SIMATIC S7 is configured as PROFIBUS master using the configuration tool SIMATIC STEP7 .				
Contents	3.1	Starting the SIMATIC STEP 7	3-2		
	3.2	Creating a new project	3-3		
	3.3	Defining SIMATIC S7 as a new station	3-5		



3.1 Starting the SIMATIC STEP 7

SIMATIC STEP 7 is started from the Windows 95/Win NT user interface:

- Double-click the SIMATIC Manager icon on your desktop. or
- Select SIMATIC → SIMATIC Manager from the Start menu.
 This opens the SIMATIC STEP 7 application SIMATIC Manager.



3.2 Creating a new project

Creating a project

In the first step to configuring your SIMATIC S7-300/400, create your own SIMATIC project. To create a new project, proceed as follows:

• Select File \rightarrow New \rightarrow Project.

This opens the **New** dialog box for a new project. It contains a list of all projects already created.

New	×				
New Project	O New Library				
Na <u>m</u> e:					
SimeasQ_Connection	n				
Name	Storage Path				
COM_SFB S7_MIX S7_ZEBRA	C:\SIEMENS\STEP7\Examples' C:\SIEMENS\STEP7\Examples' C:\SIEMENS\STEP7\Examples'				
•	F				
<u>Type:</u> Project	•				
Storage Location (Path): Browse					
C:\SIEMENS\STEP	7\S7proj				
ОК	Cancel Help				

Fig. 3-1 Creating a new project

- Select the option New Project.
- Enter a unique project name in the (Project) Name box.



Note:

Folder names must not exceed a maximum of 8 characters. Otherwise, this may cause problems when you want to archive folders.

- Select **Project** in the **Type** box.
- For the Storage location (Path), select the current project folder.
- If necessary, switch to another project folder by clicking the **Browse** button.
- Confirm your input with **OK**.

The following project window opens:



SIMATIC Manager - SimeasQ_Connection	l ×
Eile Edit Insert PLC View Options Window Help	
🔄 SimeasQ_Connection - <offline> (Project) C:\SIEMENS\STEP7\S7proj\SimeasQ_</offline>	
SineasQ_Connection	
Press F1 for help.	11.

Bild 3-2 SIMATIC project window

The left pane of the project window contains an icon for the project **SIMEAS Q Connection**.

In the right pane, the current project only contains the automatically created object **MPI(1)**. MPI designates a predefined interface between your PC and the SIMATIC S7 as target system.



Note:

You only need the MPI interface when you want to communicate between the programming device (PC) and the target system (SIMATIC S7) under STEP 7.



3.3 Defining SIMATIC S7 as a new station

The next step shows you how to define a **SIMATIC S7-300/400** as a new station within the PROFIBUS system.

- Select the current project in the left pane of the project window.
- Select Insert \rightarrow Station \rightarrow SIMATIC S7-300/400.

The **SIMATIC S7-300/400** is inserted into the project as a new station in the right pane.

• Select the new entry and give it a self-explanatory name, such as SIMEAS Q Master.



Bild 3-3 SIMATIC S7 as new station in PROFIBUS

 Station structure
 The Hardware container is automatically created when a station is created. It appears in the right pane as part of the station.

The next step shows you how to enter the hardware configuration of your SIMATIC S7-300/400 in SIMATIC Manager.







4

Configuring the hardware

Overview	Durin parar SIMA the s spon	During hardware configuration , you inform the SIMATIC Manager parameterization software which hardware components your SIMATIC S7 consists of. The hardware configuration forms the basis of the subsequent selection of associated PROFIBUS slaves and corre- sponding software blocks.			
Contents	4.1	Start hardware configuration	4-2		
	4.2	Integrating the GSD file	4-3		
	4.3	Configuring the hardware	4-4		
	4.4	Equipping the basic modules	4-5		
	4.5	Creating a PROFIBUS system	4-6		
	4.6	Integrating SIMEAS Q as PROFIBUS slave	4-9		



4.1 Start hardware configuration

To configure the hardware, proceed as follows:

• Double-click the Hardware container.

This starts the hardware configuration and the **HW Config** window opens.

📲 HW Config - Hardware Configuration: SimeasQ_Connection'SIMEAS Q Master	
<u>Station Edit Insert PLC ⊻iew Options Window H</u> elp	
Image: Second	Profil: Standard
	E W PROFIBUS DP E SIMATIC 300
	È- 🞆 SIMATIC 400 È- 💼 CP-400
	ER1
	ER2
	UR1
(U) UH	UR1
	m UR2
	SIMATIC PC Based Control
	M7, and C7 (distributed rack)
I Press F1 for help.	

Bild 4-1 HW Config with open hardware catalog

The hardware configuration in SIMATIC Manager contains a catalog with all the hardware components that your SIMATIC S7 can contain.

• Open the Hardware Catalog by selecting Insert \rightarrow Hardware Components or View \rightarrow Catalog.

This opens the Hardware Catalog window.



4.2 Integrating the GSD file

The GSD (device database) file contains all the properties of a DP slave. By integrating the GSD file for SIMEAS Q, you expand the Hardware Catalog in SIMATIC Manager by the PROFIBUS slave SIMEAS Q.

The disk with the GSD files for SIMEAS Q are included in delivery with the measured value data block.

Installing the GSD There are three files on the GSD disk:

SimQ1653.GSD

This contains the device-specific data of the SIMEAS Q device.

- 7KG 8000n.BMP
- □ 7KG 8000s.BMP

These two files are used for the graphical representation of the SIMEAS Q slaves on the PROFIBUS system.

To install the files in your Hardware Catalog, proceed as follows:

• Select **Options** → **Install New GSE** (in some releases named **Install New DDB**) in the **HW Config** window.

This opens the Install New GSE dialog.

- Switch to the sample disk which contains the GSD files.
- Select the SimQ1653.GSD file and click the Open button.

The GSE file is installed in SIMATIC Manager.

• Select **Options** → **Update Catalog**.

The Hardware Catalog is updated with the new hardware components. It now contains the folder SIMEAS Q located under PROFIBUS DP \rightarrow Additional Field Devices \rightarrow Other.

You can now use this folder to assign the hardware component SIMEAS Q to the PROFIBUS as slave.



file

Note:

You will find further details on how to configure the PROFIBUS connection in the operating instructions for your PROFIBUS configuration software.



4.3 Configuring the hardware

The **HW Config** window is initially empty. First select a **rack** from the Hardware Catalog:

• In the Hardware Catalog, open the folder SIMATIC 400 \rightarrow RACK-400.

The rack symbolizes your SIMATIC S7. Assign all hardware components contained in your SIMATIC S7 to the rack.

• To insert a rack, e.g. UR1, drag & drop it onto the SIMEAS Q (configuration) window.

The central rack automatically contains the designation UR1(0).

Display modes The **HW Config** window has two display modes for the PROFIBUS system:

- Graphical display mode
- Tabular display mode of the selected components



4.4 Equipping the basic modules

In the next step, you equip the racks with all the hardware components actually in your SIMATIC S7.

You have two options:

- Open the folder in the Hardware Catalog and browse until you reach the corresponding module.
- Select the module and drag and drop it onto the planned slot in the rack. Or:
- First select the planned slot in the rack.
- Double-click the required module in the Hardware Catalog. The selected module is inserted in the rack.

Now insert all required modules in the rack in the same manner.

Select Power Supply	First insert a P ower S upply in the rack.
	• In the Hardware Catalog, open the folder SIMATIC 400 \rightarrow PS-400.
	• Drag and drop a power supply, e.g. PS 405 20 A , onto the free slot 1 .
	The power supply requires three slots.
Select a CPU	The selection of the CPU depends on the SIMATIC S7 series and the data volume to be transmitted.
	• Open the folder for your SIMATIC series, e.g. SIMATIC-400 \rightarrow CPU-400.
	• Insert one of the CPUs 412 to 416 or the CPU 417 in slot 4.
•	Note:
	The CPU in your SIMATIC S7 influences the maximum number of mea- sured values in the response telegram. See section 4.6 Integrating SIMEAS Q as PROFIBUS slave.

Drag the selected CPU to the first free slot **4**. The CPU serves as DP master within the PROFIBUS system.



Defining the

Creating a PROFIBUS system 4.5

The Properties - PROFIBUS Interface DP Master dialog appears. **PROFIBUS** master

> For the PROFIBUS address of the DP master SIMATIC S7, use the . recommended value 2.

Properties - PROFIBUS interface DP N	laster (R0/S4.1) 🛛 🗙
General Parameters	
Address:	If a subnet is selected, the next available address is suggested.
Transmission rate:1.5 Mbit/s	
<u>S</u> ubnet:	
not networked	<u>N</u> ew
	Properties
	Dejete
ОК	Cancel Help

Fig 4-2 Defining the PROFIBUS DP master

The DP master has not yet been assigned a PROFIBUS. It currently only contains the entry --- not networked ---. You therefore need to define a new PROFIBUS network first.

Click the New button.

The Properties - New PROFIBUS Subnetwork dialog appears.



Properties - New st	ubnetPROFIBUS		×
General Network S	ettings		
<u>N</u> ame: <u>S</u> 7 subnet ID	PROFIBUS(1) 0005 - 0004		
Project path:	SIMEAS Q Connection		
Storage location of the project:	C:\SIEMENS\Step7\S7proj\Simeas_q		
<u>A</u> uthor:			
Date created: Last modified:	20.12.1999 11:30:33 20.12.1999 11:30:33		
<u>C</u> omment:			4
ОК		Cancel	Help

Fig 4-3 Creating a PROFIBUS subnetwork

If necessary, rename the subnetwork **PROFIBUS(1)** in the **Name** box.

• Switch to the Network Settings tab

Properties - New subnetPROF	IBUS			×
General Network Settings				
Highest PROFIBUS Address:	126 🔽	Change	Options	
<u>I</u> ransmission Rate:	45.45 (31.25) kbit/s 93.75 kbit/s 187.5 kbit/s 500 kbit/s 1.5 Mbit/s 3 Mbit/s			
<u>P</u> rofile:	DP Standard Universal (DP/FMS) User-Defined		<u>B</u> us Parameters	
ОК			Cancel Help)



• Check the option Turn on Cyclic Distribution of the Bus Parameters.



If this option is checked, the bus parameters in operation are cyclically sent from the DP master interfaces. This, for example, allows problem-free connection of the SIMATIC S7 to the PROFIBUS during runtime.

• For the **Transmission rate**, use either the default setting of **1.5 Mbit/s**, or select another value.

The setting of the transmission rate depends on the properties of the PROFIBUS station. The transmission rate must not be greater than that of the slowest station.

• Select DP from the Profile list.

The setting of the bus parameter is then optimized to the devices of the SIMATIC S7 series. This is defined in the standard EN 50170 Volume 2/ 3, Part 8-2 PROFIBUS.

• Confirm your input with **OK**.

This returns you to the **Properties - PROFIBUS interface DP Master dialog.**

• Confirm your input for the DP master with OK.

The graphical representation in HW Config now contains the **DP Master CPU 417-4** with connected PROFIBUS. This forms the "rack" for the **DP slaves** of the master system.



Fig 4-5 DP master with PROFIBUS



4.6 Integrating SIMEAS Q as PROFIBUS slave

The PROFIBUS master and the PROFIBUS DP system are now defined. The next step shows you how to integrate the measuring device SIMEAS Q as a PROFIBUS slave.

• Enable the **PROFIBUS** in the graphical overview.

The PROFIBUS is now highlighted.

In the Hardware Catalog folder structure, double-click the following entries: PROFIBUS-DP → Additional Field Devices → General and select the folder SIMEAS Q.

Selection of the Preset	Configuratio	n	X
12A/240E - 19 values 12A/228E - 18 values		4	
12A/216E - 17 values 12A/204E - 16 values			
12A/192E - 15 values			
12A/168E - 13 values			
12A/156E - 12 values 12A/144E - 11 values		<u> </u>	
4		Þ	
OK	Cancel	Help	

The Select Setpoint Configuration dialog appears.

Fig 4-6 Select Setpoint Configuration

The **Select Setpoint Configuration** dialog contains the available combinations for the **O**utput and Input areas of the DP slave. These also define the length of the request and response telegrams.

- O: Length of the request telegram
- I: Length of the response telegram

Values: Maximum number of measured values in the response telegram

These values cannot be selected independently of each other.

Select a combination from the displayed list.



Note:

Please note that the combinations offered in the list must not be changed.

Table 4-1 compares the maximum number of measured values for various CPUs.



SIMATIC	Master	RAM capacity in Kbytes	Maximum number of measured values	Maximum number of slaves
S5	IM 308 B	2	1	32
	IM 308 C	16	19	125
	CP 5412 A2	64 ¹⁾	19	125
S7	CPU 315 DP	64 ¹⁾	9	64
	CPU 412-416		9	64
	CPU 417		19	125

Table 4-1	Performance characte	eristics of different	SIMATIC masters

¹⁾The RAM is available for all data (incl. configuration data). Please note device manual

• Confirm your input with **OK**.

This opens the Properties - PROFIBUS Interface SIMEAS Q dialog.

Assigning PROFIBUS addresses

Enter the PROFIBUS address for the slave SIMEAS $\ensuremath{\mathsf{Q}}$ as follows.

- Select the **Parameters** tab.
- In the **Address** box, select the address that you assigned to this SIMEAS Q device.
- Confirm your input with **OK**.



Eigenschaften - PROFIBUS Schnittstelle SIMEAS Q	×
Allgemein Parameter	
Adresse:	
Übertragungsgeschwindigkeit: 1.5 Mbit/s	
<u>S</u> ubnetz:	
nicht vernetzt PRDEIRUS(1) 1.5 Mbit/s	<u>N</u> eu
	<u>E</u> igenschaften
	Löschen
OK Abb	brechen Hilfe

Fig 4-7 PROFIBUS address of the DP slave

In the **HW Config** dialog, the graphical representation of the PROFIBUS system now contains the new slave SIMEAS Q.

🔣 HW Config - [SIMEAS Q Master (Configuration) SIMEAS Q Connection]
🕼 <u>S</u> tation <u>E</u> dit Insert <u>P</u> LC <u>V</u> iew <u>O</u> ptions <u>W</u> indow <u>H</u> elp
(0) UR1 PROFIBUS(1): DP master system (1) PROFIBUS(1): DP master system (1)
4 CPU 417-4 X2 DP Master X7 MFX/DP IF1 IF2 6

Bild 4-8 PROFIBUS DP master system with SIMEAS Q

• Save the current configuration by selecting the menu command Station \rightarrow Save and Compile.

Saving this configuration stores the **S7 Program, Sources** and **Blocks** containers in your SIMATIC project for the subsequent software configuration.





Fig 4-9 SIMATIC project with containers for software blocks

The following section shows you how to assign the required software blocks of your SIMATIC S7 to the **Blocks** container.



5

Configuring the software

Overview	The for SIMA nectio	ollowing section describes the selection of the software block TIC S7. The required software blocks vary depending on the on:	for con-
	🗆 Via	a the integrated PROFIBUS DP interface	
	u To	the PROFIBUS CP with communications processor	
Contents	5.1	Overview of software blocks used	5-2
	5.2	Functional overview	5-3
	5.3	Blocks for PROFIBUS DP	5-4
	5.4	Blocks for PROFIBUS DP with CP	5-5



5.1 Overview of software blocks used

SIMATIC STEP 7 works with a range of software blocks. The software blocks for connections described in the following section are all in the sample project **S7_FB_V120.exe** on the disk included in delivery.

Code blocks

Table 5-1 Code blocks for SIMEAS Q connection

Block	Description
OB1	Standard organizational block for program call
OB100	Organizational block for unique program call during initialization
FB30, FB31	Function blocks for querying SIMEAS Q
FC1, FC2	System functions of the standard library STDLIB 30

These blocks contain the program code in the programming language STL (statement list).

The system functions SFC1 and SFC15 are permanently integrated in the CPU.

Data blocks Table 5-2 Data blocks for SIMEAS Q connection

Block	Description
DB41	Measured value data block
DB30, DB31	Instance data blocks



5.2 Functional overview

The following overview explains how to call the software blocks when more than one SIMEAS Q slave is connected.



Fig. 5-1 Calling function blocks for SIMEAS Q connection

The following section describes the blocks required for PROFIBUS DP and PROFIBUS CP. In order to save disk space, always load only the blocks necessary for your variant in SIMATIC S7.



5.3 Blocks for PROFIBUS DP

You need these blocks for connection to SIMATIC S7-400 and S7-300 with integrated interface.

For connection to PROFIBUS DP, copy the following blocks to your SIMATIC project:

- Open the sample project **S7_FB_V120.exe** on the sample disk.
- Open the folder
 SIMEAS Q → S7 Program (SimeasQ) → Blocks.
- Press and hold the CTRL key and select the following blocks: FB30, DB41, DB30



Bild 5-2 Software blocks for PROFIBUS DP

• Drag the selected blocks to the **Blocks** folder in your SIMATIC project.

The selected blocks are copied to your project.

Die system functions **SFC1** and **SFC15** are already permanently integrated in the CPU. Data transmission under PROFIBUS DP is effected via these standard blocks.



5.4 Blocks for PROFIBUS DP with CP

You need these blocks for connection to SIMATIC S7-300.

For connection to PROFIBUS DP, copy the following blocks to your SIMATIC project:

- Open the sample project S7_FB_V120.exe on the sample disk.
- Open the folder
 SIMEAS Q → S7 Program (SimeasQ) → Blocks.

FB31, DB41, DB31, FC1, FC2

• Press and hold the CTRL key and select the following blocks:

SIMATIC Manager - SIMEAS Q Connection _ 8 × Edit Insert PLC View Options Window / Heli 🗅 🚅 🎇 🚿 📴 💼 💼 🖳 💁 🕞 🔚 🏥 🏥 🤇 < No Filter > 🖸 🏹 👯 🌒 📢 SIMEAS Q Connection -- C:\SIEMENS\Step7\S7proj\Sim - 🗆 🗶 🕑 as Q PROFIBUS Anschl... 💶 🗖 🗙 🚵 System data - AND SIMEAS Q Connection 🕞 (0B1 🐴 SimeasQ 🗖 0B1 OB86 SIMATIC 416-DP OB100
 FB31 SIMEAS Q Master 🖬 FB 30 CPU416-2 DP G FC1 Ē 🗄 💼 S7 Program(1) FC2 Source: DB31 DB41 DB42 🛅 Blocks VAT1 Ϋ́Ξ 🖬 SFC14 SFC15 - 🛅 Quellen - 😋 Bausteine

Bild 5-3 Software blocks for PROFIBUS CP

• Drag the selected blocks to the **Blocks** folder in your SIMATIC project.

The selected blocks are copied to your project.

The system functions **FC1** and **FC2** are taken from the standard library **STDLIB 30**. Data transmission under PROFIBUS CP is executed via these standard blocks.







6

Reading out SIMEAS Q

Overview

The following section describes the options available for reading out SIMEAS Q via PROFIBUS. For this purpose, various parameters must be set in the programming environment of SIMATIC Manager.

6.1	Program call	6-2
6.2	Parameterizing measured values	6-5
6.3	Setting recording options	6-8



6.1 Program call

Overview	The program call is executed in the standard organizational block OB 1 and in OB 100 for initialization during the first system startup. Adapt the code in OB1 and OB100 in the sample project as follows.		
•	Note:		
	The following prog PROFIBUS for ea	gram call in 0 ch SIMEAS	DB1 must be carried out once in the Q.
	This call must be	similarly ada	pted in block OB100 .
•	Double-click block	OB1 in the	blocks container.
	The Editor opens	block OB1 fo	or processing. Integrate the following call:
PROFIBUS DP S7-400 and S7-300 with integrated interface	CALL "FB30" , "DE INIT I_ADDRESS I_SIZE O_ADDRESS O_SIZE	330" :=FALSE :=512 :=96 :=512 :=12	// :=TRUE for initialization in OB 100 // n*12, n = 8 (values)
	MV_DB Mon_Timer	:=41 := T30	<i>II</i> := 42, 43,, for each SiMEAS Q slave
PROFIBUS DP with CP S7-300	CALL "FB31" , "DE INIT I_ADDRESS I_SIZE	331" :=FALSE :=512 :=96	// :=TRUE for initialization in OB 100
	O_ADDRESS O_SIZE MV_DB Mon_Timer	:=512 :=12 :=41 := T31	<i>II</i> := 42, 43,, for each SiMEAS Q slave
Set input and output addresses	Apply the values I ware configuration lows:	ADDRESS	, O_ADDRESS , and I_SIZE from the hard- ective SIMEAS Q slave. Proceed as fol-
•	Switch to the appl	ication HW	Config.

• Select the corresponding SIMEAS Q slave in the PROFIBUS network.



The following list with the I/O addresses of the SIMEAS Q slave is displayed:

	HW	Config - [SIMEAS	Q Master (Confi	guration)	SIMEAS Q	Connection]	_ 🗆 ×
	<u>S</u> tal	tion <u>E</u> dit <u>I</u> nsert <u>F</u>	<u>PLC ⊻iew O</u> ption	ns <u>W</u> indow	<u>H</u> elp		_ 8 ×
[2 🗀	; 🗣 🖬 🙀 🖉		šu 💼 🗆		<u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u></u>	
	1 1 4 1 1 1 1 1 1 1 1 1 1 1 1 1	IRT PS 405 204 CPU 417-4 DP Maxter MPL/DP				PROFIBUS(1): DP master system (1)	×
Ē	•	(1) SIMEAS Q					
ľ	Slot	Module / D	Order number	LAddress	Q Address	Comment	
	1	171	Universal module		512.523		
	2	155	Universal module	512523			
	3	155	Universal module	524535			
	4	155	Universal module	536547			
	5	155	Universal module	548559			
	6	155	Universal module	560571			
	7	155	Universal module	572583			
	8	155	Universal module	584595			
	9	155	Universal module	596607			
	10	155	Universal module	608619			
	17	155	Universal module	620631			
	12	100	Liniversal module	632643			
	13	100	Liniversal module	050 007			
	14	133	Universal module	00000/			
	15	155	Universal module	697 691			
Pr	ess F1	to get Help.					

Fig. 6-1 Input and output addresses of the PROFIBUS slave.

- Apply the I address 512 for I_ADDRESS.
- Apply the O address **512** for O_ADDRESS.
- Apply values*12 = 96 for I_SIZE. The values parameter is found in the Setpoint Configuration dialog in HW Config.

One MVDB per SIMEAS Q slave

Each additional SIMEAS Q slave is called in the same way. In each case, change the allocated measured value data block (MVDB) and the input and output addresses of the slave.

- Copy a program call for each SIMEAS Q slave.
- Change the Instance_db as required.
- Change the allocation of the MVDB, for example to: MV_DB := 42
- Match the **I_ADDRESS**, **O_ADDRESS** and **I_SIZE** parameters with the hardware configuration of the second slave.
- Change the Timer_db as required.
- Now parameterize the individual measured values in DB42 as described in section 6.2.

The following table contains all the parameters for calling the application program.

Table 6-1	Program call	parameters
-----------	--------------	------------

Parameters	Value	Meaning
INIT	FALSE TRUE	for calling in OB 1 for initialization in OB 100:
I_ADDRESS	l address	Input address (from HW Config)
I_SIZE	values*12	Number of values multiplied by 12 bytes per measured value (from setpoint configuration of HW Config)
O_ADDRESS	O address	Output address (from HW Config)
O_SIZE	12	12 bytes per measured value
MV_DB	DBx	Parameter and measured value data block
Mon_Timer	Ту	Monitoring timer

Example

The call for connecting **two** SIMEAS Q slaves to **PROFIBUS DP** might look as follows:

CALL "FB30", "DB	30"
INIT	:=FALSE
I_ADDRESS	:=512
I_SIZE	:=96
O_ADDRESS	:=512
O_SIZE	:=12
MV_DB	:=41
Mon_Timer	:=T30
CALL "FB30", "DB3	31"
CALL "FB30" , "DB3 INIT	31" :=FALSE
CALL "FB30" , "DB3 INIT I_ADDRESS	31" :=FALSE :=524
CALL "FB30", "DB INIT I_ADDRESS I_SIZE	31" :=FALSE :=524 :=36
CALL "FB30", "DB: INIT I_ADDRESS I_SIZE O_ADDRESS	31" :=FALSE :=524 :=36 :=752
CALL "FB30", "DB: INIT I_ADDRESS I_SIZE O_ADDRESS O_SIZE	31" :=FALSE :=524 :=36 :=752 :=12
CALL "FB30" , "DB3 INIT I_ADDRESS I_SIZE O_ADDRESS O_SIZE MV_DB	31" :=FALSE :=524 :=36 :=752 :=12 :=42
CALL "FB30", "DB INIT I_ADDRESS I_SIZE O_ADDRESS O_SIZE MV_DB Mon_Timer	31" =FALSE =524 =36 =752 =12 =42 =T31

// 512 + 12

II values from setpoint configuration: 3*12 *II* recommended by SIMATIC Manager



6.2 Parameterizing measured values

The parameters for setting the individual measured values are modified in the measured value data block (MVDB).

ΝI	^	4	^		
N	c	Ð	-	-	
	-	•	-	-	

Each SIMEAS Q slave requires exactly one MVDB in the SIMATIC S7. The following changes must therefore be carried out for each PROFIBUS slave.

for this purpose, copy one MVDB 41 for each SIMEAS Q from the sample project and store it under a new name, such as **DB42.** Then set the measured values for each SIMEAS Q as follows.

• Double-click the respective MVDB, e.g. DB41.

The application for programming **LAD/STL/SFC** blocks opens block DB41 for processing.

KAD/ST	📱 LAD/STL/FBD - [DB41 SimeasQ\S7-Programm(Simeas_Q)]					
🖸 <u>F</u> ile <u>E</u> d] Eile Edit Paste PLC Iest View Options Window Help					
	• 🖬 🖨 🕺 🖬 🖻 🗩 •	• <u>678 🏜 </u> 💇	!≪≫! №			
+38.0	DW_5	DUORD	DW#16#0			
+42.0	DW_6	DWORD	DW#16#0			
+46.0	DW_7	DWORD	DW#16#0			
+50.0	number	INT	1	number of used values		
+52.0	ID	ARRAY[1500]				
*0.0		STRUCT				
+0.0	PNU	INT	1	parameter number		
+2.0	SUB	INT	0	subindex		
+4.0	value	REAL	0.000000e+0	physical value		
+8.0	timestamp	ARRAY[15]				
*1.0		BYTE				
=14.0		END_STRUCT				
=7052.0		END_STRUCT				
Press F1 to g	et Help.			S offline Abs Inset		

Fig. 6-2 Parameterizing measured values

• Click $View \rightarrow Data Display$ to switch to the data display of block DB41.

Set the number of	You can define the number of measured values to be read out via
measured values	PROFIBUS in the Number parameter.

• For example, change **Number** from its default value of **1** to the value **10**

•	Note:
	The CPU in your SIMATIC S7 influences the maximum number of measured values transmitted per response telegram.

- □ The CPUs 412 416 have an address area of 122 bytes.
- □ The CPU 417 has an address area of maximum 244 bytes.

Setting the measured value ID for each measured value SIMEAS Q enters the actual physical measured value in the **Value** cell. The **Time** cell contains the corresponding time stamp.

To enable allocation of specific measured values to the read out measured values, each is assigned a unique measured value ID. The measured value ID comprises:

- Parameter numbers
- Subindex
- Click View→ Data Display to switch to the data display of block DB41.

The data view shows a list of the data storage area of the entire measured value array.

III L	👔 LAD/STL/FBD - [DB41 SimeasQ\S7-Programm[Simeas_Q]]							
0 <u>F</u>	ile <u>E</u> dit <u>P</u> aste P <u>L</u> C <u>T</u> est	<u>View</u> Options <u>W</u> indo	w <u>H</u> elp				_8	×
	🖻 🔓 🛃 🖌 🖻		<u>b</u> 🔁 🛃	!«»! №				
	50.0 number	INT	1	2	number of used values			
	52.0 ID[1].PNU	INT	1	402	parameter number		ļ	
	54.0 ID[1].SUB	INT	0	0	subindex			
	56.0 ID[1].value	REAL	0.000000e+0	0.000000e+000	physical value			
	60.0 ID[1].timestamp	BYTE	B#16#0	B#16#0				
	61.0 ID[1].timestamp	BYTE	B#16#0	B#16#0				
	62.0 ID[1].timestamp	BYTE	B#16#0	B#16#0				
	63.0 ID[1].timestamp[BYTE	B#16#0	B#16#0				
	64.0 ID[1].timestamp[BYTE	B#16#0	B#16#0				
	66.0 ID[2].PNU	INT	1	400	parameter number			
	68.0 ID[2].SUB	INT	0	0	subindex			
	70.0 ID[2].value	REAL	0.000000e+0	0.000000e+000	physical value			
	74.0 ID[2].timestamp	BYTE	B#16#0	B#16#0				
	75.0 ID[2].timestamp[BYTE	B#16#0	B#16#0				
	76.0 ID[2].timestamp[BYTE	B#16#0	B#16#0				
	77.0 ID[2].timestamp	BYTE	B#16#0	B#16#0				
	78.0 ID[2].timestamp	BYTE	B#16#0	B#16#0				
	80.0 ID[3].PNU	INT	1	1	parameter number			
	82.0 ID[3].SUB	INT	0	0	subindex			
	84.0 ID[3].value	REAL	0.000000e+0	0.000000e+000	physical value			
	88.0 ID[3].timestamp	BYTE	B#16#0	B#16#0				
	89.0 ID[3].timestamp	BYTE	B#16#0	B#16#0				T
Press	ress F1 to get Help.							

Bild 6-3 Measured value addresses in the data display

- Enter a parameter number **PNU** between 400 and 1512 for each measured value.
- Enter a subindex SUB between 0 and 120.
- You will find a list of all measured value IDs in the application description for the SIMEAS Q network quality recorder, Appendix E, Function IDs and parameter numbers.

Note:

Any measured values that are not paramerized are rejected by SIMEAS Q.

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Shortening the
MVDBIn order to save disk space, you can shorten each measured value data
block to the length of the measured values actually used. To do this, set
the upper limit of the measured value array from the default setting 500
to the actual Number value.

- Click View→ Declaration View to switch to the declaration view of the MVDB.
- Change the declaration of the measured values in the **ID** parameter from Array[1..500] to Array[1..**10**].

Optimizing runtime The runtime of the block is strongly influenced by the number of parameterized measured values. For this reason, the number of measured values from the receive telegram actually entered in the MVDB for each block processing can be specified in the **Optimize Runtime** parameter.

KAD/S	TL/FBD - [DB41 SimeasQ\S7-F	rogramm(Simeas_Q)]		
🕞 <u>F</u> ile <u>E</u>	dit <u>Paste</u> P <u>LC</u> <u>T</u> est <u>V</u> iew Option	ns <u>W</u> indow <u>H</u> elp		
		• 63 🏜 🔁 🚳	!«»! №	
Address	Name	Туре	Start value	Comment
0.	0	STRUCT		
+0.	0 not_used	BYTE	B#16#0	not_used
+1.	optimize_runtime	BYTE	B#16#0	number of measured values per cycle 0=all
Press F1 to	get Help.	1	1	🛛 filine Abs Insett 🥢

Bild 6-4 Optimize runtime

• The default setting B#16#0 automatically enters **all** the measured values of a telegram in the MVDB immediately.

This is the least favorable for the runtime behavior.

• Select a value between **0** and **Number** in order to enter only this number of measured values in the MVDB.

All measured values above and beyond this set value are not entered in the MVDB and are rejected.

If the value entered in the **Optimize Runtime** parameter is too high, the program runtime will not improve.



6.3 Setting recording options

All commands to control the recording at SIMEAS Q are triggered by setting a bit in the measured value data block (MVDB).

• Double-click the respective data block, e.g. DB41.

The Editor opens block DB41 for processing.

##	🙀 LAD/STL/FBD - [DB41 SimeasQ\S7-Programm(Simeas_Q)]								
0	⊐ File Edit Paste PLC Iest View Options Window Help								
	D 🚅 🔓	🖬 🕘 X 🖬 🖬 🗠 🗠	• 6 % 🏜 💌 66*	!« »! N					
IF									
Ш	+3.0	com_1	BOOL	TRUE	clock set				
Ш	+3.1	com_2	BOOL	FALSE	start recording				
	+3.2	com_3	BOOL	FALSE	start recording at time				
	+3.3	com_4	BOOL	FALSE	stop recording				
	+3.4	com_5	BOOL	FALSE	stop recording + delete				
	+3.5	com_6	BOOL	FALSE	start recording at time for duration				
	+3.6	com_spare1	BOOL	FALSE					
	+3.7	com_spare2	BOOL	FALSE					
I	+4.0	starttime_minute	BYTE	B#16#0	starttime:minutes				
I	+5.0	starttime_hour	BYTE	B#16#0	starttime:hour				
I	+6.0	starttime_day	BYTE	B#16#0	starttime:day				
	+7.0	starttime_month	BYTE	B#16#0	starttime:month				
	+8.0	starttime_year	BYTE	B#16#0	starttime:year				
1	+10.0	duration_minutes	DINT	L#0	duration				-
P	ress F1 to get	Help.			•	💭 😨 offline	Abs	Insert Chg	

Bild 6-5 Command assignment

Setting the date and time	Set the date and time on SIMEAS Q by setting Com_1 to TRUE . The time and the date are automatically retrieved from SIMATIC S7 and transferred to SIMEAS Q.
Start recording	Start the recording on SIMEAS Q immediately by setting Com_2 to TRUE .
Stop recording	Stop the recording on SIMEAS Q immediately by setting Com_4 to TRUE .
Stop and delete recording	Stop the recording on SIMEAS Q and delete all current measured values simultaneously by setting Com_5 to TRUE .



Start recording at a specific time

To start recording on SIMEAS Q at a specific time, set **Com_3** to **TRUE**. Enter the desired time in the **Start_Time** parameters. The following table

Table 6-2 Value ranges of time and date information

Time information	Value range
Minute (mm)	0 to 59
Hour (hh)	0 to 23
Day (dd)	Depending on the month: - 1 to 30 - 1 to 31 For February: - 1 to 28 (non-leap year) - 1 to 29 (leap year)
Month (mm)	1 to 12
Year (yy)	The last two digits of the year are stored modulo 100. Thus, all values < 80 are interpreted as > 2000 .

The following example starts the recording on 18.11.1999 at 02:27.

į	🔀 LAD7STL7	/FBD - [DB41 SimeasQ\S7-F	rogramm(Simeas_Q)]				
1	<mark>⊡ E</mark> ile <u>E</u> dit	Paste PLC Test View Option	ns <u>W</u> indow <u>H</u> elp				_ <u>- - - - - - - - - - </u>
	🗅 🚅 🔓	. 6 X h i • •	- Giải 🔁 M	' <u>!</u> «»! M	2		
	+4.0	starttime_minute	BYTE	B#16#27	starttime:minutes		<u> </u>
I	+5.0	starttime_hour	BYTE	B#16#2	starttime:hour		
I	+6.0	starttime_day	BYTE	B#16#18	starttime:day		
I	+7.0	starttime_month	BYTE	B#16#11	starttime:month		
I	+8.0	starttime_year	BYTE	B#16#99	starttime:year		
I	+10.0	duration_minutes	DINT	L#150	duration		
F	Press F1 to get	Help.	,			😨 offline	Abs Insert Chg //

Bild 6-6 Setting the start time and period for recording

Start recording: time and period

To start the recording on SIMEAS Q at a specific time and for a specific duration, set **Com_6** to **TRUE**. As well as the time, enter the recording duration in the **Number_Minutes** parameter.

The above example starts the recording at 02:27 on 18.11.1999 for a period of 150 minutes:







7

Error messages

Overview	The f SIME mess DB4 ²	following section describes possible error messages of EAS Q device and those occurring during data transmiss sages are stored in the respective measured value dat 1).	f the sion. All error a block (e.g.
	You comr	can read this data storage area with SIMATIC Manage mand Monitor and Control Variables .	er using the
Contents	7.1	Error messages of the SIMEAS Q device	7-2
	7.2	General communications errors	7-4



7.1 Error messages of the SIMEAS Q device

Command acknowledgment SIMEAS Q can only execute a command under certain conditions. If these are not fulfilled, SIMEAS Q outputs a negative acknowledgment of the command execution. Correct execution of the respective commands com_1 to com_6 can be seen in the **Command_Acknowledgment** parameter.

Command_ Acknowledgment	Explanation
0	Executing command
1	Command executed correctly
2	An error has occurred

 Table 7-1
 Command acknowledgment in DBB15

SIMEAS Q errors If an error occurs, the exact cause of the error is entered in the Fault_Identification_Telegram parameter of the respective measured value data block (e.g. DB41).

Table 7-2	Error identification	of SIMEAS Q	device in DBB16

Command not executed Error			E	rror	cod	е		
 Start recording Start recording from specified time Start recording from specified time over specified period Set time File transfer 	 Recording running Measured data are stored in the memory of SIMEAS Q 					1	0	0
- Stop recording	 Recording not running 				1	0	0	0
 Start recording from specified time Start recording from specified time over specified period Set time 	 Already over the received time. The received time format is invalid. The received time format is invalid. 			1	0	0	0	0
- File transfer	– Invalid file ID		1	0	0	0	0	0



SIMEAS Q status Information on the operating status of SIMEAS Q is transmitted to the DP Master via PROFIBUS and stored in the Status parameter of the respective measured value data block.

> The information contained in the status parameter is in **binary code**. Only bits 1 to 6 are currently used. Bit0 and bit8 are reserved for future expansions.

	SIMEAS_Q_status							
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Measurement settings available							1	
Recording running						1		
Measurement data available					1			
Storage overflow				1				
Measuring range- exceeded			1					
Wrong or faulty connection		1						

Table 7-3 Status of SIMEAS Q, binary-coded in DBW22

Example The SIMEAS Q status "Measurement settings available", "Measurement data available" and "Storage overflow" are binary-coded as **00011010**.

The status parameter contains the value $1 \times 2^1 + 1 \times 2^3 + 1 \times 2^4 = 26$: B#16#26.



7.2 General communications errors

A general communications error is stored in the respective measured value data block in the **Error_Communication** parameter. The following general communications errors may occur:

Error	Explanation
0	No error
1	Timeout during communication (No response to measured value query)
2	Not in use
3	Function ID in the receive telegram is invalid

Table 7-4 General communications error in DBW18



7.3 Errors during data transmission

Data transmissionErrors during data transmission between SIMATIC S7 and Simeas Q are
stored in the respective measured value data block in the
RET_VAL_SFC14 and RET_VAL_SFC15 parameters.

Table 7-5	Error code for RET V	AL SFC14/15 in DE	3W24 or 26
-----------	----------------------	-------------------	------------

Error code	Explanation
0000	No error
8090	You have not configured a module for the specified logical base address, or you have disregarded the restrictions on the length of the consistent data.
8092	The ANY reference contains a type specification with uneven BYTES
80A1	The selected module is defective
only SFC 14: 80B1	The length of the specified destination area does not match the length of the user data configured with STEP 7
only SFC 15: 80B1	The length of the specified source area does not match the length of the user data configured with STEP 7





Bibliography

- /1/ SIMEAS Q, Operating Instructions C53000-B874-C204-1
- /2/ SIMEAS Q Parameterization, Operating Instructions E50417-H1176-C072-A1





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Glossary

A _{st} , A _{lt}	Measurement for disturbance sensitivity (short term; long term)
Averaging time	The averaging time is a multiple of the \rightarrow base time. During the period of the averaging time, extreme values are formed.
Base time	Time span in which an average value is formed from the sampling values. These average values are used for the period of the \rightarrow averaging time to form extreme values.
Binary outputs	Output of binary signals (high and low) for switching relays.
Byte	\rightarrow Octett. a unit of information unit consisting of 8 bits.
Classic method	Algorithm for calculating the output capacity in a \rightarrow symmetrical network without taking into account the harmonics
Continuous recording	Continuous recording of the measured values in an application-orien- tated, user-definable time reference.
Control boxes	Serve to enable or disable functions. More than one box can be active at the same time.
Converter	Adapter for linking different standardized interfaces
cos φ	Power factor
Data window	Dialog box for the input of data
Desktop	On-screen work area
DSF file	\rightarrow <u>D</u> evice <u>S</u> pecific <u>F</u> ile
Expansion method	Algorithm for calculating the output capacity in an \rightarrow unsymmetrical network taking into account the harmonics



Fault recording	Only measured values that exceed specified application-orientated \rightarrow threshold values are stored with time stamp.
Flicker	Measurement for voltage fluctuations in the low-voltage distribution.
FT	Abbreviation for <u>FileTransfer</u>
Gender Changer	Coupling for linking two connectors of the same type.
Master	Higher-level device, which monitors and controls subordinate devices (\rightarrow slaves)
Navigation window	Displays the program structure of the measurement settings. Clicking or double-clicking the structure symbols lets you "navigate" between the various parameter groups and dialog boxes.
Negative-phase-se- quence system	Polyphase system, in which phases L1, L2 and L3 are each phase- shifted through 120° in an anticlockwise direction.
Parameter numbers	\rightarrow PNU. Part of the unique identification of the measured values. The identification is made up of the PNU and \rightarrow subindex.
Positive phase- sequence system	Polyphase system, in which phases L1, L2 and L3 are each phase- shifted through 120° in an clockwise direction.
P _{st} , P _{lt}	Measurement for disturbance effect (<u>s</u> hort <u>t</u> erm; <u>long</u> <u>t</u> erm)
Radio buttons	Serve to enable or disable functions. These are latched as default (only one radio button can be active).
SIMEAS Q	Slemens MEASuring Quality
	Network quality recorder
SIMEAS Q Parameterization	Parameterization software for SIMEAS Q
Slave	Subordinate device, which is monitored and controlled by a higher-level device (\rightarrow Master).
sql file	Extension of parameter files



Standard parameter set	Factory-set parameter data record in SIMEAS Q und in SIMEAS Q Parameterization.
SW	Summer/winter time switchover
Symmetrical system	Polyphase network in which all phases are uniformly loaded with con- sumers.
THD	Total Harmonic Distortion
Threshold value	Limit value which triggers an action, e.g. status indication, warning, dis- connection, etc. Several threshold values which trigger defined actions can be specified for a single measured value.
Time information	Date and time of an event
Time stamp	\rightarrow Time information
Unsymmetrical system	Polyphase network in which not all phases are uniformly loaded with con- sumers.
Validity	Validity bit. Displays the status Valid or Invalid.







Index

С

Code blocks 5-2 Communication Via PROFIBUS 1-4 Continuous measurement Parameterize 2-9

D

Data blocks 5-2 Data polling 1-4 Data sheets 2-7 Data transmission 5-4 Error during 7-5 Data volume 1-1

E

Error messages Overview 7-1 Errors Data transmission 7-5 General communications 7-4 Example For program call 6-4 Software block 5-4 Software blocks 5-2

F

Function test 2-7

G

GSE file Installing 4-3

Η

Hardware Catalog 4-2 Hardware components 4-1 Hardware configuration 4-1

I

Incoming 2-5

Μ

Master 1-3 Measured value data block 6-3 Measured value ID 6-6 Measured values Number of 6-5 Parameterize 6-5 Measuring mode 2-12 MVDB 6-3

Ρ

Parameterization Of measurement settings 2-7 Select mode 2-5 Send data 2-11 Software 2-1 Starting the software 2-2 Parameterize **Basic settings 2-8** Continuous measurement 2-9 Fault measurement 2-10 Measurement settings 2-7 Parameterize basic settings 2-8 Parameterize measurement settings 2-7 Parameterizing fault measurement 2-10 Parameterizing measurement settings 2-7 Parameters For program call 6-4 Period 6-9 **PROFIBUS 2-5 PROFIBUS** address 2-6 Set/change 2-6 PROFIBUS DB with CPIntegrating software blocks 5-5 PROFIBUS DP Integrating software blocks 5-4 **PROFIBUS DP system** Communications procedure 1-4 Setup 1-3 PROFIBUS mode 2-12 Program runtime 6-7

R

Recording 2-5 Recording mode 1-1, 2-12 Recording options Delete recording 6-8 Recording period 6-9

Index-1 SIEMENS siemens-russia.com Set date, time 6-8 Start recording 6-8 Start recording at specific time 6-9 Stop recording 6-8 Remote parameterization 1-2

S

Select a CPU 4-5 Setting/changing the Profibus address 2-6 Setup PROFIBUS DP system 1-3 SIMEAS Q Data sheets 2-7 Error messages 7-2 LEDs 2-12 Linking with PC 2-3 Parameterization 2-1 Setpoint configuration 4-9 SIMEAS Q slave PROFIBUS address 4-10 Read out via PROFIBUS 6-1 Slave 1-3 Software blocks Code block 5-2 Data blocks 5-2 Functional overview 5-3 Overview 5-2 Program call 6-2 Sample project 5-2 System functions 5-2

Т

Telegram Configuration 1-4 Request 1-4 Telegram length Request telegram 4-9 Response telegram 4-9 TelegramResponse 1-4

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