Legal information

Warning notice system

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent
damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert
symbol, notices referring only to property damage have no safety alert symbol. These notices shown below are
graded according to the degree of danger.

**DANGER**

indicates that death or severe personal injury will result if proper precautions are not taken.

**WARNING**

indicates that death or severe personal injury may result if proper precautions are not taken.

**CAUTION**

indicates that minor personal injury can result if proper precautions are not taken.

**NOTICE**

indicates that property damage can result if proper precautions are not taken.

If more than one degree of danger is present, the warning notice representing the highest degree of danger will
be used. A notice warning of injury to persons with a safety alert symbol may also include a warning relating to
property damage.

Qualified Personnel

The product/system described in this documentation may be operated only by personnel qualified for the specific
task in accordance with the relevant documentation, in particular its warning notices and safety instructions.
Qualified personnel are those who, based on their training and experience, are capable of identifying risks and
avoiding potential hazards when working with these products/systems.

Proper use of Siemens products

Note the following:

**WARNING**

Siemens products may only be used for the applications described in the catalog and in the relevant technical
documentation. If products and components from other manufacturers are used, these must be recommended
or approved by Siemens. Proper transport, storage, installation, assembly, commissioning, operation and
maintenance are required to ensure that the products operate safely and without any problems. The permissible
ambient conditions must be complied with. The information in the relevant documentation must be observed.

Trademarks

All names identified by ® are registered trademarks of Siemens AG. The remaining trademarks in this publication
may be trademarks whose use by third parties for their own purposes could violate the rights of the owner.

Disclaimer of Liability

We have reviewed the contents of this publication to ensure consistency with the hardware and software
described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the
information in this publication is reviewed regularly and any necessary corrections are included in subsequent
ditions.
Table of contents

1 Preface ........................................................................................................................................... 7
2 Security information ....................................................................................................................... 9
3 Product specific security information ............................................................................................ 11
4 Introduction ..................................................................................................................................... 13
   4.1 Introduction .............................................................................................................................. 13
5 Getting Started ............................................................................................................................... 15
   5.1 Installation ............................................................................................................................... 15
   5.2 HW Config ............................................................................................................................... 16
   5.3 CFC ......................................................................................................................................... 19
   5.4 Operator Station ...................................................................................................................... 25
6 References ....................................................................................................................................... 35
7 List of Abbreviations ....................................................................................................................... 37
   7.1 Abbreviations .......................................................................................................................... 37
Preface

Brief description

The Getting Started of the SIMOCODE pro PCS 7 Library uses a simple example project to show you the basic procedures:

- Basic configuration steps
- Handling and monitoring different signal blocks
- Parameterization

This Getting Started manual is intended to be an introduction and largely dispenses with detailed information and background information.

Requirements

Basic knowledge of creating a PCS 7 project is necessary. You will find information about this in the Process Control System PCS 7; Getting Started (V8.0 or higher with APL) documentation on the Internet [https://support.industry.siemens.com/cs/document/109485954].

Conventions

This documentation contains designations of the software interface elements. If you have installed a multi-language package for the operating system, some of the designations will be displayed in the base language of the operating system after a language switch and will, therefore, differ from the designations used in this documentation.
Software required for the Getting Started of the SIMOCODE pro PCS 7 Library

- You can execute the example project on any PC or programming device on which the following software is installed:
  - Windows operating system
  - Internet Explorer
  - Message Queuing service
  - SQL server

**Note**
The versions required depend on the version of PCS 7 installed.

You can find further relevant details in the following manuals:
- SIMATIC Process Control System PCS 7 PC Configuration and Authorization (V8.0) [on the Internet](https://support.industry.siemens.com/cs/document/68157327/).
- SIMATIC Process Control System PCS 7 Released Modules (V8.0) on the Internet [https://support.industry.siemens.com/cs/document/109485954].

- You create the PCS 7 project with SIMATIC Manager.
  To do so, follow the instructions in the *Process Control System PCS 7: Getting Started* documentation.

Hardware required for creating an example project

<table>
<thead>
<tr>
<th>Table 1- 1 Hardware used in this sample project</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Order number</strong></td>
</tr>
<tr>
<td>3UF7 010-1A*00-0</td>
</tr>
</tbody>
</table>

Creating a PCS 7 project

This PCS 7 example project was created with the following hardware for the automation station (AS):

<table>
<thead>
<tr>
<th>Table 1- 2 Hardware - Automation station 1: Configuration direct on the master system</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Order number</strong></td>
</tr>
<tr>
<td>6ES7 410-5HX08-0AB0</td>
</tr>
<tr>
<td>6ES7 407-0KA02-0AA0</td>
</tr>
</tbody>
</table>

See also

SIMATIC Process Control System PCS 7 Released Modules [https://support.industry.siemens.com/cs/document/109736547]
Siemens provides products and solutions with industrial security functions that support the secure operation of plants, systems, machines and networks.

In order to protect plants, systems, machines and networks against cyber threats, it is necessary to implement – and continuously maintain – a holistic, state-of-the-art industrial security concept. Siemens’ products and solutions only form one element of such a concept.

Customer is responsible to prevent unauthorized access to its plants, systems, machines and networks. Systems, machines and components should only be connected to the enterprise network or the internet if and to the extent necessary and with appropriate security measures (e.g. use of firewalls and network segmentation) in place.

Additionally, Siemens’ guidance on appropriate security measures should be taken into account. For more information about industrial security, please visit: http://www.siemens.com/industrialsecurity

Siemens’ products and solutions undergo continuous development to make them more secure. Siemens strongly recommends to apply product updates as soon as available and to always use the latest product versions. Use of product versions that are no longer supported, and failure to apply latest updates may increase customer’s exposure to cyber threats.

To stay informed about product updates, subscribe to the Siemens Industrial Security RSS Feed under: http://www.siemens.com/industrialsecurity
Product specific security information

This library is designed to run under the PCS 7 environment. Therefore, it is recommended to follow the security principles for PCS 7 to support a secure operation, such as:

- User rights
- Password protection of
  - WinCC

Introduction

4.1 Introduction

Introduction

This document explains the basic principles of using the SIMOCODE pro PCS 7 Library. The SIMOCODE pro PCS 7 Library is designed according to APL standards for both, blocks and faceplates. This library contains CFC templates to fulfill the control functions of a Motor Management device.

For reducing configuration time on site, a module driver generator is included with this library. By using this driver generator it is ensured that all necessary interconnections will be handled automatically by the system and the device is ready to operate in PCS 7 environment.

Custom configuration can be done by the user as well. User manual and online help will give detailed information about the blocks and their input and output pins.

This document will guide you through the necessary steps for using the template and the module driver generator in a PCS 7 environment using a sample project. This sample uses minimum hardware, single station, one PLC connected to one SIMOCODE pro V via PROFIBUS.

Prerequisites

User

PCS 7 knowledge:

- Project creation
- HW-Config
- CFC-Editor
- WinCC-Explorer
- WinCC

Refer "Process Control System PCS 7 Getting Started [https://support.industry.siemens.com/cs/document/109485954]" for further details.

You can find the manuals for your PCS 7 Version in the manual collection.
System
- Installed and compatible PCS 7 version
- Installed SIMOCODE pro PCS 7 Library
- PCS 7 Multiproject (created by Project-Wizard).

Refer read me for this library for software details and steps to follow to change the existing project to migration.

Communication
Active communication network between Engineering Station (ES)/Operator Station (OS) and the PLC.
5.1 Installation

Installation

The Setup program will guide you through the required steps. Use "< Back" and "Next >" buttons to navigate through the screens during the installation process. The installation program supports German and English. Please choose your language at the initial screen.

The Simocode pro library has two components:

- **AS** = Components for Automation System
- **OS** = Components for Operator Station

For example, this library has:

- Library for SIMOCODE pro PCS 7 V8.2 **AS**
- Faceplates for SIMOCODE pro PCS 7 V8.2 **OS**

Installation program will ask you to decide, which product you want to install. Below is the decision matrix:

<table>
<thead>
<tr>
<th></th>
<th>AS</th>
<th>OS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single Station</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

'X' - required, '-' - not required

<table>
<thead>
<tr>
<th></th>
<th>AS</th>
<th>OS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distributed System</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Engineering Station</td>
<td>X</td>
<td>-</td>
</tr>
<tr>
<td>Operator Station</td>
<td>-</td>
<td>X</td>
</tr>
</tbody>
</table>
5.2 HW Config

Open HW-Config and switch the hardware catalog profile to Standard.

Below are the SIMOCODE pro objects for:

<table>
<thead>
<tr>
<th>Communication</th>
<th>Integration</th>
<th>Catalog path</th>
</tr>
</thead>
<tbody>
<tr>
<td>PROFIBUS</td>
<td>OM</td>
<td>at PROFIBUS DP &gt; Switching Devices &gt;</td>
</tr>
<tr>
<td></td>
<td>EDD</td>
<td>PROFIBUS DP &gt; Switching Devices</td>
</tr>
<tr>
<td></td>
<td>GSD</td>
<td>PROFIBUS DP &gt; Additional Field Devices &gt; Switching Devices &gt;</td>
</tr>
<tr>
<td>PROFINET</td>
<td>OM</td>
<td>PROFINET IO &gt; Switching devices &gt; Motor Management System</td>
</tr>
<tr>
<td></td>
<td>EDD¹,²</td>
<td>PROFINET IO &gt; Switching devices &gt; Motor Management System &gt; GSD³</td>
</tr>
<tr>
<td></td>
<td>GSDML¹,²</td>
<td></td>
</tr>
</tbody>
</table>

¹SIMOCODE pro V GSD (V1.3) and GSDML: Insert the Basic Type which meets your requirement.

²The same object is used for GSD and EDD integration in HW-Config. Configuration via PDM for EDD support needs to be activated by the user in Object Properties (Alt+Return) of the SIMOCODE pro Object.

³Folder entry GSD will be created in case of parallel integration of SIMOCODE pro OM, integrated via SIMOCODE ES.

Drag and drop the desired SIMOCODE pro-Object into the Station Window and connect it with PROFIBUS resp. PROFINET line.

Basic Types

The length of the I/O data of the SIMOCODE pro device varies by the configured Basic Type. The Basic Type defines how many valid data will be sent and received by the device in every cycle. Bytes 2 and 3 are predefined and used for the max. Current $I_{max}$. More bytes, supported by basic types 1 and 3, may be fed with user defined data. Following tables display the existing Basic Types along with the supported data length:
Cyclic send data (SIMOCODE pro > PLC)

Cyclic receive data (PLC > SIMOCODE pro)

The following table shows which Basic Type is supported by the different SIMOCODE pro Basic Units:

<table>
<thead>
<tr>
<th>Basic Unit</th>
<th>Basic Type 1</th>
<th>Basic Type 2</th>
<th>Basic Type 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>SIMOCODE pro C</td>
<td>-</td>
<td>X</td>
<td>-</td>
</tr>
<tr>
<td>SIMOCODE pro S</td>
<td>X</td>
<td>X</td>
<td>-</td>
</tr>
<tr>
<td>SIMOCODE pro V</td>
<td>X</td>
<td>X</td>
<td>-</td>
</tr>
<tr>
<td>SIMOCODE pro V PN</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

'X' - supported, '-' - not supported

Select the Basic Type which meets your requirements in HW-Config catalog. Please find detailed information about the Basic Type in the system manuals for SIMOCODE pro devices.
Input Address

Retrieve the input address of the SIMOCODE pro device:

Note

Note down the input address or insert it in symbol table of HW-Config (Options > Symbol Table or Ctrl+Alt+T) for later usage.
5.3 CFC

Master data library

For using the library in a plant, it is recommended to store the templates of the SIMOCODE pro PCS 7 Library in the Master data library. Since this is beyond the scope of this document, we recommend you to take a look at: Process Control System PCS 7 CFC for SIMATIC S7 Function manual. [https://support.industry.siemens.com/cs/document/109736727](https://support.industry.siemens.com/cs/document/109736727)

With the templates stored in the Master data library, follow the below steps.

CFC Template

1. Open CFC-Editor by double clicking on the desired CFC-Object.
2. Select the tab Libraries, located underneath the Catalog view. If the templates of SIMOCODE pro PCS 7 Library were placed in the Master data library, you will find them in the project library folder (Notation: "Project Name"+_"Lib" e.g.: GS_SIMOCODEpro_Lib). Otherwise you will find the templates in the SIMOCODE pro Library (e.g.: SMCPrior_PCS7_LibV82).
3. Expand the Master data library node ("ProjName" + "_Lib" e.g.: GS_SIMOCODEpro_Lib). You will find two nodes:
   - Blocks
   - Charts

4. Expand the Charts node. Now you will see the SIMOCODE pro PCS 7 Library templates.

SIMOCODE pro Library supports following control functions:

<table>
<thead>
<tr>
<th>Control Function</th>
<th>Template</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dahlander Starter</td>
<td>Dahland</td>
</tr>
<tr>
<td>Direct Starter</td>
<td>Direct</td>
</tr>
<tr>
<td>Molded Case Circuit Breaker</td>
<td>MCCB</td>
</tr>
<tr>
<td>Overload Relay</td>
<td>OvlRly</td>
</tr>
<tr>
<td>Pole-Changing Starter</td>
<td>PoleChng</td>
</tr>
<tr>
<td>Positioner 1~5</td>
<td>Positner</td>
</tr>
<tr>
<td>Dahlander Reversing Starter</td>
<td>RevDahl</td>
</tr>
<tr>
<td>Reversing Starter</td>
<td>Reverse</td>
</tr>
<tr>
<td>Pole-Changing Reversing Starter</td>
<td>RevPolCh</td>
</tr>
<tr>
<td>Soft Starter with Reversing Contactor</td>
<td>RevSoftStr</td>
</tr>
<tr>
<td>Star-Delta Reversing Starter</td>
<td>RevStarDel</td>
</tr>
<tr>
<td>Soft Starter</td>
<td>SoftStr</td>
</tr>
<tr>
<td>Solenoid Valve</td>
<td>SolValve</td>
</tr>
<tr>
<td>Star-Delta Starter</td>
<td>StarDel</td>
</tr>
</tbody>
</table>
5. Drag the desired template object (e.g.: Direct) by pressing left mouse button and drop the object in the Chart view.

Direct template is now instantiated.

Open the Template

1. Right click on the instantiated Direct template in the chart view and select Open. The template opens in a new chart view.
Gettting Started

5.3 CFC

Set I/O

Input

1. Scroll to the left, till you see the sheet bar. There you will find a textual interconnection named **Input Word Address of Simocode base Module**.

Now you have two options:

- Setting the HW input address manually, as seen in HW-Config
- Use symbol table for selecting the input address.

Since this is a short example, we will just hand over the devices input address as it is displayed in HW-Config. We recommend using the symbol table for large projects. Refer "SIMATIC Process Control System PCS 7 Engineering System [https://support.industry.siemens.com/cs/document/109485969]" for further details.

2. Right click on **Input Word Address of Simocode base Module** and select **Interconnection to Address**.

A symbol table like dialog opens.
3. Insert input address, in this case: **IW512**.

4. Confirm input value by pressing enter. Now the blocks input address is connected to the devices input address.

**MMMeas, MMStat and MMLog**

If you want to use measurement, statistic values and/or logbook (**MMMeas**, **MMStat** and **MMLog**) for the SIMOCODE pro device, you need to switch to sheet view 2 in the CFC plan. There you will find the additional blocks for the mentioned functions.

Repeat the **Interconnection to Address**, steps from above for this sheet.

**Note**

If you do not want to use the additional functions, you are free to delete the function blocks in question or all blocks in sheet 2.

**Result:** The basic block set up is now complete.
Generate module drivers

1. Go to Chart > Compile > Chart as Program or hit Ctrl+B or click in the toolbar. The Compile dialog opens.

2. Ensure that the option Generate module drivers is checked in.

3. Confirm dialog with the OK-Button.

After compilation has finished, the Logs dialog will be displayed.

1. Confirm this dialog by Close button.

2. Now hit F5 in the chart view. The view will be updated and all textual interconnections are replaced by the according block interconnection.

Download

The CFC-Template is now ready for download.

Go to CPU > Download or hit CTRL+L or use in the toolbar.

Result: Template set up is now complete and ready to use.
5.4 Operator Station

Operator Station

Block icons and faceplates are inserted in the project while compiling the Operator Station (OS). Compile OS. You can find details on how to work with the Operator Station in the "SIMATIC Process Control System PCS 7 Operator Station [https://support.industry.siemens.com/cs/document/109485970]" manual.

Block Icons

After activating WinCC you will find the block icon for the motor block:

![Block Icon](Image)

Activate Block icons

This library is also shipped with block icon for MMOprtn. It is disabled by default setting. If you need MMOprtn block icon you can simply activate it:

1. Open CFC-Editor.
2. Select the MMOprtn block.
3. Right click and select Object Properties in the context menu.
4. Check in the checkbox for Create block icon.
5. Confirm the **Properties** dialog by clicking **OK**.

6. Compile the OS and activate WinCC. Now you will find two block icons: **MotL** and **MMOprtn**.
The block icons in detail are:

<table>
<thead>
<tr>
<th>MotL</th>
<th>MMOprtn</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motor - Large</td>
<td>Simocode pro Direct starter Operation</td>
</tr>
</tbody>
</table>

The block icons give a general feedback of the current device status to the user. Please open a faceplate for detailed information about the device by clicking on the block icon.

**Faceplates**

Standard faceplates of the block icons:

**Note**

For further information on how to use the Library, refer the Programming and Operating Manual for the "SIMOCODE pro PCS 7 Library V8.2" Block Library [https://support.industry.siemens.com/cs/document/103954289].

**APL - MotL**

![MotL Faceplate](https://example.com/motl_faceplate.png)
MMOprtн

![MMOprtн](image1)

MMMeas

![MMMeas](image2)
5.4 Operator Station

MMStat

![MMStat screenshot]

MMLLog

![MMLLog screenshot]
Faceplate-Views

Each faceplate provides multiple views:

<table>
<thead>
<tr>
<th>APL</th>
<th>SIMOCODE pro Library</th>
</tr>
</thead>
<tbody>
<tr>
<td>MotL</td>
<td>MMOprtn</td>
</tr>
<tr>
<td></td>
<td>Standard</td>
</tr>
<tr>
<td></td>
<td>Messages</td>
</tr>
<tr>
<td></td>
<td>Trends</td>
</tr>
<tr>
<td></td>
<td>Parameters</td>
</tr>
<tr>
<td></td>
<td>Preview</td>
</tr>
<tr>
<td></td>
<td>Status diagnostics</td>
</tr>
<tr>
<td></td>
<td>Event diagnostics</td>
</tr>
<tr>
<td></td>
<td>Warning diagnostics</td>
</tr>
<tr>
<td></td>
<td>Trip diagnostics</td>
</tr>
<tr>
<td></td>
<td>Station diagnostics</td>
</tr>
<tr>
<td></td>
<td>Process image</td>
</tr>
<tr>
<td></td>
<td>Batch</td>
</tr>
</tbody>
</table>

You can switch between the single views by clicking the demanded view button.

Click on ![view buttons](image) to open additional view buttons.

Faceplates may be pinned or closed according to the demands of the user. Further information on how to use the faceplates can be found in the online help, shipped with this library or in the user manual provided for this library.
Navigation between faceplates

1. Open the Standard view of block MotL.
2. Click on button Operation.

**MMOprrtn faceplate opens.**

Click on navigation button  to return to the calling faceplate.
3. Click on button **Measurement** to open the **MMMeas** faceplate.
**MMStat**

1. Open faceplate ** MMOprtn** and switch to view **Preview**.
2. Click the **Statistics** button.

The **MMStat** faceplate opens.
MMLog
1. Open faceplate MMOprtn and switch to view Preview.
2. Click the Logbook button.

The MMLog faceplate opens.

Note
Click on navigation button at the MMMeas, MMStat or MMLog faceplate to return to the corresponding MMOprtn faceplate.
More information

Additional information can be found as follows:

- For PCS 7 V8.1: "Process Control System PCS 7 Getting Started Part 1 (V8.1)"
  [https://support.industry.siemens.com/cs/document/103141812]
- For PCS 7 V8.2: "Process Control System PCS 7 Getting Started Part 1 (V8.2)"
  [https://support.industry.siemens.com/cs/document/109485954]
- Programming and Operating Manual: "PCS 7 Library Simocode pro V8.2.
  [https://support.industry.siemens.com/cs/document/103954289]
- Process Control System PCS 7 CFC for SIMATIC S7 Function manual.
  [https://support.industry.siemens.com/cs/document/109736727]
- SIMATIC Process Control System PCS 7 Operator Station
  [https://support.industry.siemens.com/cs/document/109485970]
- SIMATIC Process Control System PCS 7 PC Configuration and Authorization (V8.0) on the Internet
  [https://support.industry.siemens.com/cs/document/68157327].
- SIMATIC Process Control System PCS 7 Released Modules (V8.0) on the Internet
  [https://support.industry.siemens.com/cs/document/109736547].
- WinCC, for more information, click here
  [https://support.industry.siemens.com/cs/document/60119725].
List of Abbreviations

7.1 Abbreviations

Overview

Table 7-1 Meaning of abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>AS</td>
<td>Automation station</td>
</tr>
<tr>
<td>CFC</td>
<td>Continuous Function Chart</td>
</tr>
<tr>
<td>EDD</td>
<td>Electronic device description</td>
</tr>
<tr>
<td>GSD</td>
<td>Generic Station Description</td>
</tr>
<tr>
<td>HMI</td>
<td>Human machine interface</td>
</tr>
<tr>
<td>HW Config</td>
<td>&quot;Hardware configuration&quot; module in the SIMATIC Manager</td>
</tr>
<tr>
<td>OM</td>
<td>Object manager</td>
</tr>
<tr>
<td>OS</td>
<td>Operator station</td>
</tr>
<tr>
<td>PCS 7</td>
<td>Process Control System 7</td>
</tr>
<tr>
<td>CPU</td>
<td>Central Processing Unit</td>
</tr>
<tr>
<td>SS</td>
<td>Soft starter</td>
</tr>
</tbody>
</table>