

**SIEMENS**



# Industrial Controls

Function Block Library Soft Starter SIRIUS 3RW44 for SIMATIC PCS 7

PCS 7 Soft Starter 3RW44 V6.2 / V7.1 / 3RW44 Soft Starter PCS 7 Library V8 Migration V8.0+SP2

Getting Started

Edition

05/2015

Answers for industry.



## Industrial Controls

### PCS 7 Library Soft Starter 3RW44 "V6.2" / "V7.1" / "V8 Migration V8.0+SP2




#### Getting Started

<u>Preface</u>	<b>1</b>
<u>Security information</u>	<b>2</b>
<u>Introduction</u>	<b>3</b>
<u>Getting Started</u>	<b>4</b>
<u>References</u>	<b>5</b>
<u>List of Abbreviations</u>	<b>6</b>

## 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.

 <b>DANGER</b>
indicates that death or severe personal injury <b>will</b> result if proper precautions are not taken.
 <b>WARNING</b>
indicates that death or severe personal injury <b>may</b> result if proper precautions are not taken.
 <b>CAUTION</b>
indicates that minor personal injury can result if proper precautions are not taken.
<b>NOTICE</b>
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.

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# Table of contents

<b>1</b>	<b>Preface .....</b>	<b>7</b>
<b>2</b>	<b>Security information .....</b>	<b>11</b>
<b>3</b>	<b>Introduction .....</b>	<b>13</b>
3.1	Introduction .....	13
<b>4</b>	<b>Getting Started .....</b>	<b>15</b>
4.1	Installation .....	15
4.2	HW-Config .....	16
4.3	CFC .....	17
4.4	Operator Station .....	24
<b>5</b>	<b>References .....</b>	<b>31</b>
<b>6</b>	<b>List of Abbreviations .....</b>	<b>33</b>
6.1	Abbreviations .....	33



# Preface

## Brief description

The Getting Started of the PCS 7 library for SIRIUS soft starter uses a simple example project to show you the basic procedures:

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

This Getting Started serves as an introduction and largely dispenses with detailed information and background information.

## Requirements

Basic knowledge of how to create a PCS 7 project. You can find information on creating a project in the following documents:

- For PCS 7 V6.1:  
"SIMATIC PCS 7 Process Control System V6.0 Getting Started - First Steps Documentation"
- For PCS 7 V7.0:  
"SIMATIC PCS 7 Process Control System V7.0 Getting Started - First Steps Documentation"
- For PCS 7 V7.1:  
"Process Control System PCS 7 Getting Started Part 1 (V7.1)"  
"Process Control System PCS 7 Getting Started Part 2 (V7.1)"
- For PCS 7 V8.0:  
"Process Control System PCS 7 Getting Started Part 1 (V8.0)"  
"Process Control System PCS 7 Getting Started Part 2 (V8.0)".

## 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 PCS 7 block library for soft starters

- 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

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### Note

The versions required conform to the version of PCS 7 installed.

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You can find further relevant details in the following manuals:

- "SIMATIC Process Control System PCS 7 PC Configuration and Authorization"
  - "SIMATIC Process Control System PCS 7 V7.0 Released Modules"
  - "SIMATIC Process Control System PCS 7 V6.1 Released Modules"
  - SIMATIC Process Control System PCS 7 Released Modules (V7.1)
  - SIMATIC Process Control System PCS 7 Released modules (V8.0)
- You create the PCS 7 project with the SIMATIC Manager.  
To create a project in PCS 7, follow the instructions in the documentation "Process Control System SIMATIC PCS 7 V6.0 Getting Started - First Steps Documentation" or "Process Control System SIMATIC PCS 7 V7.0 Getting Started - First Steps Documentation".  
For PCS 7 V7.1:  
"Process Control System PCS 7 Getting Started (V7.1)"  
For PCS 7 V8.0:  
"Process Control System PCS 7 Getting Started (V8.0)".

You can find these documents under  
Start > SIMATIC > Documentation > English.



## Hardware required for creating an example project

Table 1- 1 Soft Starter hardware

Order number	Description
3RW4422-1BC44	SIRIUS Soft Starter, values with 400 V, 40 DEG., Standard: 29 A, 15 KW, inside-delta circuit: 50 A, 22 KW, 200 ... 460 V AC, 230 V AC, screw terminals
3RW4900-0KC00	Communication board PROFIBUS for SIRIUS Soft Starter 3RW44 Note on the firmware version If the soft starter is operated as a DP slave following a Y link with a firmware version <=*E03*, no DPV1 functionality is available. Firmware version <=*E04* is required for DPV1 functionality following a Y link.

Table 1- 2 Hardware - Automation station 1: Configuration direct on the master system

Order number	Description
6ES7416-3XL04-0AB0	SIMATIC S7-400, CPU 416-3 central processing unit, e.g. with PROFIBUS DP interface
6ES7407-0KA01-0AA0	SIMATIC S7-400, Power Supply PS 407-10 A, UC 120 / 230 V, DC 5 V / 10 A

### Note

#### Creating a PCS 7 project

Create the PCS 7 project with the automation station (AS) hardware listed in the table above this note.

Table 1- 3 Hardware - Automation station 2: Configuration following a Y-link

Order number	Description
6ES7654-2PG67-0XC0	SIMATIC PCS 7 AS417-4-2H for H systems
6ES7407-0KR00-0AA0	SIMATIC S7-400, Power Supply PS 407, 10 A for redundant use
6ES7153-2BA82-0XB0	SIMATIC DP, INTERFACE DP/PA LINK and ET 200M IM153-2 HIGH FEATURE for H systems
6ES7197-1LB00-0XA0	SIMATIC S7, Y-coupler for building up a Y-link for redundant controllers



## Security information

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For the secure operation of Siemens products and solutions, it is necessary to take suitable preventive action (e.g. cell protection concept) and integrate each component into a holistic, state-of-the-art industrial security concept. Third-party products that may be in use should also be considered. For more information about industrial security, visit <http://www.siemens.com/industrialsecurity>.

To stay informed about product updates as they occur, sign up for a product-specific newsletter. For more information, visit <http://support.automation.siemens.com>.



# Introduction

## 3.1 Introduction

### Introduction

This document explains the basic principles of using the Library Soft Starter 3RW44. The library contains a CFC template to fulfill the control function of a Soft Starter device.

For reducing configuration time on site, a module driver generator is included in 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.

Any manual changes done in the interconnections between the blocks can be reverted by running the driver generator again. This will reset all interconnections to initial state.

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 example uses minimum hardware, single station, one PLC connected to one Soft Starter via PROFIBUS.



## Getting Started

### 4.1 Installation

#### Installation

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 Library Soft Starter 3RW44 has two components:

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

For example, this library has:

- 3RW44 Soft Starter PCS 7 Library V8 (AS) Migration V8.0 + SP2
- 3RW44 Soft Starter PCS 7 Library V8 (OS) Migration V8.0 + SP2.

Installation program will ask you to decide, which product you want to install. Please take a look at the decision matrix:

	AS	OS
Single Station	X	X

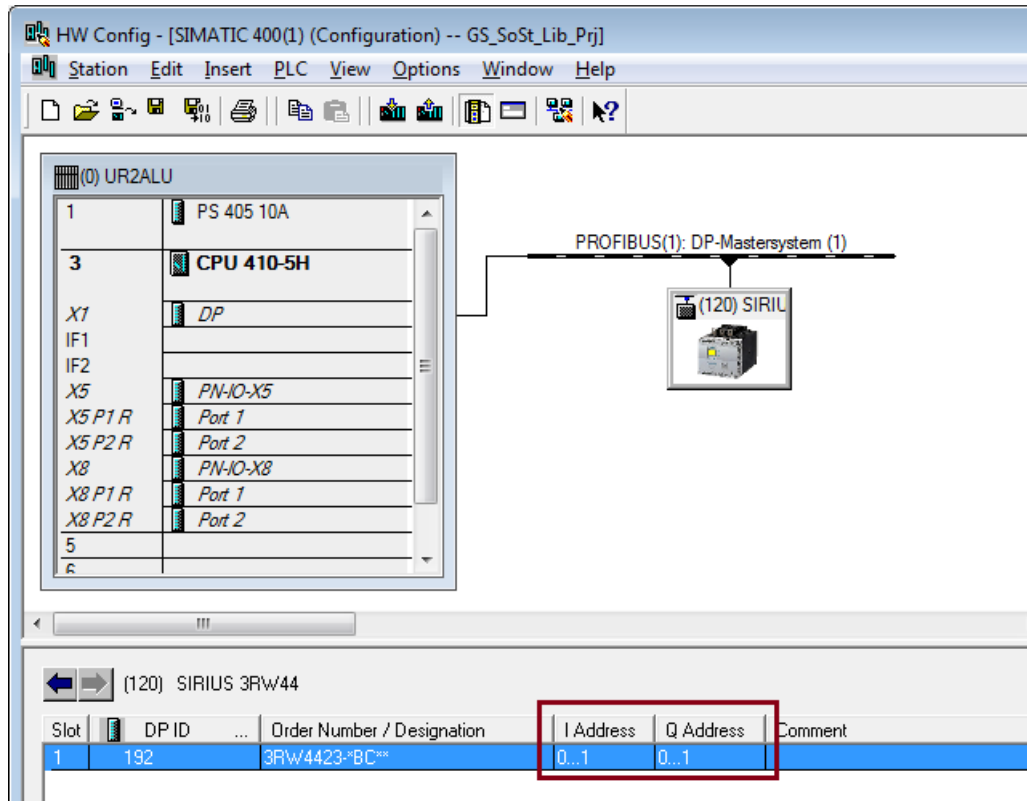
		AS	OS
Distributed System	Engineering Station	X	-
	Operator Station	-	X

"X" – required, "-" – not required.

## 4.2 HW-Config

### HW-Config

Open HW-Config to retrieve the input and output addresses of the Soft Starter device.



Note down the addresses or enter them in symbol table for later usage.



## 4.3 CFC

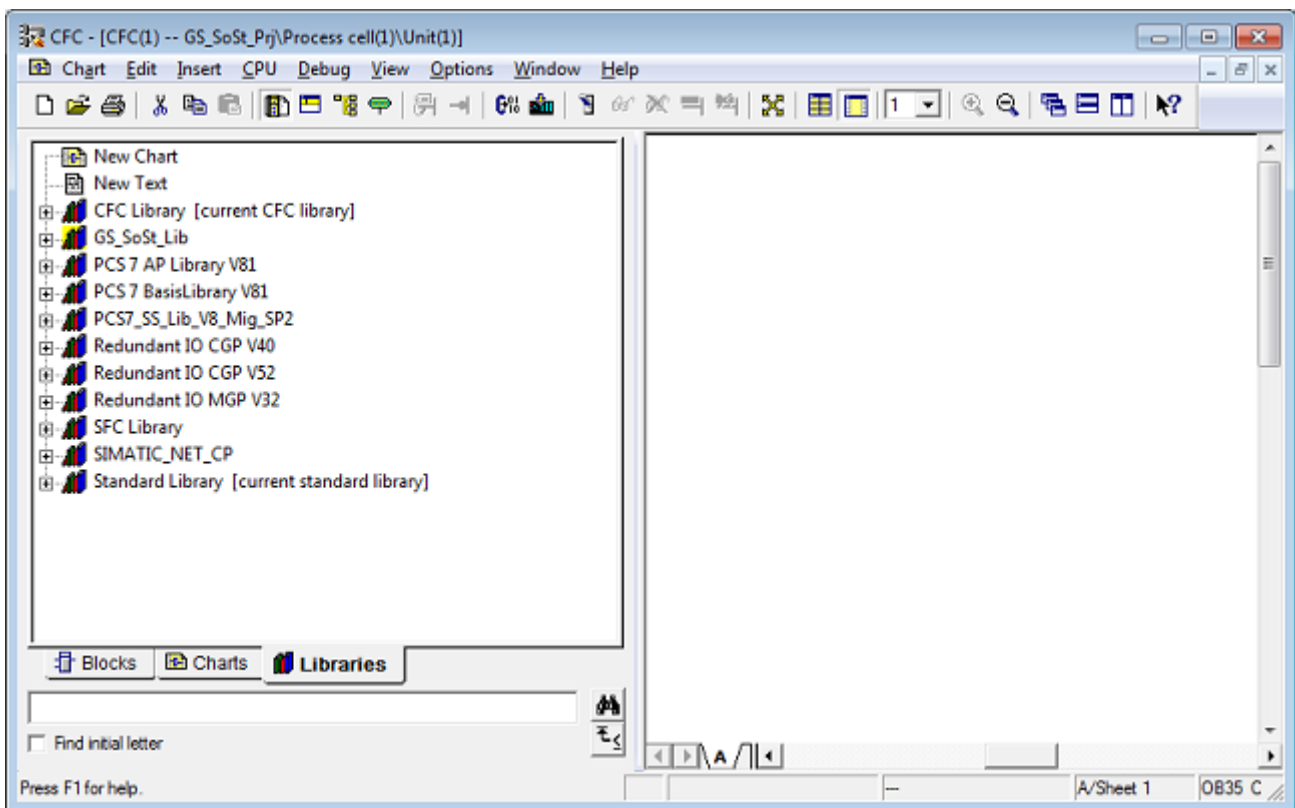
### Master data library

For using the library in a plant, it is recommended to store the Soft Starter template in the Master data library. Since this would be beyond the scope of this document, we recommend you to take a look at the "Process Control System PCS 7 CFC for SIMATIC S7 – Function manual".

With the template stored in the Master data library, proceed with the following steps.

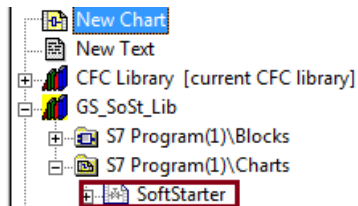
### CFC Template

1. Open CFC-Editor by double clicking on the desired CFC-Object.
2. Select the Libraries tab, located underneath the Catalog view. If the Soft Starter template is placed in the Master data library, you will find it in the project library folder (Notation: "Project Name"+"\_Lib" e.g.: GS\_SoSt\_Lib). Otherwise you will find the Soft Starter Template in the Soft Starter Library (e.g.: PCS7\_SS\_Lib\_V8\_Mig\_SP2).



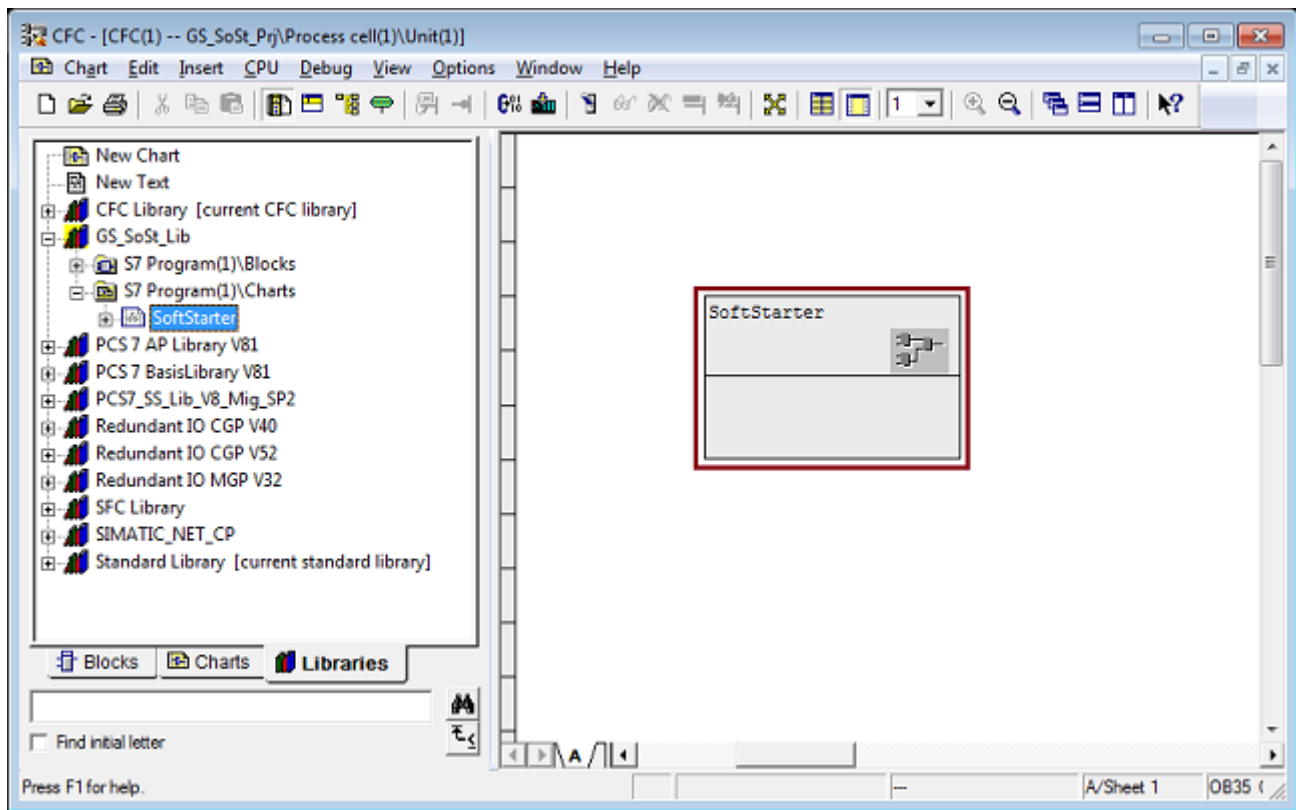
3. Expand the Master data library node GS\_SoSt\_Lib. You will find two nodes:

- Blocks
- Charts



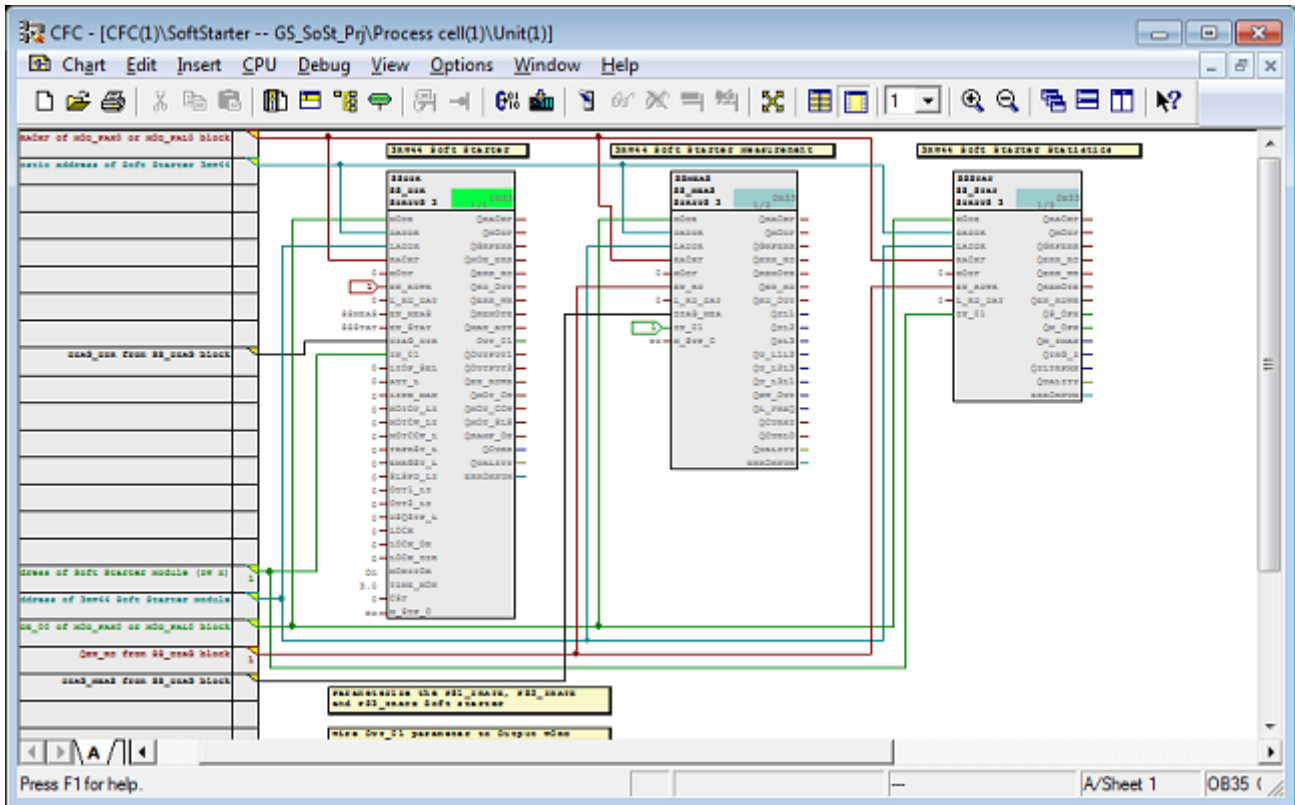
4. Expand the Charts node. The SoftStarter template is present.

5. Drag the SoftStarter object by pressing left mouse button and drop the object in the Chart view. SoftStarter template is now instantiated.



## Open the Template

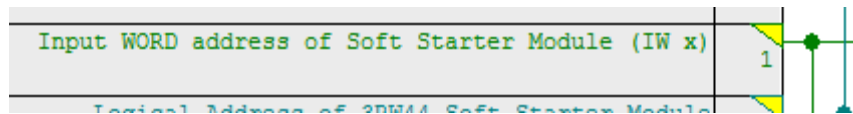
1. Right click on the instantiated SoftStarter template in the chart view and select Open. The template opens in a new chart view.



## 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 Soft Starter Module (IW x)".

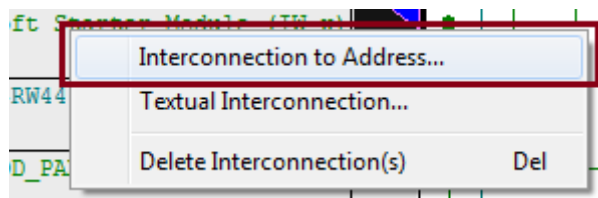


Now you have two options:

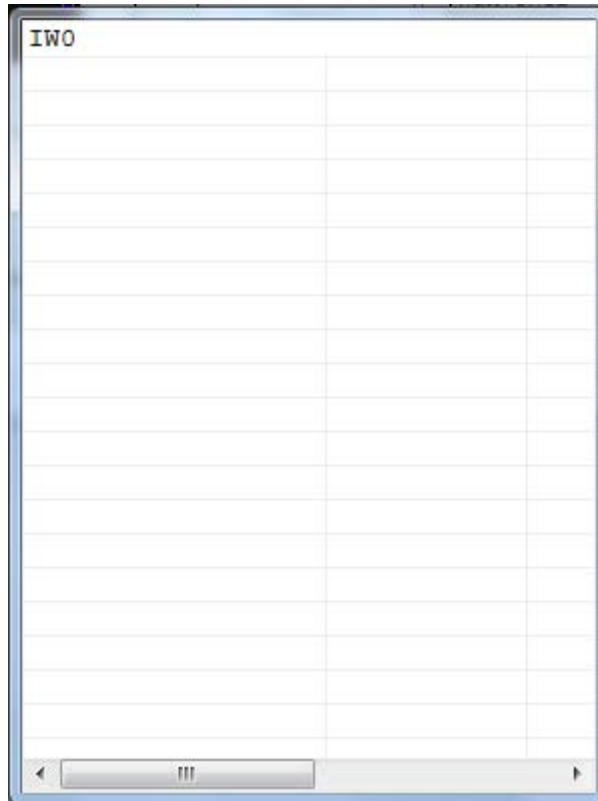
- Setting the HW input address manually, as seen in HW-Config
- Use symbol table for selecting the input address.

Since this is a short example, we will just hand over the device input address as it is displayed in HW-Config. We recommend using the symbol table for large projects. Please refer to "SIMATIC Process Control System PCS 7 Engineering System".

2. Right click on "Input WORD address of Soft Starter Module (IW x)" and select Interconnection to Address. A symbol table like dialog opens.



3. Enter input address, in this case: IW0.
4. Confirm input value by pressing enter. Now the blocks input address is connected to the devices input address.

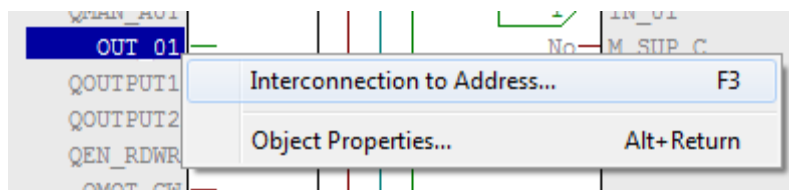


### Output

1. Please note the following label in the CFC-Template. This is a reminder that you need to wire the output address of the Soft Starter device manually.

```
Wire OUT_01 parameter to Output WORD
address of Soft starter (QW x)
```

2. Right click on output pin OUT\_01 of block SS\_DIR and select "Interconnection to Address..."




3. A dialog similar to the input address opens. Enter output address, in this case: QW0.

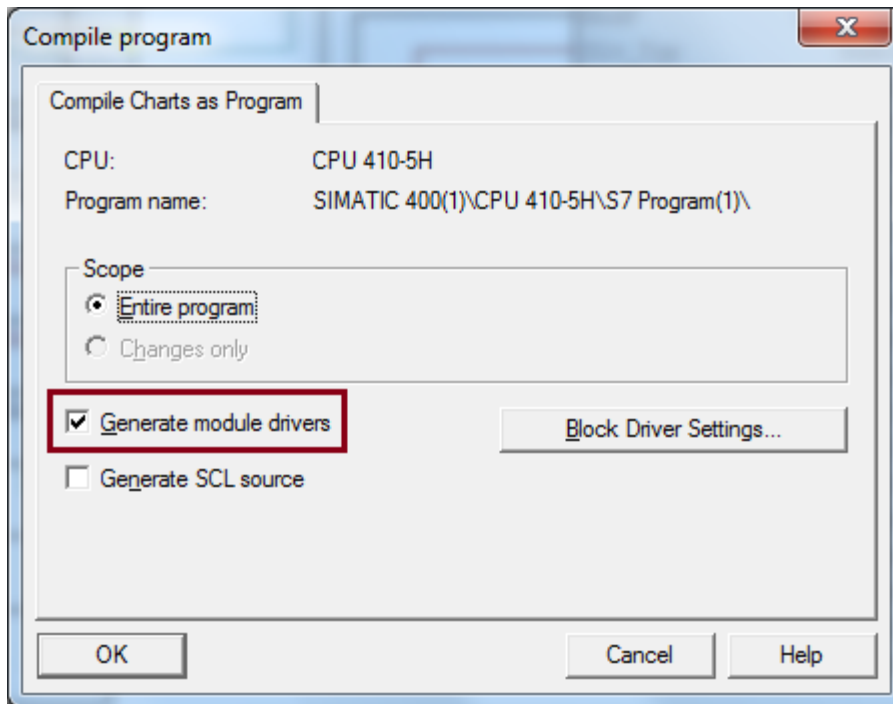


4. Confirm value by pressing enter. Now the blocks output address is connected to the devices output address.

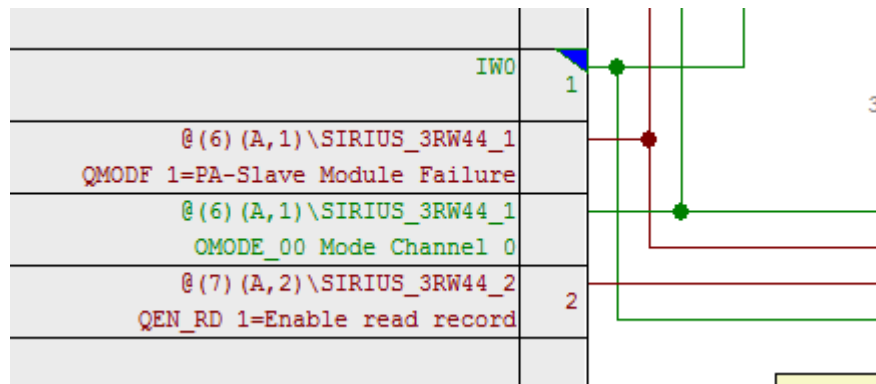
Block set up is now complete.

### Generate module drivers

1. Go to Chart > Compile > Chart as Program or hit Ctrl+B or click  in the toolbar. Compile dialog opens.
2. Ensure that the option Generate module drivers is checked in. Confirm dialog with the OK-Button.



3. After compilation has finished, Logs dialog will be displayed. Confirm this dialog by the Close button.
4. Now hit F5 in the chart view. The view will be updated and all textual interconnections are replaced by the according block interconnection.



### Note

Manual changes in the interconnections are reverted by generating the module drivers after the changes took place. Deactivate **Generate module drivers** if you want to keep your changes.

### Download

The CFC-Template is now ready for download.

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

Template set up is now complete and ready to use.

## 4.4 Operator Station

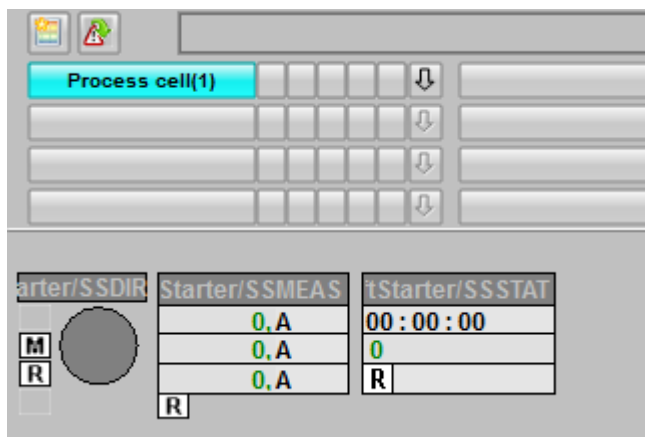
### Operator Station

Block icons and faceplates are inserted in the project while compiling the Operator Station (OS). Ensure OS is compiled.


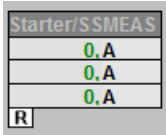
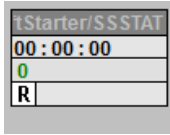
Refer the "SIMATIC Process Control System PCS 7 Operator Station" manual for working on Operator Station.

### Block Icons

After activating WinCC you will find three block icons for the Soft Starter device:



The block icons in detail are:

SSDIR Control Soft Starter	SSMEAS Measurement values	SSSTAT Statistic values
		

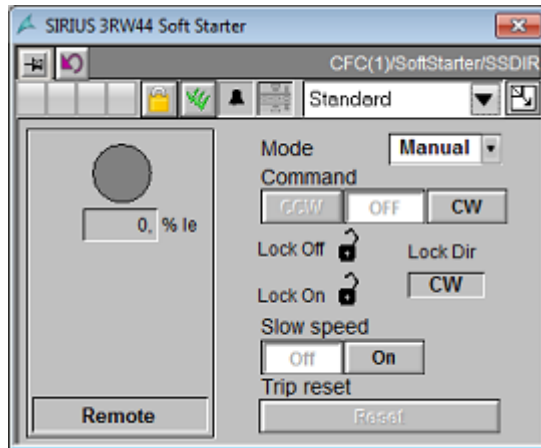
The block icons give a general feedback of the current device status to the user. You can find the detailed information about the device in the faceplate.



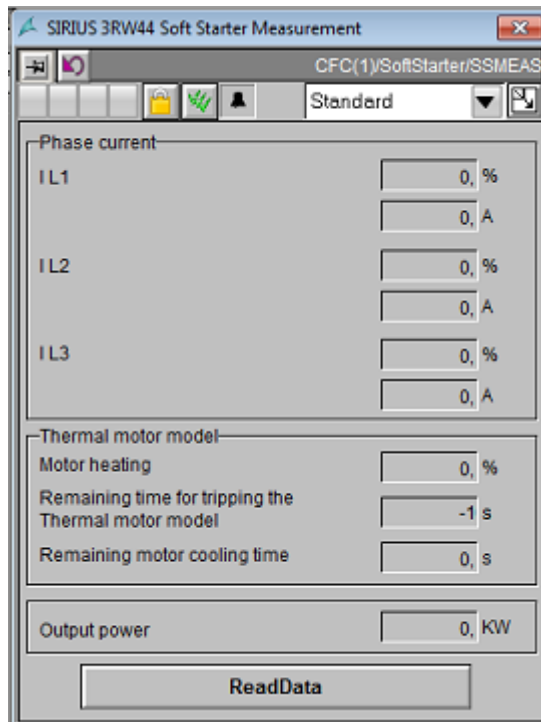
## Faceplates

Faceplates of the block icons:

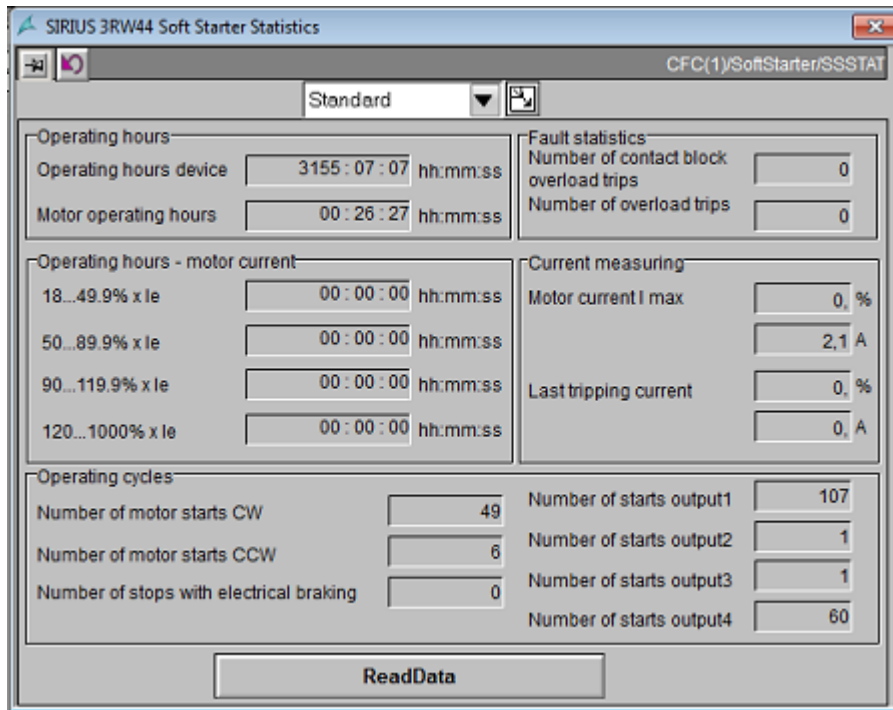
SSDIR:



SSMEAS:



SSSTAT:

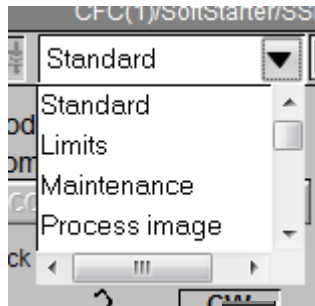



### Faceplate-Views

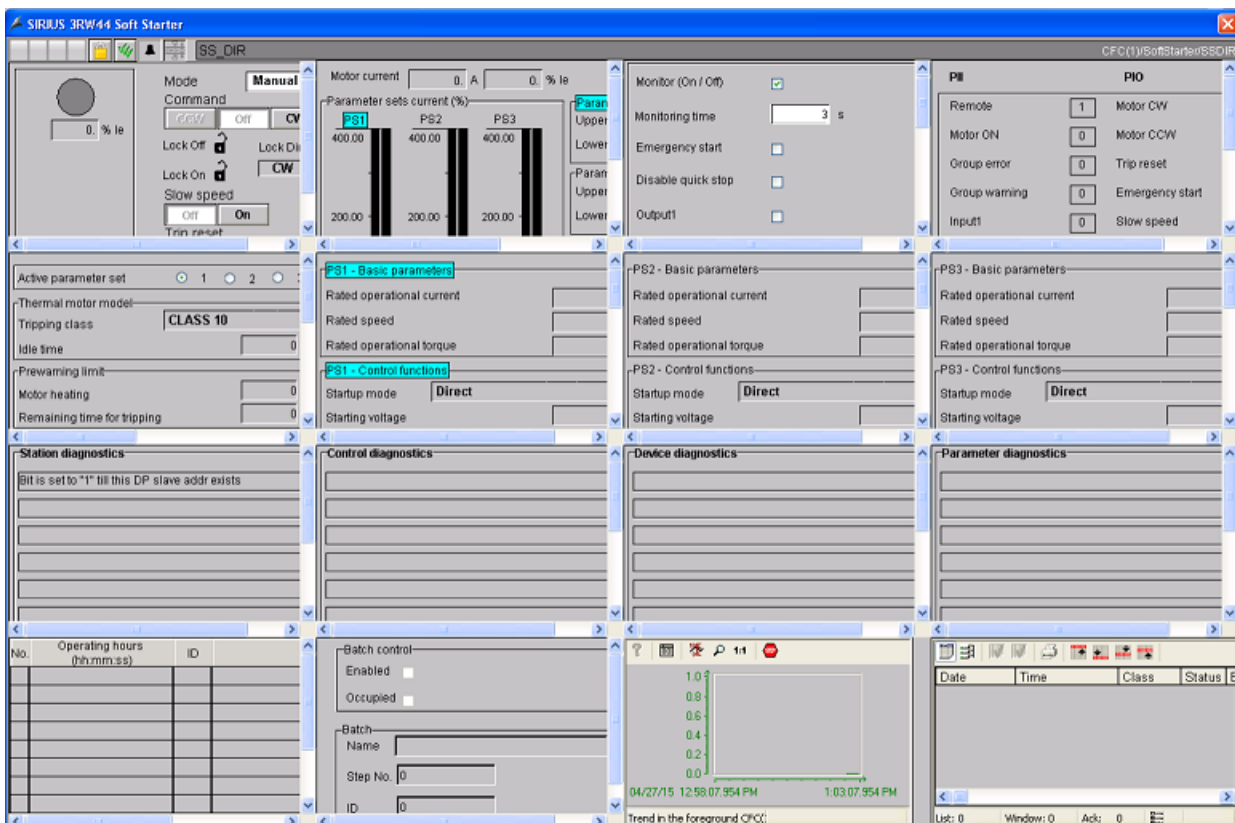
Each faceplate provides multiple views:

SSDIR	SSMEAS	SSSTAT
<ul style="list-style-type: none"> <li>• Standard</li> <li>• Limits</li> <li>• Maintenance</li> <li>• Process image</li> <li>• Parameter</li> <li>• Parameter set1</li> <li>• Parameter set2</li> <li>• Parameter set3</li> <li>• Station diag</li> <li>• Control diag</li> <li>• Device diag</li> <li>• Parameter diag</li> <li>• Logbook</li> <li>• Alarm</li> <li>• Batch</li> <li>• Trend</li> </ul>	<ul style="list-style-type: none"> <li>• Standard</li> <li>• Standard 2</li> <li>• Protection diag</li> <li>• Alarm</li> <li>• Trend</li> <li>• Batch</li> </ul>	<ul style="list-style-type: none"> <li>• Standard</li> <li>• Max Pointer</li> </ul>

You can switch between the single views by using the view selector dropdown menu.



Button Open loop  (located next to the view selector dropdown menu) opens all views of the block within one faceplate.



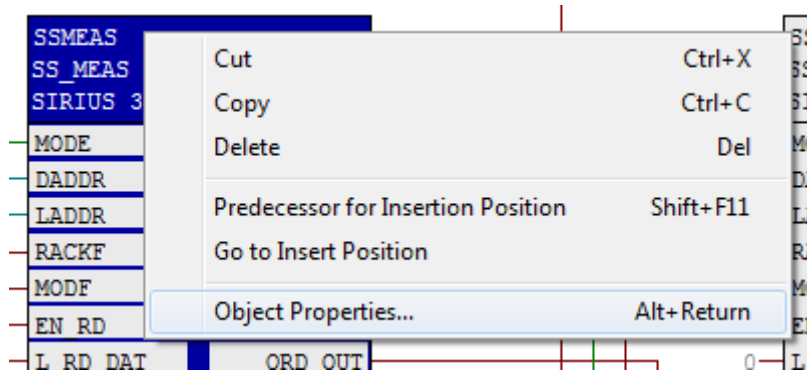
Faceplates may be pinned or unpinned to the screen according to the demands of the user. Further information on how to use the faceplates can be found in the online help or the user manual provided for this library.

## Deactivate block icons

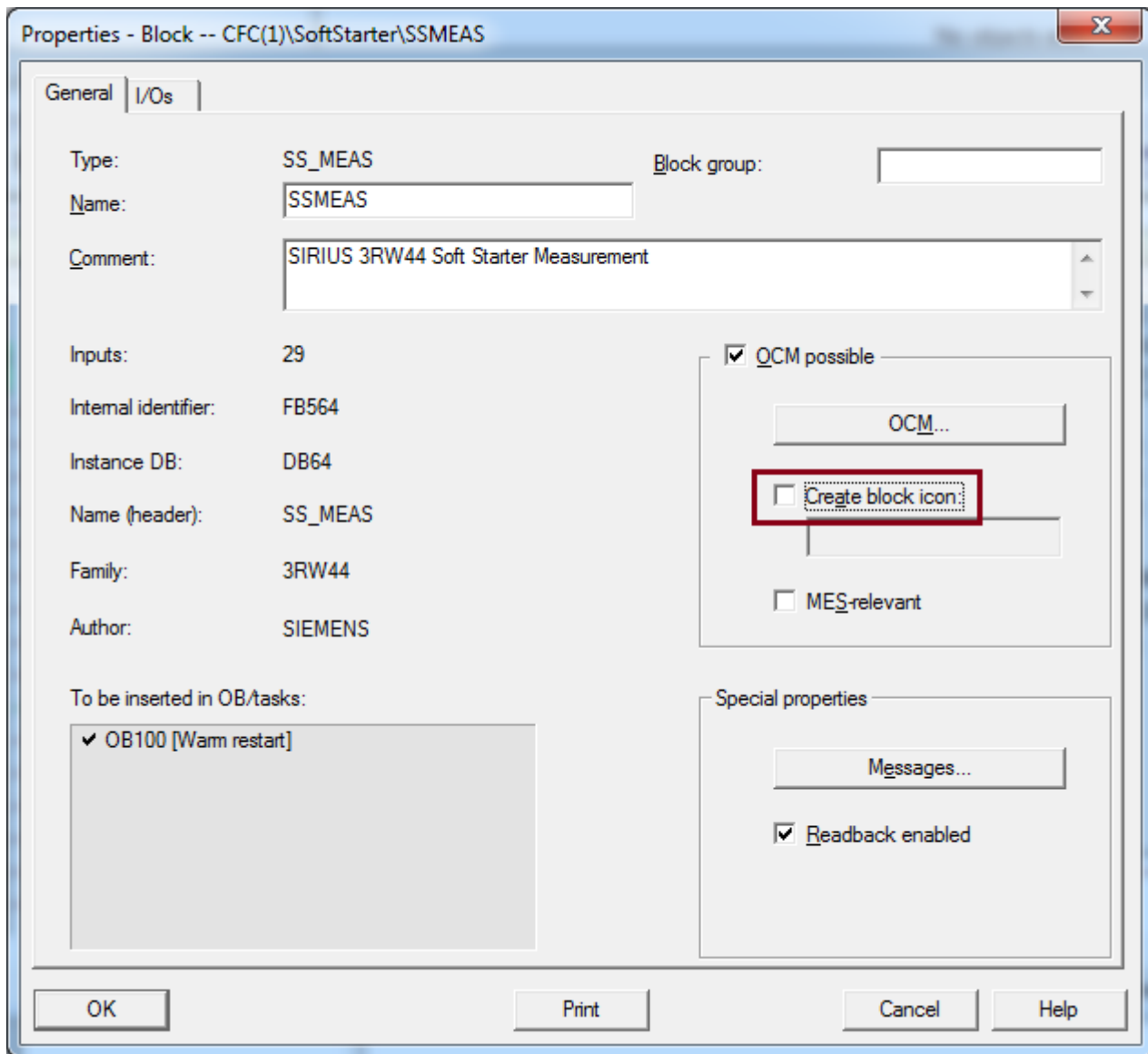
If you do not need a block icon for every block, you can deactivate it.

1. Open CFC-Editor.
2. Select the desired block.

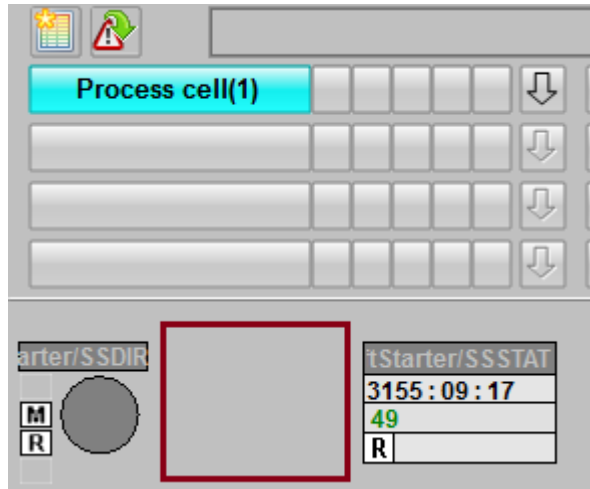
- 3. Right click and select Object properties in the context menu.



- 4. Uncheck the check box for Create block icon.



5. Confirm the Properties dialog by clicking OK.
6. Compile and download the CFC, if not yet done.
7. Compile the OS and activate WinCC. The block icon (e.g.: SSMEAS) is not visible anymore.





## References

### More information

Additional information can be found as follows:

- For PCS 7 V6.1:  
"SIMATIC PCS 7 Process Control System V6.0 Getting Started - First Steps Documentation"
- For PCS 7 V7.0:  
"SIMATIC PCS 7 Process Control System V7.0 Getting Started - First Steps Documentation"
- For PCS 7 V7.1:  
"Process Control System PCS 7 Getting Started Part 1 (V7.1)"  
"Process Control System PCS 7 Getting Started Part 2 (V7.1)"
- Programming and Operating Manual: "PCS 7 Library Soft Starter 3RW44 "V6.2" / "V7.1" / "V8 Migration V8.0+SP2.""





# List of Abbreviations

## 6.1 Abbreviations

### Overview

Table 6- 1 Meaning of abbreviations

<b>Abbrevia- tion</b>	<b>Meaning</b>
AS	Automation station
CFC	Continuous Function Chart
GSD	Generic Station Description
HMI	Human machine interface
HW Config	"Hardware configuration" module in the SIMATIC Manager
OS	Operator station
PCS 7	Process Control System 7
CPU	Central Processing Unit
SS	Soft starter

