SIEMENS

Industrial Controls

AS-Interface
AS-Interface PCS 7 Library V9.0 SP1

Programming and Operating Manual

08/2018

A5E42247406002A/RS-AB/002

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 editions.

Siemens AG
Division Digital Factory
Postfach 48 48
90026 NÜRNBERG
GERMANY

A5E42247406002A/RS-AB/002
℗ 08/2018 Subject to change

Table of contents

Introduction 1

1.1 Security information

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. You can find more information about industrial security by visiting: https://www.siemens.com/industrialsecurity.

Siemens' products and solutions undergo continuous development to make them more secure. Siemens strongly recommends you apply product updates as soon as available and 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
https://www.siemens.com/industrialsecurity.

1.2 Product specific security information

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
  - SIRIUS devices

For more information, click here
(https://support.industry.siemens.com/cs/document/60119725).

1.3 Components of the software package

General information

The "AS-Interface PCS 7 library V9.0 SP1" software is suitable for PCS 7 V9.0 SP1. It contains the following components for integrating the CP 343-2 / CP 343-2P AS-i communication modules, the CM AS-i Master ST, the DP/AS-i LINK Advanced and the IE/AS-i LINK into the PCS 7 driver concept.

- Block library with:
  - Diagnostics blocks for integrating the CP 343-2 / CP 343-2P AS-i and CM AS-i Master ST communication modules.
  - Diagnostics blocks for integrating the DP / AS-i LINK Advanced and IE/AS-i LINK with one or two AS-i lines.
  - Signal blocks for activation of the digital binary values for AS-i standard slaves, A-slaves and B-slaves which are integrated via CP 343-2 / CP 343-2P and CM AS-i Master ST.
  - Signal blocks for reading of the digital binary values for AS-i standard slaves, A-slaves and B-slaves which are integrated via CP 343-2 / CP 343-2P and CM AS-i Master ST.
  - Signal blocks for reading analog values for analog AS-i slaves integrated via DP/AS-i LINK Advanced IE/AS-i LINK.
  - Signal blocks for writing analog values for analog AS-i slaves integrated via DP/AS-i LINK Advanced IE/AS-i LINK.
- Symbols for the PCS 7 Maintenance Station
- Online help in German and English

Overview of the blocks

The blocks of the "AS-Interface PCS 7 Library V9.0 SP1" integrate standard AS-i slaves into the PCS 7 environment via the CP 343-2(P), CM AS-i Master ST, DP/AS-i LINK Advanced and IE/AS-i LINK.

The library contains the following blocks:

Name	Number	Block type
AsiMod	FB1311	Diagnostics block for module
AsiSub	FB1312	Function block for the AS-i subnet
AsiSubG	FB1313	Function block for the AS-i subnet (configured with a GSD file)
AsiSlv	FB1314	Function block for AS-i slaves
AsiDiAIn	FB1315	Channel block for digital input of AS-i standard / A-slaves
AsiDiAOu	FB1316	Channel block for digital output of AS-i standard / A-slaves
AsiDiBIn	FB1317	Channel block for digital input of an AS-i B-slave
AsiDiBOu	FB1318	Channel block for digital output of an AS-i B-slave
AsiAnIn	FB1319	Channel block for analog input of an AS-i slave (GSD, Universal AS-i Slave)
AsiAnOu	FB1320	Channel block for analog output of an AS-i slave (GSD, Universal AS-i Slave)
AsiCntrl	FB1322	AS-i Command interface

Note

The standard PCS 7 blocks Pcs7DiIn and Pcs7DiOu are used to integrate the binary AS-i slaves when configured with DP/AS-i LINK Advanced or IE/AS-i LINK.

1.4 Supported control functions

Supported modules and configurations

AS-Interface communications processors are integrated in HW Config as an S7 slave.

The following modules and configurations are supported as OMs:

- CP 343-2 (6GK7 343-2AH00-0XA0) on ET200M DP/ET200M PN
- CP 343-2 (6GK7 343-2AH01-0XA0) on ET200M DP/ET200M PN
- CP 343-2P (6GK7 343-2AH10-0XA0) on ET200M DP/ET200M PN
- CP 343-2P (6GK7 343-2AH11-0XA0) on ET200M DP/ET200M PN
- DP/AS-i LINK Advanced for connecting an AS-i network (6GK1 415-2BA10)
- DP/AS-i LINK Advanced for connecting two AS-i networks (6GK1 415-2BA20)
- IE/AS-i LINK PN IO for connecting an AS-i network (6GK1 411-2AB10)
- IE/AS-i LINK PN IO for connecting two AS-i networks (6GK1 411-2AB20)
- CM AS-i Master ST V1.0 & V1.1 (3RK7 137-6SA00-0BC1).

The driver concept for the AS-i slaves takes connection to the different AS-i masters into account.

The following modules and configurations are supported as GSDs:

- DP/AS-i LINK Advanced for connecting an AS-i network (6GK1 415-2BA10)
- DP/AS-i LINK Advanced for connecting two AS-i networks (6GK1 415-2BA20)
- IE/AS-i LINK PN IO for connecting an AS-i network (6GK1 411-2AB10)
- IE/AS-i LINK PN IO for connecting two AS-i networks (6GK1 411-2AB20).

See also

Object lists and action lists (Page 26)

1.5 Installing the library

Starting the installation

1. Place the CD/DVD in the CD/DVD-ROM drive of your PG/PC.
2. Launch the "setup.exe" program as administrator.

All the other information you need will be provided during the installation process.

Note

Readme File

Refer the information in the readme file.

1.6 Configuration steps

1.6.1 Configuring in HW Config

The AS-i devices along with their associated components and GSD file are inserted and configured in HW Config.

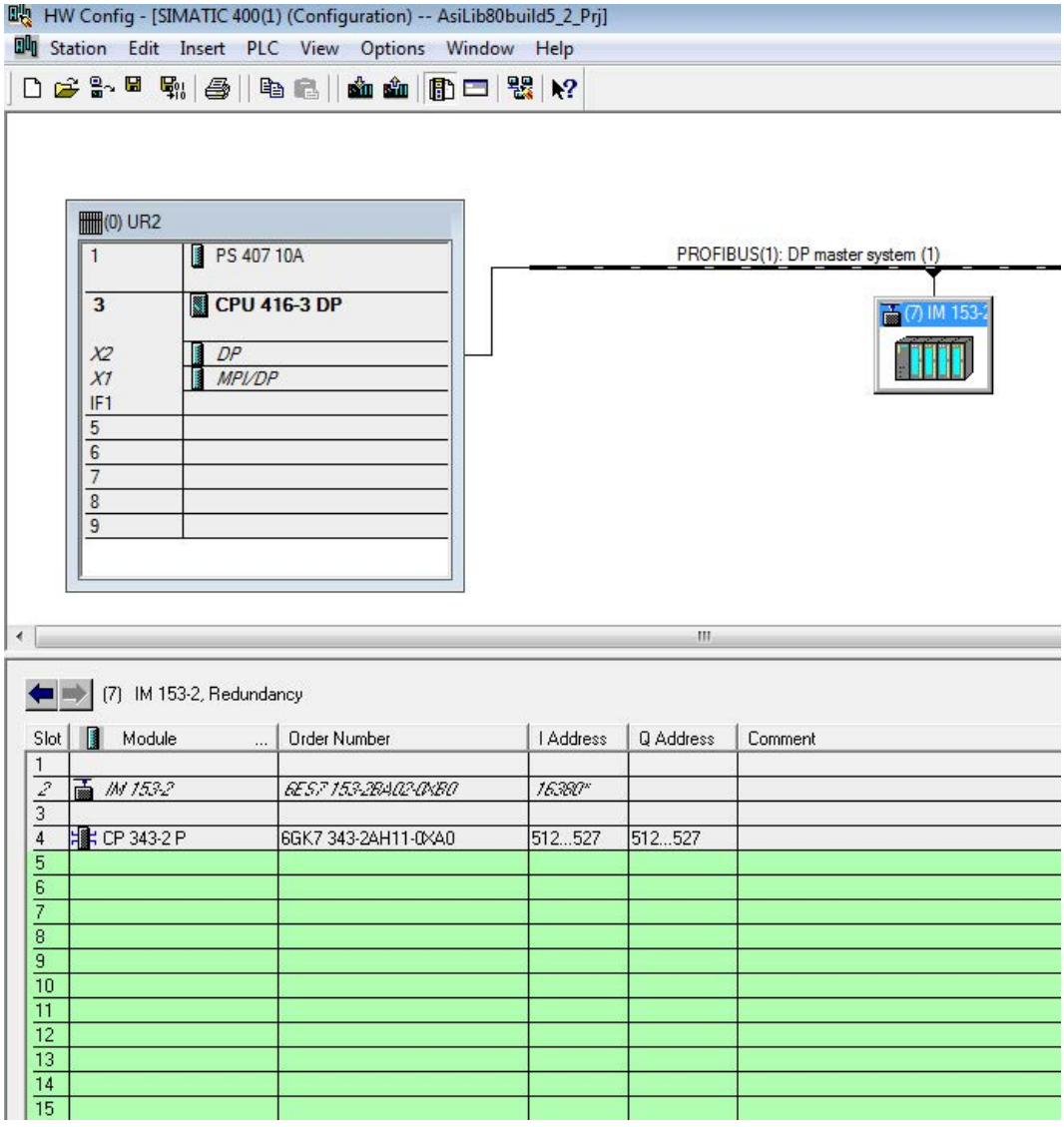
Constraints when operating downstream of a Y-Link

The DP/AS-i LINK Advanced can be operated downstream of a Y-Link only for firmware version V2.2 or higher. The GSD file must be used for configuring the same.

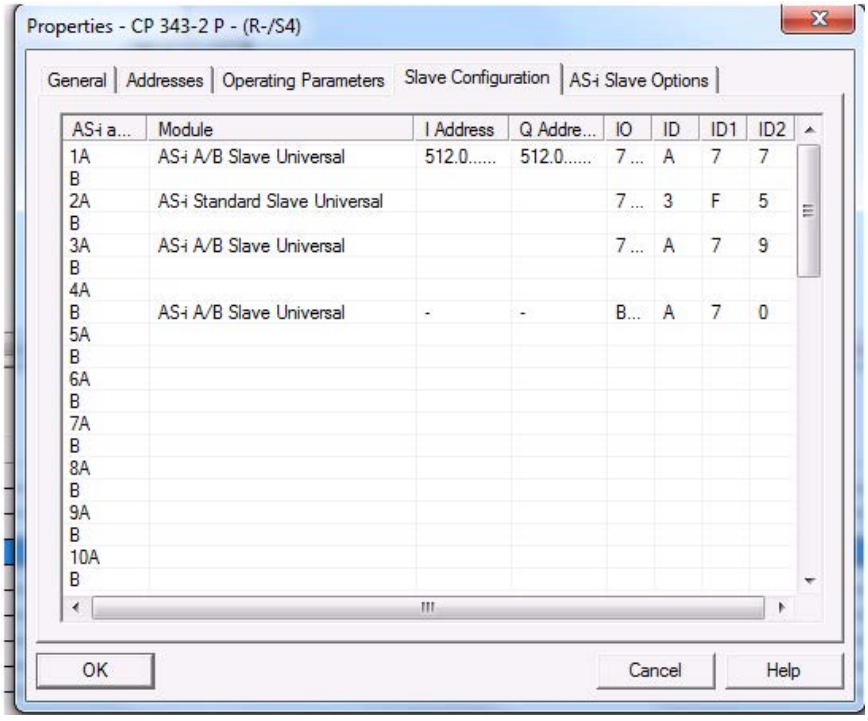
Note

The following graphics show example configurations in HW Config.

Hardware configuration for IM 153-2 with CP 343-2P device:

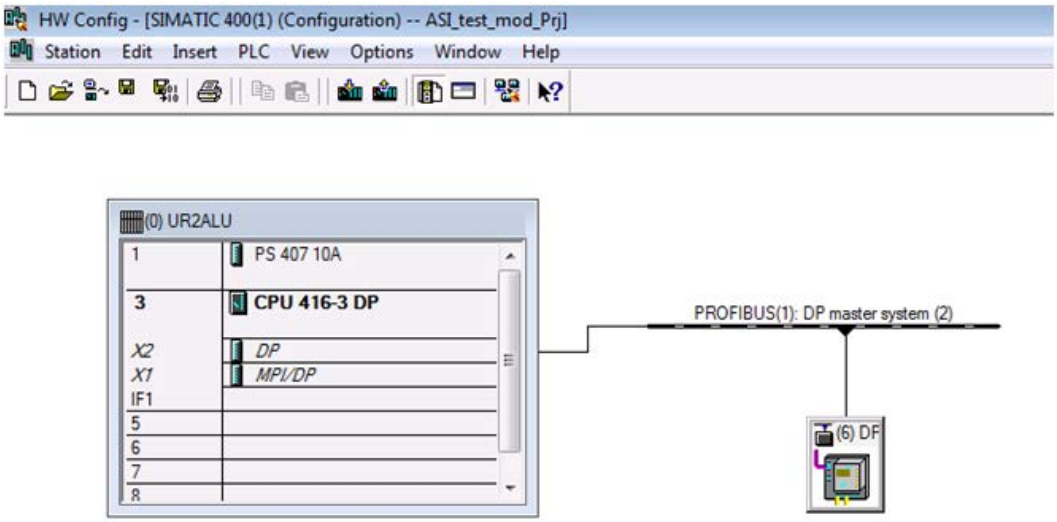


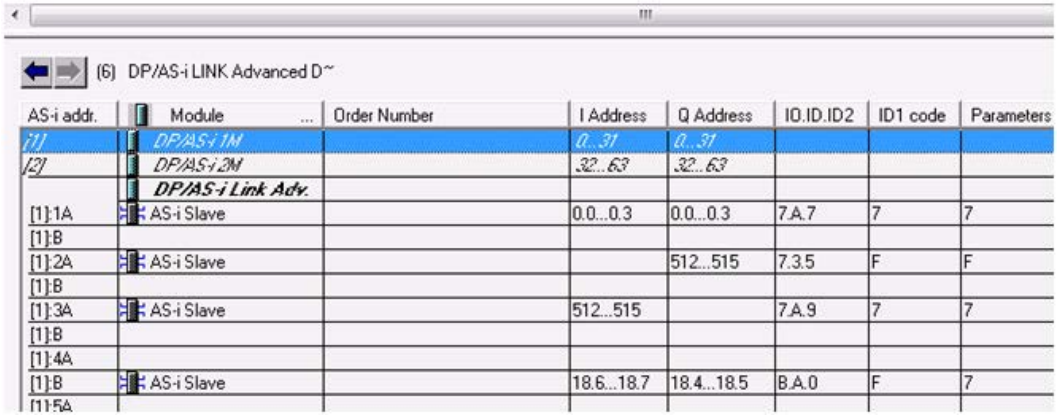
Slave configuration after uploading the slaves to PG



The "Upload to PG" option is available only for CP 343-2P modules.

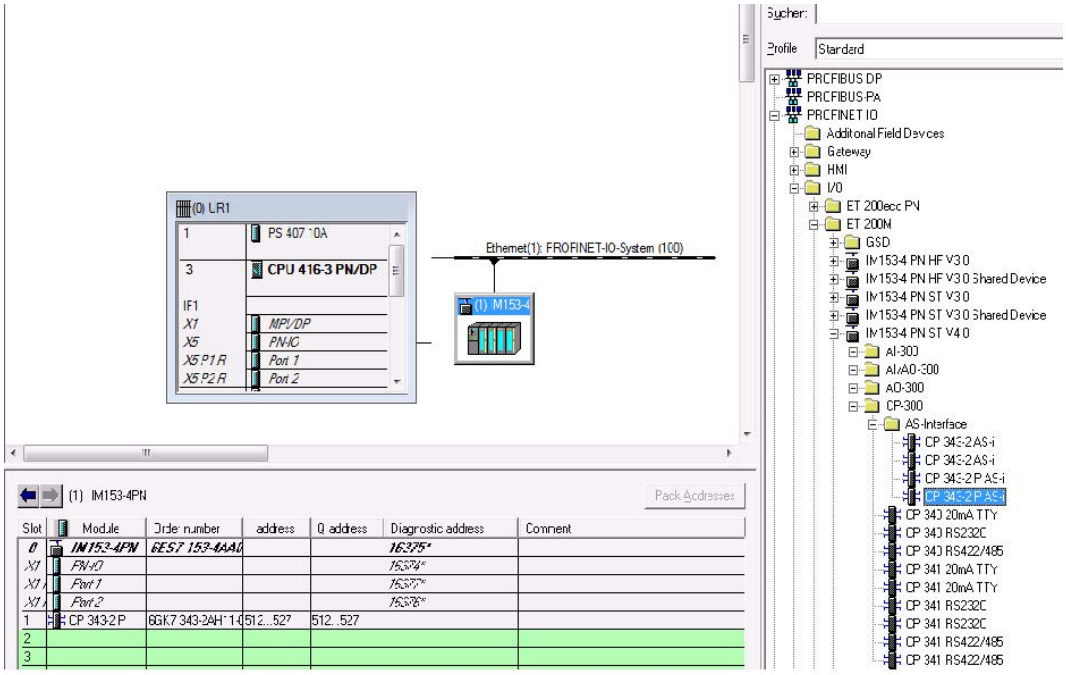
Hardware configuration of the DP AS-i LINK Advanced:



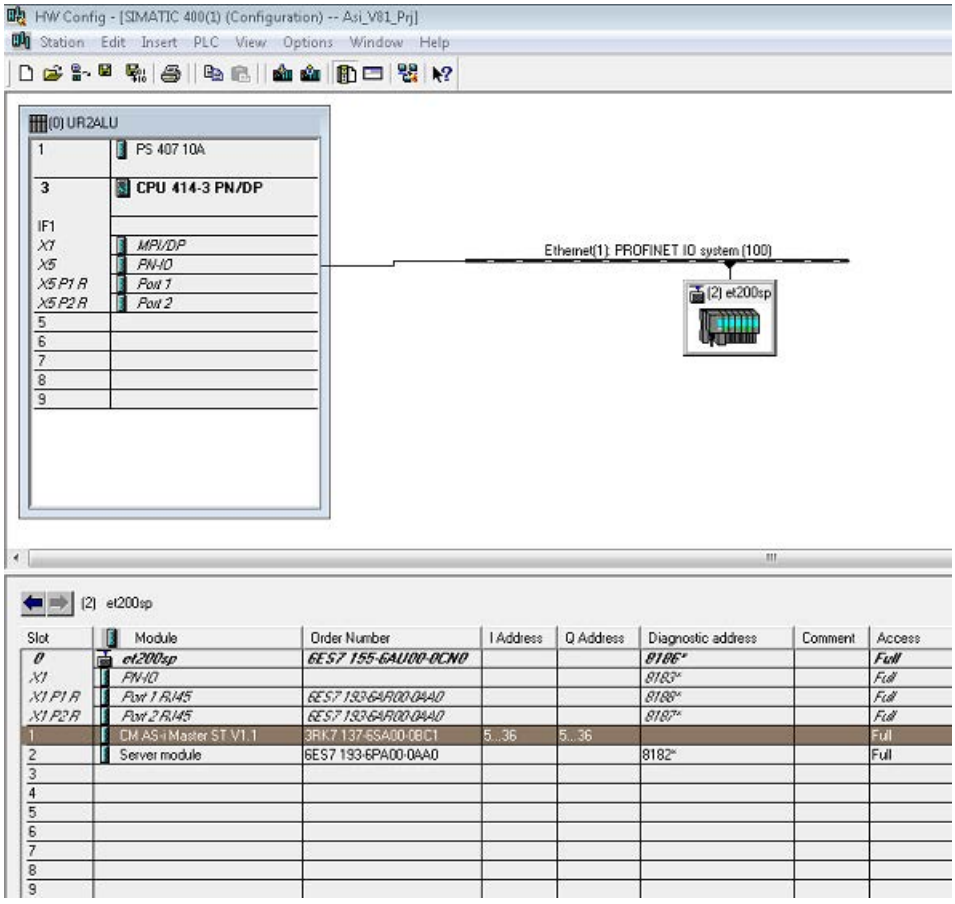


AS-i addr.	Module ...	Order Number	I Address	Q Address	IO.ID.ID2	ID1 code	Parameters
[1]	*DP/AS-i 1M*		*0...31*	*0...31*			
[2]	*DP/AS-i 2M*		*32...63*	*32...63*			
	DP/AS-i Link Adv.						
[1]:1A	AS-i Slave		0.0...0.3	0.0...0.3	7.A.7	7	7
[1]:B							
[1]:2A	AS-i Slave			512...515	7.3.5	F	F
[1]:B							
[1]:3A	AS-i Slave		512...515		7.A.9	7	7
[1]:B							
[1]:4A							
[1]:B	AS-i Slave		18.6...18.7	18.4...18.5	B.A.0	F	7
[1]:5A							

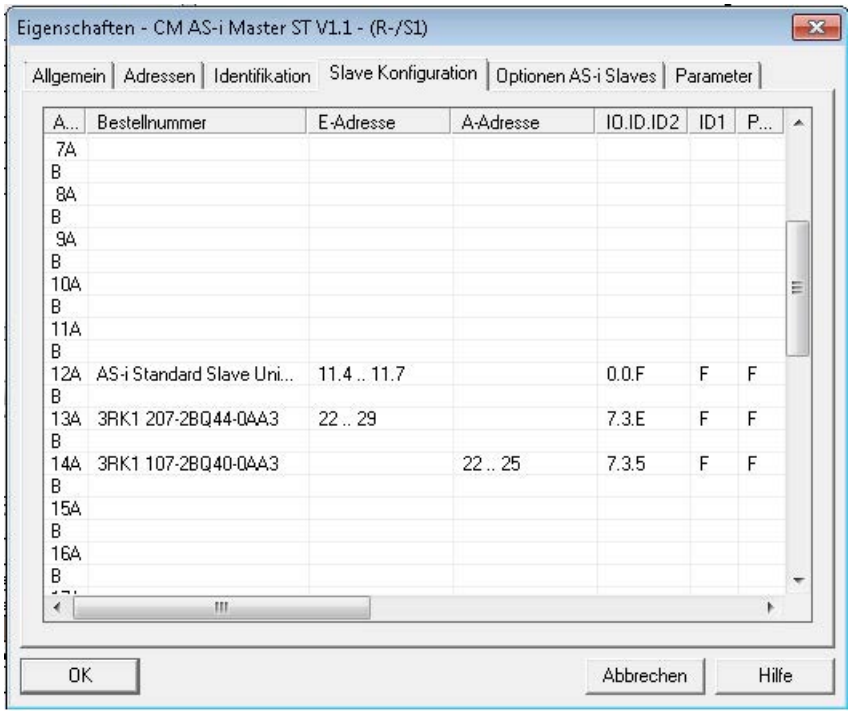
Hardware configuration of the IM 153-4 (ET200M PN) with CP 343-2P



Hardware configuration of CM AS-i Master ST with ET200 SP PN

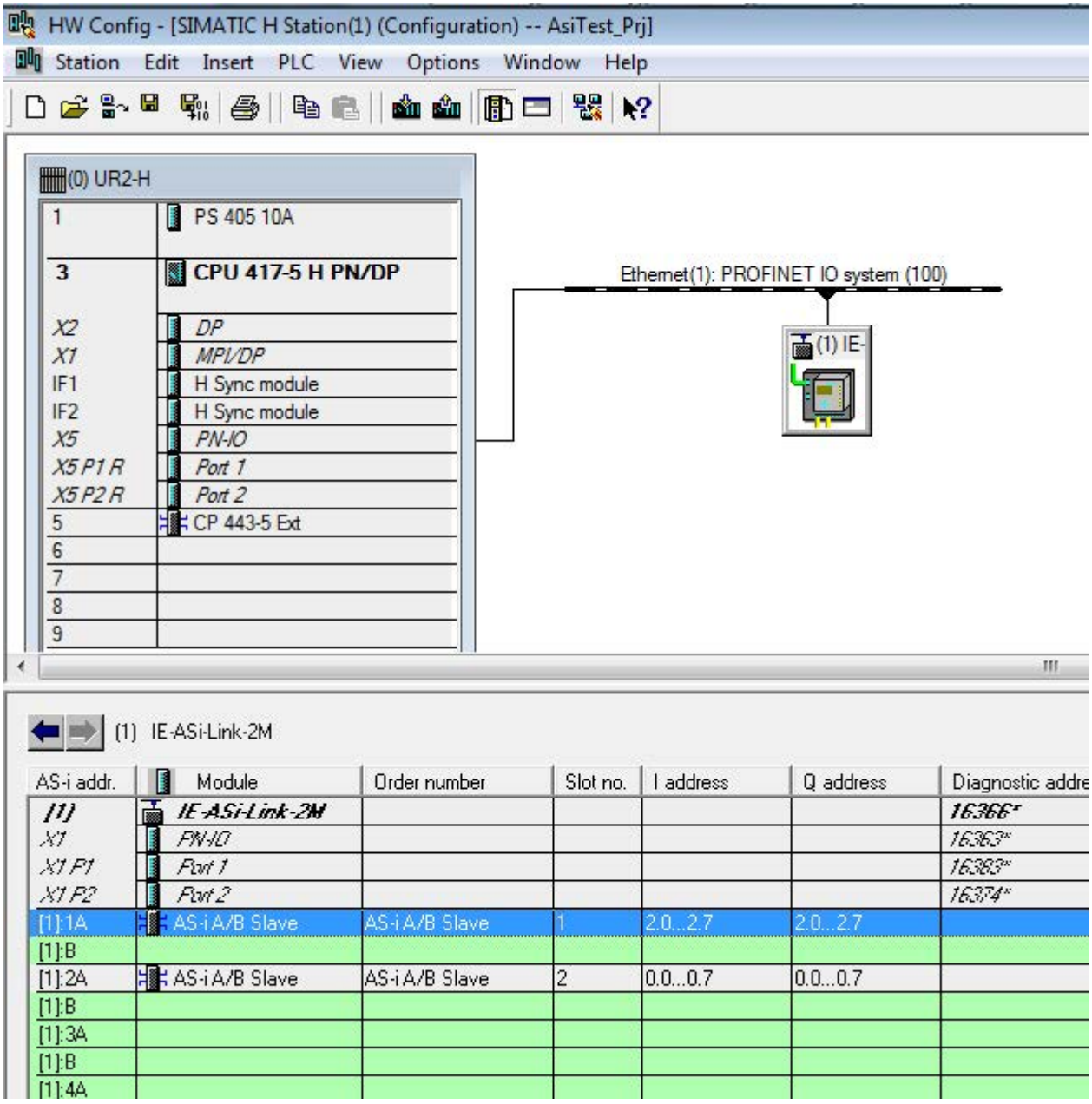


Slave configuration after uploading the slaves to PG in CM AS-i Master ST V1.1



The "Upload to PG" option is available only for CM AS-i Master ST V1.1.

Hardware configuration of the IE/AS-i LINK:



1.6.2 Configuring in CFC

Configuring in CFC

Refer the section in Getting Started (https://support.industry.siemens.com/cs/document/109760512).

Reference

Additional information is available in the "Process Control System PCS7 Compendium Part A - Configuration Guidelines" Operating manuals in the Internet (https://support.industry.siemens.com/cs/document/63187279).

1.7 Driver generator

1.7.1 Driver generator

Handling the driver generator

The "Generate Module Driver" function is available for signal processing in PCS 7. Once the hardware has been configured in HW Config and the technological functions have been configured in the CFC, this function automatically generates, interconnects, and parameterizes the required module drivers. These module drivers are responsible for the diagnostics and reporting of faults during signal processing.

The Setup program installs XML files for the connection between the AS-i devices and the driver generator.

Purpose of the driver generator

A signal-processing block is inserted in the CFC for each AS-i device, and the connection to the hardware is established using symbolic addressing.

The "Generate Module Driver" option inserts the additionally required OB_DIAG1, OB_DIAG1_PN, AsiCntrl, AsiMod, AsiSub, AsiSlv and AsiSubG blocks and then connects and assigns the relevant parameters.

1.7.2 Requirements for generating the module drivers

Supported modules

The Setup program installs XML files for connecting the AS-Interface communication modules to the driver generator.

The following modules and configurations are supported:

Module	Article number
DP/AS-i LINK Advanced (V1.0, V2.0 and V2.2)	• 6GK1415-2BA10 • 6GK1415-2BA20
CP 343-2	• 6GK7343-2AH00-0XA0 • 6GK7343-2AH01-0XA0
CP 343-2P	• 6GK7343-2AH10-0XA0 • 6GK7343-2AH11-0XA0
IE/AS-Interface LINK PN IO (V1.0, V2.0 and V2.2)	• 6GK1411-2AB10 • 6GK1411-2AB20
CM AS-i Master ST (V1.0 & V1.1)	• 3RK7 137-6SA00-0BC1

Only DP/AS-i LINK and IE/AS-i LINK may also be configured with the aid of GSD files.

In order to be operated behind a Y-Link, the DP/AS-i LINK must be configured with the aid of the PROFIBUS GSD file.

Note

Both DPV0 and DPV1 modes are supported for DP/AS-i LINK Advanced V2.2 (SI018139.gs?) whereas DP/AS-i LINK Advanced (SIEM8139.gs?) supports only the DPV0 mode of operation.

Language-independent GSD file name	AS-Interface	Compatible modules
SIEM8139.gs?	DP/AS-i LINK Advanced	Yes
SI018139.gs?	DP/AS-i LINK Advanced V2.2	Yes
GSDML-V2.1-Siemens-IeAsiLink-20080611.xml	IE-AS-i-LINK (V1.0 and V2.0)	Yes

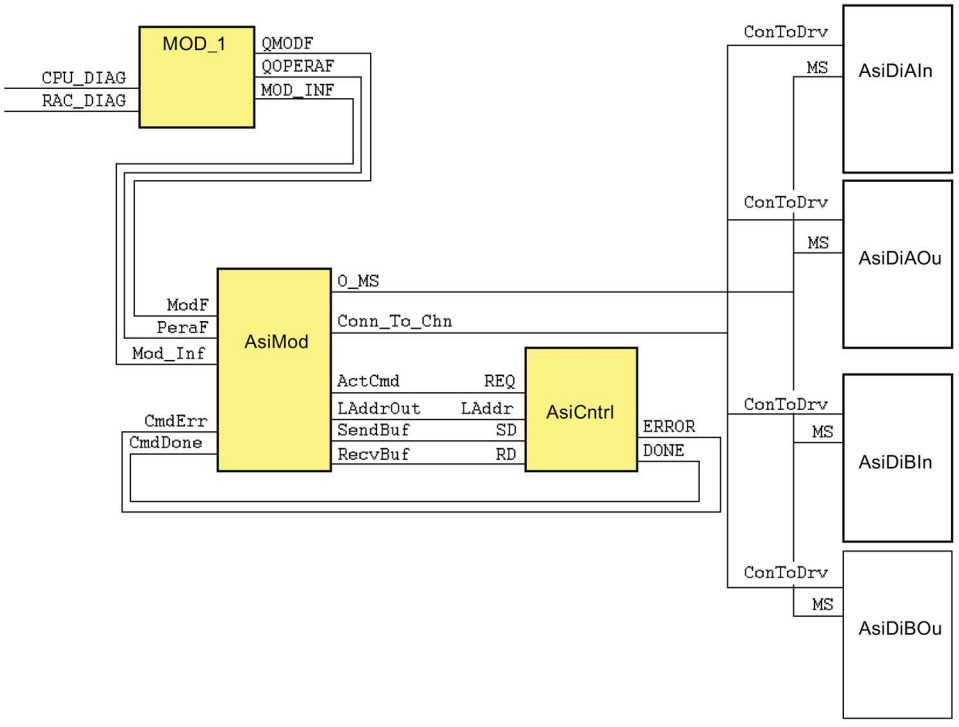
A signal-processing block is inserted in the CFC by the user, for each sensor/actuator present, and the connection to the hardware is established using symbolic addressing.

If the "Generate module driver" option is selected when the CFC chart is compiled, all other required blocks are inserted and the corresponding parameters are connected and assigned.

1.7.3 Handling of driver generators (CP 343-2 / CP 343-2P) for ET 200M and ET 200M PN

Interconnection diagram of driver generator (CP 343-2 / CP 343-2P)

Based on the projected AS-i slaves, the user must configure a channel block for each actuator/sensor. These are illustrated as the white blocks in the diagram below. The yellow blocks are inserted by the driver generator.

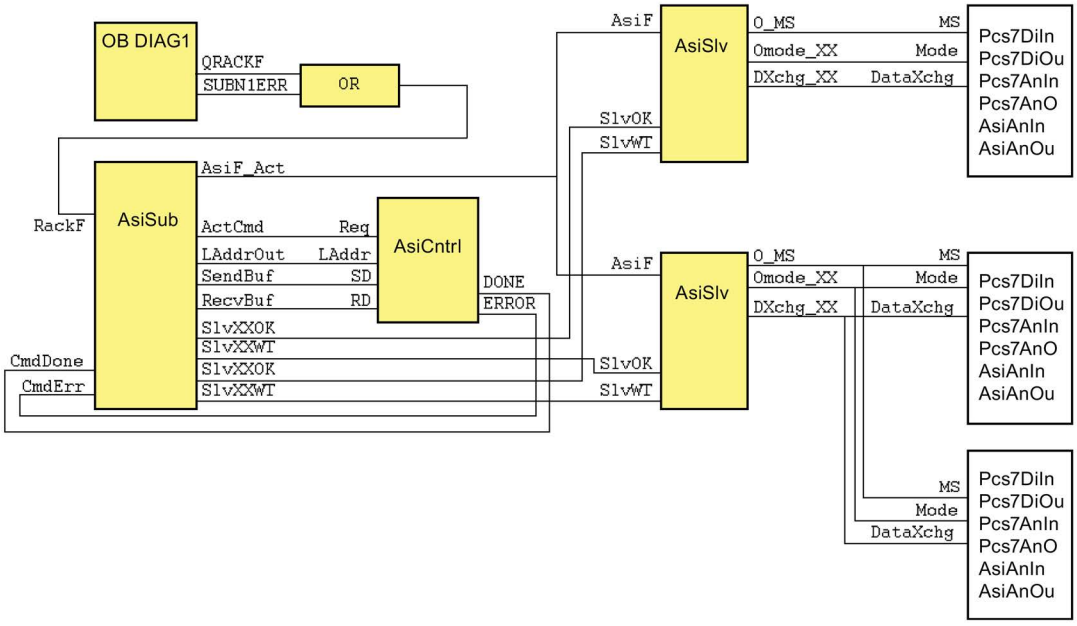


AsiDiAIn	AsiDiAOu	AsiDiBIn	AsiDiBOu	AsiMod	AsiCntrl	MOD_1
ConToDrv	ConToDrv	ConToDrv	ConToDrv	Conn_To_Chn	-	-
MS	MS	MS	MS	O_MS	-	-
-	-	-	-	ActCmd	Req	-
-	-	-	-	LAddrOut	LAddr	-
-	-	-	-	SendBuf	SD	-
-	-	-	-	RecvBuf	RD	-
-	-	-	-	EN	-	-
-	-	-	-	ModF	-	QMODF
-	-	-	-	PeraF	-	QPERAF
-	-	-	-	CmdDone	Done	-
-	-	-	-	CmdErr	Error	-
-	-	-	-	Mod_Inf	-	MOD_INF
-	-	-	-	Rac_Diag	-	-

1.7.4 Handling of driver generators (DP/AS-i LINK Advanced)

Interconnection diagram of the driver generator (configuration with Object Manager)

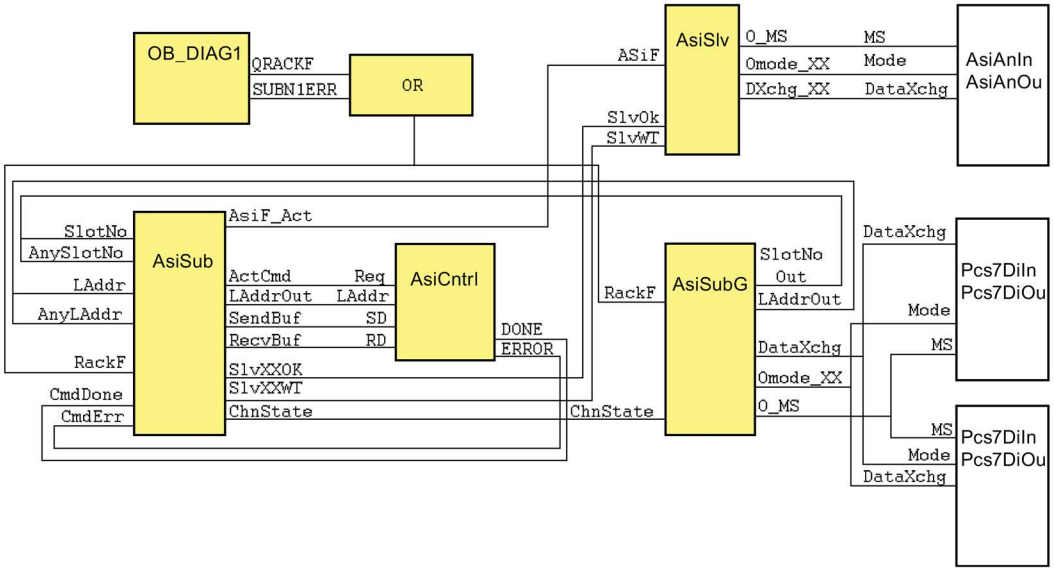
Based on the projected AS-i slaves, the user must configure a channel block for each actuator/sensor. These are illustrated as the white blocks in the diagram below. The yellow blocks are inserted by the driver generator.



Pcs7DiIn	Pcs7DiOu	Pcs7AnIn / AsiAnIn	Pcs7AnOu / AsiAnOu	AsiSlv	AsiSub	AsiCntrl
MS	MS	MS	MS	O_MS	-	-
DataXchg	DataXchg	DataXchg	DataXchg	DXchg_slaveNo	-	-
Mode	Mode	Mode	Mode	Omode_SlaveNo	-	-
-	-	-	-	ASiF	AsiF_Act	-
-	-	-	-	SlvOk	SlvXXOK	-
-	-	-	-	SlvWT	SlvXXWT	-
-	-	-	-		CmdAct	Req
-	-	-	-		LAddrOut	LAddr
-	-	-	-		Send_Buf	SD
-	-	-	-		Recv_Buf	RD
-	-	-	-		CmdDone	Done
-	-	-	-		CmdErr	Error

Interconnection diagram of the driver generator (configuring with GSD file)

Based on the projected AS-i slaves, the user must configure a channel block for each actuator/sensor. These are illustrated as the white blocks in the diagram below. The yellow blocks are inserted by the driver generator.

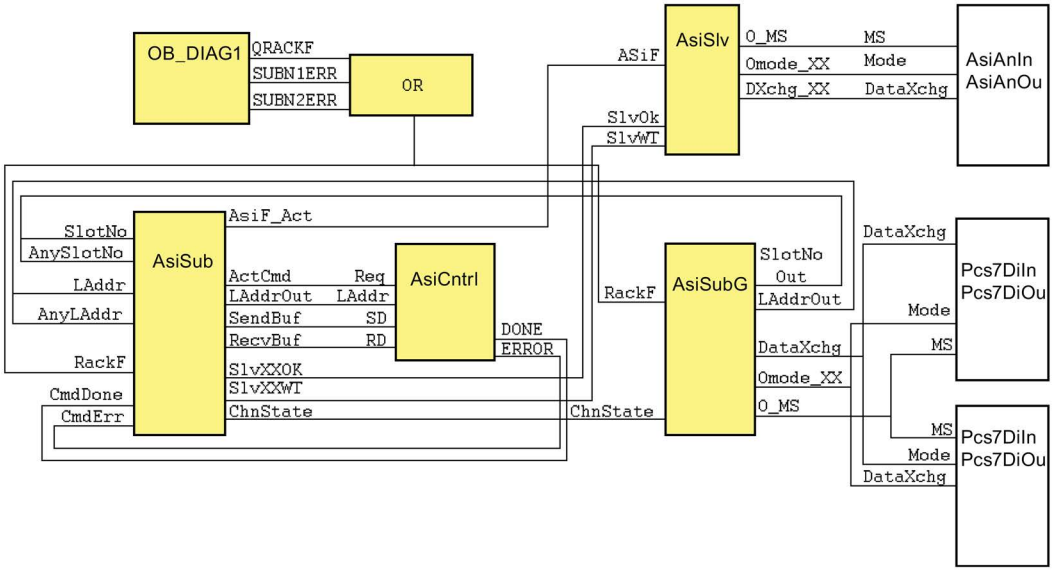


(The AsiCntrl block is omitted if the GSD is configured in DPV0 mode)

Pcs7DiIn	Pcs7DiOu	AsiAnIn	AsiAnOu	AsiSlv	AsiSub	AsiSubG	AsiCntrl
MS	MS	MS	MS	O_MS	-	O_MS	-
DataXchg	DataXchg	DataXchg	DataXchg	DXchg_slaveNo	-	DXchg_slaveNo	-
Mode	Mode	Mode	Mode	Omode_SlaveNo	-	Omode_SlaveNo	-
-	-	-	-	ASiF	AsiF_Act	-	-
-	-	-	-	SlvOk	SlvXXOK	-	-
-	-	-	-	SlvWT	SlvXXWT	-	-
-	-	-	-	-	LAddrOut	-	LAddr
-	-	-	-	-	CmdAct	-	Req
-	-	-	-	-	Send_Buf	-	SD
-	-	-	-	-	Recv_Buf		RD
-	-	-	-	-	ChnState	ChnState	-
-	-	-	-	-	CmdDone	-	Done
-	-	-	-	-	CmdErr	-	Error
-	-	-	-	-	RackF	RackF	-
-	-	-	-	-	LAddr	LAddrOut	-
-	-	-	-	-	AnyLAddr	LAddrOut	-
-	-	-	-	-	SlotNo	SlotNoOut	-
-	-	-	-	-	AnySlotNo	SlotNoOut	-

Interconnection diagram of the driver generator for DP/AS-i LINK (behind Y-Link)

Based on the projected AS-i slaves, the user must configure a channel block for each actuator/sensor. These are illustrated as the white blocks in the diagram below. The yellow blocks are inserted by the driver generator.



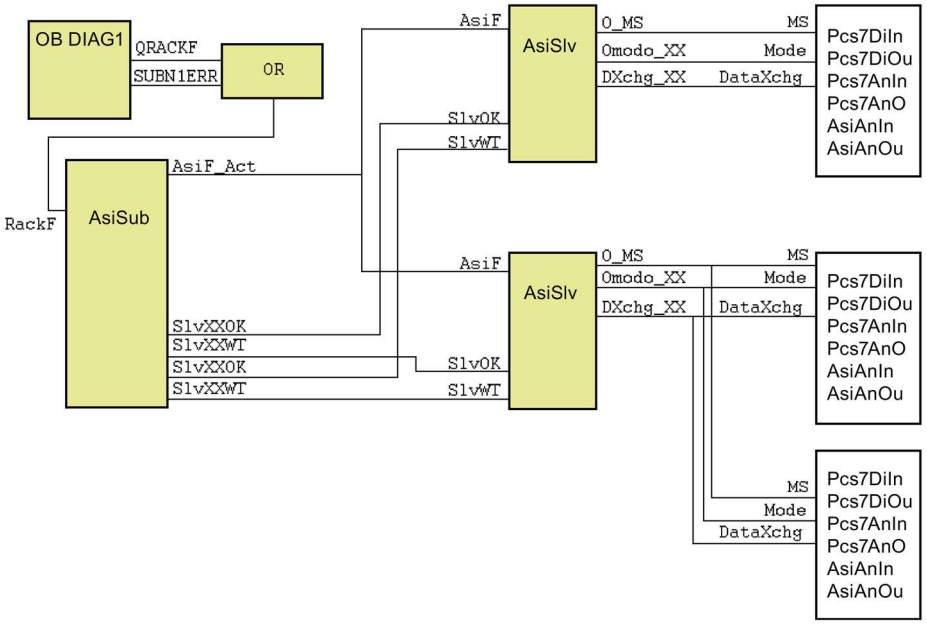
(The AsiCntrl block is omitted if the GSD is configured in DPV0 mode)

Pcs7DiIn / Pcs7DiOu	AsiAnIn / AsiAnOu	AsiSlv	AsiSub	AsiSubG	OB_DIAG1 / OB_DIAG1_PN
MS	MS	O_MS	-	O_MS	-
DataXchg	DataXchg	DXchg_slaveNo	-	DXchg_slaveNo	-
Mode	Mode	Omode_SlaveNo	-	Omode_SlaveNo	-
-	-	ASiF	AsiF_Act	-	-
-	-	SlvOk	SlvXXOK	-	-
-	-	SlvWT	SlvXXWT	-	-
-	-	-	ChnState	ChnState	-
-	-	-	RackF	RackF	SUBN1ERR
-	-	-	LAddr	LAddrOut	-
-	-	-	AnyLAddr	LAddrOut	-
-	-	-	SlotNo	SlotNoOut	-
-	-	-	AnySlotNo	SlotNoOut	-

1.7.5 Handling of driver generators (IE/AS-i LINK)

Interconnection diagram of the driver generator (configuring with Object Manager)

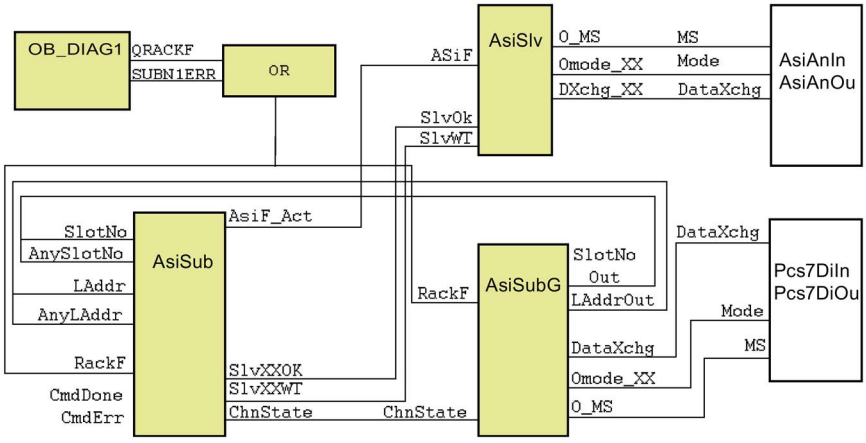
Based on the projected AS-i slaves, the user must configure a channel block for each actuator/sensor. These are illustrated as the white blocks in the diagram below. The yellow blocks are inserted by the driver generator.



Pcs7DiIn	Pcs7DiOu	Pcs7AnIn / AsiAnIn	Pcs7AnOu / AsiAnOu	AsiSlv	AsiSub
MS	MS	MS	MS	O_MS	-
DataXchg	DataXchg	DataXchg	DataXchg	DXchg_slaveNo	-
Mode	Mode	Mode	Mode	Omode_SlaveNo	-
-	-	-	-	ASiF	AsiF_Act
-	-	-	-	SlvOk	SlvXXOK
-	-	-	-	SlvWT	SlvXXWT

Interconnection diagram of the driver generator (configuring with GSD file)

Based on the projected AS-i slaves, the user must configure a channel block for each actuator/sensor. These are illustrated as the white blocks in the diagram below. The yellow blocks are inserted by the driver generator.

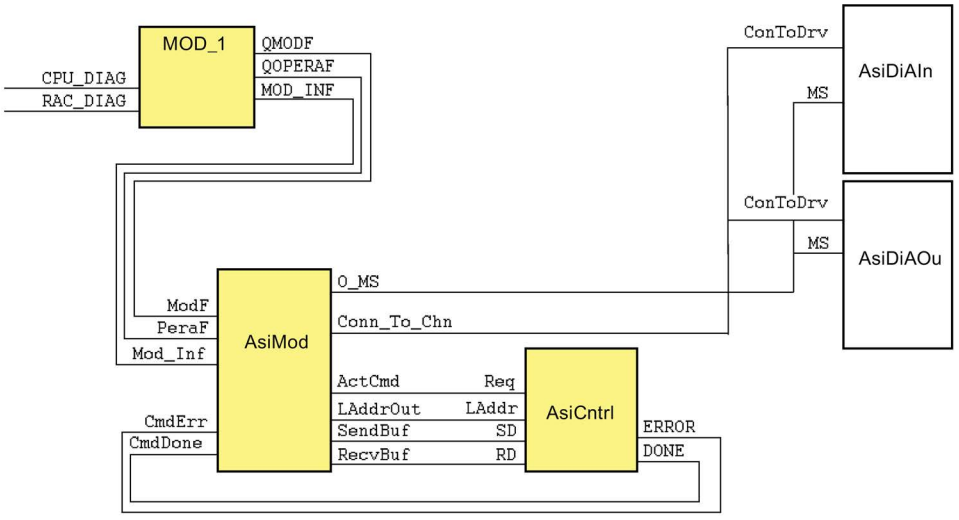


Pcs7DiIn	Pcs7DiOu	AsiAnIn	AsiAnOu	AsiSlv	AsiSub	AsiSubG
MS	MS	MS	MS	O_MS	-	O_MS
DataXchg	DataXchg	DataXchg	DataXchg	DXchg_slaveNo	-	DXchg_slaveNo
Mode	Mode	Mode	Mode	Omode_SlaveNo	-	Omode_SlaveNo
-	-	-	-	ASiF	AsiF_Act	-
-	-	-	-	SlvOk	SlvXXOK	-
-	-	-	-	SlvWT	SlvXXWT	-
-	-	-	-	-	ChnState	ChnState
-	-	-	-	-	RackF	RackF
-	-	-	-	-	LAddr	LAddrOut
-	-	-	-	-	AnyLAddr	LAddrOut
-	-	-	-	-	SlotNo	SlotNoOut
-	-	-	-	-	AnySlotNo	SlotNoOut

1.7.6 Handling of driver generators CM AS-i Master ST for ET200SP

Connection diagram of driver generator (CM AS-i Master ST)

Based on the projected AS-i slaves, the user must configure a channel block for each actuator/sensor. These are illustrated as the white blocks in the diagram below. The yellow blocks are inserted by the driver generator.



AsiDiAIn	AsiDiAOu	AsiMod	AsiCntrl	MOD_1
ConToDrv	ConToDrv	Conn_To_Chn	-	-
MS	MS	O_MS	-	-
-	-	ActCmd	EN	-
-	-	ActCmd	Req	-
-	-	LAddrOut	LAddr	-
-	-	SendBuf	SD	-
-	-	RecvBuf	RD	-
-	-	EN	-	-
-	-	ModF	-	QMODF
-	-	PeraF	-	QPERAF
-	-	CmdDone	Done	-
-	-	CmdErr	Error	-
-	-	Mod_Inf	-	MOD_INF
-	-	Rac_Diag	-	-

1.7.7 AS-Interface masters and employed blocks

The table show the blocks used by the specific AS-Interface masters.

AS-Interface master	Digital standard slaves	Digital A/B slaves at "A addresses"	Digital A/B slaves at "B addresses"	Analog Siemens slaves [1]	Analog non-Siemens slaves
CP 343-2(P)	AsiDiAIn AsiDiAOu		AsiDiBIn AsiDiBOu	-	-
CM AS-i Master ST	AsiDiAIn AsiDiAOu			-	-
DP/AS-i LINK Advanced	Pcs7DiIn Pcs7DiOu			AsiAnIn AsiAnOu Pcs7AnIn Pcs7AnOu	
DP/AS-i LINK Advanced (GSD)					
IE/AS-i LINK PN IO					
IE/AS-i LINK PN IO (GSD)					

[1] A Siemens slave must be configured in HW Config with the article number.

1.7.8 Object lists and action lists

Hardware modules, among other things, are configured in HW Config.

Description

The object lists and the action lists are used to generate the module drivers for these hardware modules.

The object list contains a unique object identification number for each of these hardware modules. Each object list is assigned to a particular hardware configuration.

The action list contains a list of actions. These actions must be executed for the object identification numbers that appear in the object list. Examples of such actions include:

- Assigning the device address
- Interconnecting the input and output parameters of the driver block

The "Generate Module Driver" function generates the module drivers when the CFC is compiled.

1.8 Update an existing PCS 7 project

Performing a project update

Refer "ReadMe" provided with the library.

1.9 Further documentation

Overview

More information

- Overview of AS-Interface block library for SIMATIC PCS 7 (https://support.industry.siemens.com/cs/document/109759605)
- Online help for PCS 7 Advanced Process Library
- Online help for SIMATIC PCS 7 Process Control System
- Function modules for SIMATIC PCS 7 Process Control System in the Internet (https://support.industry.siemens.com/cs/document/109477335)
- Getting started on the Internet (https://support.industry.siemens.com/cs/document/109760512).

Description of blocks

2

2.1 Diagnostics block AsiMod

2.1.1 Diagnostics block AsiMod

FB1311

Application

The AsiMod block monitors an AS-Interface CP 343-2/CP 343-2P and CM AS-i Master ST communication modules.

Calling OBs

The block must be inserted in the run sequence in the following OBs (occurs automatically in CFC):

OB 1	Cyclic program
OB 3x	Cyclic interrupt OB in which the channel blocks are inserted (e.g., OB 32 to OB 38)
OB 82	Diagnostic interrupt
OB 83	Insert/remove interrupt
OB 85	Priority Class Error
OB 100	Warm restart

Use in CFC

When the "Generate module driver" CFC function is used, the following is executed automatically:

- The AsiMod block is inserted into the OBs indicated above in its own runtime group downstream of the runtime group of the MOD_1 block.
- Assignment of parameters to
  - inputs `Subn1ID`, `Subn2ID`, `RackNo` and `SlotNo`.
  - the logical start address of the `LAddr` module and Input `SlvTyp`.
- Interconnects
  - The OUT structures `MOD_INF` of the MOD_1 block and `RAC_DIAG` of the RACK block are connected to the corresponding IN structures `Mod_Inf` and `Rac_Diag` of the `AsiMod`.
  - The input `EN` is connected to the output of an AND block. Its inputs are connected to the outputs `EN_SUBx` (x = number of the DP master system) of the OB_BEGIN block, `EN_Rxxx` (xxx = rack / station number) of the SUBNET block, and `EN_Mxx` (xx = module number) of the RACK block.
  - The input `ModF` is connected to the output `QMODF` of the MOD_1 block.
  - The input `PeraF` is connected to the output `QPERAF` of the MOD_1 block.
  - Input `CmdDone` is connected to output `Done` of the AsiCntrl block.
  - Input `CmdErr` is connected to output `Error` of the AsiCntrl block.
  - Furthermore, outputs `ActCmd`, `LAddrOut`, `SendBuf`, and `RecvBuf` are connected to inputs `Req`, `LAddr`, `SD` and `RD` of the AsiCntrl block.

Redundancy

The redundancy of the DP master systems in an H-system is monitored in the higher-level RACK block.

Display of valid channels

The projected slaves of a module are indicated in the outputs SlvExist (for A-Slaves) and SlvExistB (for B-slaves). A bit is set in each DWORD for each projected slave, starting with bit 0 (for slave 0). If the bit assigned to a slave has the value "0", the slave is not projected.

The valid slaves of a module are indicated in the outputs SlvOk (for A-slaves) and SlvOkB (for B-slaves). A bit is set in each DWORD for each valid slave, starting with bit 0 (for slave 0). If the bit assigned to a slave has the value "0", the slave is faulty. In the event of module faults, all slaves are faulty.

Troubleshooting

The input parameters are not checked for plausibility.

Time response

Not implemented.

Message capability

AsiMod signals module faults using ALARM_8P. The messages are indicated in WinCC only if the `MsgLock` parameter is reset.

In addition, the block signals the following statuses for each of the 62 possible slave addresses (1A - 31A, 1B to 31B):

- Unconfigured slave detected
- Slave failure
- Slave has incorrect slave type

Reading data records

For CP 343-2 or CP 343-2P, the block reads the information of the B-slaves by means of data records with SFB52 RDREC.

For CM AS-i Master ST, information of the B slaves will be read directly through PII (Process Image Input).

The input data of the B-slaves which has been read out of the B-slave record is written into the nibble corresponding to the slave in the Pae_Di_Typ_B parameter of the Conn_To_Chn structure. The returned value of RDREC (SFB52), which indicates if a fault has occurred, is written in the ERR_CODE_PAE_DI_TYP_B parameter of Err_Code_Read_Write by Conn_To_Chn.

Writing data records

For CP 343-2 or CP 343-2P, the block writes the information of the B-slaves by means of data records with SFB53 WRREC .

For CM AS-i Master ST, information to the B slaves will be written directly through PIO (Process Image Output).

The output data of the B-slave stored in the nibble corresponding to the slave in the Pae_Di_Typ_B parameter of the Conn_To_Chn structure is written to the device. The returned value of WRREC (SFB53), which indicates if a fault has occurred, is written in the ERR_CODE_PAE_DI_TYP_B parameter of Err_Code_Read_Write of Conn_To_Chn.

Reading diagnostic data

If the CP 343-2/CP343-2P/CM-AS-i Master ST module initiates a diagnostic interrupt, reading of the device-specific diagnostic data will be triggered.

The information read contains the current status (OK or faulty) of the configured slaves. These data are transferred to the signal-processing blocks where they are evaluated.

The diagnostics data can also be displayed on a Maintenance Station.

Startup characteristics

After a restart or initial run, a check is made to determine whether the module is available under the logical start address.

Quality code of the output

The `GrpErr` parameter provides the quality code of the output. It is set and the status is additionally set to 16#00 if a fault (`RackF_Act`, `ModF` and `PeraF_Act`) occurs (= TRUE), otherwise the parameter has the value "0" and the status 16#80 indicates a valid output value.

See also

AsiMod block parameters (Page 33)

AsiMod block messages (Page 37)

Insertion in the PCS 7 Maintenance Station (Page 119)

2.1.2 AsiMod block parameters

Table 2- 1 Input parameters

Parameter	Meaning	Data format	Default setting
AccId	Not in use	BOOL	0
CmdDone	Command finished	BOOL	0
CmdErr	Command Error	BOOL	0
LAddr	Logical address of the module	INT	0
MS	Maintenance State	DWORD	16#00
ModF	1 = Module Removed / Out of Order	BOOL	0
Mod_Inf	System structure: Module parameter	STRUCT • SUBN_ID: BYTE • RACK_NO: BYTE • SUBSL_NO: BYTE • BASADR: WORD • EXPECTYP: WORD • ACTTYP: WORD • RESERVE: WORD • IOSTAT: BYTE • IOSTAT_0 : BOOL • IOSTAT_1 : BOOL • IOSTAT_2 : BOOL • IOSTAT_3 : BOOL • IOSTAT_4 : BOOL • IOSTAT_5 : BOOL • IOSTAT_6 : BOOL • IOSTAT_7 : BOOL	—
MsgEvIdx 1 < = x < = 10	Message Event ID x	DWORD	16#00

Parameter	Meaning	Data format	Default setting
MsgLock	Suppress process message	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
PeraF	1 = Module I/O Access Failure	BOOL	0
Rac_Diag	System structure: RACK diagnostics	STRUCT • SUBN1_ID: BYTE • SUBN2_ID : BYTE • RACK_NO: BYTE • SUBN_TYP: BOOL • SUBN1ERR: BOOL • SUBN2ERR: BOOL • SUBN1ACT: BOOL • SUBN2ACT: BOOL • RACK_ERR: BOOL • V1_MODE: BOOL	—
RackNo	Rack Number	BYTE	16#00
RunUpCyc	Number of cycles in startup; messages are suppressed during these cycles	INT	3
SlotNo	Slot Number	BYTE	16#00
SlvTyp	SlvTyp = 0: CP343-2/2P on PROFIBUS SlvTyp = 1: CP343-2/2P on PROFINET SlvTyp = 2: CM ASi Master ST on PROFINET	INT	0
Subn1_Id	ID of Primary Subnet	BYTE	16#FF
Subn2_Id	ID of Redundant Subnet	BYTE	16#FF
SubnTyp	1 = External DP/PN-Interface	BOOL	0
SubSlot_No	Subslot Number	BYTE	16#00
ReserveIn	Reserved	WORD	16#00

Table 2- 2 Output parameters

Parameter	Meaning	Data format	Default setting
ActCmd	Activate command	BOOL	0
Conn_To_Chn	Connection to Channel-Driver blocks	STRUCT • Slave_Status: STRUCT • Pae_Di_Typ_B: STRUCT • Pae_Do_Typ_B: STRUCT • Err_Code_Read_Write: STRUCT • Enable_Sfc_Calls: STRUCT	—
GrpErr	1 = Group error is active	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
LAddrOut	Logical address output	WORD	16#00
ModF_Act	1 = Module Failure	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
MsgAcknx 1 < = x < = 10	ALARM_8P x: Message acknowledgement status	WORD	16#00
MsgErrx 1 < = x < = 10	1 = ALARM_8P x Messaging Error Occurs	BOOL	0
MsgStatx 1 < = x < = 10	ALARM_8P x: Message status	WORD	16#00
O_MS	Maintenance State	DWORD	16#00
PeraF_Act	1 = Module I/O Access Failure	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
RackF_Act	1 = Rack Failure	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80

Parameter	Meaning	Data format	Default setting
RecvBuf	Receive buffer	STRUCT • DWORD0 : DWORD • DWORD1 : DWORD • DWORD2 : DWORD • DWORD3 : DWORD • DWORD4 : DWORD • DWORD5 : DWORD • DWORD6 : DWORD • DWORD7 : DWORD	—
SendBuf	Send buffer	STRUCT • BYTE0 : BYTE • BYTE1 : BYTE	—
SlvExist	List of existing standard/A-slaves	DWORD	16#00
SlvExistB	List of existing B-slaves	DWORD	16#00
SlvOk	List of existing standard/A-slaves with status OK	DWORD	16#00
SlvOkB	List of existing B-slaves with status OK	DWORD	16#00
Startup	Startup bit	BOOL	0
Status	Unused Parameter	DWORD	16#00
ReserveOut	Reserved	WORD	16#00

See also

AsiMod block messages (Page 37)

2.1.3 AsiMod block messages

Assignment of message texts

Message block ALARM_8P	Message number	Block parameter	Event	Message class[1)]
MsgEvId1	1	ModF_Act	ModF_Act on @1%d@/@2%d@/@3%d@	S
	2	PeraF_Act	PeraF_Act on @1%d@/@2%d@/@3%d@	S
	3	RackF_Act	RackF_Act on @1%d@/@2%d@/@3%d@	S
	4	-	Internal module error on @1%d@/@2%d@/@3%d@	S
	5	-	External module error on @1%d@/@2%d@/@3%d@	S
	6	-	At least 1 slave differs on @1%d@/@2%d@/@3%d@ from configuration	S
	7	-	AS-interface voltage on @1%d@/@2%d@/@3%d@ too low	S
	8	-	Module on @1%d@/@2%d@/@3%d@ is in offline state	S
MsgEvId2	1	-	Slave 1 on @1%d@/@2%d@/@3%d@ is @4W%t#cp343-2@	S
	2	-	Slave 2 on @1%d@/@2%d@/@3%d@ is @5W%t#cp343-2@	S
	3	-	Slave 3 on @1%d@/@2%d@/@3%d@ is @6W%t#cp343-2@	S
	4	-	Slave 4 on @1%d@/@2%d@/@3%d@ is @7W%t#cp343-2@	S
	5	-	Slave 5 on @1%d@/@2%d@/@3%d@ is @8W%t#cp343-2@	S
	6	-	Slave 6 on @1%d@/@2%d@/@3%d@ is @9W%t#cp343-2@	S
	7	-	Slave 7 on @1%d@/@2%d@/@3%d@ is @10W%t#cp343-2@	S
	8	-	Hardware error on module on @1%d@/@2%d@/@3%d@	S
MsgEvId3	1	-	Slave 8 on @1%d@/@2%d@/@3%d@ is @4W%t#cp343-2@	S
	2	-	Slave 9 on @1%d@/@2%d@/@3%d@ is @5W%t#cp343-2@	S
	3	-	Slave 10 on 1%d@/@2%d@/@3%d@ is @6W%t#cp343-2@	S
	4	-	Slave 11 on 1%d@/@2%d@/@3%d@ is @7W%t#cp343-2@	S
	5	-	Slave 12 on 1%d@/@2%d@/@3%d@ is @8W%t#cp343-2@	S
	6	-	Slave 13 on 1%d@/@2%d@/@3%d@ is @9W%t#cp343-2@	S
	7	-	Slave 14 on 1%d@/@2%d@/@3%d@ is @10W%t#cp343-2@	S
	8	-	EPROM on @1%d@/@2%d@/@3%d@ is defective	S
MsgEvId4	1	-	Slave 16 on 1%d@/@2%d@/@3%d@ is @4W%t#cp343-2@	S
	2	-	Slave 17 on 1%d@/@2%d@/@3%d@ is @5W%t#cp343-2@	S
	3	-	Slave 18 on 1%d@/@2%d@/@3%d@ is @6W%t#cp343-2@	S
	4	-	Slave 19 on 1%d@/@2%d@/@3%d@ is @7W%t#cp343-2@	S
	5	-	Slave 20 on 1%d@/@2%d@/@3%d@ is @8W%t#cp343-2@	S
	6	-	Slave 21 on 1%d@/@2%d@/@3%d@ is @9W%t#cp343-2@	S
	7	-	Slave 22 on 1%d@/@2%d@/@3%d@ is @10W%t#cp343-2@	S
	8	-	Earth fault on module on @1%d@/@2%d@/@3%d@	S

Message block ALARM_8P	Message number	Block parameter	Event	Message class[1)]
MsgEvId5	1	-	Slave 24 on 1%d@/@2%d@/@3%d@ is @4W%t#cp343-2@	S
	2	-	Slave 25 on 1%d@/@2%d@/@3%d@ is @5W%t#cp343-2@	S
	3	-	Slave 26 on 1%d@/@2%d@/@3%d@ is @6W%t#cp343-2@	S
	4	-	Slave 27 on 1%d@/@2%d@/@3%d@ is @7W%t#cp343-2@	S
	5	-	Slave 28 on 1%d@/@2%d@/@3%d@ is @8W%t#cp343-2@	S
	6	-	Slave 29 on 1%d@/@2%d@/@3%d@ is @9W%t#cp343-2@	S
	7	-	Slave 30 on 1%d@/@2%d@/@3%d@ is @10W%t#cp343-2@	S
	8	-	Free	S
MsgEvId6	1	-	Slave 1B on 1%d@/@2%d@/@3%d@ is @4W%t#cp343-2@	S
	2	-	Slave 2B on 1%d@/@2%d@/@3%d@ is @5W%t#cp343-2@	S
	3	-	Slave 3B on 1%d@/@2%d@/@3%d@ is @6W%t#cp343-2@	S
	4	-	Slave 4B on 1%d@/@2%d@/@3%d@ is @7W%t#cp343-2@	S
	5	-	Slave 5B on 1%d@/@2%d@/@3%d@ is @8W%t#cp343-2@	S
	6	-	Slave 6B on 1%d@/@2%d@/@3%d@ is @9W%t#cp343-2@	S
	7	-	Slave 7B on 1%d@/@2%d@/@3%d@ is @10W%t#cp343-2@	S
	8	-	Free	S
MsgEvId7	1	-	Slave 8B on 1%d@/@2%d@/@3%d@ is @4W%t#cp343-2@	S
	2	-	Slave 9B on 1%d@/@2%d@/@3%d@ is @5W%t#cp343-2@	S
	3	-	Slave 10B on 1%d@/@2%d@/@3%d@ is @6W%t#cp343-2@	S
	4	-	Slave 11B on 1%d@/@2%d@/@3%d@ is @7W%t#cp343-2@	S
	5	-	Slave 12B on 1%d@/@2%d@/@3%d@ is @8W%t#cp343-2@	S
	6	-	Slave 13B on 1%d@/@2%d@/@3%d@ is @9W%t#cp343-2@	S
	7	-	Slave 14B on 1%d@/@2%d@/@3%d@ is @10W%t#cp343-2@	S
	8	-	Free	S
MsgEvId8	1	-	Slave 16B on 1%d@/@2%d@/@3%d@ is @4W%t#cp343-2@	S
	2	-	Slave 17B on 1%d@/@2%d@/@3%d@ is @5W%t#cp343-2@	S
	3	-	Slave 18B on 1%d@/@2%d@/@3%d@ is @6W%t#cp343-2@	S
	4	-	Slave 19B on 1%d@/@2%d@/@3%d@ is @7W%t#cp343-2@	S
	5	-	Slave 20B on 1%d@/@2%d@/@3%d@ is @8W%t#cp343-2@	S
	6	-	Slave 21B on 1%d@/@2%d@/@3%d@ is @9W%t#cp343-2@	S
	7	-	Slave 22B on 1%d@/@2%d@/@3%d@ is @10W%t#cp343-2@	S
	8	-	Free	S
MsgEvId9	1	-	Slave 24B on 1%d@/@2%d@/@3%d@ is @4W%t#cp343-2@	S
	2	-	Slave 25B on 1%d@/@2%d@/@3%d@ is @5W%t#cp343-2@	S
	3	-	Slave 26B on 1%d@/@2%d@/@3%d@ is @6W%t#cp343-2@	S
	4	-	Slave 27B on 1%d@/@2%d@/@3%d@ is @7W%t#cp343-2@	S
	5	-	Slave 28B on 1%d@/@2%d@/@3%d@ is @8W%t#cp343-2@	S
	6	-	Slave 29B on 1%d@/@2%d@/@3%d@ is @9W%t#cp343-2@	S
	7	-	Slave 30B on 1%d@/@2%d@/@3%d@ is @10W%t#cp343-2@	S
	8	-	Free	S

Message block ALARM_8P	Message number	Block parameter	Event	Message class[1)]
MsgEvId10	1	-	Slave 15 on 1%d@/@2%d@/@3%d@ is @4W%t#cp343-2@	S
	2	-	Slave 23 on 1%d@/@2%d@/@3%d@ is @5W%t#cp343-2@	S
	3	-	Slave 31 on 1%d@/@2%d@/@3%d@ is @6W%t#cp343-2@	S
	4	-	Slave 15B on 1%d@/@2%d@/@3%d@ is @7W%t#cp343-2@	S
	5	-	Slave 23B on 1%d@/@2%d@/@3%d@ is @8W%t#cp343-2@	S
	6	-	Slave 31B on 1%d@/@2%d@/@3%d@ is @9W%t#cp343-2@	S
	7	-	Slave 0 on @1%d@/@2%d@/@3%d@ is @10W%t#cp343-2@	S
	8	-	Free	S

1) S = AS, OS process control fault

The following table presents the message texts and related text numbers of text library "cp343-2" for the AsiMod block (FB 1311):

Text number	Message text
1	not configured
2	not active
3	wrong type

Assignment of associated values

Message block ALARM_8P	Associated values	Block parameter	Meaning
MsgEvId1	1	Mod_Inf. SUBN_ID	ID of subnet (byte)
	2	Mod_Inf. RACK_NO	Rack number (byte)
	3	Mod_Inf. Slot_No	Slot number (byte)
MsgEvId2	1	Mod_Inf. SUBN_ID	ID of subnet (byte)
	2	Mod_Inf. RACK_NO	Rack number (byte)
	3	Mod_Inf. Slot_No	Slot number (byte)
	4	-	Text ID from text library "cp343-2" for Slave 1
	5	-	Text ID from text library "cp343-2" for Slave 2
	6	-	Text ID from text library "cp343-2" for Slave 3
	7	-	Text ID from text library "cp343-2" for Slave 4
	8	-	Text ID from text library "cp343-2" for Slave 5
	9	-	Text ID from text library "cp343-2" for Slave 6
	10	-	Text ID from text library "cp343-2" for Slave 7
MsgEvId3	1	Mod_Inf. SUBN_ID	ID of subnet (byte)
	2	Mod_Inf. RACK_NO	Rack number (byte)
	3	Mod_Inf. Slot_No	Slot number (byte)
	4	-	Text ID from text library "cp343-2" for Slave 8
	5	-	Text ID from text library "cp343-2" for Slave 9
	6	-	Text ID from text library "cp343-2" for Slave 10
	7	-	Text ID from text library "cp343-2" for Slave 11
	8	-	Text ID from text library "cp343-2" for Slave 12
	9	-	Text ID from text library "cp343-2" for Slave 13
	10	-	Text ID from text library "cp343-2" for Slave 14
MsgEvId4	1	Mod_Inf. SUBN_ID	ID of subnet (byte)
	2	Mod_Inf. RACK_NO	Rack number (byte)
	3	Mod_Inf. Slot_No	Slot number (byte)
	4	-	Text ID from text library "cp343-2" for Slave 16
	5	-	Text ID from text library "cp343-2" for Slave 17
	6	-	Text ID from text library "cp343-2" for Slave 18
	7	-	Text ID from text library "cp343-2" for Slave 19
	8	-	Text ID from text library "cp343-2" for Slave 20
	9	-	Text ID from text library "cp343-2" for Slave 21
	10	-	Text ID from text library "cp343-2" for Slave 22

Message block ALARM_8P	Associated values	Block parameter	Meaning
MsgEvId5	1	Mod_Inf. SUBN_ID	ID of subnet (byte)
	2	Mod_Inf. RACK_NO	Rack number (byte)
	3	Mod_Inf. Slot_No	Slot number (byte)
	4	-	Text ID from text library "cp343-2" for Slave 24
	5	-	Text ID from text library "cp343-2" for Slave 25
	6	-	Text ID from text library "cp343-2" for Slave 26
	7	-	Text ID from text library "cp343-2" for Slave 27
	8	-	Text ID from text library "cp343-2" for Slave 28
	9	-	Text ID from text library "cp343-2" for Slave 29
	10	-	Text ID from text library "cp343-2" for Slave 30
MsgEvId6	1	Mod_Inf. SUBN_ID	ID of subnet (byte)
	2	Mod_Inf. RACK_NO	Rack number (byte)
	3	Mod_Inf. Slot_No	Slot number (byte)
	4	-	Text ID from text library "cp343-2" for Slave 1B
	5	-	Text ID from text library "cp343-2" for Slave 2B
	6	-	Text ID from text library "cp343-2" for Slave 3B
	7	-	Text ID from text library "cp343-2" for Slave 4B
	8	-	Text ID from text library "cp343-2" for Slave 5B
	9	-	Text ID from text library "cp343-2" for Slave 6B
	10	-	Text ID from text library "cp343-2" for Slave 7B
MsgEvId7	1	Mod_Inf. SUBN_ID	ID of subnet (byte)
	2	Mod_Inf. RACK_NO	Rack number (byte)
	3	Mod_Inf. Slot_No	Slot number (byte)
	4	-	Text ID from text library "cp343-2" for Slave 8B
	5	-	Text ID from text library "cp343-2" for Slave 9B
	6	-	Text ID from text library "cp343-2" for Slave 10B
	7	-	Text ID from text library "cp343-2" for Slave 11B
	8	-	Text ID from text library "cp343-2" for Slave 12B
	9	-	Text ID from text library "cp343-2" for Slave 13B
	10	-	Text ID from text library "cp343-2" for Slave 14B
MsgEvId8	1	Mod_Inf. SUBN_ID	ID of subnet (byte)
	2	Mod_Inf. RACK_NO	Rack number (byte)
	3	Mod_Inf. Slot_No	Slot number (byte)
	4	-	Text ID from text library "cp343-2" for Slave 16B
	5	-	Text ID from text library "cp343-2" for Slave 17B
	6	-	Text ID from text library "cp343-2" for Slave 18B
	7	-	Text ID from text library "cp343-2" for Slave 19B
	8	-	Text ID from text library "cp343-2" for Slave 20B
	9	-	Text ID from text library "cp343-2" for Slave 21B
	10	-	Text ID from text library "cp343-2" for Slave 22B

Message block ALARM_8P	Associated values	Block parameter	Meaning
MsgEvId9	1	Mod_Inf. SUBN_ID	ID of subnet (byte)
	2	Mod_Inf. RACK_NO	Rack number (byte)
	3	Mod_Inf. Slot_No	Slot number (byte)
	4	-	Text ID from text library "cp343-2" for Slave 16B
	5	-	Text ID from text library "cp343-2" for Slave 17B
	6	-	Text ID from text library "cp343-2" for Slave 18B
	7	-	Text ID from text library "cp343-2" for Slave 19B
	8	-	Text ID from text library "cp343-2" for Slave 20B
	9	-	Text ID from text library "cp343-2" for Slave 21B
	10	-	Text ID from text library "cp343-2" for Slave 22B
MsgEvId10	1	Mod_Inf. SUBN_ID	ID of subnet (byte)
	2	Mod_Inf. RACK_NO	Rack number (byte)
	3	Mod_Inf. Slot_No	Slot number (byte)
	4	-	Text ID from text library "cp343-2" for Slave 15
	5	-	Text ID from text library "cp343-2" for Slave 23
	6	-	Text ID from text library "cp343-2" for Slave 31
	7	-	Text ID from text library "cp343-2" for Slave 15B
	8	-	Text ID from text library "cp343-2" for Slave 23B
	9	-	Text ID from text library "cp343-2" for Slave 31B
	10	-	Text ID from text library "cp343-2" for Slave 0

See also

AsiMod block parameters (Page 33)

2.2 Diagnostics block AsiSub

2.2.1 Diagnostics block AsiSub

FB1312

Application

The AsiSub block monitors an AS-Interface line of a DP/AS-i LINK Advanced / IE/AS-i LINK (Object Manager). The block supports the APL blocks Pcs7DiIn, Pcs7DiOu and also the blocks AsiAnIn and AsiAnOu.

Calling OBs

The block must be inserted in the run sequence in the following OBs (occurs automatically in CFC):

OB 1	Cyclic program
OB 82	Diagnostic interrupt
OB 83	Insert/remove interrupt
OB 86	Rack failure
OB 100	Warm restart

Use in CFC

When the "Generate module driver" CFC function is used, the following is executed automatically:

- The AsiSub block is inserted into the OBs indicated above in its own runtime group downstream of the runtime group of the OB_DIAG1 / OB_DIAG1_PN block.
- Assignment of parameters to
  - inputs `Subn1ID`, `Subn2ID`, `RackNo`, and `SlotNo`.
  - the logical start address of the `LAddr` module and the `DAddr` diagnostic address.
  - Input `SlvTyp` is configured as a function of the hardware configuration:

    For DP / AS-i LINK Advanced it is set to 0.

    For IE / AS-i LINK it is set to 1.
  - Input `SubnTyp` is parameterized as a function of the hardware configuration:
    For DP / AS-i LINK Advanced and IE / AS-i LINK on CPU it is set to 0.
    For DP / AS-i LINK Advanced and IE / AS-i LINK on External CP it is set to 1.

  When DP/AS-i LINK Advanced / IE/AS-i LINK PN IO is configured with a GSD file:
  - The inputs `GsxSlave` (always TRUE) and `En_Diag` (only when connected to DP master system after DPV1 = TRUE)
- Interconnects
  - input RackF to OR of Outputs QRACKF, SUBN1ERR and SUBN2ERR of the OB_DIAG1/OB_DIAG1_PN block
  - the output `AsiF_Act` to the inputs `ASiF` of the associated AsiSlv blocks
  - the outputs `SlvxxOK` / `SlvxxWT` to the inputs `SlvOK` / `SlvWT` of the associated AsiSlv block
  - Input `CmdDone` is connected to output `Done` of the AsiCntrl block.

    Note: This only applies to configurations with DP / AS-i LINK Advanced.
  - Input `CmdErr` is connected to output `Error` of the AsiCntrl block.

    Note: This only applies to configurations with DP / AS-i LINK Advanced.
  - Furthermore, outputs `ActCmd`, `LAddrOut`, `SendBuf`, and `RecvBuf` are connected to inputs `Req`, `LAddr`, `SD`, and `RD` of the AsiCntrl block.

    Note: This only applies to configurations with DP / AS-i LINK Advanced.

  When DP/AS-i LINK Advanced / IE/AS-i LINK PN IO is configured with a GSD file:
  - Output structure `ChnState` to input structure `ChnState` of the associated AsiSubG block
  - Inputs `LAddr` / `Any_LAddr` and `SlotNo` / `Any_SlotNo` to outputs `LAddrOut` / `SlotNoOut` of the associated AsiSubG block

Redundancy

The redundancy of the DP master systems in an H-system is monitored in the higher-level OB_DIAG1 block.

Troubleshooting

The input parameters are not checked for plausibility.

Time response

Not implemented.

Message capability

AsiSub signals diagnostic events that affect the AS-i line using ALARM_8P.

In addition, the block signals if an unconfigured slave was detected for each of the 64 possible slave addresses.

Reading diagnostic data

The current status of ASi slaves(OK or faulty) configured on the AS-i line are monitored using system function block RDSYSST (SFC51). If the AS-i line initiates a diagnostic interrupt, the AsiCntrl block (FB1322) will be triggered which will in turn trigger readout of Get_LPS, Get_LAS, Get_LDS, Get_Flags.

The information thus read contains the complete status of the configured slaves. On the basis of this data, the outputs SlvxxOK (AS-i Slave OK) and SlvxxWT (AS-i slave is incorrect type) of the AS-i slave is set.

The diagnostics data can also be displayed on a Maintenance Station.

Startup characteristics

After a restart or initial run, a check is made to determine whether the module is available under the logical start address.

See also

AsiSub block parameters (Page 46)

AsiSub block messages (Page 49)

Insertion in the PCS 7 Maintenance Station (Page 119)

2.2.2 AsiSub block parameters

Table 2- 3 Input parameters

Parameter	Meaning	Data format	Default setting
Acc_Id	Not in use	BOOL	0
AnyLAddr	Logical Address of Module	ANY	—
AnySlotNo	Slot Number	ANY	—
CmdDone	Command finished	BOOL	0
CmdErr	Command Error	BOOL	0
DAddr	Diagnostic Address of Module	INT	0
Delay	Alarm Delay [s]	INT	2
En_Diag	1 = Read diagnosis	BOOL	1
En_Maint	1 = Enable Maintenance Station	BOOL	1
GsxSlave	1 = configured with GSx file	BOOL	0
LAddr	Logical Address of module	INT	0
MS	Maintenance State	DWORD	16#00
MsgEvIdx 1 < = x < = 9	Message Event ID x	DWORD	16#00
MsgLock	Suppress process messages	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
RackF	1 = Rack error	BOOL	0
RackNo	Rack number	BYTE	16#00
SlotNo	Slot Number	BYTE	16#00
SlvTyp	0 = PROFIBUS 1 = PROFINET	BOOL	0
Subn1ID	ID of Primary Subnet	BYTE	16#FF
Subn2ID	ID of Redundant Subnet	BYTE	16#FF
SubnTyp	1 = External DP/PN-Interface	BOOL	0
ReserveIn	Reserved	WORD	16#00

Table 2- 4 Output parameters

Parameter	Meaning	Data format	Default setting
AsiF_Act	1 = Rack or AS-i Bus Error	STRUCT • Value: BOOL • ST: BYTE	— • 0 • 16#80
ChnExist	List of configured "A-Type" ASi-slaves	DWORD	16#00
ChnExist2	List of configured "B-Type" ASi-slaves	DWORD	16#00
ChnOk	List of "A-Type" ASi-slaves with status OK	DWORD	16#00
ChnOk2	List of "B-Type" ASi-slaves with status OK	DWORD	16#00
ChnState	State of channels	STRUCT • ChnExist: DWORD • ChnExist2: DWORD • ChnOK: DWORD • ChnOK2: DWORD • Msg: WORD • Msg1: DWORD • Msg2: DWORD • MS: DWORD	—
CmdAct	Activate command	BOOL	0
LAddrOut	Logical Address of Module	WORD	16#00
MsgErrx 1 < = x < = 9	1 = ALARM_8P x Messaging Error Occurs	BOOL	0
MsgAcknx 1 < = x < = 9	ALARM_8P x: Message acknowledgement status	WORD	16#00
MsgStatx 1 < = x < = 9	ALARM_8P x: Message status	WORD	16#00
O_MS	Maintenance State	DWORD	16#00
RackF_Act	1 = Rack Failure	STRUCT • Value: BOOL • ST: BYTE	— • 0 • 16#80

Parameter	Meaning	Data format	Default setting
Recv_Buf	Receive buffer	STRUCT • DWORD0 : DWORD • DWORD1 : DWORD • DWORD2 : DWORD • DWORD3 : DWORD • DWORD4 : DWORD • DWORD5 : DWORD • DWORD6 : DWORD • DWORD7 : DWORD	—
Send_Buf	Send Buffer	STRUCT • BYTE0 : BYTE • BYTE1 : BYTE	—
SlvxxOK 00 < = xx < = 63	1 = Slave with address xx OK	BOOL	1
SlvxxWT 00 < = xx < = 63	1 = Slave with address xx wrong type	BOOL	0
StartUp	Startup bit	BOOL	0
Status	Unused Variable	DWORD	16#00
ReserveOut	Reserved	WORD	16#00

See also

Diagnostics block AsiSub (Page 43)

AsiSub block messages (Page 49)

2.2.3 AsiSub block messages

Assignment of message texts

Message block ALARM_8P	Message number	Block parameter	Event	Message class[1)]
MsgEvId1	1	-	AS-i line @3%d@: Internal error on @1%d@/@2%d@	S
	2	-	AS-i line @3%d@: External error on @1%d@/@2%d@	S
	3	-	AS-i line @3%d@: At least 1 slave differs on @1%d@/@2%d@ from configuration	S
	4	-	AS-i line @3%d@: AS-interface voltage on @1%d@/@2%d@ too low	S
	5	-	AS-i line @3%d@: Invalid configuration on @1%d@/@2%d@	S
MsgEvId2...9	1	-	AS-i line @3%d@: AS-i Slave xx on @1%d@/@2%d@: not configured	S
	2	-	AS-i line @3%d@: AS-i Slave xx on @1%d@/@2%d@: not configured	S
	3	-	AS-i line @3%d@: AS-i Slave xx on @1%d@/@2%d@: not configured	S
	4	-	AS-i line @3%d@: AS-i Slave xx on @1%d@/@2%d@: not configured	S
	5	-	AS-i line @3%d@: AS-i Slave xx on @1%d@/@2%d@: not configured	S
	6	-	AS-i line @3%d@: AS-i Slave xx on @1%d@/@2%d@: not configured	S
	7	-	AS-i line @3%d@: AS-i Slave xx on @1%d@/@2%d@: not configured	S
	8	-	AS-i line @3%d@: AS-i Slave xx on @1%d@/@2%d@: not configured	S

[1)] S = AS, OS process control fault

"AS-i Slave xx" stands for "AS-i Slave 1 ... 31" and "AS-i Slave 1B ... 31B"

Associated values

1. `Subn1ID`
2. `RackNo`
3. ID of AS-i line (1 or 2)

See also

Diagnostics block AsiSub (Page 43)
AsiSub block parameters (Page 46)

2.3 Diagnostics block AsiSubG

2.3.1 Diagnostics block AsiSubG

FB1313

Application

The AsiSubG block is required only when DP/AS-i LINK Advanced or IE/AS-i LINK are configured with a GSD file. It serves as the interface to the PCS 7 Maintenance Station for an AS-Interface line and supplies the MODE inputs of the digital signal-processing blocks.

Calling OBs

The block must be inserted in the run sequence in the following OBs (occurs automatically in CFC):

OB 1	Cyclic program
OB 85	Program execution error
OB 100	Warm restart

Use in CFC

When the "Generate module driver" CFC function is used, the following is executed automatically:

- The AsiSubG block is inserted into the OBs indicated above in its own runtime group downstream of the runtime group of the AsiSub block.
- Assignment of parameters to
  - inputs `Subn1ID`, `Subn2ID`, `RackNo` and `LAddr`
  - outputs `LAddrOut` and `SlotNoOut`
  - The inputs `GSxSlv` (always TRUE) and `En_Diag` (only when connected to DP master system after DPV1 = TRUE)
  - Input `SlvTyp` is parameterized as a function of the hardware configuration:

    For DP / AS-i LINK Advanced it is set to 0.

    For IE / AS-i LINK it is set to 1.
- Interconnects
  - input RackF to OR of Outputs QRACKF, SUBN1ERR and SUBN2ERR of the OB_DIAG1/OB_DIAG1_PN block
  - input structure `ChnState` to output structure `ChnState` of the associated AsiSub block
  - outputs `LAddrOut` and `SlotNoOut` to inputs `LAddr` / `AnyLAddr` and `SlotNo` / `AnySlotNo` of the associated AsiSub block
  - Outputs `OMode_xx`, `DXchg_xx` and `O_MS` to inputs `Mode`, `DataXchg` and `MS` of the associated signal processing blocks.

Troubleshooting

The input parameters are not checked for plausibility.

Time response

Not implemented.

Message capability

AsiSubG signals diagnostic events that affect the AS-i line using ALARM_8P.

In addition, the block signals if an unconfigured or failed slave or a slave of the wrong type was detected for each of the 62 possible slave addresses.

Note

For IE/AS-i LINK, the block doesn't support alarm signals for unconfigured slaves.

Startup characteristics

After a restart or initial run, a check is made to determine whether the module is available under the logical start address.

See also

AsiSubG block parameters (Page 54)

AsiSubG block messages (Page 56)

Insertion in the PCS 7 Maintenance Station (Page 119)

2.3.2 AsiSubG block parameters

Table 2- 5 Input parameters

Parameter	Meaning	Data format	Default setting
ChnState	State of channels	STRUCT: • ChnExist: DWORD • ChnExist2: DWORD • ChnOK: DWORD • ChnOK2: DWORD • Msg: WORD • Msg1: DWORD • Msg2: DWORD • MS: DWORD	—
LAddr	Logical Address of Module	INT	0
MaxAsiSlaves	Max. No. of AS-i Slaves per DP/AS-i line denoted by 1 - 6: 1. ASi-1: Binary Array 32 Byte (max. 62 slaves) 2. ASi-1: Binary Array 16 Byte (max. 31 slaves) 3. ASi-1: Binary Array 8 Byte (max. 15 slaves) 4. ASi-2: Binary Array 32 Byte (max. 62 slaves) 5. ASi-2: Binary Array 16 Byte (max. 31 slaves) 6. ASi-2: Binary Array 8 Byte (max. 15 slaves)	INT	0
MS	Maintenance state	DWORD	16#00
MsgEvIdx 1 < = x < = 9	Message Event ID x	DWORD	16#00
RackF	1 = Rack error	BOOL	0
RackNo	Rack number	BYTE	16#00
SlotNo	Slot number	BYTE	16#00
SlvTyp	0 = PROFIBUS 1 = PROFINET	BOOL	0
Subn1ID	ID of Primary Subnet	BYTE	16#FF
Subn2ID	ID of Redundant Subnet	BYTE	16#FF
ReserveIn	Reserved	WORD	16#00

Table 2- 6 Output parameters

Parameter	Meaning	Data format	Default setting
ChnExist	List of configured "A-Type" ASi-slaves	DWORD	16#00
ChnExist2	List of configured "B-Type" ASi-slaves	DWORD	16#00
ChnOk	List of "A-Type" ASi-slaves with status OK	DWORD	16#00
ChnOk2	List of "B-Type" ASi-slaves with status OK	DWORD	16#00
DXchg_xx 00 < = xx < = 127	Data exchange (digital input "A-Type") xx 00<=xx<=31 Data exchange (digital input "B-Type") xx 32<=xx<=63 Data exchange (digital output "A-Type") xx 64<=xx<=95 Data exchange (digital output "B-Type") xx 96<=xx<=127	DWORD	16#00
LAddrOut	Logical Address of Module	INT	0
ModF_Act	1 = Module failure	STRUCT • Value:BOOL • ST: BYTE	— • 0 • 16#80
MsgAcknx 1 < = x < = 9	ALARM_8P x: Message acknowledgement status	WORD	16#00
MsgErrx 1 < = x < = 9	1 = ALARM_8P x Messaging Error Occurs	BOOL	0
MsgStatx 1 < = x < = 9	ALARM_8P x: Message status	WORD	16#00
OMode_xx 00 < = xx < = 127	Mode for channel block(digital input "A-Type") xx 00<=xx<=31 Mode for channel block(digital input "B-Type") xx 32<=xx<=63 Mode for channel block(digital output "A-Type") xx 64<=xx<=95 Mode for channel block(digital output "B-Type") xx 96<=xx<=127	DWORD	16#00
O_MS	Maintenance state	DWORD	16#00
RackF_Act	1 = Rack Failure	STRUCT • Value:BOOL • ST: BYTE	— • 0 • 16#80
SlotNoOut	Slot number	BYTE	16#00
ReserveOut	Reserved	WORD	16#00

See also

AsiSubG block messages (Page 56)

2.3.3 AsiSubG block messages

Assignment of message texts

Message block ALARM_8P	Message number	Block parameter	Event	Message class[1)]
MsgEvId1	1	-	AS-i line @3%d@: Internal error on @1%d@/@4%d@/@2%d@	S
	2	-	AS-i line @3%d@: External error on @1%d@/@4%d@/@2%d@	S
	3	-	AS-i line @3%d@: At least 1 slave differs on @1%d@/@4%d@/@2%d@ from configuration	S
	4	-	AS-i line @3%d@: AS-interface voltage on @1%d@/@4%d@/@2%d@ too low	S
	5	-	AS-i line @3%d@: Invalid configuration on @1%d@/@4%d@/@2%d@	S
MsgEvId2...9	1	-	AS-i line @3%d@: AS-i Slave xx on @1%d@/@4%d@/@2%d@: broken down, wrong type, or not configured	S
	2	-	AS-i line @3%d@: AS-i Slave xx on @1%d@/@4%d@/@2%d@: broken down, wrong type, or not configured	S
	3	-	AS-i line @3%d@: AS-i Slave xx on @1%d@/@4%d@/@2%d@: broken down, wrong type, or not configured	S
	4	-	AS-i line @3%d@: AS-i Slave xx on @1%d@/@4%d@/@2%d@: broken down, wrong type, or not configured	S
	5	-	AS-i line @3%d@: AS-i Slave xx on @1%d@/@4%d@/@2%d@: broken down, wrong type, or not configured	S
	6	-	AS-i line @3%d@: AS-i Slave xx on @1%d@/@4%d@/@2%d@: broken down, wrong type, or not configured	S
	7	-	AS-i line @3%d@: AS-i Slave xx on @1%d@/@4%d@/@2%d@: broken down, wrong type, or not configured	S
	8	-	AS-i line @3%d@: AS-i Slave xx on @1%d@/@4%d@/@2%d@: broken down, wrong type, or not configured	S

[1)] S = AS, OS process control fault

"AS-i Slave xx" stands for "AS-i Slave 1 ... 31" and "AS-i Slave 1B ... 31B"

Associated values

1. `Subn1ID`
2. `RackNo`
3. ID of AS-i line (1 or 2)
4. SubLnkID

See also

AsiSubG block parameters (Page 54)

2.4 Diagnostics block AsiSlv

2.4.1 Diagnostics block AsiSlv

FB1314

Application

The AsiSlv block monitors an AS-i slave and supplies the `Mode` input of the signal-processing blocks.

The block supports DP/AS-i LINK Advanced and IE/AS-I LINK PN IO and monitors AS-i slaves.

Calling OBs

The block must be inserted in the run sequence in the following OBs (occurs automatically in CFC):

OB 1	Cyclic program
OB 85	Program execution error
OB 100	Warm restart

Use in CFC

When the "Generate module driver" CFC function is used, the following is executed automatically:

- The AsiSlv block is inserted into the OBs indicated above in its own runtime group downstream of the runtime group of the AsiSub block.
- Assignment of parameters to
  - inputs `Subn1_ID`, `Subn2_ID`, `Rack_No` and `Slot_No`.
  - the start addresses of the AS-i slave `LAddr` (inputs) and `LAddr1` (outputs)
  - the inputs `ChnExist` and `ChnExist2` corresponding to the existing channels
  - the input `GSxSlave` (TRUE if configuration uses GSD file, otherwise FALSE)
  - Input `SlvTyp` is configured as a function of the hardware configuration:

    For DP / AS-i LINK Advanced it is set to 0.

    For IE / AS-i LINK it is set to 1.
- Interconnects
  - input `ASiF` to the output `ASiF` of the associated AsiSub block
  - inputs `SlvOk` / `SlvWT` to the outputs `SLVxx_OK` / `SLVxx_WT` of the associated AsiSub block
  - Outputs `OMode_xx`, `DXchg_xx` and `O_MS` to inputs `Mode`, `DataXchg` and `MS` of the associated signal processing blocks

Display of valid channels

The existing channels of the AS-i slave are indicated in the inputs `ChnExist` and `ChnExist2` in that a bit is set in the DWORD for each existing channel, starting with bit 0. If the bit assigned to a channel has the value "0", the channel is not present.

The valid channels of the AS-i slave are indicated in the outputs `ChnOk` and `ChnOk2` in that a bit is set to TRUE for each valid channel, where bit 0 is assigned to channel 0 etc. If the bit assigned to a channel has the value "0", the channel is faulty. In the event of higher-level faults, all channels are faulty.

Message capability

AsiSlv signals the following events using ALARM_8P:

- Slave failure
- Slave has incorrect (unconfigured) slave type
- I/O access error

See also

AsiSlv block parameters (Page 60)

AsiSlv block messages (Page 62)

Insertion in the PCS 7 Maintenance Station (Page 119)

2.4.2 AsiSlv block parameters

Table 2- 7 Input parameters

Parameter	Meaning	Data format	Default setting
ASiF	1 = Rack or AS-i Bus Failure	BOOL	0
ChnExist	List of configured channels in the slave	DWORD	16#00
Delay	Alarm Delay (s)	INT	2
GSxSlave	1 = configured with GSx file	BOOL	0
LAddr	Logical Address of module (inputs)	INT	-1
LAddr1	Logical Address of module (outputs)	INT	-1
Mode_xx 1 < = xx < = 07	Mode of Channel x	WORD	16#00
MS	Maintenance state	DWORD	16#00
MsgEvId1	Message Event ID	DWORD	16#00
Rack_No	Rack number	BYTE	16#00
Slot_No	Slot Number	BYTE	16#00
SlvOk	1 = AS-i slave OK (projected, detected and active)	BOOL	0
SlvTyp	0 = PROFIBUS 1 = PROFINET	BOOL	0
SlvWT	1 = AS-i slave wrong type	BOOL	0
Subn1_ID	ID of Primary Subnet	BYTE	16#FF
Subn2_ID	ID of Redundant Subnet	BYTE	16#FF
ReserveIn	Reserved	WORD	16#00
AsiLneNo	AS-i Line number	INT	0

Table 2- 8 Output parameters

Parameter	Meaning	Data format	Default setting
ChnOK	List of configured channels in the slave which are OK	DWORD	16#00
DXchg_xx 1 < = xx < = 07	Data exchange xx	DWORD	16#00
MsgErr	1 = ALARM_8P Messaging Error Occurs	BOOL	0
MsgAck	ALARM_8P Message acknowledgement status	WORD	16#00
MsgStat	ALARM_8P Message Status	WORD	16#00
OMode_xx 1 < = xx < = 07	Mode of channel xx	DWORD	16#00
O_MS	Maintenance State	DWORD	16#00
Peraf_Act	1 = Module I/O Access Failure	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
ReserveOut	Reserved	WORD	16#00

See also

AsiSlv block messages (Page 62)

2.4.3 AsiSlv block messages

Assignment of message texts

Message block ALARM_8P	Message number	Block parameter	Event	Message class[1)]
MsgEvId1	1	SlvOk	AS-i line @4%d@: AS-i Slave @3%s@ on @1%d@/@2%d@: broken down	S
	2	SlvWT	AS-i line @4%d@: AS-i Slave @3%s@ on @1%d@/@2%d@: wrong type	S
	3	ModF_Act	AS-i line @4%d@: AS-i Slave @3%s@ on @1%d@/@2%d@: Access error	S
	4	SlvOK / SlvWT	AS-i line @4%d@: AS-i Slave @3%s@ on @1%d@/@2%d@: broken down, wrong type, or not configured	S

1) S = AS, OS process control fault

Associated values:

1. Subn1_Id
2. Rack_No
3. Slave number
4. AS-i Line number

See also

Diagnostics block AsiSlv (Page 58)

AsiSlv block parameters (Page 60)

2.5 Channel block for digital input (A-slaves) AsiDiAIn

FB1315

Application

The AsiDiAIn block is used to process signals of a digital input value from AS-i standard / A-slaves for CP 343-2/2P and A/B-slaves for CM AS-i Master ST.

Calling OBs

The block must be inserted in the run sequence in the following OBs (occurs automatically in CFC):

OB 3x	Cyclic interrupt OB in which the channel blocks are inserted (e.g., OB 32)
OB 100	Warm restart

Use in CFC

When the "Generate module driver" CFC function is used, the following is executed automatically:

- The input `ConToDrv` and `MS` is connected to the output `Conn_To_Chn` and `O_MS` of the AsiMod block.
- The inputs `BinAcSen` and `Slave_No` are configured.

Functions and principle of operation

The AsiDiAIn block cyclically processes all channel-specific signal functions of an AS-i standard / A-slaves for CP 343-2/2P and A/B-slaves for CM AS-i Master ST. The block reads a digital value of data type BOOL from the process image (partition).

The result generated is a quality code (`PV_ChnST`), which can have the following statuses:

Status	Quality code (`PV_ChnST`)
Valid value	16#80
Simulation	16#60
Invalid value	16#00

Flutter suppression

The time-controlled "Flutter suppression" function is used to delay the cancelation of a message by a parameterizable time.

Flutter suppression is used for:

- OB82 events - diagnostics messages
- OB83 events - failure

The flutter time is entered on the channel block using the `FlutTmIn` parameter. The High byte of the `DataXchg` parameter of the channel blocks contains the flutter time.

Flutter suppression becomes effective if `FlutEN` = 1 or `FlutTmIn` > 0 is set on the channel block.

There is only one flutter message per block. The delay times and fault messages are channel-granular, the fault messages are extended by at least the delay time. A flutter is present if the status of fault messages changes from "DOWN" to "UP" again within the delay time.

The last channel with flutter and its set delay time deactivates the flutter message.

Note

This function is not available for digital AS-i input slaves.

Coding of the measuring range for digital input and digital output modules

There is no measurement type and no measurement range for digital input modules.

- Mode = 16#8000FFFF (blocks for digital input).

Simulation

Simulation is the manipulation of a signal, independently of the actual source of the signal or logic that generates this signal. Simulation is performed either on the field device (externally outside the process control system) itself or on a block (internally within the process control system).

In both cases, the relevant status in the signal is set to the value simulation 16#60. In simulation, each block is considered as a separate unit. There are two types of simulation:

- Block-external simulation

  Block-external simulation is characterized by the fact that the simulation function is not performed in the block itself and a signal is pending at an input parameter whose status is simulation, e.g. simulation of the signal on another block or directly in the I/O devices.

- Block-internal simulation

  Block-internal simulation is characterized by the fact that the "simulation" function is performed in the block itself. Simulation is performed in the CFC via parameterization directly on the block via the input parameters `SimOn` and `SimPV_In`.

  If the input parameter `SimOn` is set to TRUE, the value of the input parameter `SimPV_In` will be output with the quality code `PV_Out.ST` = 16#60 into the (sub)process image. `Bad` = TRUE is reset. Simulation has the highest priority. While the block is in simulation mode, `SimAct` is set to TRUE.

Parameterizable functions via the `Feature` connection

You can influence the response of the block via the `Feature` input.

The `Feature` bits are assigned in the following order:

Bit number	Meaning	Description
28	Output invalid raw value	Via this feature bit, you activate output of the invalid raw value on channel blocks. The default setting is 1. • **Bit = 0**: The invalid raw value is not output. Either the substitute value (feature bit) or the last valid value (feature bit) will be output. • **Bit = 1**: The invalid raw value is output. The signal status of the output value is set to "bad, due to device" or "bad, due to process." In the case of an invalid raw value, the output parameter `Bad` is automatically set to 1.
29	Output substitute value in case of invalid raw value	Via this feature bit, you activate the output of the substitute value on channel blocks (input parameter `SubsPV_In`) if an invalid raw value is present. The default setting is 0. • **Bit = 0**: If the raw value is invalid, the substitute value is not output. • **Bit = 1**: If the raw value is invalid, the substitute value is output. The signal status of the output value is set to "Local function check / simulation." In the case of an invalid raw value, the output parameter `Bad` is automatically set to 1.
30	Output last valid value if raw value is invalid	Via this feature bit, you activate for channel blocks the output of the most recent valid raw value if an invalid raw value is present. The default setting is 0. • **Bit = 0**: In the case of an invalid raw value, the last valid raw value is not output. • **Bit = 1**: In the case of an invalid raw value, the last valid raw value is output. The signal status of the output value is set to "Local function check / simulation." In the case of an invalid raw value, the output parameter `Bad` is automatically set to 1.

Prioritization of the `Feature` bits for channel blocks:

For the channel blocks, you must parameterize three `Feature` bits for the response to an invalid raw value.

If more than one of these `Feature` bits is set (=1), the following priority applies:

- Output invalid raw value (`Feature` bit 28, highest priority).
- Output substitute value if raw value is invalid (`Feature` bit 29)
- The most recent valid value if raw value is invalid (`Feature` bit 30, lowest priority)

If none of the `Feature` bits 28, 29, and 30 is set, the invalid raw value will be output.

Addressing

The PV_In input must be connected to the channel address of the associated sensor. For information on obtaining the correct sensor address, refer to Section "Exchanging AS-i binary values with standard or A-slaves" in the "SIMATIC NET CP 343-2 / CP 343-2 P-AS-Interface Master" manual for AS-i Standard / A-slaves and refer the section "Data exchange between the user program and AS-i slaves" in the ET 200SP AS-Interface master CM AS-i Master ST for A/B-slaves manual of CM AS-i Master ST. The driver wizard requires this interconnection.

Higher-level fault / invalid measuring range

A higher-level fault is output (output parameter ModErr = 1), if either:

- the signal status has value 16#40 in the High word of the input parameter Mode, or
- there is an invalid measurement type in the Low word of the input parameter Mode.

Configuration error

The ConfErr parameter is set to TRUE, if the address of the AS-i slave is incorrect or mode has a bad value.

Maintenance

Use of the "in process" status on the maintenance station

The "in process" status is implemented on the maintenance station for a measuring point or a field device via the channel blocks and the interconnectable output parameter OosAct = 1. You can interconnect the OosAct output parameter of the channel block with the OosLi input parameter of a technological block.

The channel block ascertains the "in process" status of the maintenance station via the MS input parameter and provides this information at the OosAct output parameter.

Issuing maintenance release

The maintenance release is information about a measuring point at which maintenance, service, or calibration work is to be performed. You can use the signal for the maintenance release to convey information about release of a measuring point from the operator station to the maintenance station.

The maintenance release (operator control permission "high-value process operation" required) is issued in the parameter view by operation of the MS_RelOp = 1 input parameter of the technological block. A maintenance release is then provided via the interconnectable output parameter MS_Release = 1 for further processing. To provide this information of the maintenance station, you must interconnect the output parameter MS_Release of the technological block with the MS_Release input parameter of the associated channel block (AsiDiAIn).

The AsiDiAIn block signals maintenance release to the diagnostic drivers via the DataXchg parameter. The maintenance release is only transmitted to the maintenance station when all bits of the DataXchg_XX parameter on the diagnostics driver are set to 0.

Different Maintenance jobs with their states

Maintenance job	Requested action	Status Service	MS state
Alarm	---	---	16#3000000
	Disassembly	in service	16#7000000
	Device swap		
	Calibration	Release request	---
	Zero Adjustment	Planned servicing	16#F000000
	Cleaning	Completed	0
	Service	Cancel	16#8000000

Maintenance job	Requested action	Status Service	MS state
Demand	---	---	16#3000000
	Disassembly	in service	16#6000000
	Device swap	Release request	---
	Calibration	Planned servicing	16#E000000
	Zero Adjustment	Completed	0
	Cleaning		
	Service	Cancel	16#8000000

Maintenance job	Requested action	Status Service	MS state
Request	---	---	16#2000000
	Disassembly	in service	16#5000000
	Device swap	Release request	---
	Calibration	Planned servicing	16#D000000
	Zero Adjustment	Completed	0
	Cleaning		
	Service	Cancel	16#8000000

Other Conditions	MS state
slave removal	16#8000007
power off AS-i line	16#8000008
removal of profinet line	16#8000008

See also

Block parameter AsiDiAIn (Page 68)

Insertion in the PCS 7 Maintenance Station (Page 119)

2.5.1 Block parameter AsiDiAIn

Input parameters

Parameter	Meaning	Data format	Default setting
ConToDrv	Connection to driver block AsiMod	ANY	-
Feature	Status of various features	STRUCT • Bit 0: BOOL • ... • Bit 30: BOOL • Bit 31: BOOL	- • 0 • 0 • 1 • 0
FlutEn	1 = Fluttersuppress enable	BOOL	0
FlutTmIn	Flutter Supress time in seconds	INT	0
MS	Maintenance state	DWORD	16#00
MS_Release	Maintenance release	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
ProImQB	Quality bit from Process Image	BOOL	0
PV_In	Input value	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
SelQB	1 = Select Quality bit from Process Image	BOOL	0
SimOn	1 = Simulation active	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
SimPV_In	Simulation value	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
SubsPV_In	Substitute value	BOOL	0

In/Out parameters

Parameter	Meaning	Data format	Default setting
BinAcSen	Channel number of the actuator sensor of the parameterized AS-i slave	INT	0
DataXchg	Data exchange	DWORD	16#00
Mode	Quality and mode	DWORD	16#8000FFFF
Slave_No	AS-i slave address	INT	0

Output parameters

Parameter	Meaning	Data format	Default setting
Bad	1 = Bad process value	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
ConfErr	1 = Configuration error (bad slave address or not linked to driverblock)	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
ErrorNum	Error Number	INT	-1
ModErr	1 = Device/module is faulty	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
MS_Dev	Maintenance state	DWORD	16#00
OosAct	Field device out of service, maintenance in pogress	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
PV_Out	Process value	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
SimAct	1 = Simulation active	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80

2.6 Channel block for digital output (A-slaves) AsiDiAOu

FB1316

Application

The AsiDiAOu block is used to process signals of a digital output value from AS-i standard / A-slaves for CP 343-2/2P and A/B-slaves for CM AS-i Master ST.

Calling OBs

The block must be inserted in the run sequence in the following OBs (occurs automatically in CFC):

OB 3x	Cyclic interrupt OB in which the channel blocks are inserted (e.g., OB 32)
OB 100	Warm restart

Use in CFC

When the "Generate module driver" CFC function is used, the following is executed automatically:

- The input `ConToDrv` and `MS` is connected to the output `Conn_To_Chn` and `O_MS` of the AsiMod block.
- The inputs `BinAcSen` and `Slave_No` are configured.

Functions and principle of operation

The AsiDiAOu block cyclically processes all channel-specific signal functions of an AS-i Standard / A-slave for CP 343-2/2P and A/B-slaves for CM AS-i Master ST. The block writes a digital value of data type BOOL to the process image (partition). The result generated is a quality code (`PV_ChnST`), which can have the following statuses:

Status	Quality code (`PV_ChnST`)
Valid value	16#80
Simulation	16#60
Invalid value	16#00

Flutter suppression

The time-controlled "Flutter suppression" function is used to delay the cancelation of a message by a parameterizable time.

Flutter suppression is used for:

- OB82 events - diagnostics messages
- OB83 events - failure

The flutter time is entered on the channel block using the FlutTmIn parameter. The High byte of the DataXchg parameter of the channel blocks contains the flutter time.

Flutter suppression becomes effective if FlutEN = 1 or FlutTmIn > 0 is set on the channel block.

There is only one flutter message per block. The delay times and fault messages are channel-granular, the fault messages are extended by at least the delay time. A flutter is present if the status of fault messages changes from "DOWN" to "UP" again within the delay time.

The last channel with flutter and its set delay time deactivates the flutter message.

Note

This function is not available for digital AS-i output slaves.

Coding of the measuring range for digital input and digital output modules

There is no measurement type and no measurement range for digital output modules.

- Mode = 16#8000FFFE (blocks for digital output)

Simulation

Simulation is the manipulation of a signal, independently of the actual source of the signal or logic that generates this signal. Simulation is performed either on the field device (externally outside the process control system) itself or on a block (internally within the process control system).

In both cases, the relevant status in the signal is set to the value simulation 16#60. In simulation, each block is considered as a separate unit. There are two types of simulation:

- Block-external simulation

  Block-external simulation is characterized by the fact that the simulation function is not performed in the block itself and a signal is pending at an input parameter whose status is simulation, e.g. simulation of the signal on another block or directly in the I/O devices.

- Block-internal simulation

  Block-internal simulation is characterized by the fact that the "simulation" function is performed in the block itself. Simulation is performed in the CFC via parameterization directly on the block via the input parameters SimOn and SimPV_In.

  If the input parameter SimOn is set to TRUE, the value of the input parameter SimPV_In will be output with the quality code PV_ChnST = 16#60 into the (sub)process image. Bad = TRUE is reset. Simulation has the highest priority. While the block is in simulation mode, SimAct is set to TRUE.

Parameterizable functions via the `Feature` connection

You can influence the response of the block via the `Feature` input.

The `Feature` bits are assigned in the following order:

Bit number	Meaning	Description
0	Set startup characteristics	• **Bit = 0**: The channel block AsiDiAOu uses as its starting value either the process value `PV_In` or the value of `SimPV_In`, depending on how the input parameter `SimOn` is set (`PV_In = PV_Out` or `SimPV_In = PV_Out`). • **Bit = 1** (default setting): The channel block uses the `StartVal` value as its starting value (`StartVal = PV_Out`).
30	Output value without power with block-external stimulation	Via this `Feature` bit, you can define for channel blocks whether the value without power will be output if the block is in block-external simulation. • **Bit = 0:** (default setting)**:** If an input parameter has the simulation value 16#60, this value will be written into the field device. • **Bit = 1:** If an input parameter has the simulation value 16#60, the value 16#0000 will be output in the output parameter `PV_Out`.

Addressing

The `PV_Out` output must be connected to the channel address of the associated actuator. This interconnection is needed by the driver wizard.
For information on obtaining the correct sensor address, refer to the section "Exchanging AS-i binary values with standard or A-slaves" in the "SIMATIC NET CP 343-2 / CP 343-2 P − AS-Interface Master (https://support.industry.siemens.com/cs/document/5581657)" manual and refer the section "Data exchange between the user program and AS-i slaves" in the ET 200SP AS-Interface master CM AS-i Master ST for A/B-slaves manual of CM AS-i Master ST.

Channel fault

In the event of a channel fault, quality codes `PV_ChnST` = 16#00 and `Bad` = TRUE are set. The current digital value is always written to the process image (partition).

Higher-level fault / invalid measuring range

A higher-level fault is output (output parameter `ModErr` = 1), if either:

- the signal status has value 16#40 in the High word of the input parameter `Mode`, or
- there is an invalid measurement type in the Low word of the input parameter `Mode`.

Configuration error

The `ConfErr` parameter is set to TRUE, if the address of the AS-i slave is incorrect or mode has a bad value.

Maintenance

Use of the "in process" status on the maintenance station

The "in process" status is implemented on the maintenance station for a measuring point or a field device via the channel blocks and the interconnectable output parameter `OosAct` = 1. You can interconnect the `OosAct` output parameter of the channel block with the `OosLi` input parameter of a technological block.

The channel block ascertains the "in process" status of the maintenance station via the `MS` input parameter and provides this information at the `OosAct` output parameter.

Issuing maintenance release

The maintenance release is information about a measuring point at which maintenance, service, or calibration work is to be performed. You can use the signal for the maintenance release to convey information about release of a measuring point from the operator station to the maintenance station.

The maintenance release (operator control permission "high-value process operation" required) is issued in the parameter view by operation of the `MS_RelOp` = 1 input parameter of the technological block. A maintenance release is then provided via the interconnectable output parameter `MS_Release` = 1 for further processing. To provide this information of the maintenance station, you must interconnect the output parameter `MS_Release` of the technological block with the `MS_Release` input parameter of the associated channel block (AsiDiAOu).

The AsiDiAOu block signals maintenance release to the diagnostic drivers via the `DataXchg` parameter. The maintenance release is only transmitted to the maintenance station when all bits of the `DataXchg_XX` parameter on the diagnostics driver are set to 0.

Different Maintenance jobs with their states

Maintenance job	Requested action	Status Service	MS state
Alarm	---	---	16#3000000
	Disassembly	in service	16#7000000
	Device swap		
	Calibration	Release request	---
	Zero Adjustment	Planned servicing	16#F000000
	Cleaning	Completed	0
	Service	Cancel	16#8000000

Maintenance job	Requested action	Status Service	MS state
Demand	---	---	16#3000000
	Disassembly	in service	16#6000000
	Device swap	Release request	---
	Calibration	Planned servicing	16#E000000
	Zero Adjustment	Completed	0
	Cleaning		
	Service	Cancel	16#8000000

Maintenance job	Requested action	Status Service	MS state
Request	---	---	16#2000000
	Disassembly	in service	16#5000000
	Device swap	Release request	---
	Calibration	Planned servicing	16#D000000
	Zero Adjustment	Completed	0
	Cleaning		
	Service	Cancel	16#8000000

Other Conditions	MS state
slave removal	16#8000007
power off AS-i line	16#8000008
removal of profinet line	16#8000008

See also

Block parameter AsiDiAOu (Page 75)

Insertion in the PCS 7 Maintenance Station (Page 119)

2.6.1 Block parameter AsiDiAOu

Input parameters

Parameter	Meaning	Data format	Default setting
ConToDrv	Connection to driver block AsiMod	ANY	-
Feature	Status of various features	STRUCT • Bit 0: BOOL • ... • Bit 30: BOOL • Bit 31: BOOL	- • 0 • 0 • 1 • 0
FlutEn	1 = Fluttersuppress enable	BOOL	0
FlutTmIn	Flutter Supress time in seconds	INT	0
MS	Maintenance state	DWORD	16#00
MS_Release	Maintenance release	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
PV_In	Process value	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
SimOn	1 = Simulation active	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
SimPV_In	Simulation value	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
StartVal	Start value	BOOL	0

In/Out parameters

Parameter	Meaning	Data format	Default setting
BinAcSen	No. of the actuator sensor of the parameterized AS-i slave	INT	0
DataXchg	Data exchange	DWORD	16#00
Mode	Quality and mode	DWORD	16#8000FFFE
Slave_No	AS-i slave address	INT	0

Output parameters

Parameter	Meaning	Data format	Default setting
Bad	1 = Bad process value	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
ConfErr	1 = Configuration error (bad slave address or not linked to driverblock)	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
ErrorNum	Error Number	INT	-1
ModErr	1 = Device/module is faulty	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
MS_Dev	Maintenance state	DWORD	16#00
OosAct	Field device out of service, maintenance in pogress	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
PV_ChnST	State of output value	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
PV_Out	Output value	BOOL	0
SimAct	1 = Simulation active	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80

See also

Channel block for digital output (A-slaves) AsiDiAOu (Page 70)

2.7 Channel block for digital input (B-slaves) AsiDiBIn

FB1317

Application

The AsiDiBIn block is used to process signals of a digital input value from B-slaves of CP 343-2/2P.

Calling OBs

The block must be inserted in the run sequence in the following OBs (occurs automatically in CFC):

OB 3x	Cyclic interrupt OB in which the channel blocks are inserted (e.g., OB 32)
OB 100	Warm restart

Use in CFC

When the "Generate module driver" CFC function is used, the following is executed automatically:

- The input `ConToDrv` and `MS` is connected to the output `Conn_To_Chn` and `O_MS` of the AsiMod block.
- The `Conn_To_Chn` output of AsiMod to the `ConToDrv` input of the AsiDiBIn block.

Functions and principle of operation

The AsiDiBIn block cyclically processes all channel-specific signal functions of B-slaves of CP 343-2/2P.

The result generated is a quality code (`PV_ChnST`), which can have the following statuses:

Status	Quality code (`PV_ChnST`)
Valid value	16#80
Simulation	16#60
Invalid value	16#00

Flutter suppression

The time-controlled "Flutter suppression" function is used to delay the cancelation of a message by a parameterizable time.

Flutter suppression is used for:

- OB82 events - diagnostics messages
- OB83 events - failure

The flutter time is entered on the channel block using the `FlutTmIn` parameter. The High byte of the `DataXchg` parameter of the channel blocks contains the flutter time.

Flutter suppression becomes effective if `FlutEN` = 1 or `FlutTmIn` > 0 is set on the channel block.

There is only one flutter message per block. The delay times and fault messages are channel-granular, the fault messages are extended by at least the delay time. A flutter is present if the status of fault messages changes from "DOWN" to "UP" again within the delay time.

The last channel with flutter and its set delay time deactivates the flutter message.

Note

This function is not available for digital AS-i input slaves.

Coding of the measuring range for digital input and digital output modules

There is no measurement type and no measurement range for digital input modules.

- Mode = 16#8000FFFF (blocks for digital input).

Simulation

Simulation is the manipulation of a signal, independently of the actual source of the signal or logic that generates this signal. Simulation is performed either on the field device (externally outside the process control system) itself or on a block (internally within the process control system).

In both cases, the relevant status in the signal is set to the value simulation 16#60. In simulation, each block is considered as a separate unit. There are two types of simulation:

- Block-external simulation

  Block-external simulation is characterized by the fact that the simulation function is not performed in the block itself and a signal is pending at an input parameter whose status is simulation, e.g. simulation of the signal on another block or directly in the I/O devices.

- Block-internal simulation

  Block-internal simulation is characterized by the fact that the "simulation" function is performed in the block itself. Simulation is performed in the CFC via parameterization directly on the block via the input parameters `SimOn` and `SimPV_In`.

  If the input parameter `SimOn` is set to TRUE, the value of the input parameter `SimPV_In` will be output with the quality code PV_Out.ST = 16#60 into the (sub)process image. `Bad` = TRUE is reset. Simulation has the highest priority. While the block is in simulation mode, SimAct is set to TRUE.

Parameterizable functions via the `Feature` connection

You can influence the response of the block via the `Feature` input.

The `Feature` bits are assigned in the following order:

Bit number	Meaning	Description
28	Output invalid raw value	Via this feature bit, you activate output of the invalid raw value on channel blocks. The default setting is 1. • **Bit = 0**: The invalid raw value is not output. Either the substitute value (feature bit) or the last valid value (feature bit) will be output. • **Bit = 1**: The invalid raw value is output. The signal status of the output value is set to "bad, due to device" or "bad, due to process." In the case of an invalid raw value, the output parameter `Bad` is automatically set to 1.
29	Output substitute value in case of invalid raw value	Via this feature bit, you activate the output of the substitute value on channel blocks (input parameter `SubsPV_In`) if an invalid raw value is present. The default setting is 0. • **Bit = 0**: If the raw value is invalid, the substitute value is not output. • **Bit = 1**: If the raw value is invalid, the substitute value is output. The signal status of the output value is set to "Local function check / simulation." In the case of an invalid raw value or during the initialization phase of the device, the output parameter `Bad` is set to 1.
30	Output last valid value if raw value is invalid	Via this feature bit, you activate for channel blocks the output of the last valid raw value if an invalid raw value is present. The default setting is 0. • **Bit = 0**: In the case of an invalid raw value, the last valid raw value is not output. • **Bit = 1**: In the case of an invalid raw value, the last valid raw value is output. The signal status of the output value is set to "Local function check / simulation." In the case of an invalid raw value, the output parameter `Bad` is automatically set to 1.

Prioritization of the `Feature` bits for channel blocks:

For the channel blocks, you must parameterize three `Feature` bits for the response to an invalid raw value.

If more than one of these `Feature` bits is set (=1), the following priority applies:

- Output invalid raw value (`Feature` bit 28, highest priority).
- Output substitute value if raw value is invalid (`Feature` bit 29)
- The most recent valid value if raw value is invalid (`Feature` bit 30, lowest priority)

If none of the `Feature` bits 28, 29, and 30 is set, the invalid raw value will be output.

Addressing

The module start address of CP 343-2 or CP 343-2P must be configured at the `LAddr` input. The driver wizard uses these to establish the connection with the module. Moreover, the slave address must be assigned to the `Slave_No` input and the channel number of the slave must be assigned to the `BinAcSen` input.

Channel fault

In the event of a channel fault, quality codes `PV_ChnST` = 16#00 and `Bad` = TRUE are set. The current digital value is always written to the process image (partition).

Higher-level fault / invalid measuring range

A higher-level fault is output (output parameter `ModErr` = 1), if either:

- the signal status has value 16#40 in the High word of the input parameter `Mode`, or
- there is an invalid measurement type in the Low word of the input parameter `Mode`.

Configuration error

The `ConfErr` parameter is set to TRUE if the address of the AS-i slave is incorrect.

Communication error

If a communication error occurs in communication between the DP master and the PLC, the `CommErr` parameter is set to TRUE.

Maintenance

Use of the "in process" status on the maintenance station

The "in process" status is implemented on the maintenance station for a measuring point or a field device via the channel blocks and the interconnectable output parameter `OosAct` = 1. You can interconnect the `OosAct` output parameter of the channel block with the `OosLi` input parameter of a technological block.

The channel block ascertains the "in process" status of the maintenance station via the MS input parameter and provides this information at the `OosAct` output parameter.

Issuing maintenance release

The maintenance release is information about a measuring point at which maintenance, service, or calibration work is to be performed. You can use the signal for the maintenance release to convey information about release of a measuring point from the operator station to the maintenance station.

The maintenance release (operator control permission "high-value process operation" required) is issued in the parameter view by operation of the `MS_RelOp` = 1 input parameter of the technological block. A maintenance release is then provided via the interconnectable output parameter `MS_Release` = 1 for further processing. To provide this information of the maintenance station, you must interconnect the output parameter `MS_Release` of the technological block with the MS_Release input parameter of the relevant channel block (AsiDiBIn).

The AsiDiBIn block signals maintenance release to the diagnostic drivers via the `DataXchg` parameter. The maintenance release is only transmitted to the maintenance station when all bits of the `DataXchg_XX` parameter on the diagnostics driver are set to 0.

Different Maintenance jobs with their states

Maintenance job	Requested action	Status Service	MS state
Alarm	---	---	16#3000000
	Disassembly	in service	16#7000000
	Device swap		
	Calibration	Release request	---
	Zero Adjustment	Planned servicing	16#F000000
	Cleaning	Completed	0
	Service	Cancel	16#8000000

Maintenance job	Requested action	Status Service	MS state
Demand	---	---	16#3000000
	Disassembly	in service	16#6000000
	Device swap	Release request	---
	Calibration	Planned servicing	16#E000000
	Zero Adjustment	Completed	0
	Cleaning		
	Service	Cancel	16#8000000

Maintenance job	Requested action	Status Service	MS state
Request	---	---	16#2000000
	Disassembly	in service	16#5000000
	Device swap	Release request	---
	Calibration	Planned servicing	16#D000000
	Zero Adjustment	Completed	0
	Cleaning		
	Service	Cancel	16#8000000

Other Conditions	MS state
slave removal	16#8000007
power off AS-i line	16#8000008
removal of profinet line	16#8000008

See also

AsiDiBIn block parameter (Page 82)

Insertion in the PCS 7 Maintenance Station (Page 119)

2.7.1 AsiDiBIn block parameter

Input parameters

Parameter	Meaning	Data format	Default setting
ConToDrv	Connection to driver block AsiMod	ANY	-
Feature	Status of various features	STRUCT • Bit 0: BOOL • ... • Bit 30: BOOL • Bit 31: BOOL	- • 0 • 0 • 1 • 0
FlutEn	1 = Fluttersuppress enable	BOOL	0
FlutTmIn	Flutter Supress time in seconds	INT	0
LAddr	Logical address of the module	INT	0
MS	Maintenance state	DWORD	16#00
MS_Release	Maintenance release	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
SimOn	1 = Simulation active	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
SimPV_In	Simulation value	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
SubsPV_In	Substitute value	BOOL	-

In/Out parameters

Parameter	Meaning	Data format	Default setting
BinAcSen	Channel number of the actuator sensor of the parameterized AS-i slave	INT	0
DataXchg	Data exchange	DWORD	16#00
Mode	Quality and mode	DWORD	16#8000FFFF
Slave_No	AS-i slave address	INT	0

Output parameters

Parameter	Meaning	Data format	Default setting
Bad	1 = Bad process value	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
CommErr	Communication error	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
ConfErr	1 = Configuration error (bad slave address or not linked to driverblock)	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
ErrorNum	Error Number	INT	-1
ModErr	1 = Device/module is faulty	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
MS_Dev	Maintenance state	DWORD	16#00
OosAct	Field device out of service, maintenance in pogress	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
PV_Out	Process value	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
SimAct	1 = Simulation active	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80

2.8 Channel block for digital output (B-slaves) AsiDiBOu

FB1318

Application

The AsiDiBOu block is used to process signals of a digital input value from B-slaves of CP 343-2/2P.

Calling OBs

The block must be inserted in the run sequence in the following OBs (occurs automatically in CFC):

OB 3x	Cyclic interrupt OB in which the channel blocks are inserted (e.g., OB 32)
OB 100	Warm restart

Use in CFC

When the "Generate module driver" CFC function is used, the following is executed automatically:

- The input `ConToDrv` and `MS` is connected to the output `Conn_To_Chn` and `O_MS` of the AsiMod block.

Then connect this manually to the `ConToDrv` input on the AsiDiBOu block.

Functions and principle of operation

The AsiDiBOu block cyclically processes all channel-specific signal functions of an B-slaves of CP 343-2/2P.

The result generated is a quality code (`PV_ChnST`), which can have the following statuses:

Status	Quality code (`PV_ChnST`)
Valid value	16#80
Simulation	16#60
Invalid value	16#00

Flutter suppression

The time-controlled "Flutter suppression" function is used to delay the cancelation of a message by a parameterizable time.

Flutter suppression is used for:

- OB82 events - diagnostics messages
- OB83 events - failure

The flutter time is entered on the channel block using the `FlutTmIn` parameter. The High byte of the `DataXchg` parameter of the channel blocks contains the flutter time.

Flutter suppression becomes effective if `FlutEN` = 1 or `FlutTmIn` > 0 is set on the channel block.

There is only one flutter message per block. The delay times and fault messages are channel-granular, the fault messages are extended by at least the delay time. A flutter is present if the status of fault messages changes from "DOWN" to "UP" again within the delay time.

The last channel with flutter and its set delay time deactivates the flutter message.

Note

This function is not available for digital AS-i output slaves.

Coding of the measuring range for digital input and digital output modules

There is no measurement type and no measurement range for digital output modules.

- Mode = 16#8000FFFE (blocks for digital output).

Simulation

Simulation is the manipulation of a signal, independently of the actual source of the signal or logic that generates this signal. Simulation is performed either on the field device (externally outside the process control system) itself or on a block (internally within the process control system).

In both cases, the relevant status in the signal is set to the value simulation 16#60. In simulation, each block is considered as a separate unit. There are two types of simulation:

- Block-external simulation

  Block-external simulation is characterized by the fact that the simulation function is not performed in the block itself and a signal is pending at an input parameter whose status is simulation, e.g. simulation of the signal on another block or directly in the I/O devices.

- Block-internal simulation

  Block-internal simulation is characterized by the fact that the "simulation" function is performed in the block itself. Simulation is performed in the CFC via parameterization directly on the block via the input parameters `SimOn` and `SimPV_In`.

  If the input parameter `SimOn` is set to TRUE, the value of the input parameter `SimPV_In` will be output with the quality code `PV_ChnST` = 16#60 into the (sub)process image. `Bad` = TRUE is reset. Simulation has the highest priority. While the block is in simulation mode, `SimAct` is set to TRUE.

Parameterizable functions via the `Feature` connection

You can influence the response of the block via the `Feature` input.

The `Feature` bits are assigned in the following order:

Bit number	Meaning	Description
0	Set startup characteristics	• **Bit = 0**: The channel block AsiDiBOu uses as its starting value either the process value `PV_In` or the value of `SimPV_In`, depending on how the input parameter `SimOn` is set (`PV_In = PV_Out` or `SimPV_In = PV_Out`). • **Bit = 1** (default setting): The channel block uses the `StartVal` value as its starting value (`StartVal = PV_Out`).
30	Output last valid value if raw value is invalid	Via this `Feature` bit, you can define for channel blocks whether the value without power will be output if the block is in block-external simulation. The default setting is 1. • **Bit = 0:** If an input parameter has the simulation value 16#60, the value 16#0000 will be output in the output parameter `PZDOut1`. • **Bit = 1:** If an input parameter has the simulation value 16#60, this value will be written into the field device.

Addressing

The module start address of CP 343-2 or CP 343-2P must be configured at the `LAddr` input. The driver wizard uses these to establish the connection with the module. Moreover, the slave address must be assigned to the `Slave_No` input and the channel number of the slave must be assigned to the `BinAcSen` input.

Channel fault

In the event of a channel fault, quality codes `PV_ChnST` = 16#00 and `Bad` = TRUE are set. The current digital value is always written to the process image (partition).

Higher-level fault / invalid measuring range

A higher-level fault is output (output parameter `ModErr` = 1), if either:

- the signal status has value 16#40 in the High word of the input parameter `Mode`, or
- there is an invalid measurement type in the Low word of the input parameter `Mode`.

Configuration error

The `ConfErr` parameter is set to TRUE if the address of the AS-i slave is incorrect.

Maintenance

Use of the "in process" status on the maintenance station

The "in process" status is implemented on the maintenance station for a measuring point or a field device via the channel blocks and the interconnectable output parameter `OosAct` = 1. You can interconnect the `OosAct` output parameter of the channel block with the `OosLi` input parameter of a technological block.

The channel block ascertains the "in process" status of the maintenance station via the `MS` input parameter and provides this information at the `OosAct` output parameter.

Issuing maintenance release

The maintenance release is information about a measuring point at which maintenance, service, or calibration work is to be performed. You can use the signal for the maintenance release to convey information about release of a measuring point from the operator station to the maintenance station.

The maintenance release (operator control permission "high-value process operation" required) is issued in the parameter view by operation of the `MS_RelOp` = 1 input parameter of the technological block. A maintenance release is then provided via the interconnectable output parameter `MS_Release` = 1 for further processing. To provide this information of the maintenance station, you must interconnect the output parameter `MS_Release` of the technological block with the `MS_Release` input parameter of the associated channel block (AsiDiBOu).

The AsiDiBOu block signals maintenance release to the diagnostic drivers via the `DataXchg` parameter. The maintenance release is only transmitted to the maintenance station when all bits of the `DataXchg_XX` parameter on the diagnostics driver are set to 0.

Different Maintenance jobs with their states

Maintenance job	Requested action	Status Service	MS state
Alarm	---	---	16#3000000
	Disassembly	in service	16#7000000
	Device swap		
	Calibration	Release request	---
	Zero Adjustment	Planned servicing	16#F000000
	Cleaning	Completed	0
	Service	Cancel	16#8000000

Maintenance job	Requested action	Status Service	MS state
Demand	---	---	16#3000000
	Disassembly	in service	16#6000000
	Device swap	Release request	---
	Calibration	Planned servicing	16#E000000
	Zero Adjustment	Completed	0
	Cleaning		
	Service	Cancel	16#8000000

Maintenance job	Requested action	Status Service	MS state
Request	---	---	16#2000000
	Disassembly	in service	16#5000000
	Device swap	Release request	---
	Calibration	Planned servicing	16#D000000
	Zero Adjustment	Completed	0
	Cleaning		
	Service	Cancel	16#8000000

Other Conditions	MS state
slave removal	16#8000007
power off AS-i line	16#8000008
removal of profinet line	16#8000008

See also

AsiDiBOu block parameter (Page 89)
Block parameter AsiDiAIn (Page 68)
Insertion in the PCS 7 Maintenance Station (Page 119)

2.8.1 AsiDiBOu block parameter

Input parameters

Parameter	Meaning	Data format	Default setting
ConToDrv	Connection to driver block AsiMod	ANY	-
Feature	Status of various features	STRUCT • Bit 0: BOOL • ... • Bit 30: BOOL • Bit 31: BOOL	- • 0 • 0 • 1 • 0
FlutEn	1 = Fluttersuppress enable	BOOL	0
FlutTmIn	Flutter Supress time in seconds	INT	0
LAddr	Logical address of the module	INT	0
MS	Maintenance state	DWORD	16#00
MS_Release	Maintenance release	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
PV_In	Process value	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
SimOn	1 = Simulation active	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
SimPV_In	Simulation value	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
StartVal	Start value	BOOL	0

In/Out parameters

Parameter	Meaning	Data format	Default setting
BinAcSen	Channel number of the actuator sensor of the parameterized AS-i slave	INT	0
DataXchg	Data exchange	DWORD	16#00
Mode	Quality and mode	DWORD	16#8000FFFE
Slave_No	AS-i slave address	INT	0

Output parameters

Parameter	Meaning	Data format	Default setting
Bad	1 = Bad process value	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
CommErr	Communication error	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
ConfErr	1 = Configuration error (bad slave address or not linked to driverblock)	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
ErrorNum	Error Number	INT	-1
ModErr	1 = Device/module is faulty	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
MS_Dev	Maintenance state	DWORD	16#00
OosAct	Field device out of service, maintenance in pogress	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
PV_ChnST	State of output value	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
PV_Out	Output value	BOOL	0
SimAct	1 = Simulation active	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80

2.9 Channel block for analog input AsiAnIn

2.9.1 Block for analog input AsiAnIn

FB1319

Application

The AsiAnIn block is used to process signals of an analog input value from AS-i slaves that are connected to the control system via DP/AS-i LINK Advanced or IE/AS-i LINK.

The block is used for the following applications:

Signal processing (cyclic service) according to PROFIBUS PA profile "Transmitter" of an analog input value:

- Of a PA field device according to PROFIBUS 3.0 Classes A and B.
- Of a secondary variable of a HART field device
- Of an FF field device

Calling OBs

The block must be inserted in the run sequence in the following OBs (occurs automatically in CFC):

OB 3x	Cyclic interrupt OB in which the channel blocks are inserted (e.g., OB 32)
OB 100	Warm restart

Use in CFC

When the "Generate module driver" CFC function is used, the following is executed automatically:

- The `Mode`, `MS` and `DataXchg` input is connected to the applicable `OMode_xx`, `O_MS` and `DXchg` output of the AsiSlv block.

Functions and principle of operation

The AsiAnIn block cyclically processes all channel-specific signal functions of an analog input module.

The block reads an analog raw value from the process image (partition) and adapts it to its physical quantity or uses it to determines a percentage value. The `Mode` input is used to determine the format of the raw value and how it must be processed. The high byte of the input parameter Mode indicates the quality code.

The result generated is a quality code, which can assume the following statuses:

Status	Quality code
Valid value	16#80
Simulation	16#60
Last valid value	16#44
Substitute value	16#48
Invalid value	16#00

The quality code is formed from a combination of internal events, such as channel faults, higher-level errors, or simulation, and a quality code, which comes directly from the device (QC parameter).

Flutter suppression

The time-controlled "Flutter suppression" function is used to delay the cancelation of a message by a parameterizable time.

Flutter suppression is used for:

- OB82 events - diagnostics messages
- OB83 events - failure

The flutter time is entered on the channel block using the `FlutTmIn` parameter. The High byte of the `DataXchg` parameter of the channel blocks contains the flutter time.

Flutter suppression becomes effective if `FlutEN` = 1 or `FlutTmIn` > 0 is set on the channel block.

There is only one flutter message per block. The delay times and fault messages are channel-granular, the fault messages are extended by at least the delay time. A flutter is present if the status of fault messages changes from "DOWN" to "UP" again within the delay time.

The last channel with flutter and its set delay time deactivates the flutter message.

Simulation

Simulation is the manipulation of a signal, independently of the actual source of the signal or logic that generates this signal.

Simulation is performed either on the field device (externally outside the process control system) itself or on a block (internally within the process control system).

In both cases, the relevant status in the signal is set to the value simulation 16#60.

In simulation, each block is considered as a separate unit. There are two types of simulation:

- Block-external simulation

  Block-external simulation is characterized by the fact that:

  – the simulation function is not performed in the block itself and

  – a signal is pending at an input parameter whose status is simulation, e.g. simulation of the signal on another block or directly in the I/O devices.

- Block-internal simulation

  Block-internal simulation is characterized by the fact that the "simulation" function is performed in the block itself. Simulation is performed in the CFC via parameterization directly on the block via the input parameters `SimOn` and `SimPV_In`.

When input parameter `SimOn` = TRUE, the value of input parameter `SimPV_In` is output to the process image (partition) with quality code `PV_ChnST` = 16#60. `Bad` = TRUE is reset.

Simulation has the highest priority. If the block is in the simulation state, `SimAct` is set to TRUE.

Parameterizable functions via the `Feature` connection

You can influence the response of the block via the `Feature` input.

The `Feature` bits are assigned in the following order:

Bit number	Meaning	Description
5	Activate LowCutOff	Via this feature bit, you activate the use of LowCutOff bits.The default setting is 0. • **Bit = 0:** Low signal cut-off - OFF (default) • **Bit = 1**: Low signal cut-off - ON If this bit is activated, LowCutOff value will be set at PV_Out when the PV_Out value is below the LowCutOff value.
28	Output invalid raw value	Via this feature bit, you activate output of the invalid raw value on channel blocks. The default setting is 1. • **Bit = 0**: The invalid raw value is not output. Either the substitute value (feature bit) or the last valid value (feature bit) will be output. • **Bit = 1**: The invalid raw value is output. The signal status of the output value is set to 16#00 "bad, due to device" or "bad, due to process." In the case of an invalid raw value, the output parameter `Bad` is automatically set to 1.
29	Output substitute value in case of invalid raw value	Via this feature bit, you activate the output of the substitute value on channel blocks (input parameter `SubsPV_In`) if an invalid raw value is present. The default setting is 0. • **Bit = 0**: The substitute value is not output. • **Bit = 1**: The substitute value is output. The signal status of the output value is set to "Local function check / simulation." In the case of an invalid raw value, the output parameter `Bad` is automatically set to 1.
30	Output last valid value if raw value is invalid	Via this `Feature` bit, you activate output of the last valid value on channel blocks if an invalid raw value is present. The default setting is 0. • **Bit = 0:** In the case of an invalid raw value, the last valid value is not output. • **Bit = 1:** In the case of an invalid raw value, the last valid value is output. The signal status of the output value is set to "Local function check / simulation." In the case of an invalid raw value of the device, the output parameter `Bad` is set to 1.

Prioritization of the `Feature` bits for channel blocks:

For the channel blocks, you must parameterize three `Feature` bits for the response to an invalid raw value.

If more than one of these `Feature` bits is set (=1), the following priority applies:

- Output invalid raw value (`Feature` bit 28, highest priority).
- Output substitute value if raw value is invalid (`Feature` bit 29)
- The most recent valid value if raw value is invalid (`Feature` bit 30, lowest priority)

If none of the `Feature` bits 28, 29, and 30 is set, the invalid raw value will be output.

Raw value check

Depending on the measurement type and measuring range, there is a nominal range of the analog input module in which the analog signal is converted to a digital value (raw value). The nominal range is defined in HW Config and automatically saved in the in/out parameter `Mode` when generating the module driver.

In addition, there is an overrange and an underrange in which the analog signal can still be converted into a digital value. These ranges are defined relative to the nominal range (approx. 18.5%). Outside these ranges there is a so-called overflow or underflow, and the output parameter `Bad` is set to 1.

- If the value is less than the nominal range, the output parameter `PV_LoAct` is set to 1.
- If the value is more than the nominal range, the output parameter `PV_HiAct` is set to 1.

NAMUR limit check (with 4 to 20 mA modules)

With live zero monitoring, the signal is invalid (`Bad` = 1) if the measured current is less than 3.6 mA or greater than 21 mA (defined by NAMUR).

The NAMUR limits are set permanently by default for the limit check. If you want to set other limits, set input parameter `NamurOff` to 1 and set new limits, in mA, for the input parameters `HighLimit` and `LowLimit`. When the active limits are violated (`PV_HiAct` or `PV_LoAct` = 1), `Bad` is set to 1 in the case of a live zero analog signal.

Note

The selectable limit values must be below the upper limit of the overrange and above the lower limit of the underrange of the module. Thus, values outside the NAMUR range are also possible if the module does not automatically limit the measured values to this range.

Generation of normal value

The normal value (physical variable) is generated from the raw value using the `Scale` and `Mode` parameters. You define two scale values on the configured parameter `Scale`:

- Upper scale value (`Scale.High`)
- Lower scale value (`Scale.Low`)

If you are not using the CFC function "Generate Module Driver," you must set the in/out parameter `Mode` manually.

The settings of the `Scale` parameter are copied into the output parameter `ScaleOut`. The output parameter can be connected to a corresponding input parameter of a technological block (e.g. `PV_OpScale`).

The normal value is generated using a linear characteristic. `Scale.Low` is the lowest physical value which the process variable can assume, and `Scale.High` is the highest physical value.

When `Scale.Low` = 0 and `Scale.High` = 100, the result is a percentage value.

Special cases when generating the normal value using the Scale parameter:

- If you set Scale.High = Scale.Low, you are provided with the electrical input signal of the analog input module (e.g. mA) in accordance with the setting of the Mode parameter.
- If the raw value is already a physical value, set Scale.Low = 0 and Scale.High = 1. The raw value is then output unchanged as a physical variable.
- With measurement type PTC (**P**ositive **T**emperature **C**oefficient, binary evaluation of resistance thermometers), a binary signal is coded in the analog value. The following information is then made available at the PV_Out output:
  - If the measured resistance is within the normal range, PV_Out = 0.0
  - If the measured resistance is within the pre-warning range, PV_Out = 4.0
  - If the measured resistance is within the trigger range, PV_Out = 1.0

    This only applies if the input parameters Scale.Low = 0 and Scale.High = 1. In the case of a simulation or output of the substitute value, you may only set the input parameters SimPV_In and SubsPV_In to 0.0 or 1.0.
- With measurement type "Thermocouples, external or internal reference," the raw value is matched to the physical variable ± 80 mV in the case of S7 300 modules. You must determine the temperature from the associated conversion tables in the module manual. The physical equivalent in mV is delivered as the raw value by the module, and therefore set Scale to ± 80 mV.

Hold last value in case of invalid raw value

If the block is to hold the last valid value in the case of an invalid raw value, you must activate this function on the Feature bit "Output last valid value in case of invalid raw value."

In addition, you can influence this function using the input parameter DeltaVal:

- DeltaVal ≤ 0: hold last value, no influence
- DeltaVal > 0: last or penultimate value is output

If you set DeltaVal > 0, the last PV_Out(k - 1) or penultimate PV_Out(k - 2) valid output value is output (PV_Out(k) is the current value, k the current point in time).

You can use the DeltaVal parameter to define a permissible change in process value (PV_Out) between two calls.

The following options are available:

- For invalid raw values and DeltaVal > 0:
  - If |PV_Out(k - 1) - PV_Out(k - 2)| > DeltaVal, then PV_Out = PV_Out(k - 2) (penultimate valid output value is output)
  - If |PV_Out(k) - PV_Out(k - 1)| ≤ DeltaVal, then PV_Out = PV_Out(k - 1) (last valid output value is output)
- For valid raw values and DeltaVal > 0:
  - If |PV_Out(k) - PV_Out(k - 1)| > DeltaVal, then PV_Out = PV_Out(k - 1) is output for one cycle, i.e. DeltaVal is used to limit the change in the valid raw value. The signal status on the output parameter PV_Out is additionally set to 16#60 and the output parameter Bad to 0.

    The value of DeltaVal should be selected carefully. If it is too small, the signal status can jump back and forth between 16#80 and 16#60, even though the raw value is OK.

Output substitute value in case of invalid raw value

If the block is to output a substitute value in the case of an invalid raw value (SubsPV_In), you must activate this function on the Feature bit "Output substitute value in case of invalid raw value."

Output invalid value in case of invalid raw value

If the block is to output an invalid value (PV_Out = PV_In), you must activate this function on the Feature bit "Output invalid raw value."

This function is preset.

Delay in acceptance of value

Following a restart or if the output parameter Bad changes its value from 1 to 0, the signal status and the value of output parameter PV_Out are not updated until the number of cycles for delaying acceptance of the value have elapsed (input parameter CountLim). During the delay in acceptance of the value, the signal status on the output parameter PV_Out is 16#00 and Bad = 1. The last value is retained during the delay in acceptance of the value.

The function is deactivated if CountLim = 0.

Sign-of-life monitoring

If an input value whose signal status is 16#80 (good) remains constant for a time configured by the user (monitoring time), the input value is recognized as being faulty and the Bad and FrzVal outputs are set to 1. The signal status PV_Out.ST is set to 16#00.

The monitoring time is specified in seconds on the input parameter FrznTmIn. If FrznTmIn = 0 or FrznEn = 0 (default setting), the sign-of-life monitoring is deactivated, and any faults present are reset.

The input value is recognized as faulty for as long as it is detected as being constant. The monitoring time is restarted each time the input value changes.

Maintenance

Use of the "in process" status on the maintenance station

The "in process" status is implemented on the maintenance station for a measuring point or a field device via the channel blocks and the interconnectable output parameter `OosAct` = 1. You can interconnect the `OosAct` output parameter of the channel block with the `OosLi` input parameter of a technological block.

The channel block ascertains the "in process" status of the maintenance station via the `MS` input parameter and provides this information at the `OosAct` output parameter.

Issuing maintenance release

The maintenance release is information about a measuring point at which maintenance, service, or calibration work is to be performed. You can use the signal for the maintenance release to convey information about release of a measuring point from the operator station to the maintenance station.

The maintenance release (operator control permission "high-value process operation" required) is issued in the parameter view by operation of the `MS_RelOp` = 1 input parameter of the technological block. A maintenance release is then provided via the interconnectable output parameter `MS_Release` = 1 for further processing. To provide this information of the maintenance station, you must interconnect the output parameter `MS_Release` of the technological block with the `MS_Release` input parameter of the associated channel block (AsiAnIn).

The AsiAnIn block signals maintenance release to the diagnostic drivers via the `DataXchg` parameter. The maintenance release is only transmitted to the maintenance station when all bits of the `DataXchg_XX` parameter on the diagnostics driver are set to 0.

Different Maintenance jobs with their states

Maintenance job	Requested action	Status Service	MS state
Alarm	---	---	16#3000000
	Disassembly	in service	16#7000000
	Device swap		
	Calibration	Release request	---
	Zero Adjustment	Planned servicing	16#F000000
	Cleaning	Completed	0
	Service	Cancel	16#8000000

Maintenance job	Requested action	Status Service	MS state
Demand	---	---	16#3000000
	Disassembly	in service	16#6000000
	Device swap	Release request	---
	Calibration	Planned servicing	16#E000000
	Zero Adjustment	Completed	0
	Cleaning		
	Service	Cancel	16#8000000

Maintenance job	Requested action	Status Service	MS state
Request	---	---	16#2000000
	Disassembly	in service	16#5000000
	Device swap	Release request	---
	Calibration	Planned servicing	16#D000000
	Zero Adjustment	Completed	0
	Cleaning		
	Service	Cancel	16#8000000

Other Conditions	MS state
slave removal	16#8000007
power off AS-i line	16#8000008
removal of profinet line	16#8000008

See also

Insertion in the PCS 7 Maintenance Station (Page 119)

2.9.2 AsiAnIn block parameters

Input parameters

Parameter	Meaning	Data format	Default setting
ConToDrv	Connection to driver block AsiMod	ANY	-
CountLim	Restart counter limit	INT	0
DeltaVal	Delta value (PV.value - LastValidValue)	REAL	0.0
Feature	Status of various features	STRUCT • Bit 0: BOOL • ... • Bit 30: BOOL • Bit 31: BOOL	- • 0 • ... • 1 • 0
FlutEn	1 = Fluttersuppress enable	BOOL	0
FlutTmIn	Flutter Supress time in seconds	INT	0
FrznEn	Enable monitoring for frozen input value (In)	BOOL	0
FrznTmIn	Monitoring time of frozen imput value [s]	REAL	0.0
HighLimit	High limit used if NAMUR check (NamurOff = 1) is deactivated	REAL	21.5
LAddr	Logical address of the module	INT	0
LowCutOff	Input value Lowcutoff	REAL	0.0
LowLimit	Low limit used if NAMUR check (NamurOff = 1) is deactivated	REAL	3.3
MS	Maintenance state	DWORD	16#00
MS_Release	Maintenance release	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
NamurOff	1 = NAMUR limits off	BOOL	0
PV_In	Input value	INT	0
PV_InUnit	Unit of process value	INT	1001
RR_High	High limit of input value	INT	0
RR_Low	Low limit of input value	INT	0
SampleTime	Sample Time [s]	REAL	0.1
Scale	Range of process value	STRUCT • High: REAL • Low: REAL	- • 100.0 • 0.0
SimOn	1 = Simulation active	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
SimPV_In	Simulation value	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
SubsPV_In	Substitute value	REAL	0.0

In/Out parameters

Parameter	Meaning	Data format	Default setting
DataXchg	Data exchange	DWORD	16#00
Mode	Quality and mode	DWORD	16#8000FFFD

Output parameters

Parameter	Meaning	Data format	Default setting
Bad	1 = Bad process value	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
ErrorNum	Error Number	INT	-1
FrznVal	Frozen input value	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
ModErr	1 = Device/module is faulty	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
MS_Dev	Maintenance state	DWORD	16#00
OosAct	Field device out of service, maintenance in pogress	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
PV_HiAct	1 = Input value high limit failure	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
PV_LcoAct	Limited to within range limits Lowcutoff	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
PV_LoAct	1 = Input value low limit failure	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
PV_Out	Process value	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
PV_OutUnit	Unit of process value	INT	0
RemMonTm	Remaining monitoring time	REAL	0.0
ScaleOut	Range of process value	STRUCT • High: REAL • Low: REAL	- • 100.0 • 0.0
SimAct	1 = Simulation active	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80

2.10 Channel block for analog output AsiAnOu

2.10.1 Block for analog output AsiAnOu

FB1320

Application

The AsiAnOu block is used to process signals of an analog output value from AS-i slaves that are connected to the control system via DP/AS-i LINK Advanced or IE/AS-i LINK PN IO.

The block is used for the following applications:

Signal processing (cyclic service) according to PROFIBUS PA profile "Actuator" of an analog output value:

- Of a PA field device according to PROFIBUS 3.0 Classes A and B.
- Of a secondary variable of a HART field device
- Of an FF field device

Calling OBs

The block must be inserted in the run sequence in the following OBs (occurs automatically in CFC):

OB 3x	Cyclic interrupt OB in which the channel blocks are inserted (e.g., OB 32)
OB 100	Warm restart

Use in CFC

When the "Generate module driver" CFC function is used, the following is executed automatically:

- The `Mode`, `MS` and `DataXchg` input is connected to the applicable `OMode_xx`, `O_MS` and `DXchg` output of the AsiSlv block.
- The AsiAnOu block is inserted into OB 100 downstream of the AsiSlv block assigned to it.

Function and functionality

The AsiAnOu block cyclically processes all channel-specific signal functions.

The block writes a process value to a process image (partition) as an analog raw value. Input parameter `Mode` is used to specify the form in which the raw value is generated. If the high byte of input parameter `Mode` = 0 (value status), the raw value will continue to be written to the process image (partition), but quality code "invalid value" will be set.

The quality code can assume the following statuses:

Status	Quality code
Valid value	16#80
Upper value limited	16#56
Lower value limited	16#55
Simulation	16#60
Invalid value	16#00

The quality code is formed from internal events, such as a higher-level error or simulation.

Flutter suppression

The time-controlled "Flutter suppression" function is used to delay the cancelation of a message by a parameterizable time.

Flutter suppression is used for:

- OB82 events - diagnostics messages
- OB83 events - failure

The flutter time is entered on the channel block using the `FlutTmIn` parameter. The High byte of the `DataXchg` parameter of the channel blocks contains the flutter time.

Flutter suppression becomes effective if `FlutEN` = 1 or `FlutTmIn` > 0 is set on the channel block.

There is only one flutter message per block. The delay times and fault messages are channel-granular, the fault messages are extended by at least the delay time. A flutter is present if the status of fault messages changes from "DOWN" to "UP" again within the delay time.

The last channel with flutter and its set delay time deactivates the flutter message.

Simulation

Simulation is the manipulation of a signal, independently of the actual source of the signal or logic that generates this signal.

Simulation is performed either on the field device (externally outside the process control system) itself or on a block (internally within the process control system).

In both cases, the relevant status in the signal is set to the value simulation 16#60.

In simulation, each block is considered as a separate unit. There are two types of simulation:

- Block-external simulation

  Block-external simulation is characterized by the fact that the simulation function is not performed in the block itself and a signal is pending at an input parameter whose status is simulation, e.g. simulation of the signal on another block or directly in the I/O devices.

- Block-internal simulation

  Block-internal simulation is characterized by the fact that the "simulation" function is performed in the block itself. Simulation is performed in the CFC via parameterization directly on the block via the input parameters `SimOn` and `SimPV_In`.

  If the input parameter `SimOn` is set to TRUE, the value of the input parameter `SimPV_In` will be output with the quality code `PV_ChnST` = 16#60 into the (sub)process image. `Bad` = TRUE is reset. Simulation has the highest priority. While the block is in simulation mode, `SimAct` is set to TRUE.

Parameterizable functions via the `Feature` connection

You can influence the response of the block via the `Feature` input.

The `Feature` bits are assigned in the following order:

Bit number	Meaning	Description
30	Output value without power with block-external stimulation	Via this feature bit, you can define for channel blocks whether the value without power will be output if the block is in block-external simulation. The default setting is 1. • **Bit = 0**: If an input parameter has the simulation value 16#60, the value 16#0000 will be output in the `PZDOut1` output parameter. • **Bit = 1**: If an input parameter has the simulation value 16#60, this value will be written into the field device.

Raw value check

Depending on the measurement type and measuring range, there is a nominal range of the analog output module in which the analog signal is converted to a digital value (raw value). The nominal range is defined in HW Config and automatically saved in the in/out parameter `Mode` when generating the module driver.

In addition, there is an overrange and an underrange in which the analog signal can still be converted into a digital value. These ranges are defined relative to the nominal range (approx. 18.5%). Outside these ranges there is a so-called overflow or underflow, and the output parameter `Bad` is set to 1.

- If the value is less than the nominal range, the output parameter `PV_LoAct` is set to 1.
- If the value is more than the nominal range, the output parameter `PV_HiAct` is set to 1.

Generation of normal value

The normal value (physical variable) is generated from the raw value using the `Scale` and `Mode` parameters. You define two scale values on the configured parameter `Scale`:

- Upper scale value (`Scale.High`)
- Lower scale value (`Scale.Low`)

If you are not using the CFC function "Generate Module Driver," you must set the in/out parameter `Mode` manually.

The settings of the `Scale` parameter are copied into the output parameter `ScaleOut`. The output parameter can be connected to a corresponding input parameter of a technological block (e.g. `PV_OpScale`).

The normal value is generated using a linear characteristic. `Scale.Low` is the lowest physical value which the process variable can assume, and `Scale.High` is the highest physical value.

When `Scale.Low` = 0 and `Scale.High` = 100, the result is a percentage value.

Special cases when generating the normal value using the `Scale` parameter:

- If you set `Scale.High` = `Scale.Low`, you are provided with the electrical input signal of the analog input module (e.g. mA) in accordance with the setting of the `Mode` parameter.
- If the raw value is already a physical value, set `Scale.Low` = 0 and `Scale.High` = 1. The raw value is then output unchanged as a physical variable.
- With measurement type PTC (**P**ositive **T**emperature **C**oefficient, binary evaluation of resistance thermometers), a binary signal is coded in the analog value. The following information is then made available at the `PV_Out` output:
  - If the measured resistance is within the normal range, `PV_Out` = 0.0
  - If the measured resistance is within the pre-warning range, `PV_Out` = 4.0
  - If the measured resistance is within the trigger range, `PV_Out` = 1.0

    This only applies if the input parameters `Scale.Low` = 0 and `Scale.High` = 1. In the case of a simulation or output of the substitute value, you may only set the input parameters `SimPV_In` and `SubsPV_In` to 0.0 or 1.0.
- With measurement type "Thermocouples, external or internal reference," the raw value is matched to the physical variable ± 80 mV in the case of S7 300 modules. You must determine the temperature from the associated conversion tables in the module manual. The physical equivalent in mV is delivered as the raw value by the module, and therefore set `Scale` to ± 80 mV.

Output invalid value in case of invalid raw value

If the block is to output an invalid value (`PV_Out` = `PV_In`), you must activate this function on the `Feature` bit "Output invalid raw value."

This function is preset.

Troubleshooting

The following errors can be displayed for this block:

- Channel fault
- Higher-level fault
- Invalid measuring range

Channel fault

In the event of a channel fault, quality codes `PV_ChnST` = 16#00 and `Bad` = TRUE are set. The current digital value is always written to the process image (partition).

Higher-level fault / invalid measuring range

A higher-level fault is indicated with "1" in the output parameters `ModErr` and `Bad` if the signal status in the High word of the input parameter `Mode` assumes the value 16#40.

A higher-level fault is also present if an incorrect measurement type has been entered in the Low word of the input parameter `Mode`.

Maintenance

Use of the "in process" status on the maintenance station

The "in process" status is implemented on the maintenance station for a measuring point or a field device via the channel blocks and the interconnectable output parameter `OosAct` = 1. You can interconnect the `OosAct` output parameter of the channel block with the `OosLi` input parameter of a technological block.

The channel block ascertains the "in process" status of the maintenance station via the `MS` input parameter and provides this information at the `OosAct` output parameter.

Issuing maintenance release

The maintenance release is information about a measuring point at which maintenance, service, or calibration work is to be performed. You can use the signal for the maintenance release to convey information about release of a measuring point from the operator station to the maintenance station.

The maintenance release (operator control permission "high-value process operation" required) is issued in the parameter view by operation of the `MS_RelOp` = 1 input parameter of the technological block. A maintenance release is then provided via the interconnectable output parameter `MS_Release` = 1 for further processing. To provide this information of the maintenance station, you must interconnect the output parameter `MS_Release` of the technological block with the `MS_Release` input parameter of the associated channel block (AsiAnOu).

The AsiAnOu block signals maintenance release to the diagnostic drivers via the `DataXchg` parameter. The maintenance release is only transmitted to the maintenance station when all bits of the `DataXchg_XX` parameter on the diagnostics driver are set to 0.

Different Maintenance jobs with their states

Maintenance job	Requested action	Status Service	MS state
Alarm	---	---	16#3000000
	Disassembly	in service	16#7000000
	Device swap		
	Calibration	Release request	---
	Zero Adjustment	Planned servicing	16#F000000
	Cleaning	Completed	0
	Service	Cancel	16#8000000

Maintenance job	Requested action	Status Service	MS state
Demand	---	---	16#3000000
	Disassembly	in service	16#6000000
	Device swap	Release request	---
	Calibration	Planned servicing	16#E000000
	Zero Adjustment	Completed	0
	Cleaning		
	Service	Cancel	16#8000000

Maintenance job	Requested action	Status Service	MS state
Request	---	---	16#2000000
	Disassembly	in service	16#5000000
	Device swap	Release request	---
	Calibration	Planned servicing	16#D000000
	Zero Adjustment	Completed	0
	Cleaning		
	Service	Cancel	16#8000000

Other Conditions	MS state
slave removal	16#8000007
power off AS-i line	16#8000008
removal of profinet line	16#8000008

See also

Insertion in the PCS 7 Maintenance Station (Page 119)

2.10.2 AsiAnOu block parameters

Input parameters

Parameter	Meaning	Data format	Default setting
ConToDrv	Connection to driver block AsiMod	ANY	-
Feature	Status of various features	STRUCT • Bit 0: BOOL • ... • Bit 30: BOOL • Bit 31: BOOL	- • 0 • ... • 1 • 0
FlutEn	1 = Fluttersuppress enable	BOOL	0
FlutTmIn	Flutter Supress time in seconds	INT	0
LAddr	Logical address of the module	INT	0
MS	Maintenance state	DWORD	16#00
MS_Release	Maintenance release	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
OvrShtR	Overshoot range	INT	0
PV_In	Process value	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
PV_InUnit	Unit of process value	INT	1001
RR_High	High limit of input value	INT	0
RR_Low	Low limit of input value	INT	0
Scale	Range of process value	STRUCT • High: REAL • Low: REAL	- • 100.0 • 0.0
ScaleOff	1 = Scale limits off	BOOL	0
SimOn	1 = Simulation active	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
SimPV_In	Simulation value	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
StartVal	Start Value	REAL	0.0
UndShtR	Undershoot range	INT	0

In/Out parameters

Parameter	Meaning	Data format	Default setting
DataXchg	Data exchange	DWORD	16#00
Mode	Quality and mode	DWORD	16#8000FFFC

Output parameters

Parameter	Meaning	Data format	Default setting
Bad	1 = Bad process value	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
ErrorNum	Error Number	INT	-1
ModErr	1 = Device/module is faulty	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
MS_Dev	Maintenance state	DWORD	16#00
OosAct	Field device out of service, maintenance in pogress	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
PV_ChnST	Value and state of PV_Out	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
PV_HiAct	1 = Input value high limit failure	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
PV_LoAct	1 = Input value low limit failure	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
PV_Out	Output value	WORD	16#00
PV_OutUnit	Unit of process value	INT	0
ScaleOut	Range of process value	STRUCT • High: REAL • Low: REAL	- • 100.0 • 0.0
SimAct	1 = Simulation active	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80

2.11 AS-i command interface AsiCntrl

2.11.1 AS-i command interface AsiCntrl

FB1322

Application

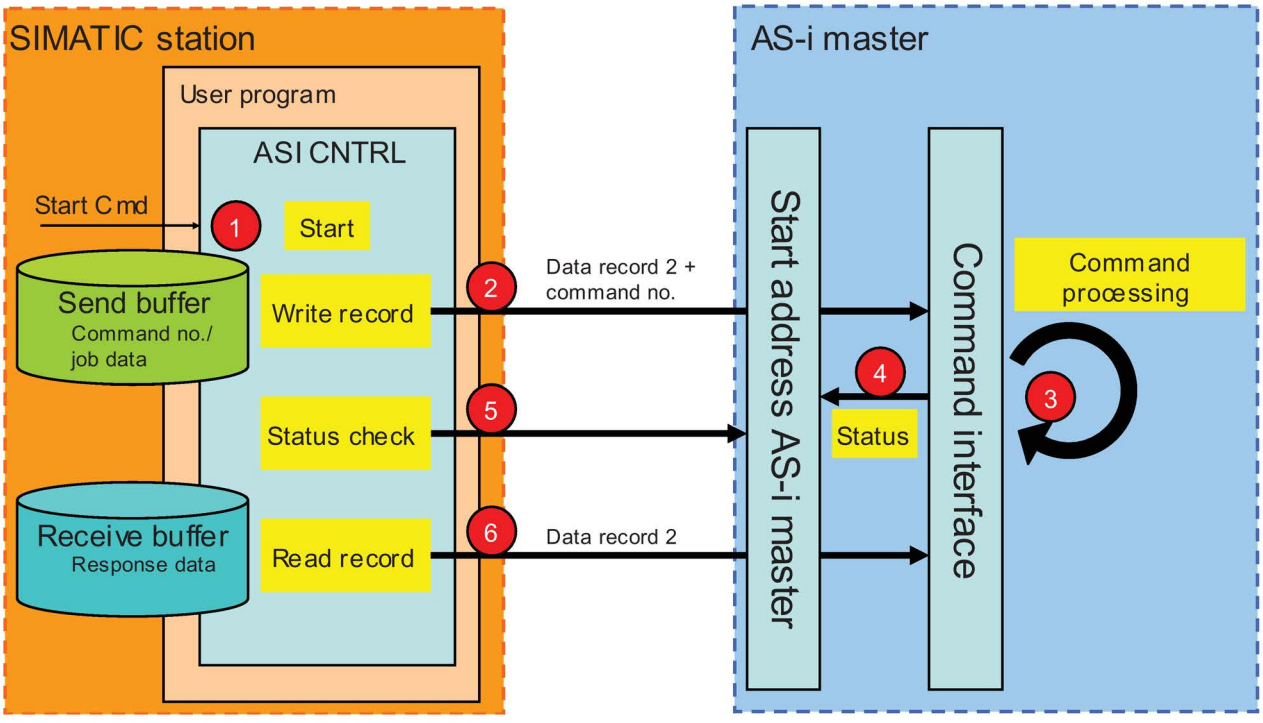
The ASiCntrl block supports modular AS-i masters, AS-i masters connected via PROFIBUS (1M / 2M) and also AS-i masters connected behind communication processor CP 443-1.

The Modules supported are:

- CP343−2 / CP343−2P
- CM AS-i Master ST
- DP/AS-i LINK Advanced.

The AS-i master establishes the connection to a higher-level, programmable controller, manages the connected AS-i slaves, organizes the data traffic on the AS-i line, and performs parameterization, monitoring and diagnostics functions.

The cyclic exchange of data between the CPU and the inputs and outputs of the AS-i slaves, and also parameterization during start-up, takes place automatically.



No	Description
1	In response to the trigger command, the block starts processing.
2	The program transmits the desired command to the AS-i master via the "Write record" command and the fixed data record number 2.
3	The AS-i master processes the command.
4	It stores its current status in the input range of its binary data (logical base address).
5	AsiCntrl cyclically polls the status nibble and evaluates it.
6	When command processing is finished, the command job is completed by "Read record" with data record number 2. Depending on the command, the data field of the "Read record" command contains the response data of the command or further status information.

Calling OBs

The block must be installed in the processing sequence in the following OBs:

OB 1x Cyclic program
OB 83 Insert/remove interrupt
OB 85 Program execution error
OB 86 Rack failure

Use in CFC

When the "Generate module driver" CFC function is used, the following is executed automatically:

1. Assignment of parameters to:

- The `DAddr` diagnostic address of the module.
- Input `SlvTyp` is parameterized as a function of the hardware configuration:
  - For Profibus it is set to 0.
  - For Profinet it is set to 1.
  - For CM AS-i Master ST it is set to 2.

1. Interconnects
   - the input `Req` to the output `ActCmd/CmdAct` of the associated AsiMod/AsiSub block
   - the input `LAddr` to the output `LAddrOut` of the associated AsiMod/AsiSub block
   - the input `SD` to the output `SendBuf` of the associated AsiMod/AsiSub block
   - the input `RD` to the output `RecvBuf` of the associated AsiMod/AsiSub block
   - the output `Done` to the input `CmdDone` of the associated AsiMod/AsiSub block
   - the output `Error` to the input `CmdErr` of the associated AsiMod/AsiSub block

Function and functionality

This function block runs asynchronously. This means that processing extends over several FB calls. A task is begun with `Req` = TRUE.

The working status is indicated via the `Busy` output parameter and the two central bytes of the Status output parameter. Busy output parameter and the two central bytes of the `Status` output parameter.

The `Busy` parameter is set while the task is being processed. When called for the first time, the `Status` parameter is assigned the value 00700100H. In all subsequent calls that are part of the task, it receives the value 00700200H.

When the task is complete, the result is output in the `Done` or `Error` parameter.

`Done` is set if no error has occurred. For tasks with reply data from the AS-i master, this data is made available in the specified receive buffer. In this case, the `Status` parameter additionally indicates the quantity of the delivered data in bytes.

For tasks without reply data, the value 00000000H is entered in the `Status` parameter.

`Error` is set if an error occurs during a task. In this case, the contents of the receive buffer are invalid.

To supply a detailed description of the error, an error code is entered in the `Status` parameter.

Reading data records

By means of data records with SFB52 RDREC, the block reads the information of the:

- LAS - List of active slaves
- LPS - List of projected slaves
- LDS - List of detected slaves.

The data which has been read out is written into the Receive-buffer (RD).

The returned value of RDREC, which indicates if a fault has occurred, is written in the status of the block.

Writing data records

The block writes the Command information by means of data records with SFB53 WRREC. The data which has been read out from AsiMod/AsiSub block send buffer (SD input) is written into the device.The returned value of WRREC, which indicates if a fault has occurred, is written in the status of the block.

Interface Command

Interface command to read LAS, LPS and LDS are:

- 16#30 for DP/AS-i LINK
- 16#30 for CP343-2/CP343-2P
- 16#B0 for CM AS-i Master ST

Error coding of AsiCntrl

The following table shows the correlation between BUSY, DONE and ERROR.

They enable the user to determine the current status of FB.

If an error occurs during processing, this will be signaled on the ERROR bit. When ERROR = True, the job was terminated with an error. The error cause is encoded in the STATUS parameter.

DONE	BUSY	ERROR	STATUS	Meaning
0	0	0	00700000 H	First call with REQ = FALSE; no job active
0	1	0	00700100 H	First call with REQ = TRUE; job triggered
0	1	0	00700200 H	Sequential call (REQ irrelevant); job still being processed.
1	0	0	00000000 H	Job completed without error and without response data
1	0	0	0000xx00 H	Job completed without error and number of xx bytes of response data
0	0	1	C0818400 H	Data type of formal operand RD not permitted
0	0	1	C0818500 H	Communication error with AS-i master (incorrect addressconfigured in LAddr).
0	0	1	C0838100 H	The AS-i slave address is incorrect.
0	0	1	C0838200 H	The AS-i slave is not activated (not in LAS).
0	0	1	C0838300 H	Error on the AS-Interface (the setting of the SD parametermay be too small).
0	0	1	C0838400 H	The command is not permitted in the current status of the AS-i master.
0	0	1	C0838500 H	An AS-i slave with address 0 exists.
0	0	1	C0838600 H	The AS-i slave has illegal configuration data (I/O or ID codes).
0	0	1	C083A100 H	The addressed AS-i slave was not found on the AS-Interface.
0	0	1	C083A200 H	An AS-i slave with address 0 exists.
0	0	1	C083A300 H	An AS-i slave with the new address already exists on the AS-Interface.
0	0	1	C083A400 H	The AS-i slave address cannot be deleted.
0	0	1	C083A500 H	The AS-i slave address cannot be set.
0	0	1	C083A600 H	The AS-i slave address cannot be permanently stored.
0	0	1	C083A700 H	Error while reading the extended ID1 code.
0	0	1	C083A800 H	The target address is not plausible (e.g., a B slave address is used for a standard slave).
0	0	1	C083B100 H	A length error has occurred while transferring a string.
0	0	1	C083B200 H	A protocol error has occurred while transferring a string.
0	0	1	C083F800 H	The job number or the job parameter are unknown.
0	0	1	C083F900 H	The AS-i master has detected an EEPROM error.

Note

For more on error information, refer to the description of SFB 54 "RALRM" in this document: System and Standard Functions for S7-300/400 Volume 1 and Volume 2 (ID Number: 44240604).

See also

Insertion in the PCS 7 Maintenance Station (Page 119)

2.11.2 AsiCntrl block parameters

Input parameters

Parameter	Meaning	Data format	Default setting
LAddr	Logical address of the AS-i master	WORD	16#00
RD	Pointer to the receive buffer	ANY	-
SD	Pointer to the send buffer	ANY	-
Req	Start of the task with Req = TRUE	BOOL	0
DAddr	Diagnostic address of AS-i Master	INT	16#00
SlvTyp	SlvTyp = 0: CP343-2/2P on PROFIBUS SlvTyp = 1: CP343-2/2P on PROFINET SlvTyp = 2: CM ASi Master ST on PROFINET	INT	0
ReserveIn	Reserved	WORD	16#00

Output parameters

Parameter	Meaning	Data format	Default setting
Busy	Task is being processed	BOOL	0
Done	Task completed without errors	BOOL	0
Error	Task terminated with error	BOOL	0
Status	Status	DWORD	16#00
ReserveOut	Reserved	WORD	16#00

Technical specifications

3

Block (type name)[1]	Number[2]	Block length in load/work memory (bytes)[3]	Length of instance data in load/work memory (bytes)[4]	Temporary memory (bytes)[5]	Blocks called [6]
AsiMod	FB1311	13014/11046	4508/2798	176	SFB35 SFC51 SFB52 SFB53 SFC6
AsiSub	FB1312	14724/12902	3096/1566	76	SFB35 SFB52 SFC20 SFC21 SFC51 SFC6 SFC64
AsiSubG	FB1313	11020/9230	3676/2302	110	SFB35 SFC21 SFC6
AsiSlv	FB1314	3118/2672	654/342	46	SFB35 SFC6 SFC64
AsiDiAIn	FB1315	1528/1206	368/108	32	-
AsiDiAOu	FB1316	1522/1202	366/110	30	-
AsiDiBIn	FB1317	2114/1756	388/110	44	-
AsiDiBOu	FB1318	2102/1734	396/114	42	-
AsiAnIn	FB1319	11598/10170	568/192	40	-

Block (type name)[1]	Number[2]	Block length in load/work memory (bytes)[3]	Length of instance data in load/work memory (bytes)[4]	Temporary memory (bytes)[5]	Blocks called [6]
AsiAnOu	FB1320	2382/1952	458/154	38	-
AsiCntrl[7]	FB1322	2232/1856	358/160	52	SFB52 SFB53 SFC6

1) The symbolic identifier in the library's symbol table for the relevant FB. It must be unique in the project.

2) Consists of the type of block (FB) and the number.

3) Memory requirement of program code, once per block type

4) Memory requirement of an instance DB.

5) The local data memory needed when calling the block in an execution level. This is limited according to the specific CPU. If exceeded, you must check this in the CPU configuration and, if necessary, redistribute to OBs of the size actually needed.

6) The blocks stated here are used by the driver block in question and must be located in the user program. They are stored in the same library.

7) For existing projects using AS-Interface PCS 7 Library, the AsiCtrl block will be replaced by the block AsiCntrl (FB1322) on generation of module drivers.

Insertion in the PCS 7 Maintenance Station

4

The interface to the PCS 7 Maintenance Station is integrated into the AsiMod, AsiSub, AsiSubG, and AsiSlv blocks.

The block evaluates the diagnostic data of the module and uses this to define the conditions under which maintenance messages are issued. It issues the following messages or maintenance states to WinCC:

Cause	MS	Message bit	Message text
Rack failure	8 (unsafe)	`RackF` / `RackF_Act`	`RackF_Act`
Module removed (AsiMod only)	7 (Maintenance: high priority)	`ModF` / `ModF_Act`	`ModF_Act`
I/O access error	No effect	`PeraF` / `PeraF_Act`	`PeraF_Act`
Internal fault (e.g., EEPROM defective)	7 (Maintenance: high priority)	`OB82_INT_FAULT`	Internal fault
External fault (e.g., slave failed or APF)	7 (Maintenance: high priority)	`OB82_EXT_FAULT`	External fault
At least one slave does not match the target specification	7 (Maintenance: high priority)	`OB82_PNT_INFO` or `OB82_SUB_MDL_ERR`	At least 1 slave does not match the target specification
AS-Interface voltage too low (APF)	7 (Maintenance: high priority)	`OB82_EXT_VOLTAGE`	Voltage too low
0: Module is in normal state, 1: Module is in offline state	7 (Maintenance: high priority)	`OB82_MDL_STOP`	Module in offline state
Hardware fault (internal watchdog)	7 (Maintenance: high priority)	`OB82_WTCH_DOG_FLT`	Hardware fault of module
EEPROM defective	7 (Maintenance: high priority)	`OB82_EPROM_FLT`	EPROM defective

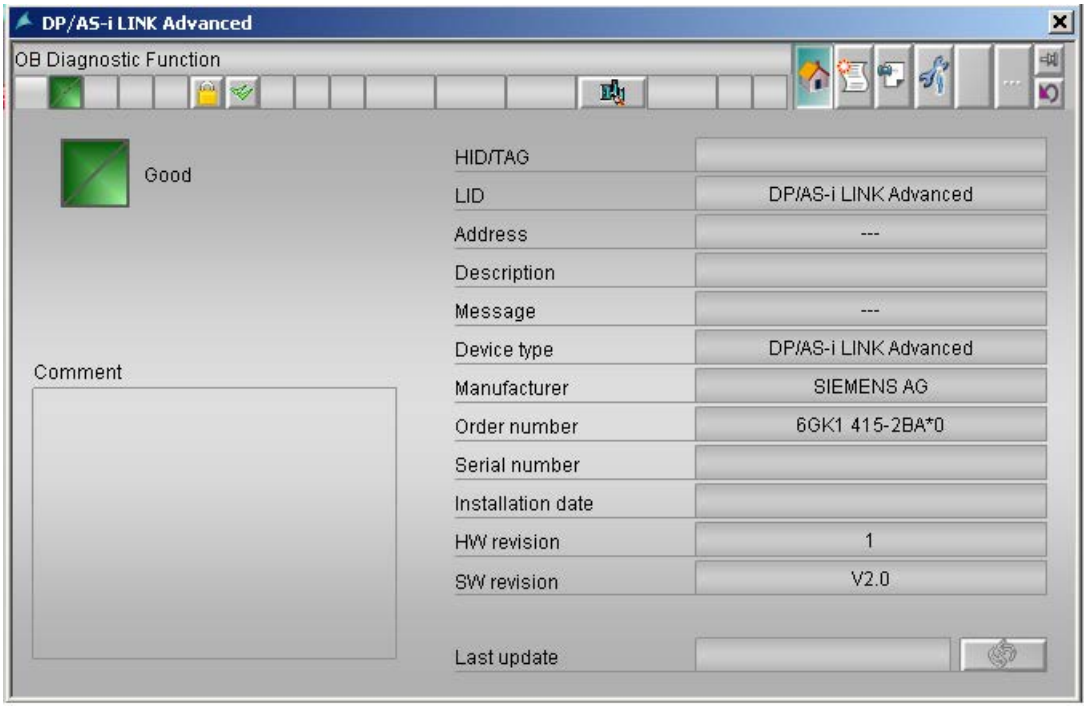
The `ChnOk` and `ChnOk2` block outputs contain the status information of the slaves. Information on the slaves present is stored in the `ChnExist` and `ChnExist2` outputs. This notifies the Maintenance Station which slave is faulty.

The WinCC picture @MaintenanceTypicals_ASi_V8.pdl contains the icons shown below to display the maintenance state. If the "Create/update diagnostics screens" function is executed in SIMATIC Manager, PCS 7 automatically uses the block icons from this file. The screen is installed when the library is installed.

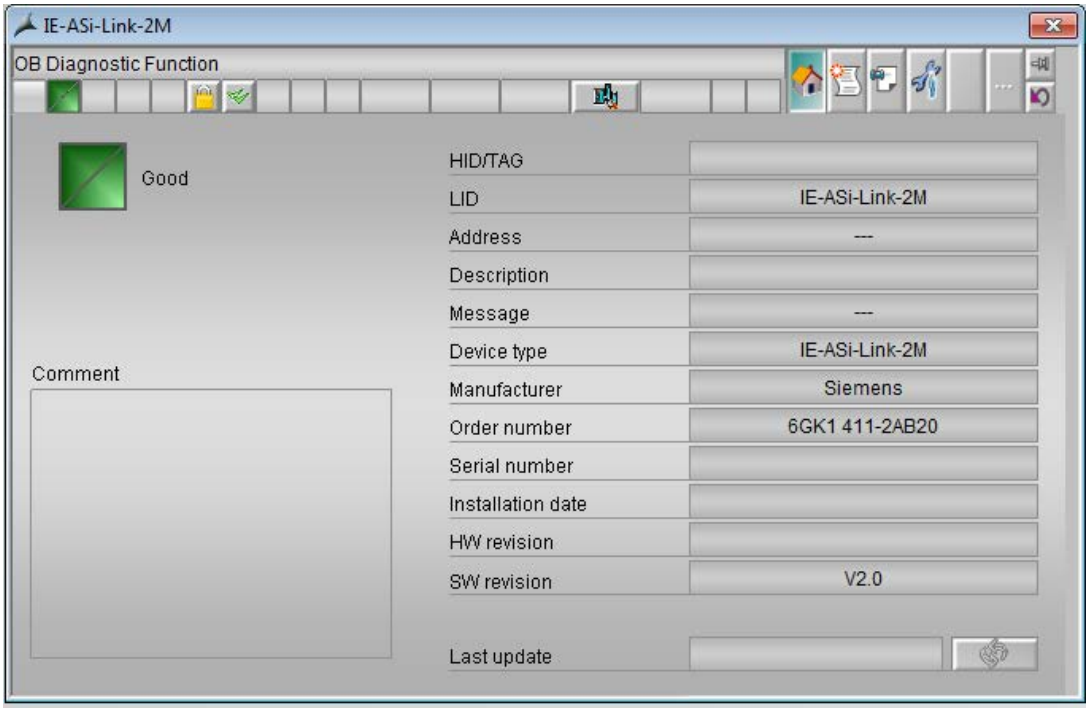
The symbols indicate the maintenance states "good", "bad", and "undefined" and when clicked open the standard faceplate for the Maintenance Station.

Insertion in the PCS 7 Maintenance Station

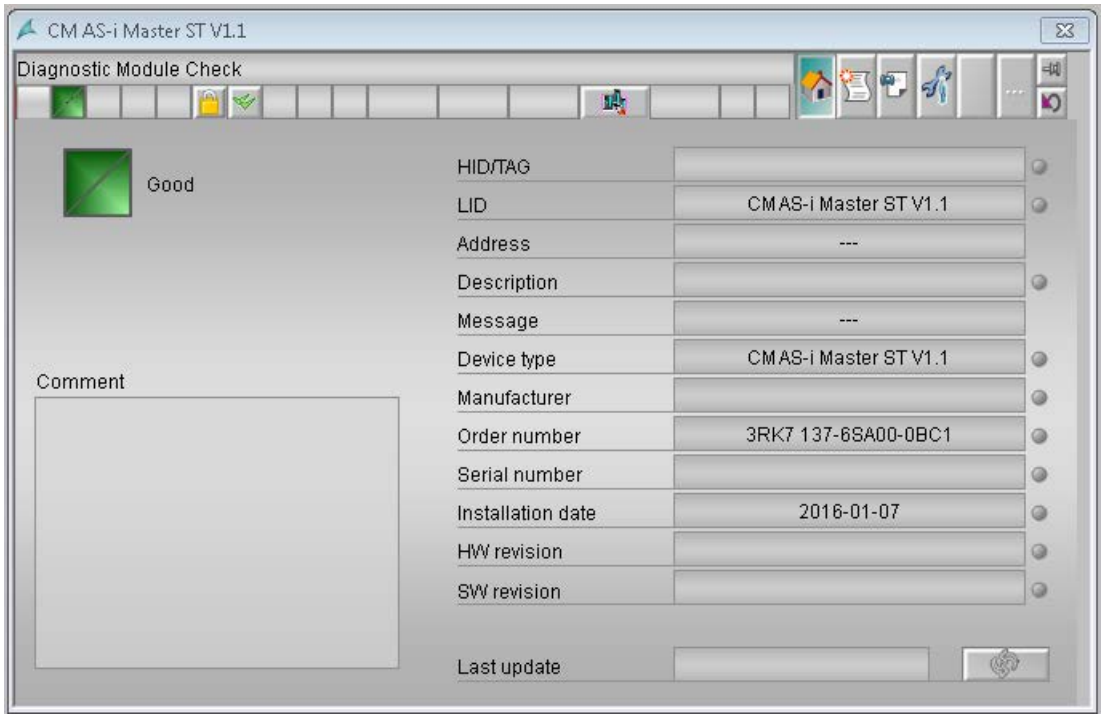
Insertion in the PCS 7 Maintenance Station DP/AS-i



Insertion in the PCS 7 Maintenance Station IE/AS-i



Insertion in the PCS 7 Maintaince station CM AS-i Master ST



Insertion in the PCS 7 Maintaince station CP343-2/CP343-2P

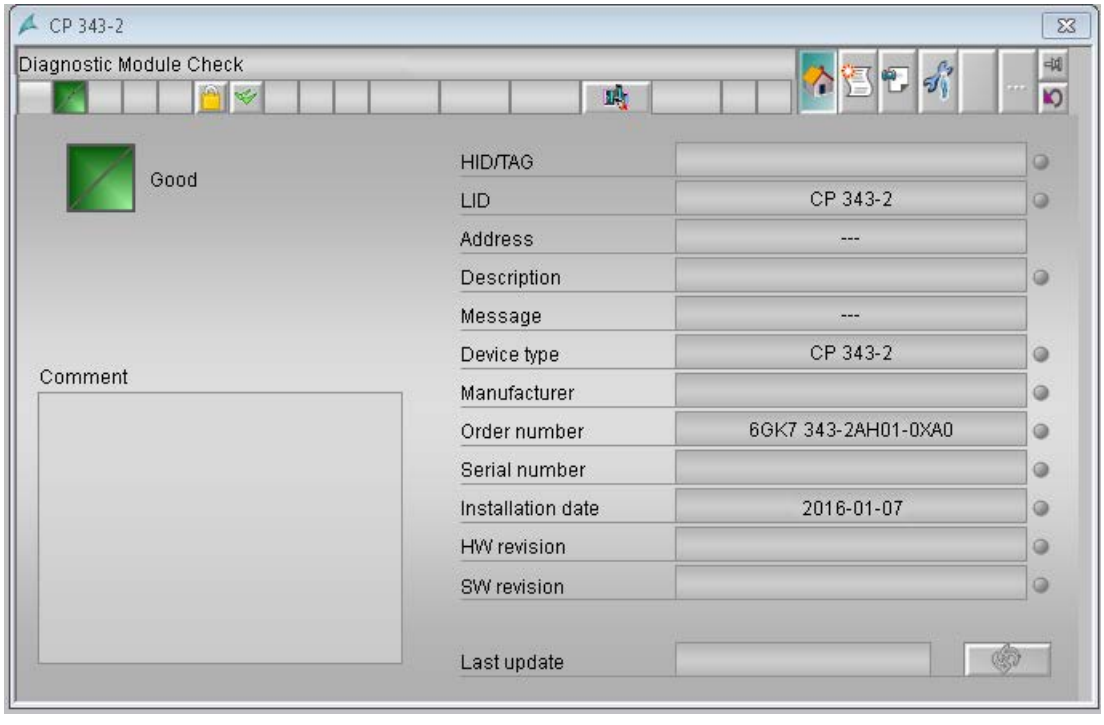
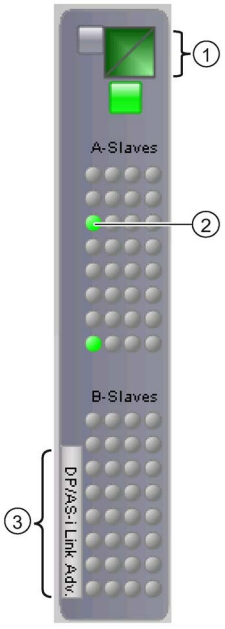


Table 4- 1 Icons for the AsiSub, AsiSubG, AsiSlv and AsiMod blocks

Insertion in the PCS 7 Maintenance Station			
AsiSub	**AsiSubG**	**AsiSlv**	**AsiMod**
			

① Global status of the AS-Interface network (good/bad)

② AS-i slave overview (OK / failed). Detail are displayed in the alarm window of the maintenance station.

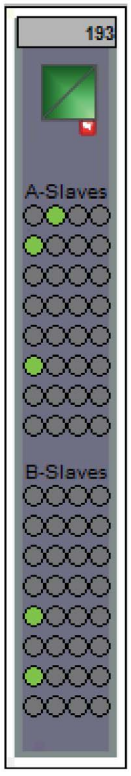
③ Name of the configured device

This symbol represents the slaves with A-address (or standard address) at the top and the slaves with B-address at the bottom with the following information: "good" (green), "bad" (red), and "not applicable" (gray). The AS-i slaves are sequentially numbered column-by-column for eight slaves each.

The element for jumping to the lower-level screen, which contains the symbols of the AS-i slaves, is omitted in the symbol for blocks SUBASI_G (configuring with GSD file or Profibus mode according to DPV0) and MOD_ASI.

Columns from left to right	Each column from top to bottom
Column 1	Slaves 0 to 7
Column 2	Slaves 8 to 15
Column 3	Slaves 16 to 23
Column 4	Slaves 24 to 31

Slave address '0' is the shipping address of a new slave. As slave '0' cannot transmit I/O values, the address '0' must be changed to a valid operating address 1...31 (A/B) on the AS-i network before it can be used for normal operation. If slave '0' is detected on the AS-i network, it is signaled "bad" (red) by the AS-i master as shown in the screenshot below.



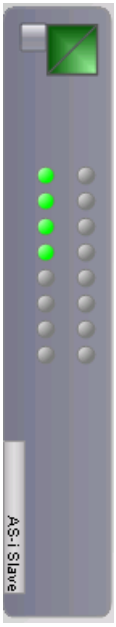
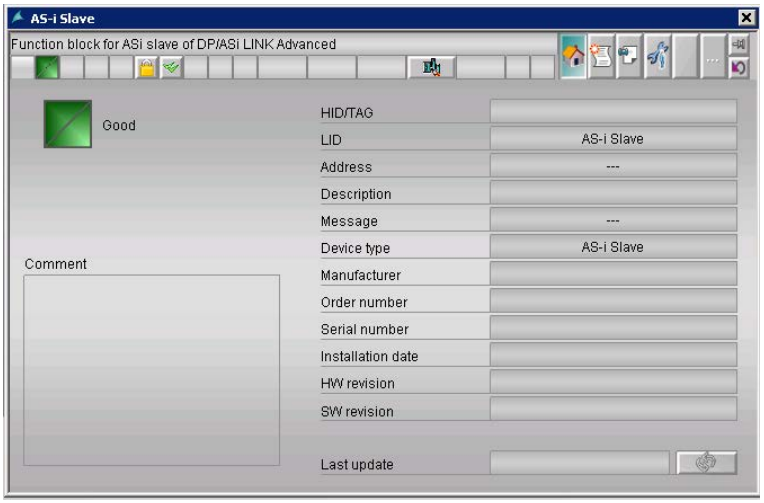
The following error messages will be displayed in the alarm window:

- AS-i line @3%d@: External error on @1%d@/@4%d@/@2%d@
- AS-i line @3%d@: At least 1 slave differs on @1%d@/@4%d@/@2%d@ from configuration

Associated values for the above messages are:

1. SUBN1_ID
2. RACK_NO
3. ID of AS-i line (1 or 2)
4. SUBLN_ID

The element for jumping to the lower-level screen, which contains the symbols of the AS-i slaves, is omitted in the symbol for blocks AsiSubG (configuring with GSD file or PROFIBUS mode according to DPV0 or DPV1) and AsiMod.

Insertion in the PCS 7 Maintenance Station AsiSlv	
	

The symbol for the AS-i slave indicates the status of its channels: "good" (green) and "bad" (red).

Abbreviations

5

Table 5- 1 Meaning of abbreviations

Abbreviation	Meaning
AS	Automation Station
APL	Advanced Process Library
CFC	Continuous Function Chart
DP	Distributed Peripherals
FB	Function Block
GSD	Generic Station Description, Device Description File for PROFIBUS / PROFINET
HMI	Human Machine Interface
HW Config	"Hardware configuration" module in SIMATIC Manager
ID	Identification number
MS	Maintenance Station
OB	Organization Block
OM	Object Manager, Integrated Hardware Configuration Management in STEP 7
OS	Operator Station
PCS 7	Process Control System 7
PG	Programming device
PS	Parameter Set
SFB	System Function Block
SFC	System Function