SIEMENS

Introduction 1

Product Information 2

SIMATIC

Bus links
Amendments to the operating instructions for DP/PA coupler, active field distributors, DP/PA

Product Information

08/2015
A5E35926358-AB

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.

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Introduction

1

Overview

This product information applies to:

- IM 153-2 (Outdoor): 6ES7153-2BA70-0XB0
- DP/PA Coupler FDC 157: 6ES7157-0AC85-0XA0
- Active field distributor AFDiSD: 6ES7655-5DX60-1BB0
- Active field distributors AFD4 (6ES7157-0AG81-0XA0), AFD8 (6ES7157-0AG82-0XA0) and AFS (6ES7157-0AG80-0XA0)

Supplement to the operating instructions for DP/PA coupler, active field distributors, DP/PA Link and Y Link

This product information is a supplement to the Bus links DP/PA coupler, active field distributors, DP/PA Link and Y Link (http://support.automation.siemens.com/WW/view/en/1142696) 07/2011 operating instructions.

Please also note the supplementary product information:

- for the active field distributors AFD4, AFD8 and AFS (http://support.automation.siemens.com/WW/view/en/66916188)
- for the active field distributor AFDiS (http://support.automation.siemens.com/WW/view/en/63033765)

Scope of this product information

This product information supplements the documentation named above and takes precedence over it.

Conventions

In this product information, the terms "DP/PA Coupler" and "Field Device Coupler" are used synonymously.

Compatibility

The interface modules, the Field Device Coupler FDC 157 and the active field distributor AFDiSD referred to in this product information are compatible with their predecessors in terms of spare parts and functionality as shown in the table below.

Table 1-1 Compatibility overview

The components described in this product information...	...are compatible with predecessor models
IM 153-2 (Outdoor): 6ES7153-2BA70-0XB0[1)]	• IM 153-2 (Outdoor): 6ES7153-2BA82-0XB0 • IM 153-2: 6ES7153-2BA02-0XB0
Field Device Coupler FDC 157: 6ES7157-0AC85-0XA0	Field Device Coupler FDC157: • 6ES7157-0AC83-0XA0 • 6ES7157-0AC84-0XA0
AFDiSD: 6ES7655-5DX60-1BB0	AFDiS: 6ES7157-0AG83-0XA0

1) The operation of the IM 153-2 (2BA70) as IM 157 (6ES7157-0AA81-0XA0) in redundant mode on the bus module BM IM/IM (6ES7195-7HE80-0XA0) is no longer supported.

Security information

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

Product Information 2

2.1 Interface module IM 153-2 (6ES7153-2BA70-0XB0)

The interface module IM 153-2 (6ES7153-2BA70-0XB0) is compatible with its predecessors (6ES7153-2BA82-0XB0, 6ES7153-2BA02-0XB0) in terms of spare parts and functionality. For this reason, the information given in the operating instructions DP/PA coupler, active field distributors, DP/PA Link and Y Link (http://support.automation.siemens.com/WW/view/en/1142696) also applies to the component described in this product information.

Please also note the following explanations.

Applications

The IM 153-2 is intended for the following applications:

- Replacement for the interface module IM 153-2 with the article number 6ES7153-2BA82-0XB0, 6ES7153-2BA02-0XB0
  Exception:
  The operation of the IM 153-2 (2BA70) as IM 157 (6ES7157-0AA81-0XA0) in redundant mode on the bus module BM IM/IM (6ES7195-7HE80-0XA0) is no longer supported.
- Operation in the DP/PA Link

Properties

The interface module IM 153-2 (6ES7153-2BA70-0XB0) offers all features that were provided by the predecessor.

Particularities when using the IM 153-2 (2BA70)

The IM 153-2 (2BA70) described in this product information replaces the predecessors:

- Usage as spare part:
  No change to the STEP 7 project is necessary.
- Usage as new interface module:
  - Install the HSP246.
  - As of STEP 7 V5.5 SP4, select the interface module "IM 153-2 OD" from the hardware catalog under "PROFIBUS DP", directory "DP/PA Link". The article number of the interface module appears in the bottom line of the display window: 6ES7153-2BA70-0XB0.
- When configuring the DP/PA Link with GSD tool:
  You must select the predecessor "2BA82". The GSD tool is available for download free-of-charge on the Internet (http://support.automation.siemens.com/WW/view/en/26562190).

LED display when deleting an existing configuration

When using the IM 153-2 (6ES7153-2BA70-0XB0) and deleting an existing configuration by resetting the interface module, the following LED display appears:

LEDs					Meaning	Remedy
SF	BF 1	BF 2	ACT	ON		
Off	Flash-es	Off	Off	Off	This only occurs when the PROFIBUS address (DIP switch) is "0" at Power ON. Temporary state while the default configuration data is restored in retentive memory.	-

2.2 Field Device Coupler FDC 157 (6ES7157-0AC85-0XA0)

The Field Device Coupler FDC 157 (6ES7157-0AC85-0XA0) is compatible with its predecessors (6ES7157-0AC83-0XA0, 6ES7157-0AC84-0XA0) in terms of spare parts and functionality. For this reason, the information given in the operating instructions DP/PA coupler, active field distributors, DP/PA Link and Y Link (http://support.automation.siemens.com/WW/view/en/1142696) also applies to the component described in this product information.

Please also note the following explanations.

Applications

The Field Device Coupler FDC 157 is intended for the following applications:

- Replacement for the DP/PA coupler with article number 6ES7157-0AC83-0XA0, 6ES7157-0AC84-0XA0
- Operation in the DP/PA Link

Properties

The Field Device Coupler FDC 157 (6ES7157-0AC85-0XA0) offers all features that were provided by its predecessors.

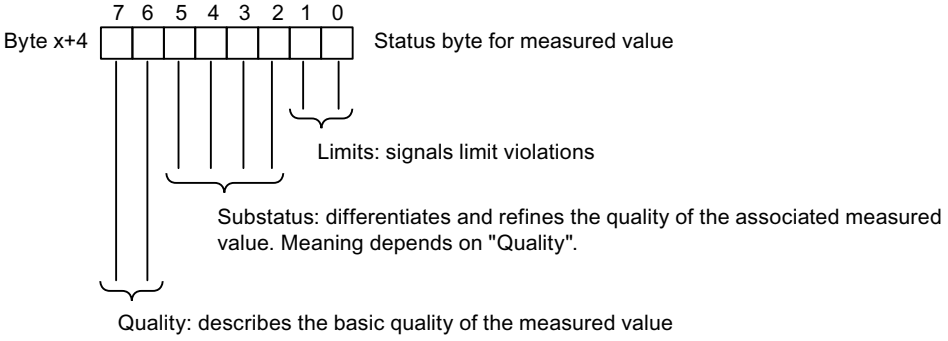
Particularities when using the FDC 157 (0AC85)

The FDC 157 described in this product information replaces the predecessors:

- Usage as spare part:
  No change to the STEP 7 project is necessary.
- Usage as new Field Device Coupler FDC 157:
  - Install the HSP253.
  - In STEP 7, V5.5 SP4 or higher, select the Field Device Coupler "FDC157-0 (EFD)" from the hardware catalog under "PROFIBUS DP", directory "DP/PA Link". The article number of the FDC 157 appears in the bottom line of the display window: 6ES7157-0AC85-0XA0.

Syntax of an IEEE status byte in user data frame of the Field Device Coupler (byte x+4)

The Field Device Coupler FDC 157 (6ES7157-0AC85-0XA0) returns a PA redundancy error with status code "68_H" (instead of "24_H" for 0AC83).



Status codes:

00 0000 00 (0_H)	Bad, non-specific
00 1000 11 ($4F_H$)	Uncertain (initial value), (value not measured)
00 1001 00 (24_H)	Bad (maintenance alarm), (short-circuit, wire break, DP/PA coupler defective, poor signal level)
00 1001 01 (25_H)	Bad (maintenance alarm), low limit violation
00 1001 10 (26_H)	Bad (maintenance alarm), high limit violation
01 1010 00 (68_H)	Uncertain (maintenance demanded), PA redundancy error, parameter assignment error, Redundancy mode wrong partner
01 1010 01 (69_H)	Uncertain (maintenance demanded), low limit violation
01 1010 10 ($6A_H$)	Uncertain (maintenance demanded), high limit violation
10 0000 00 (80_H)	Good, ok (no error)
10 0000 01 (81_H)	Good, low limit violation
10 0000 10 (82_H)	Good, high limit violation

Figure 2-1 Syntax of an IEEE status byte

2.3 Active field distributor AFDiSD (6ES7655-5DX60-1BB0)

2.3.1 Active field distributor AFDiSD

The active field distributor 6ES7655-5DX60-1BB0(AFDiSD) is compatible with its predecessor (AFDiS, 6ES7157-0AG83-0XA0) in terms of spare parts and functionality. For this reason, the information given in the operating instructions DP/PA coupler, active field distributors, DP/PA Link and Y Link (http://support.automation.siemens.com/WW/view/en/1142696) and in the appropriate product information also applies to the component described in this product information.

The explanations given in section Supplements to the operating instructions for DP/PA coupler, active field distributors, DP/PA Link... (Page 31) of this product information apply accordingly.

Please also note the following explanations.

Applications

The active field distributor AFDiSD is intended for the following applications:

- Replacement for the active field distributor AFDiS with the article number 6ES7157-0AG83-0XA0
- Operation in connection with the DP/PA Link

Properties

The active field distributor AFDiSD (6ES7655-5DX60-1BB0) offers all features that were provided by its predecessor.

Particularities when using the AFDiSD

The AFDiSD described in this product information replaces the predecessor.

Make sure in this application that the mode switch of the AFDiSD is set to the compatible mode (switch position = "C"). The mode switch can be found (in top view) to the left of the IP30 covers.

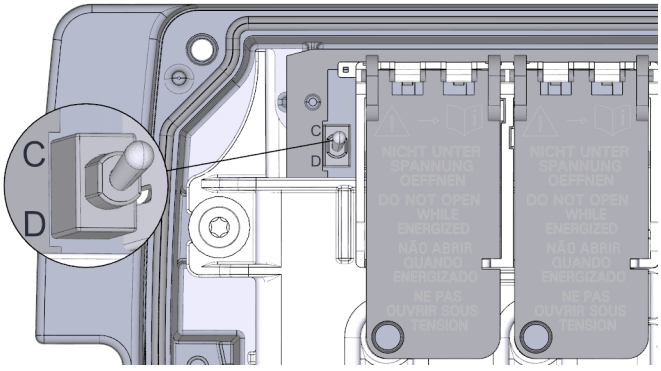


Figure 2-2 AFDiSD: Mode switch (factory setting "C" = compatible mode)

LED display for the function "Find AFDiSD"

The active field distributor AFDiSD provides an additional LED display as compared to its predecessor AFDiS (6ES7157-0AG83-0XA0):

Table 2-1 **LED display for the function "Find AFDiSD"**

LED T1, T2	LED S1 to S6	Meaning	Remedy
	All flashing fast	Function "Find AFDiSD" is being performed: All LEDs of the spur lines to the field devices (S1 to S6) flash for 5 s.	-

Using the AFDiSD in hazardous area

DANGER

Explosion hazard

In mixed operation with AFD, always disconnect the Field Device Coupler from the power supply before you replace active field distributors AFDiSD.

2.3.2 Active field distributor AFDiSD in hazardous area

2.3.2.1 Overview

Using the AFDiSD in hazardous area

For more information on the use of the active field distributor AFDiSD in hazardous areas, the information given in the operating instructions DP/PA coupler, active field distributors, DP/PA Link and Y Link (http://support.industry.siemens.com/cs/document/1142696) and in the Product Information (http://support.automation.siemens.com/WW/view/en/63033765) for the active field distributor AFDiS applies.

2.3.2.2 Safety instructions for connection

Safety instructions

DANGER

Explosion hazard

When laying cables and wiring, make sure that you adhere to the installation regulations according to EN 60079-14 and any regulations specific to your country.

Information on how to install the PROFIBUS PA can be found in the "Technical Guideline PROFIBUS PA, User and Installation Guideline". Available from PROFIBUS User Organization (http://www.profibus.com).

DANGER

Explosion hazard

Ignitable sparks may be generated during connection.
Therefore, use a **non-magnetic** screwdriver when connecting the cables!

⚠ DANGER

Explosion hazard

A tensile load on the screws of AFDiSD can impair the degree of protection and is not permitted.

Implement a fixed installation for the cable inlets.

⚠ WARNING

Risk to intrinsic safety

If the wrong connection is made on the AFDiSD (PA trunk line <--> spur lines) or the cables are incorrectly connected to the PA field devices, the intrinsic safety is put at risk:

Only connect Ex i circuits (intrinsically-safe PA field devices) to the spur lines!

Check the wiring to the PA field devices.

IP30 cover

The connections of the PA trunk lines inside the enclosure of the AFDiSD are sealed with an IP30 cover. Opening the IP30 cover switches off the voltage supply to the terminals and the feed lines.

Depending on the zone in which the AFDiSD is located, you are permitted to open the IP30 cover during operation for a visual inspection.

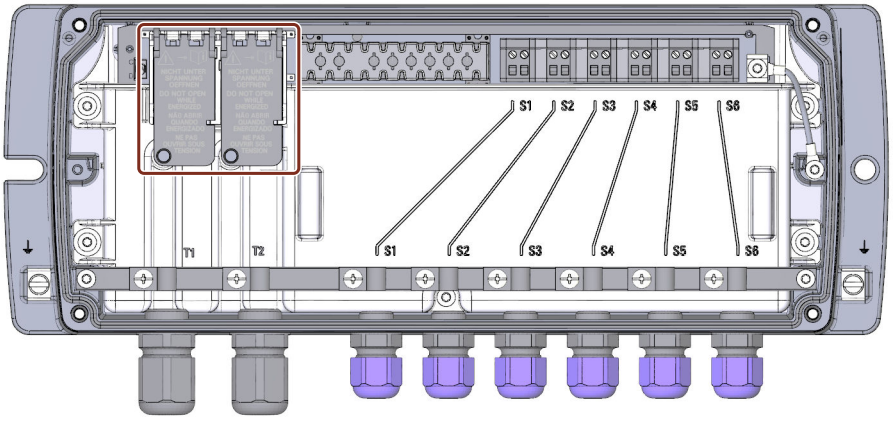


Figure 2-3 AFDiSD with IP30 covers

⚠ DANGER

Explosion hazard

In the hazardous area **Zone 1** you are not permitted to open the IP30 cover during operation.

Before opening the IP30 cover, disconnect the voltage supply to the relevant FDC 157 couplers.

In the hazardous area **Zone 2**, you are permitted to open the IP30 cover during operation.

Zone 1: Disconnecting the trunk line / connecting the trunk line to AFDiSD

⚠ DANGER

Explosion hazard

In the hazardous area **Zone 1** it is not permitted to disconnect the trunk line to an AFDiSD during operation.

Prior to starting work, disconnect the voltage supply to the FDC 157 coupler(s).

Zone 2: Disconnecting the trunk line / connecting the trunk line to AFDiSD

⚠ DANGER

Explosion hazard

In the hazardous area **Zone 2**, you are not permitted to disconnect the trunk line to an AFDiSD during operation if it is **directly** connected to an FDC 157 coupler or an AFS.

Prior to starting work, disconnect the voltage supply to the FDC 157 coupler(s).

In hazardous area **Zone 2**, it is permissible to disconnect a trunk line to an AFDiSD during operation if it connects two AFDiSDs.

Zone 2: Disconnecting the trunk line / connecting the trunk line to AFS

⚠ DANGER

Explosion hazard

In the hazardous area **Zone 2** it is not permitted to disconnect the lines from an AFS during operation.

Prior to starting work, disconnect the voltage supply to the FDC 157 coupler(s).

Rules for connecting trunk lines

The following examples illustrate the rules which you must observe when connecting trunk lines:

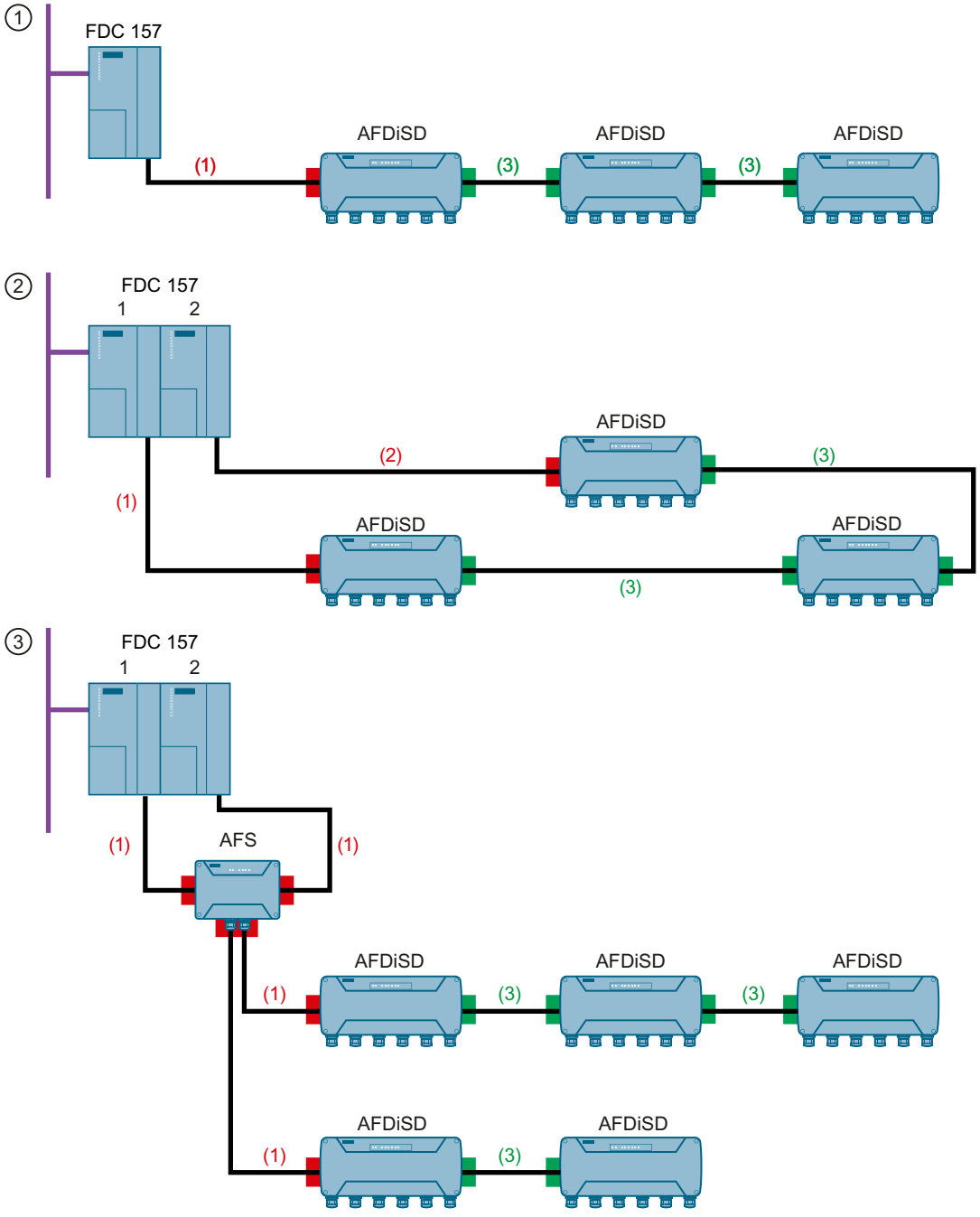


Figure 2-4 Rules for connecting trunk lines in hazardous areas

Rules

When connecting trunk lines in a zone 2 hazardous area, please comply with the following rules:

No.	Rule
①	FDC must be disconnected from the voltage supply when disconnecting the line (1) on the AFDiSD
②	FDC 1 must be disconnected from the voltage supply when disconnecting the line (1) on the AFDiSD FDC 2 must be disconnected from the voltage supply when disconnecting the line (2) on the AFDiSD
③	FDC 1 and FDC 2 must be disconnected from the voltage supply when disconnecting the line (1) on the AFS and AFDiSD

The following applies to all configurations:

- Connection of the lines (3) is possible during operation
  (marked green in the figure above)
- The spur lines S1 to S6 can always be connected during operation.

Identifying trunk lines

Note

Identify those trunk lines which must not be disconnected during operation on the field distributors.

Identify in your system:

- on the AFDiSD, the trunk lines coming directly from the coupler FDC 157
- on the AFDiSD, the trunk lines coming directly from the AFS
- on the AFS, the trunk lines coming directly from the AFDiSD
  (marked red in the figure above)

2.3.2.3 Protection by locking the IP30 cover

Protection by locking

Protect your active field distributor AFDiSD from unauthorized or unintentional opening with sufficiently secured IP30 covers.

You can lead a wire **made from non-conductive material** through the locking tabs on both sides of the IP30 covers and then have the following options, for example:

- affix a seal
- tightly knot the two ends of the wire
  Make sure that the seal/knot does not damage the IP30 covers when putting the enclosure lid on and tightening the screws.

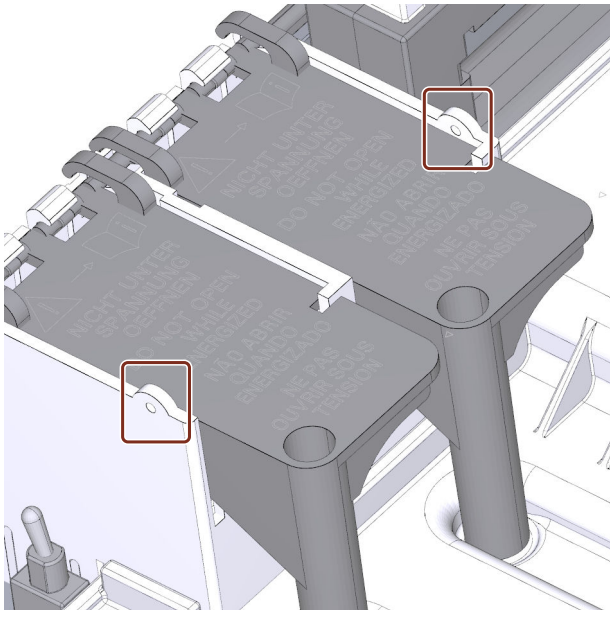


Figure 2-5 Locking tabs

2.4 Technical specifications

2.4.1 General technical specifications

What are general technical specifications?

The technical specifications contain:

- The standards and test values observed and met by the described components
- The test criteria used to test the described components.

2.4.1.1 Standards and approvals

The components described meet the following standards and approvals.

Exceptions:

- DP/PA coupler Ex [i]: Deviations from the standards and approvals listed here can be found in the respective sections.
- Active field distributors: The valid standards and approvals can be found in the respective sections.

Note

Currently valid certifications can be found on the rating plate of the relevant module.

CE Label

The described components meet the requirements and protective aims of the following EC directives and comply with the harmonized European Standards (EN) published for programmable logic controllers (PLC) in the official gazettes of the European Union:

- 2004/108/EC "Electromagnetic Compatibility" (EMC Directive)
- 94/9/EU "Equipment and protective systems intended for use in potentially explosive atmospheres" (Guidelines for Explosion Protection)

The EC Declarations of Conformity are available to the relevant authorities at the following address:

Siemens AG
Gleiwitzer Str. 555
DE-90475 Nuremberg
Germany

ATEX Approval

DEKRA 14ATEX0026X
according to EN 60079-15 (Electrical apparatus for potentially explosive atmospheres; Type of protection "n") and EN 60079-0 (Electrical apparatus for potentially explosive gas atmospheres - Part 0: General Requirements)

II 3 G Ex nA II T4

WARNING

Personal injury and material damage can occur.

In hazardous areas, personal injury and material damage can occur if plug connections are disconnected during operation.

In hazardous areas, only disconnect plug connections when all components are disconnected from the power.

IECEx approval

IECEX DEK 14.0082X

According to IEC 60079-15 (Explosive atmospheres - Part 15: Equipment protection by type of protection "n") and IEC 60079-0 (Explosive atmospheres - Part 0: Equipment - General requirements)

⚠ WARNING

Personal injury and material damage may occur.

In hazardous areas, personal injury and material damage can occur if plug connections are disconnected during operation.

In hazardous areas, only disconnect plug connections when all components are disconnected from the power.

UL / CSA Approval

c UL us
HAZ. LOC.

Underwriters Laboratories Inc. according to

Ordinary locations

- UL 508 (Industrial Control Equipment)
- CSA C22.2 No. 142 (Process Control Equipment)

Hazardous locations

- ANSI/ISA -12.12.01
- CSA C22.2 No. 213

APPROVED for use in
Class I, Division 2, Group A, B, C, D Tx;
Class I, Zone 2, Group IIC Tx

Installation Instructions for cULus haz.loc.

- WARNING - Explosion Hazard - Do not disconnect while circuit is live unless area is known to be non-hazardous.
- WARNING - Explosion Hazard - Substitution of components may impair suitability for Class I, Division 2 or Zone 2.
- This equipment is suitable for use in Class I, Division 2, Groups A, B, C, D; Class I, Zone 2, Group IIC; or non-hazardous locations.

FM Approval

FM
APPROVED

Factory Mutual Research (FM) according to
Approval Standard Class Number 3611, 3600, 3810 (ANSI/ISA 82.02.01)
APPROVED for use in Class I, Division 2, Group A, B, C, D Tx;
Class I, Zone 2, Group IIC Tx

Marking for Australia and New Zealand

The described components meet the requirements of the standard AS/NZS CISPR 16.

IEC 61131

The described components meet the requirements and criteria of the standard IEC 61131-2 (programmable logic controllers, part 2: Equipment requirements and tests).

PROFIBUS standard

The described components are based on the IEC 61158 standard type 3.

PROFIBUS PA

The DP/PA coupler meets the requirements and criteria of the PROFIBUS PA directive.

Use in industry

SIMATIC products are designed for industrial applications.

Table 2-2 Use in industry

Area of application	Noise emission requirements	Noise immunity requirements
Industry	EN 61000-6-4:2007 + A1:2011	EN 61000-6-2: 2005

Use in residential areas

If you use the described components in residential areas, you must ensure that they comply with the radio interference emission values of EN 61000-6-3, measured according to EN 55011.

Suitable measures are, for example:

- Installation of grounded control cabinets / control boxes
- Use of noise filters in the supply lines

See also

Standards and approvals of active field distributor AFDiSD (Page 19)

2.4.1.2 Standards and approvals of active field distributor AFDiSD

Note

Currently valid certifications can be found on the rating plate of the relevant module.

CE label

The described components meet the requirements and protective aims of the following EC directives and comply with the harmonized European Standards (EN) published for programmable logic controllers (PLC) in the official gazettes of the European Union:

- 2004/108/EC "Electromagnetic Compatibility" (EMC Directive)
- 94/9/EU "Equipment and protective systems intended for use in potentially explosive atmospheres" (Guidelines for Explosion Protection)

The EC Declarations of Conformity are available to the relevant authorities at the following address:

Siemens AG
Gleiwitzer Str. 555
DE-90475 Nuremberg
Germany

ATEX approval

II 2 G (1) GD
II 3 G (1) GD
II 2 D
Ex e ib mb [ia IIC Ga] [ia IIIC Da] IIC T4 Gb
Ex nA ic [ia IIC Ga] [ia IIIC Da] IIC T4 Gb
Ex tb IIIC T80 °C Db IP66
DEKRA 14ATEX0044

0344

WARNING

Personal injury and material damage can occur.

In hazardous areas, personal injury and material damage can be incurred if plug connections are disconnected during operation.

In hazardous areas, only disconnect plug connections when all components are disconnected from the power.

IECEx approval

IECEx DEK 14.0008

Use in industry

SIMATIC products are designed for industrial applications.

Table 2-3 Use in industry

Area of application	Noise emission requirements	Noise immunity requirements
Industry	EN 61000-6-4:2007 + A1:2011	EN 61000-6-2: 2005

2.4.1.3 Use in zone 2 hazardous areas

Refer to the product information: *Use of subassemblies / modules in a zone 2 Hazardous Area*.

The product information is available for download from the Internet (http://support.automation.siemens.com/WW/view/en/19692172).

2.4.2 Technical specifications IM 153-2

Technical specifications IM 153-2 (6ES7153-2BA70-0XB0)

	6ES7153-2BA70-0XB0
General information	
Hardware version	01
Firmware version	V6.0.0
Manufacturer ID (VendorID)	801Eh
Supply voltage	
24 V DC	Yes
Low limit of permissible range (DC)	20.4 V
High limit of permissible range (DC)	28.8 V
Permissible range (ripple included), low limit (DC)	20.4 V
Permissible range (ripple included), high limit (DC)	28.8 V
External protection for supply cables (recommendation)	2.5 A
Power failure buffering	
Mains/voltage failure buffering time	5 ms
Input current	
Current consumption, max.	650 mA
Inrush current, typ.	3 A
I^2t	0.1 A^2s
Output voltage	
Rated value, 5 V DC	Yes
Output current	

	6ES7153-2BA70-0XB0
for backplane bus (5 V DC), max.	1.5 A
Power loss	
Typical power loss	5.5 W
Address area	
Address capacity	
Inputs	244 bytes
Outputs	244 bytes
Hardware configuration	
Number of modules per DP slave interface, max.	12
Fieldbus connection via separate bus link	Yes
Time stamping	
Accuracy	1 ms; 1 ms for up to 8 modules; 10 ms for up to 12 modules
Alarm buffer quantity	15
Alarms per alarm buffer	20
Number of digital inputs that can be stamped, max.	128; max. 128 signals / station; max. 32 signals / slot
Time-of-day format	RFC 1119
Time resolution	0.466 ns
Time interval for sending the alarm buffers when an alarm is pending	1000 ms
Time stamp for signal change	Rising/falling edge as incoming or outgoing signal
Interfaces	
Interface hardware, RS 485	Yes
Interface hardware, fiber-optic cable	No
PROFIBUS DP	
Device addresses	1 to 125 permitted
Automatic determination of transmission rate	Yes
PROFIBUS DP, output current, max.	70 mA
Transmission rate, max.	12 Mbps
Transmission method	RS 485
SYNC capability	Yes
FREEZE capability	Yes
Direct data exchange (cross-traffic)	Yes; as publisher with all IO, as subscriber with F-IO only
PROFIBUS DP	9-pin sub D
1st interface	
DP slave	
GSD file	SI05801E.GSG
Automatic baud rate detection	Yes
Protocols	
PROFIBUS	Yes

	6ES7153-2BA70-0XB0
Other protocols	
CAN	No
MODBUS	No
Other bus systems	No
Communication functions	
Bus protocol/transmission protocol	PROFIBUS DP according to EN 50170
Electrical isolation	
Electrical isolation exists	Yes
Insulation	
Insulation tested with	Insulation voltage 500 V
Degree of protection and protection class	
IP (rear)	IP20
IP20	Yes
Standards, approvals, certificates	
Suitable for safety functions	No
Ambient conditions	
Operating temperature	
Horizontal mounting position, min.	-25 °C
Horizontal mounting position, max.	60 °C
Vertical mounting position, min.	-25 °C
Vertical mounting position, max.	40 °C
Air pressure	
Operating height above sea level, max.	3000 m
Configuration	
Configuration software	
STEP 7	Yes; STEP 7 / COM PROFIBUS / non-Siemens tools via GSD file
Dimensions	
Width	40 mm
Height	125 mm
Depth	117 mm
Weights	
Weight, approx.	360 g

2.4.3 Technical specifications FDC 157 (6ES7157-0AC85-0XA0)

Technical specifications FDC 157 (6ES7157-0AC85-0XA0)

	6ES7157-0AC85-0XA0
Product type designation	Field Device Coupler FDC 157
General information	
Product description	Field Device Coupler for PROFIBUS PA and Foundation Fieldbus
Supply voltage	
24 V DC	Yes
Low limit of permissible range (DC)	20.4 V
High limit of permissible range (DC)	28.8 V
Polarity reversal protection	Yes
Overvoltage protection	Yes
Input current	
Current consumption, max.	2.3 A; at 24 V DC
Power loss	
Typical power loss	13.4 W
Interfaces	
PROFIBUS DP	Yes
PROFIBUS DP	
Transmission rate, max.	45.45 Kbps
PROFIBUS DP	9-pin sub D
PROFIBUS PA	
PROFIBUS PA	Yes
Transmission rate, max.	31.25 Kbps
Number of connectable PA field devices	31
Current output to PA field devices, max.	1 A
Power failure buffering	5 ms
Protocols	
Other protocols	
Other bus systems	Yes; Foundation Fieldbus (FF)
Interrupts/diagnostics/status information	
Status display	Yes; Group error (red)
Interrupts	
Interrupts	Yes
Diagnostics alarms	
Diagnostic functions	Yes
Diagnostic indicator LED	
Bus activity DP (yellow)	Yes
Bus activity PA (yellow)	Yes

	6ES7157-0AC85-0XA0
Bus fault (red)	Yes
Group fault (red)	Yes
Monitoring 24 V power supply ON (green)	Yes
Electrical isolation	
between the backplane bus and other circuit elements	Yes
between PROFIBUS DP and all other circuits	Yes
between PROFIBUS PA and all other circuits	Yes
between supply and all other circuits	Yes
Insulation	
Insulation tested with	600 V DC
Degree of protection and protection class	
IP20	Yes
Ambient conditions	
Operating temperature	
min.	-25 °C
max.	60 °C
Storage/transport temperature	
min.	-40 °C
max.	70 °C
Relative humidity	
Operation, max.	95%
Dimensions	
Width	80 mm
Height	125 mm
Depth	130 mm
Weights	
Weight, approx.	550 g

2.4.4 Technical specifications AFDiSD (6ES7655-5DX60-1BB0)

Technical specifications AFDiSD (6ES7655-5DX60-1BB0)

	6ES7655-5DX60-1BB0
Product type designation	Active field distributor
General information	
Hardware version	01
Product description	Active field distributor with diagnostics
Product function	
Repeater function	Yes

	6ES7655-5DX60-1BB0
Operator control and monitoring	
Illuminant	LED
Supply voltage	
Description	Via fieldbus
Low limit of permissible range (DC)	16 V
High limit of permissible range (DC)	32 V
Polarity reversal protection	Yes; only in conjunction with FDC 157
Overvoltage protection	Yes; only in conjunction with FDC 157
Input current	
Current consumption, max.	400 mA; at 20 V input voltage
Current consumption in the case of short-circuit at all spur lines	100 mA; at 24 V input voltage
Power loss	
Typical power loss	1.4 W; minimum - typical specification not possible because load-dependent
Power loss, max.	5.9 W
Interfaces	
PROFIBUS DP	No
FOUNDATION Fieldbus H1	Yes
AS interface	No
PROFIBUS PA	
PROFIBUS PA	Yes
Transmission rate, max.	31.25 Kbps
Number of connectable PA field devices	6
Current output to PA field devices, max.	260 mA; max. 180 mA total current of all field devices for operation in the permitted operating voltage range from 16 V to 32 V
Permitted current per spur line	40 mA; first spur line 60 mA
Interrupts/diagnostics/status information	
Status display	Yes
Interrupts	
Interrupts	No
Diagnostics alarms	
Diagnostic functions	Yes
Diagnostic indicator LED	
Trunk line status	Yes
Trunk line fault	Yes
Spur line status/fault	Yes
Automatic bus termination	Yes
Electrical isolation	
between trunk line and spur lines	Yes
Insulation	

	6ES7655-5DX60-1BB0
Insulation tested with	2550 V DC
Degree of protection and protection class	
IP 66	Yes
Standards, approvals, certificates	
Use in hazardous areas	
EX Zone 1	Yes
EX Zone 11	No; EX zone 21
EX Zone 2	Yes
EX Zone 22	Yes
Class I Zone 1	Yes
Class I Zone 2, Division 2	Yes
Test number KEMA	14 ATEX 0044
Type of protection to KEMA	14 ATEX 0044
Ambient conditions	
Operating temperature	
min.	-40 °C
max.	70 °C
Storage/transport temperature	
min.	-40 °C
max.	70 °C
Relative humidity	
Operation, max.	95%
Connection system	
Trunk line	
Number of trunk lines	2
Design of terminals	Screw terminal block
Type of connection (enclosure cable gland)	M20
Line type	Type A
Line diameter, min.	6 mm
Line diameter, max.	13 mm
Line cross-section, min.	0.2 mm²
Line cross-section, max.	2.5 mm²
Automatic bus termination	Yes
Permitted trunk line current	1 A
Spur line	
Number of spur lines	6
Design of terminals	Screw terminal block
Type of connection (enclosure cable gland)	M16
Line type	Type A
Line diameter, min.	4 mm
Line diameter, max.	9 mm

	6ES7655-5DX60-1BB0
Line cross-section, min.	0.2 mm²
Line cross-section, max.	2.5 mm²
Total current output to field devices, max.	260 mA; max. 180 mA total current of all field devices for operation in the permitted operating voltage range from 16 V to 32 V
Number of connectable field devices	6
Current limitation per field device, max.	40 mA; 60 mA at S1
No-load voltage, max.	15.3 V
Short circuit-proof	Yes
Short-circuit current (test current); max.	6 mA
Intrinsically safe according to FISCO model	Yes
Debounce logic	Yes
Dimensions	
Width	380 mm
Height	85 mm
Depth	170 mm
Weights	
Weight, approx.	4500 g

2.4.5 Dimensional drawings AFDiSD (6ES7655-5DX60-1BB0)

Dimension drawings AFDiSD (6ES7655-5DX60-1BB0)

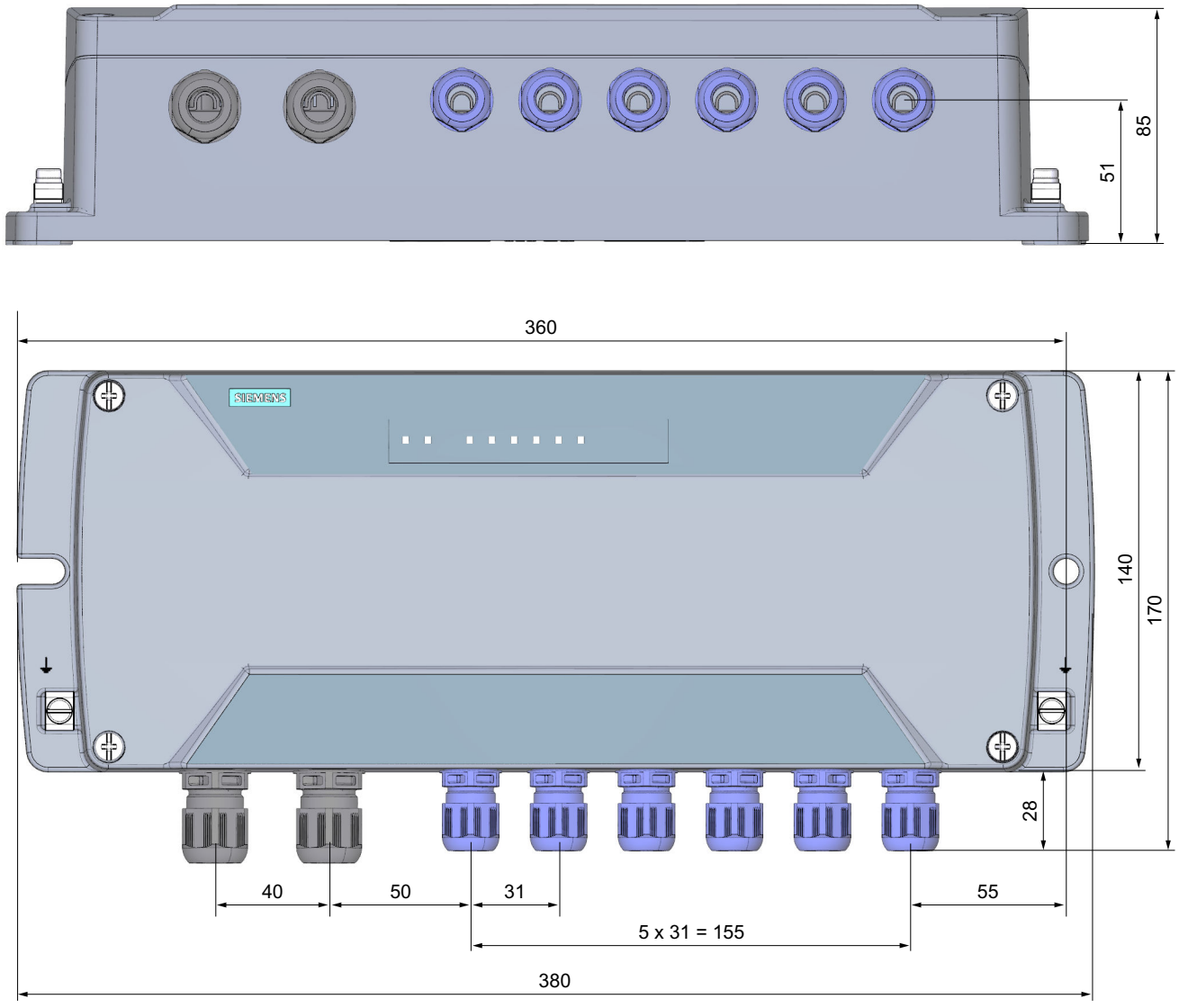


Figure 2-6 AFDiSD dimension drawing front

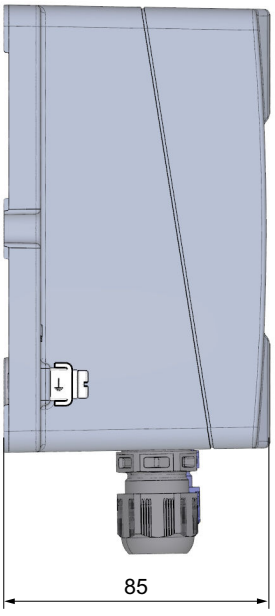


Figure 2-7 AFDiSD dimension drawing side view

2.5 Active field distributors AFD4, AFD8 and AFS

Protection by locking

Protect your active field distributors AFD4 (6ES7157-0AG81-0XA0), AFD8 (6ES7157-0AG82-0XA0) and AFS (6ES7157-0AG80-0XA0) from unauthorized or unintentional opening with a sufficiently secured IP30 cover.

You can lead a wire **made from electrically non-conductive material** through the locking tab to the right of each IP30 cover and then have the following options, for example:

- affix a seal
- tightly knot the two ends of the wire
  Make sure that the seal/knot does not damage the IP30 covers when putting the enclosure lid on and tightening the screws.

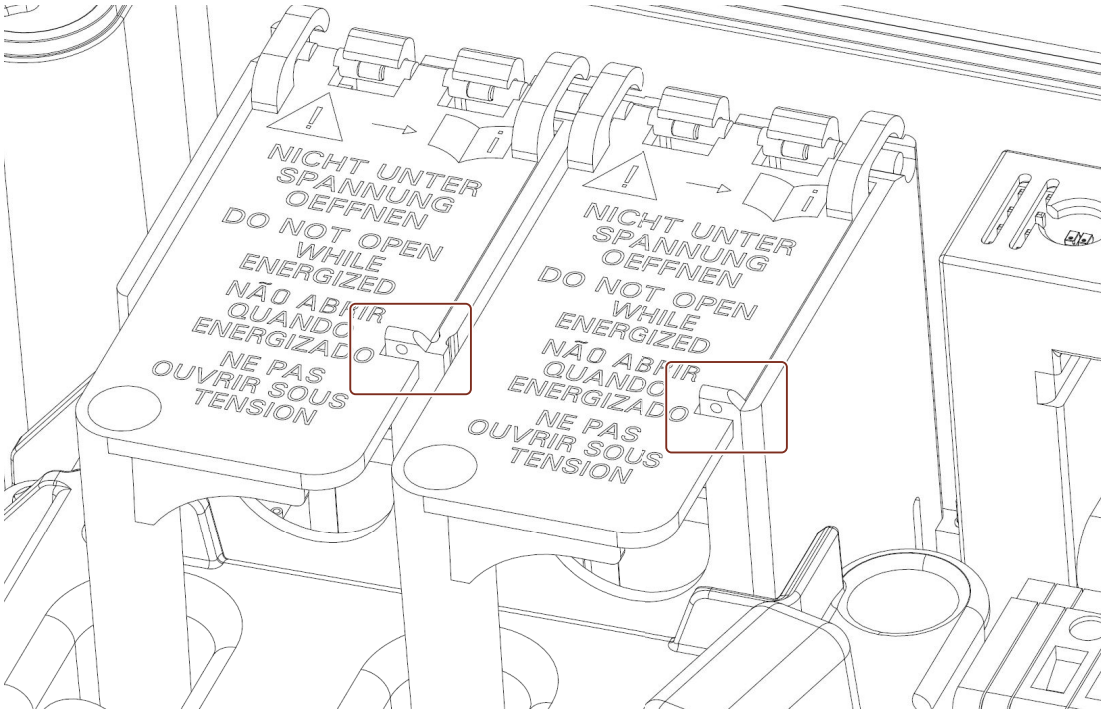


Figure 2-8 Locking tab active field distributors

2.6 Supplements to the operating instructions for DP/PA coupler, active field distributors, DP/PA Link...

Section: Active field distributor AFDiS

In this section, the subsection "Integrated repeater function of the AFDiS" states:

- Length of the PA spur lines in accordance with IEC 61158-2 up to 120 m, in accordance with IEC/EN 60079-27 (FISCO) 60 m, irrespective of the number of field devices connected to the segment via spur lines (> 1 m).

The following also applies:

- For PA spur line lengths > 120 m in Zone 2 and > 60 m in Zone 1, you must equip the subsegment with a bus terminating resistor.

Section: Startup characteristics of the DP/PA Link in non-redundant mode

The flow chart "Startup characteristics of the IM 153-2 after POWER ON" contains a display error. The correct version is:

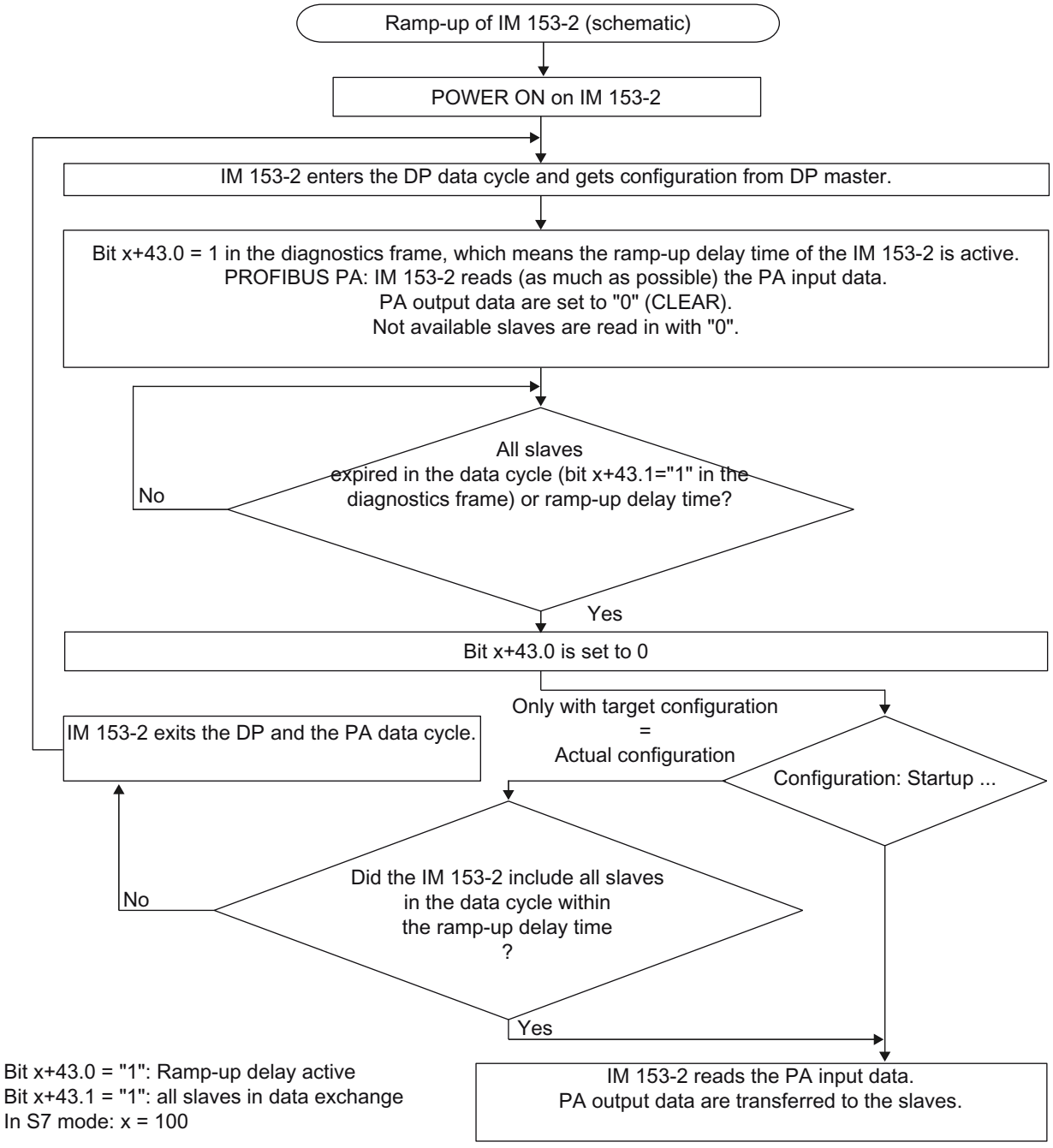


Figure 2-9 Startup characteristics of the IM 153-2 after POWER ON

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