

SIMATIC

Bus links

DP/PA coupler, DP/PA link and Y link

Operating instructions



The following supplement is part of this documentation:

No.	Product Information	Drawing number	Edition
1	Standards and approvals	A5E01200465-02	11/2007
2	DP/PA Link and Y Link bus links IM 153-2 Interface Module	A5E01208363-01	08/2007

Preface

Product Overview

1

Description of the components

2

Application planning

3

Mounting

4

Connecting

5

Commissioning: DP/PA coupler

6

Commissioning: DP/PA link

7

Commissioning: Y link

8

Operation of the DP/PA-Link and Y-Link

9

Maintenance and service

10

Functions

11

Interrupt, error and system messages

12

Technical specifications

13

Order numbers

A

Basics about PROFIBUS PA

B

Preface

Purpose of the operating instructions

These operating instructions provide all required information to configure, mount, wire, and commission the DP/PA coupler and the DP/PA link and Y link bus couplings.

Basic knowledge required

To understand these operating instructions you should have general experience in the field of automation engineering.

Range of validity of these operating instructions

These operating instructions apply for the following products:

- IM 153-2: 6ES7153-2BA01-0XB0 and 6ES7153-2BA81-0XB0
- DP/PA coupler FDC 157-0: 6ES7157-0AC83-0XA0
- DP/PA coupler: 6ES7157-0AC82-0XA0
- DP/PA coupler Ex [i]: 6ES7157-0AD81-0XA0 and 6ES7157-0AD82-0XA0
- Y coupler: 6ES7197-1LB00-0XA0
- Bus module BM PS/IM: 6ES7195-7HA00-0XA0
- Bus module BM IM/IM: 6ES7195-7HD10-0XA0
- Bus module BM IM/IM: 6ES7195-7HD80-0XA0
- Bus module BM FDC 157-0: 6ES7195-7HG80-0XA0
- Bus module BM; DP/PA coupler: 6ES7195-7HF80-0XA0
- Bus module BM Y coupler: 6ES7654-7HY00-0XA0
- Active Field Distributor (AFD): 6ES7157-0AF81-0XA0
- Active Field Splitter (AFS) 6ES7157-0AF82-0XA0
- Complete package of the above components: 6ES7197-1LA03-0XA0

These operating instructions contain a description of the components that was valid at the time the operating instructions were published. We reserve the right to include product information with information updates with new components and components with a new product status.

PA bus terminator switch

You can loop through the PROFIBUS PA on DP/PA couplers with a PA bus terminator switch. The PA bus terminator switch is available on the following DP/PA couplers:

- DP/PA coupler FDC 157-0 (6ES7157-0AC83-0XA0)
- DP/PA coupler (6ES7157-0AC82-0XA0)

In the DP/PA coupler Ex [i] the bus terminator cannot be switched off. Consequently the DP/PA coupler Ex [i] must be located at the beginning or the end of a PA segment.

DP/PA coupler

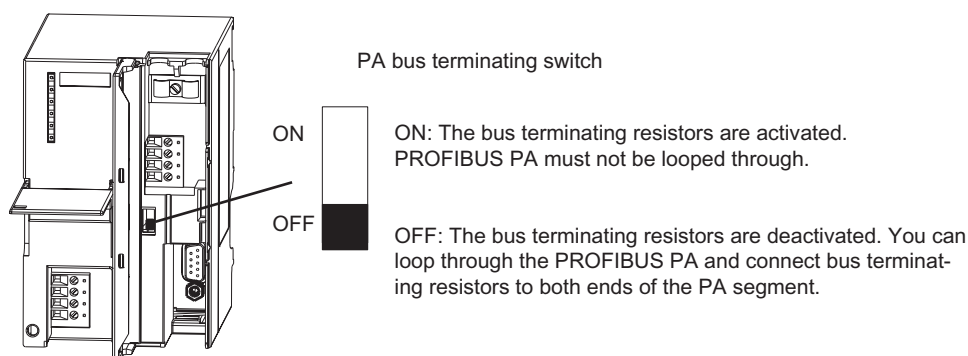
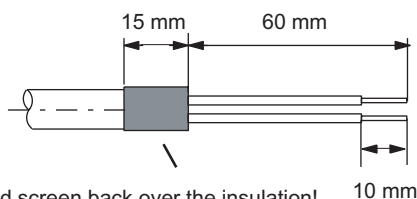


Figure 5-12 PA bus terminator switch

Procedure

Connect the PROFIBUS PA as follows:

1. Strip the insulation from the bus cable as depicted and pull the braided shield over the insulation.



2. Clamp the shield of the bus cable under the cable grip and screw down the cable grip.
3. Fix the wires of the bus lead into the screw-type terminals P+ and P-. Ensure that the wires have the correct polarity.

Compatibility test, mechanical environmental conditions

The table below provides information on the type and scope of the test of mechanical environmental conditions.

Table 13-6 Test of mechanical environmental conditions

Test for ...	Test standard	Remarks
Vibration	Vibration test in compliance with IEC 60068 Part 2-6 (Sine)	Type of oscillation: Frequency cycles at a rate of change of 1 octave per minute. 10 Hz ≤ f ≤ 58 Hz, constant amplitude 0.075 mm 58 Hz ≤ f ≤ 150 Hz, constant acceleration 1 g Duration of oscillation: 10 frequency cycles per axis in each of the 3 mutually perpendicular axes
Shock	Shock test in compliance with IEC 60068 Part 2-29	Type of shock: half-sine Severity of shock: 15 g peak value, 11 ms duration Direction of shock: 3 shocks each in the +/- direction in each of the 3 mutually perpendicular axes

Climatic environmental conditions

The described components may be operated under the following climatic ambient conditions:

Table 13-7 Climatic environmental conditions

Ambient conditions	Permissible range	Remarks
Temperature: horizontal installation vertical installation	from 0 to 60 °C from 0 to 40 °C	IM 153-2 (6ES7153-2BA01-0XB0) Y coupler 6ES7197-1LB00-0XA0 Bus module BM IM/IM 6ES7195-7HD10-0XA0 Bus module BM Y coupler 6ES7654-7HY00-0XA0
Temperature: horizontal installation vertical installation	from -25 to 60 °C from -25 to 40 °C	IM 153-2 Outdoor 6ES7153-2BA81-0XB0 DP/PA coupler FDC 157-0 6ES7157-0AC83-0XA0 DP/PA coupler 6ES7157-0AC82-0XA0 DP/PA coupler Ex [i] 6ES7157-0AD81-0XA0 6ES7157-0AD82-0XA0 Bus module BM IM/IM 6ES7195-7HD80-0XA0 Bus module BM DP/PA coupler 6ES7195-7HF80-0XA0 Bus module BM FDC157-0 6ES7195-7HG80-0XA0
Temperature: any installation	from -25 to 70 °C	Active field distributor (AFD) 6ES7157-0AF81-0XA0 Active field splitter (AFS) 6ES7157-0AF82-0XA0

13.5 Technical specifications for DP/PA coupler (6ES7157-0AC82-0XA0)

Dimensions and weight	
Dimension W x H x D (mm)	80 x 125 x 130
Weight	approx. 515 g
Module-specific data	
Transmission speed on PROFIBUS DP	45.45 kbaud
Transmission speed on PROFIBUS PA	31.25 kbaud
Bus protocol	PROFIBUS DP
Voltages, currents, potentials	
Rated supply voltage	24 VDC (20.4 V ... 28.8 V)
• Polarity reversal protection	Yes
Output voltage for PA section:	31 VDC $\pm$ 1 V
• Power failure bypass	Min. 5 ms
electrical isolation of the 24 V power supply	
• to PROFIBUS DP	Yes
• to PROFIBUS PA	Yes
Insulation tested with	500 VDC
DP/PA coupler power consumption (24 VDC)	max. 1.8 A
Output current PA section (for dimensioning the PA configuration)	1 A
Power loss of the module	Typically 12 W
Status, interrupts, diagnostics	
Status display	No
Interrupts	None
Diagnostic function	Yes
• PROFIBUS DP bus monitoring	Yellow LED "DP"
• PROFIBUS PA bus monitoring	Yellow LED "PA"
• Monitoring 24 V voltage supply	Green "ON" LED
Data for selecting the PA field devices	
Connection to DP/PA couplers	- max. power consumption of the PA field devices altogether 1 A - Field devices with certification for PROFIBUS PA - Field devices are located outside the Ex area - max. 31 PA field devices can be connected

Order numbers

A.1 Components of the bus couplings

Components of the bus couplings

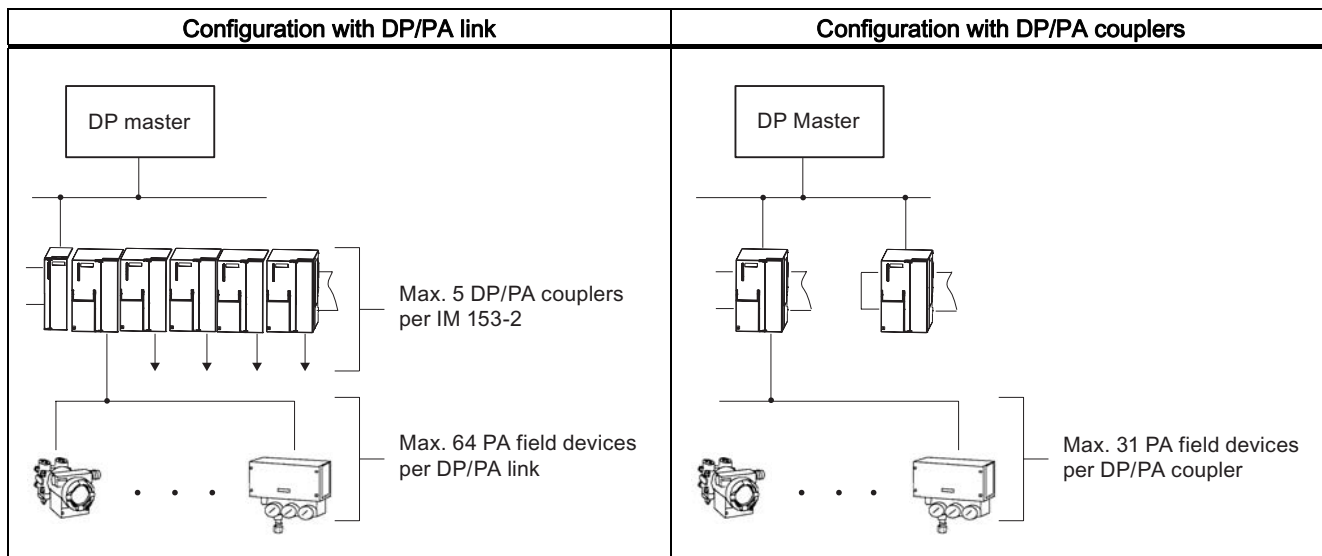
Table A-1 Order numbers for the components of the bus couplers

Component	Order number
IM 153-2	6ES7153-2BA01-0XB0
IM 153-2 Outdoor	6ES7153-2BA81-0XB0
DP/PA coupler FDC 157-0	6ES7157-0AC83-0XA0
DP/PA coupler	6ES7157-0AC82-0XA0
DP/PA coupler Ex [i]	6ES7157-0AD81-0XA0
DP/PA coupler Ex [i]	6ES7157-0AD82-0XA0
Y coupler	6ES7197-1LB00-0XA0
Bus module BM PS/IM	6ES7195-7HA00-0XA0
Bus module BM IM/IM	6ES7195-7HD10-0XA0
Bus module BM IM/IM Outdoor	6ES7195-7HD80-0XA0
Bus module BM DP/PA coupler	6ES7195-7HF80-0XA0
Bus module BM FDC 157-0 (left/right bus module)	6ES7195-7HG80-0XA0
Bus module BM Y coupler	6ES7654-7HY00-0XA0
Active Field Distributor (AFD)	6ES7157-0AF81-0XA0
Active Field Splitter (AFS)	6ES7157-0AF82-0XA0
Complete package Y link, consisting of:	
• 2 x IM 157 • 1 x bus module BM IM/IM • 1 x Y coupler • 1 x bus module BM Y coupler:	6ES7197-1LA02-0XA0
• 2 x IM 153-2 • 1 x bus module BM IM/IM • 1 x Y coupler • 1 x bus module BM Y coupler:	6ES7197-1LA03-0XA0

B.3 Configuration of PROFIBUS PA with the DP/PA link bus coupler

Configuration

The figure below describes the configuration of a PROFIBUS PA system with one DP master



Rules

The following rules apply when configuring PROFIBUS PA:

- a maximum of 31 PA field buses may be present in a physical PROFIBUS PA segment.
- Only **one supply device** (= DP/PA couplers) can be connected in a given physical PROFIBUS PA segment.
- a maximum of 64 PA field devices may be attached in a DP/PA link. The maximum number of connectable PA field devices per physical PROFIBUS PA segment or per DP/PA coupler is limited by the maximum output current of the DP/PA coupler and the I/O data to be transmitted.

See also

Technical specifications for DP/PA Ex [i] coupler (6ES7157-0AD81-0XA0, 6ES7157-0AD82-0XA0) (Page 13-18)

Technical specifications for DP/PA coupler (6ES7157-0AC82-0XA0) (Page 13-20)