

SIMATIC

Bus Link FF Link

Operating Instructions

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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

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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.

Preface

1.1 Security information

Siemens provides products and solutions with industrial security functions that support the secure operation of plants, solutions, machines, equipment and/or networks. They are important components in a holistic industrial security concept. With this in mind, Siemens' products and solutions undergo continuous development. Siemens recommends strongly that you regularly check for product updates.

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 under: <http://www.siemens.com/industrialsecurity>

To stay informed about product updates as they occur, sign up for a product-specific newsletter. You can find additional information on this at: <http://support.automation.siemens.com>.

1.2 Preface

Bus links are gateways between bus systems and enable the communication connection of the bus systems.

The FF Link is a bus link for the communication between PROFIBUS DP and FOUNDATION Fieldbus H1 (hereafter referred to simply as FF). In automation systems configured with *SIMATIC PCS 7* and *SIMATIC STEP 7*, the FF Link enables the integration of FF devices on an FF segment.

Purpose of the operating instructions

These operating instructions provide you with all the information you need to plan, install, wire, and commission a bus link based on the "FF Link" module.

Basic knowledge required

To understand these operating instructions you should have general experience in the field of automation engineering. Basic knowledge of the following is also necessary:

- Automation system S7-400
- Distributed I/O systems on PROFIBUS DP

- *STEP 7 / SIMATIC PCS 7* basic software, in particular:
 - Working with *SIMATIC Manager*
 - Hardware configuration with *HW Config*
 - *SIMATIC PCS 7* Process Control System
 - Process Device Manager *SIMATIC PDM*
- FOUNDATION Fieldbus

Scope of these operating instructions

These operating instructions apply for the following products:

- FF Link IM 153-2: 6ES7153-2DA80-0XB0
- Field Device Coupler FDC 157: 6ES7157-0AC85-0XA0
Use as spare part for the Field Device Coupler FDC 157 with article number 6ES7157-0AC84-0XA0:
The Field Device Coupler FDC 157 is a spare part and functionally compatible.
No modification to the STEP 7 project is necessary.
- Bus module BM PS/IM SIPLUS extreme: 6AG1195-7HA00-2XA0
- Bus module BM IM/IM (redundant): 6ES7195-7HD80-0XA0
- Bus module BM FDC: 6ES7195-7HF80-0XA0
- Bus module BM FDC/FDC (redundant) for redundant link pair: 6ES7195-7HG80-0XA0

For information about the active field distributors (Active Field Distributor AFD, Active Field Splitter AFS), refer to the DP/PA coupler, Active Field Distributor, DP/PA Link, and Y Link (<http://support.automation.siemens.com/WW/view/en/1142696>) Operating Instructions. All active field distributors described in this documentation can be used on the FF Link.

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.

Configuring with *SIMATIC PCS 7*

The FF Link can be configured using *SIMATIC PCS 7* V7.1 SP2 and higher and *SIMATIC PDM* V7.0 and higher.

Position in the overall information structure

Depending on the hardware used you require the following manuals in addition to these operating instructions:

- Operating Instructions DP/PA coupler, Active Field Distributor, DP/PA Link, and Y Link (<http://support.automation.siemens.com/WW/view/en/1142696>)
- The manual for the implemented DP master, including the following special information:
 - Configuring and commissioning of a DP master system
 - Description of the DP master

Application planning

4.1 Configuration variants with FF Link as a bus link

Introduction

You can set up a maximum of 2 IM 153-2 FFs and 2 FDC 157 Field Device Couplers (redundant coupler pair).

- For operation with redundant IM 153-2 FF modules, you need the BM IM/IM (redundant) bus module.
- As far as the hardware and firmware is concerned, you must use identical components (Link and coupler) for operation with ring redundancy or coupler redundancy.
- For operation with ring redundancy, you need the active field distributor AFD, the BM FDC/FDC (redundant) bus module, and the BM PS/IM or BM IM/IM (redundant) bus module.
- For operation with coupler redundancy, you need the active field splitter AFS, the BM FDC/FDC (redundant) bus module, and the BM PS/IM or BM IM/IM (redundant) bus module.
- For configuration variants with coupler redundancy, the FDC 157s monitor each other to detect power failures and faults.

Field Device Coupler FDC 157

You do not need the PROFIBUS DP connections on the FDC 157 Field Device Coupler. The IM 153-2 FF and the Field Device Coupler are connected via the S7 backplane bus.

The diagnostic function of the FDC 157 Field Device Coupler is only available in conjunction with the diagnostics of IM 153-2 FF.

Applications

With the FF Link, you can implement the following applications:

- Configuration variants without FF Link Master redundancy (single IM 153-2 FF)
 - Use without coupler redundancy (1 x FDC 157)
 - Use with ring redundancy (2 x FDC 157) with active field distributor AFD
 - Use with coupler redundancy (2 x FDC 157) with active field distributor AFS
 - The FF device as backup FF Link Master
- Configuration variants with FF Link Master redundancy (redundant IM 153-2 FF)
 - Use without coupler redundancy (1 x FDC 157)
 - Use with ring redundancy (2 x FDC 157) with active field distributor AFD
 - Use with coupler redundancy (2 x FDC 157) with active field distributor AFS
 - The FF device as backup FF Link Master

Mounting

5.1 Installation rules for FF Link

Mounting position

The IM 153-2 FF modules and FDC 157 Field Device Coupler can be mounted vertically or horizontally.

WARNING

Open equipment

The IM 153-2 FF modules and FDC 157 Field Device Coupler are open equipment. This means that they may only be mounted in enclosures, cabinets, or electrical service rooms that can only be accessed by using a key or a tool. Only authorized personnel may have access to the enclosures, cabinets or electrical service rooms.

Mounting system

The IM 153-2 FF modules and FDC 157 Field Device Coupler are mounted on mounting rails. Free space of 40 mm must be maintained above and below the modules for trouble-free mounting.

Additional instructions for installing modules in the S7 mounting system are available in the installation manual S7-400 Automation System, Installation (<http://support.automation.siemens.com/WW/view/en/1117849>).

5.2 Mounting rules for active field distributors

Mounting position

The active field distributors AFD and AFS can be installed in any mounting position.

Mounting system

The active field distributors AFD and AFD can be screw-mounted onto planar, vibration-free surfaces of sufficient carrying capacity. The modules can also be installed on a mounting rail using an adapter.

For trouble-free installation of the modules, a clearance of 60 mm must be maintained on their side and below them.

For more information on mounting procedures, refer to the DP/PA Coupler, Active Field Distributors, DP/PA Link and Y Link Operating Instructions.

See also

Active field distributor (AFD) (Page 20)

Active field splitter (AFS) (Page 20)

5.3 Installing "FF Link" bus link

5.3.1 Mounting the FF Link for non-redundant mode

Introduction

A configuration variant without FF Link Master redundancy (single IM 153-2 FF) supports the following applications

- Use without coupler redundancy (1 x FDC 157):
 - Configuration with the "for standard configuration" mounting rail and bus connector between the modules or
 - Optional configuration with the "for hot-swapping modules" mounting rail and active bus modules
- Use for ring redundancy (2 x FDC 157) with active field distributor AFD
 - Configuration with the mounting rail "for hot-swapping modules" and active bus modules.
- Use with coupler redundancy (2 x FDC 157) with active field distributor AFS
 - Configuration with the mounting rail "for hot-swapping modules" and active bus modules.

Installation steps

Depending on your configuration, you have to carry out the following installation steps in consecutive order:

1. Install the mounting rail
2. Install the modules
 - For a standard configuration: Install the modules on the mounting rail
 - For a configuration with active bus modules: Install the active bus modules and modules

Use without coupler redundancy

Components needed for use without coupler redundancy (1 x FDC 157)

- Mounting rail "for standard configuration"
- IM 153-2 FF

- Field Device Coupler FDC 157
- Bus connector (included with the Field Device Coupler FDC 157)

An optional configuration with active bus modules is also supported::

- Mounting rail "for hot-swapping modules" (the active bus modules can be installed only in this rail).
- IM 153-2 FF
- Field Device Coupler FDC 157
- Bus module BM PS/IM or BM IM/IM (redundant)
- Bus module BM FDC

The following figure shows the configuration of the FF Link with bus connectors and with open front doors.

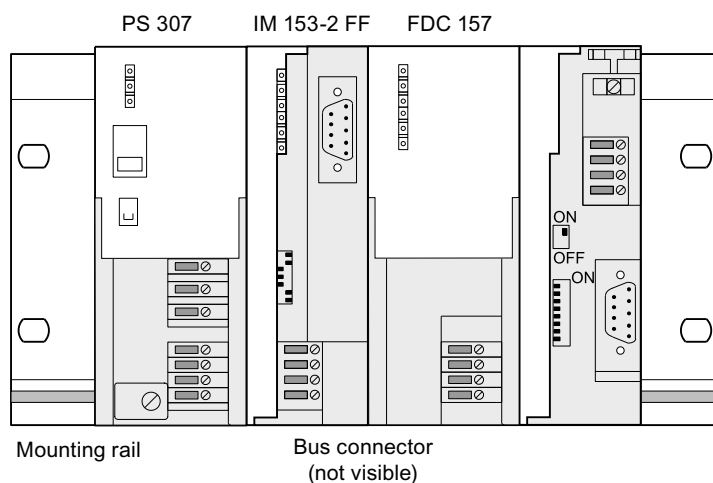


Figure 5-1 Configuration of the FF Link for non-redundant mode

Mounting the FF Link

1. Plug the bus connector that is included with the Field Device Coupler FDC 157 onto the IM 153-2 FF.
2. Hook the IM 153-2 FF into the mounting rail "for standard configuration" and swing it downward.
3. Tighten the mounting screws of the IM 153-2 FF.
4. On the right side of IM 153-2 FF, hook the Field Device Coupler FDC 157 into the mounting rail "for standard configuration" and then swing the FDC downward.
5. Tighten the mounting screws of the Field Device Coupler FDC 157.

Use with ring redundancy/coupler redundancy

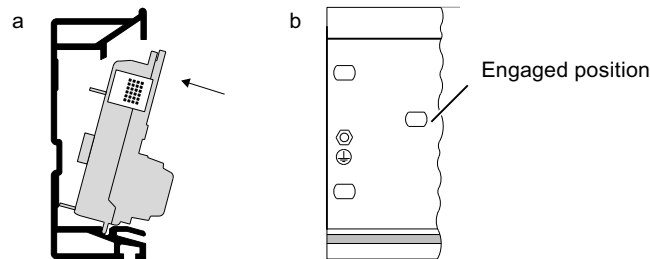
Components required for the use with ring redundancy or coupler redundancy (2 x FDC 157)

- Mounting rail "for hot-swapping modules"
- IM 153-2 FF
- 2 x Field Device Coupler FDC 157 (redundant coupler pair)
- Bus module BM PS/IM or BM IM/IM (redundant)
- BM FDC/FDC (redundant) bus module for connecting a redundant coupler pair

Mounting the FF Link

1. Place the bottom edge of the BM PS/IM or BM IM/IM (redundant) bus module into the mounting rail "for module replacement during operation", snap it onto the rail (a), and then slide it to the left up to the snap-in position (b).

If using the 482.6 mm or 530 mm mounting rail "for module replacement during operation" and positioning the BM IM/IM (redundant) bus module at the right-hand snap-in position, you can install two additional PS 307; 2A or one PS 307; 5A on its left side.



2. Hook the BM FDC/FDC (redundant) bus module into the mounting rail and then snap it in.
3. Slide the bus modules together so that the module connections are mated.
4. Insert the IM 153-2 FF into the BM PS/IM or BM IM/IM (redundant) bus module.
5. Insert both FDC 157 Field Device Couplers into the BM FDC/FDC (redundant) bus module. Use the lateral guides of the bus module.
6. Tighten the screws of the modules. This also fixes the bus modules to the rail.

Dismounting the FF Link

To remove the FF Link, proceed in the reverse order. Start with the FDC 157 Field Device Coupler that is installed on the extreme right side.

If the FF Link is already in operation, switch off the 24 VDC power supplies prior to removing it.

See also

Accessories for PROFIBUS DP (Page 102)

Accessories for FOUNDATION Fieldbus (Page 102)

5.3.2 Mounting the FF Link for redundant operation

Introduction

A configuration variant with FF Link Master redundancy (redundant IM 153-2 FF) supports the following applications

- Use without coupler redundancy (1 x FDC 157)
- Use for ring redundancy (2 x FDC 157) with active field distributor AFD
- Use with coupler redundancy (2 x FDC 157) with active field distributor AFS

Configuration with bus modules

For the redundancy mode, the FF Link must set up with the mounting rail "for module replacement during operation" and active bus modules.

Installation steps

Carry out the following installation steps in consecutive order:

1. Install the mounting rail
2. Install the active bus modules and modules

Components required

- Mounting rail "for hot-swapping modules"
- 2 x IM 153-2 FF
- Field Device Coupler FDC 157, or 2 x Field Device Coupler FDC 157 (redundant coupler pair)
- Bus module BM IM/IM (redundant)
- BM FDC or BM FDC/FDC (redundant) bus module for accommodating a redundant coupler pair

Typical configuration

The following figure shows the typical configuration of the FF Link for the redundancy mode with two voltage supply modules and with front doors open.

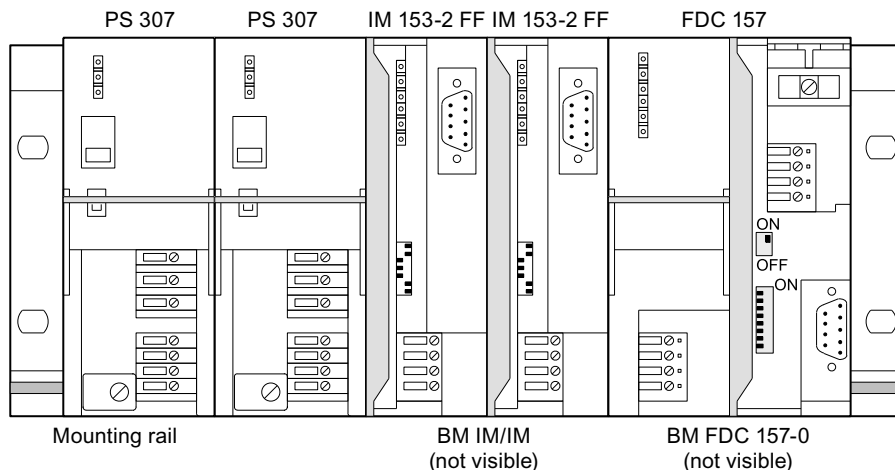
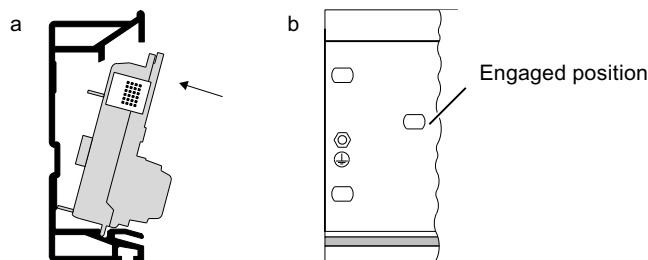


Figure 5-2 Typical configuration of the FF Link for the redundancy mode

Mounting the FF Link

1. Place the bottom edge of the BM IM/IM (redundant) bus module into the mounting rail, push it onto the rail (a), and then slide it to the left up to the snap-in position (b).
If using the 482.6 mm or 530 mm mounting rail and positioning the BM IM/IM (redundant) in the right-hand snap-in position, you can install two additional PS 307; 2A or one PS 307; 5A on its left side.



2. For the FDC 157 Field Device Coupler(s), place a BM FDC bus module or a BM FDC/FDC (redundant) shared bus module onto the mounting rail and press it into the mounting rail.
3. Slide the bus modules together so that the module connections are mated.
4. Insert both IM 153-2 FF into the BM IM/IM (redundant) bus module.
5. Insert the FDC 157 Field Device Coupler(s) into the BM FDC or BM FDC/FDC (redundant) bus module. Use the lateral guides of the bus module.
6. Tighten the screws of the modules. This also fixes the bus modules to the rail.

Dismounting the FF Link

To remove the FF Link, proceed in the reverse order.

If the FF Link is already in operation, switch off the 24 VDC power supplies prior to removing it.

See also

Accessories for PROFIBUS DP (Page 102)

Accessories for FOUNDATION Fieldbus (Page 102)

5.4 Setting the PROFIBUS address of the IM 153-2 FF

Definition

All nodes must be assigned a PROFIBUS address for unambiguous identification on PROFIBUS DP.

Rules

The following rules apply to the PROFIBUS address of the IM 153-2 FF in the higher-level DP master system:

- Valid PROFIBUS addresses: 1 to 125
- In a DP master system, each PROFIBUS address must be assigned once only.
- In redundant mode, the same PROFIBUS address must be set for both IM 153-2 FF.

Tools required

You need a 3 mm screwdriver to set the PROFIBUS address.

The EC Declaration of Conformity is also available for download from the Internet (<http://www.siemens.com/automation/service&support>) (keyword "Declaration of Conformity").

ATEX Approval



DEKRA 14ATEX 0026 X
to EN 60079-15 (Electrical apparatus for potentially explosive atmospheres; Type of protection "n") and EN 60079-0 (Explosive atmospheres; General requirements)



WARNING

Personal injury and material damage can be incurred.

In potentially explosive atmospheres, personal injury and material damage can be incurred if plug connections are disconnected during operation.

In potentially explosive atmospheres, only disconnect the plug connections of all components when they are not under current.

IECEx approval



IECEx DEK 14.0082X



WARNING

Personal injury and material damage can be incurred.

In potentially explosive atmospheres, personal injury and material damage can be incurred if plug connections are disconnected during operation.

In potentially explosive atmospheres, only disconnect the plug connections of all components when they are not under current.

UL / CSA Approval



Underwriters Laboratories Inc. in accordance with

Ordinary locations

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

Hazardous locations

- 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

Note the following information:

Note

This product must be installed according to the NEC (National Electric Code) stipulations.

When used in environments according to class I, division 2 (see above), S7-400 must be mounted in an enclosure that corresponds to at least IP54 according to EN 60529.

⚠ WARNING Installation Instructions according cULus 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 Class I, Zone 2 This equipment is suitable for use in Class I, Division 2, Groups A, B, C or D; Class I, Zone 2, Group IIC, or non-hazardous locations only.
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FM Approval



Factory Mutual Research (FM) in accordance with
Approval Standard Class Number 3611, 3600, 3810
Class I, Division 2, Group A, B, C, D Tx;
Class I, Zone 2, Group IIC Tx

Tick mark for Australia and New Zealand



The components described satisfy the requirements of the following standard:
EN 61000-6-4: 2007 + A1: 2011

IEC 61131

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

PROFIBUS standard

The components described are based on the following standards:
IEC 61784-1 CP 3/1

FOUNDATION Fieldbus



The FF Link, i.e. IM 153-2 FF and FDC 157, conform to the requirements and criteria of the FOUNDATION Fieldbus guidelines.

IEC 61158-2

Host registration by the Fieldbus Foundation; refer to the Internet (http://www.fieldbus.org/index.php?option=com_mtree&task=viewlink&link_id=1586&ffbstatus=Registered&Itemid=324).

Use in industry

SIMATIC products are designed for industrial applications.

Area of application	Interference emission requirements	Interference 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 the following standard:
EN 61000-6-3 + A1

Suitable measures for achieving RF interference Limit Class B include, for example:

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

12.1.2 Use in zone 2 potentially explosive areas

See product information Using the modules in the hazardous zone 2 (<http://support.automation.siemens.com/WW/view/en/19692172>).

12.1.3 Electromagnetic Compatibility

Introduction

This chapter provides you with information on the immunity to interference of the described components as well as on radio interference suppression.

The described components meet, among others, the requirements of the EMC legislation of the European single market.

Definition: EMC

Electromagnetic compatibility (EMC) is the capacity of an electrical installation to function satisfactorily in its electromagnetic environment without affecting that environment.

Pulse-shaped Interference

The table below shows the electromagnetic compatibility of the described components with regard to pulse-shaped interference. The prerequisite for this is that the system complies with the relevant requirements and guidelines relating to electrical equipment.

Table 12-1 Pulse-shaped Interference

Pulse-shaped disturbance	Tested at	Corresponds to severity
Electrostatic discharge according to IEC 61000-4-2	8 kV 6 kV	3 (air discharge) 3 (contact discharge)
Burst impulses (fast transient interference) according to IEC 61000-4-4	2 kV (supply line) 2 kV (signal line)	3
High-energy current surge according to IEC 61000-4-5 External protective circuit needed (refer to the Automation System S7-400, Hardware and Installation (http://support.automation.siemens.com/WW/view/en/1117849) Installation Manual, chapter <i>Lightning protection and overvoltage protection</i>) It is not necessary to install an external protection circuit for the FF bus.		
• Asymmetric interference	2 kV (supply line) 2 kV (signal cable/data line)	3
• Symmetric interference	1 kV (supply line) 1 kV (signal line / data line)	

Sinusoidal disturbance

EMC performance of the described components in relation to sinusoidal disturbance variables:

- HF radiation acc. to IEC 61000-4-3
Electromagnetic HF field, amplitude modulated
 - 80 MHz to 1000 MHz / 1.4 GHz to 2 GHz
 - 10 V/m
 - 80% AM (1 kHz)
- HF coupling according to IEC 61000-4-6
 - 0.15 to 80 MHz
 - 10 V_{eff} unmodulated
 - 80% AM (1 kHz)
 - 150 Ω source impedance

Emission of Radio Interferences

Emission of electromagnetic interference to EN 55016: limit value class A, group 1

from 30 to 230 MHz	< 40 dB (μV/m)Q
from 230 to 1000 MHz	< 47 dB (μV/m)Q
measured at a distance of 10 m	

Disturbance via supply lines to EN 55016: Limit Class A, Group 1

from 0.15 to 0.5 MHz	< 79 dB (μV)Q < 66 dB (μV) M
from 0.5 to 5 MHz	< 73 dB (μV)Q < 60 dB (μV) M
from 5 to 30 MHz	< 73 dB (μV)Q < 60 dB (μV) M

12.1.4 Shipping and storage conditions

Transport and Storage of Modules

With regard to their transport and storage conditions, the described components exceed the requirements according to IEC 61131, Part 2. The following specifications apply to modules transported and stored in the original packaging.

Table 12-2 Transport and storage conditions

Type of condition	Permitted range
Free fall (in transport packaging)	≤ 0.3 m
Temperature	from -40 °C to + 70 °C
Atmospheric pressure	from 1080 to 660 hPa (corresponds to an altitude of -1000 to 3500 m)
Relative humidity	of 10 to 95 %, without condensation
Sinusoidal vibrations according to IEC 60068-2-6	5 to 9 Hz: 3.5 mm 9 to 150 Hz: 9.8 m/s ²
Shock according to IEC 60068-2-29	250 m/s ² , 6 ms, 1000 shocks

12.1.5 Mechanical and climatic ambient conditions for operation

Conditions of use

The described components are designed for use in a fixed, sheltered location. The operating conditions exceed the requirements of IEC 61131 Part 2.

The described components meet the operating conditions of Class 3C3 in accordance with DIN EN 60721-3-3.

Use with additional measures

The described components must not be operated without additional measures:

- at locations with a high degree of ionizing radiation
- in aggressive environments caused, for example, by
 - the development of dust
 - corrosive vapors or gases
 - strong electric or magnetic fields
- in installations requiring special monitoring, for example
 - elevators
 - electrical plants in potentially hazardous areas

An additional measure can be installation in a cabinet or in an enclosure, for instance.

Mechanical ambient conditions

The mechanical ambient conditions for the described components are specified in the table below for sinusoidal vibrations.

Table 12-3 Mechanical ambient conditions

Frequency range in Hz	Continuous	Infrequently
$10 \leq f \leq 58$	0.0375 mm amplitude	0.075 mm amplitude
$58 \leq f \leq 150$	0.5 <i>g</i> constant acceleration	1 <i>g</i> constant acceleration

Reduction of vibrations

If the described components are subject to big shocks or vibrations appropriate measures must be taken to reduce the acceleration or the amplitude.

We recommend fixing the described components on damping materials (rubber-metal anti-vibration mountings, for example).

Checking mechanical environmental conditions

The following table provides information on the type and scope of checks regarding mechanical environmental conditions.

Table 12-4 Checking Mechanical Environmental Conditions

Checking for	Test standard	Remarks
Vibrations	Vibration test in compliance with IEC 60068-2-6 (sine)	Type of vibration: Frequency sweeps with a sweep rate of 1 octave/minute. $10 \text{ Hz} \leq f \leq 58 \text{ Hz}$, constant amplitude 0.075 mm $58 \text{ Hz} \leq f \leq 150 \text{ Hz}$, constant acceleration 1 g Period of oscillation: 10 frequency sweeps per axis in each of the 3 axis which are vertical to each other.
Shock	Shock test in accordance with IEC 60068-2-29	Type of shock: half-sine Strength of shock: 15 g peak value, 11 ms duration Shock direction: 3 shocks each in +/- direction in each of the 3 axes that are vertical to each other

Climatic environmental conditions

The described components can be used in the following climatic environmental conditions:

Table 12-5 Climatic environmental conditions

ambient conditions	Permitted range	Remarks
Temperature: Horizontal installation Vertical installation	from -25 to 60 °C from -25 to 40 °C	IM 153-2 FF 6ES7153-2DA80-0XB0 Field Device Coupler FDC157 6ES7157-0AC84-0XA0 Bus module BM PS/IM SIPLUS extreme 6AG1195-7HA00-2XA0 Bus module BM IM/IM (redundant) 6ES7195-7HD80-0XA0 Bus module BM FDC 6ES7195-7HF80-0XA0 Bus module BM FDC/FDC (redundant) 6ES7195-7HG80-0XA0
Temperature: any type of installation	from -25 to 70 °C	Active field distributors Refer to the DP/PA coupler, Active Field Distributor, DP/PA Link, and Y Link Operating Instructions

ambient conditions	Permitted range	Remarks
Relative humidity	from 10 to 95 %	Without condensation, corresponds to relative humidity (RH) stress class 2 in accordance with IEC 61131-2 With condensation: Active field distributors Refer to the DP/PA coupler, Active Field Distributor, DP/PA Link and Y Link Operating Instructions
Atmospheric pressure	from 1080 to 795 mHz	corresponds to a height of -1000 to 2000 m
Contaminant concentration	SO ₂ : < 0.5 ppm; RH < 60 %, no condensation H ₂ S: < 0.1 ppm; RH < 60 %, no condensation	Test: 10 ppm; 4 days Test: 1 ppm; 4 days

12.1.6 Specifications for insulation tests, protection class and degree of protection

Test voltages

Table 12-6 Test voltages

Circuits with a rated voltage of U_n relative to other circuits or ground	Test voltage
$0 \text{ V} < U_n \leq 50 \text{ V}$	600 V DC, 2 s

Protection class

Protection class I in compliance with IEC 61140; this means that a grounding terminal to the rail is required!

Protection against foreign bodies and water

Protection class IP 20 according to IEC 60529; that is protection against contact with standard probes.

There is no protection from penetration by water.

Order numbers

A.1 Components for the use of FF Link

Article numbers for components of the bus link

Component	Article number
FF Link IM 153-2	6ES7153-2DA80-0XB0
Field Device Coupler FDC 157	6ES7157-0AC84-0XA0
Bus module BM PS/IM SIPLUS extreme	6AG1195-7HA00-2XA0
Bus module BM IM/IM (redundant)	6ES7195-7HD80-0XA0
Bus module BM FDC	6ES7195-7HF80-0XA0
Bus module BM FDC/FDC (redundant)	6ES7195-7HG80-0XA0
Active field distributors (Active Field Distributor AFD, Active Field Splitter AFS)	Refer to the Operating Instructions DP/PA coupler, Active Field Distributor, DP/PA Link, and Y Link (http://support.automation.siemens.com/WW/view/en/1142696)

Article numbers for installation accessories

Component	Article number
Mounting rail "for standard configuration"	e.g. 6ES7390-1AE80-0AA0
Bus connector for mounting rail "for standard configuration" (included with each Field Device Coupler FDC 157)	6ES7390-0AA00-0AA0
Mounting rail for the "hot-swapping modules" function • 482.6 mm • 530 mm • 620 mm • 2000 mm	6ES7195-1GA00-0XA0 6ES7195-1GF30-0XA0 6ES7195-1GG30-0XA0 6ES7195-1GC00-0XA0
Covers (included are 4 backplane bus covers and 1 bus module cover)	6ES7195-1JA00-0XA0
PS 307 power supply with jumper	e.g. 6ES7307-1BA00-0AA0

A.2 Accessories for PROFIBUS DP

Article numbers for PROFIBUS DP accessories

Accessories	Article number
PROFIBUS DP bus connector (up to 12 Mbps)	
• without PG port	6ES7972-0BA12-0XA0
• with PG port	6ES7972-0BB12-0XA0
PROFIBUS DP FastConnect connector	
• without PG port	6ES7972-0BA52-0XA0
• with PG port	6ES7972-0BB52-0XA0
PROFIBUS DP bus cable	
• 2-core, shielded	6XV1830-0EH10
PROFIBUS DP terminator	6ES7972-0DA00-0XA0

A.3 Accessories for FOUNDATION Fieldbus

Article numbers for FOUNDATION Fieldbus accessories

Accessories	Article number
FF cable (blue)	6XV1830-5GH10
FF cable (orange)	6XV1830-5HH10

Additional information

For additional information please refer to the *ST PI Catalog*.