SIEMENS

SIMATIC

Distributed I/O devices BusAdapter for Distributed I/O

Equipment Manual

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Valid for ET 200SP HA and Compact Field Unit

09/2019
A5E39261458-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

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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.

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Security information

1

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 constitute one element of such a concept.

Customers are responsible for preventing unauthorized access to their plants, systems, machines and networks. Such systems, machines and components should only be connected to an enterprise network or the internet if and to the extent such a connection is necessary and only when appropriate security measures (e.g. firewalls and/or network segmentation) are in place.

For additional information on industrial security measures that may be implemented, please visit
https://www.siemens.com/industrialsecurity.

Siemens' products and solutions undergo continuous development to make them more secure. Siemens strongly recommends that product updates are applied as soon as they are available and that the latest product versions are used. Use of product versions that are no longer supported, and failure to apply the 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.

Special conditions for safe use of the BusAdapter 2

Introduction

The I/O system in which the BusAdapters are to be used must be installed in a suitable enclosure which ensures at least IP 54 degree of protection according to EN 60529.

Use a safety enclosure that meets the requirements regarding spread of fire and exhibits an appropriate strength according to UL61010-1 and UL61010-2-201.

The I/O system is intended only for weather-protected, dry and stationary use.

Safety information

⚠ WARNING

Enclosure and cables

The device is intended for installation in an enclosure / control cabinet. The internal operating temperature of the enclosure / control cabinet corresponds to the maximum permissible ambient temperature of the module.

Cables must be used whose maximum permissible operating temperature is at least 30 °C above the maximum permissible ambient temperature.

⚠ WARNING

Ambient temperature of the device

The temperature of the device housing can be higher than 70 °C if the device is operated at an ambient temperature of more than 50 °C. The device must therefore be installed so that it is only accessible to service technicians or users who are aware of the reason for the restricted access and the necessary safety measures at an ambient temperature of over 50 °C.

⚠ WARNING

Safety functional extra low voltage

Make sure that the supply and input voltages of the IO system are generated safely separately (Nominal value: 24 V DC +-20%⎓).

Power supply according to the following standards:

- IEC/UL 61010-2-201 This safety functional extra-low voltage with the required protection is referred to as SELV (Safety Extra Low Voltage) / PELV (Protective Extra Low Voltage). or
- NEC Class 2, as in the National Electrical Code (r) (ANSI / NFPA 70)

If the device is connected to a redundant power supply (two separate power supplies), both must meet these requirements.

⚠ WARNING

Ambient conditions

The device must only be used in areas with a pollution degree of not more than 2 according to IEC 60664-1 or IEC/UL61010-2-201.

NOTICE

Risk of injury

Read the manual before use to avoid injury.

Use in hazardous area Zone 2

- A permissible installation location is below the maximum permissible installation height of 2 000 m above sea level.
  Observe the permissible air pressure of at least 795 hPa (corresponds to a height of approx. 2 000 m).
- A manufacturer declaration in accordance with EN 60079-0 or a manufacturer declaration for fulfillment of Zone 2 in accordance with EN 60079-15 must be available for the enclosure.

⚠ WARNING

Explosion hazard

If the electric circuit is live, the following must be observed:

- Do not disconnect the device in a flammable or combustible atmosphere.
- Do not open the housing in a flammable or combustible atmosphere.

⚠ WARNING

Area of application

This device is suitable for use in environments of Class 1, Division 2, Groups A, B, C, D; Class 1, Zone 2, Group IIC, or non-hazardous locations only.

NOTICE

Removal and replacement

When you replace components, compliance with Class 1, Division 2 might become invalid. Replacing components can affect the usability of the device.

Preface

3

Purpose of the documentation

This documentation explains the use of the BusAdapters for PROFINET IO.

You can find information about the electrical and optical networks (including cables and cable lengths) in the system manual "SIMATIC NET; Industrial Ethernet / PROFINET; Passive Network Components (https://support.industry.siemens.com/cs/ww/en/view/84922825)".

Validity of the documentation

This documentation applies to the following products:

- Distributed I/O System ET 200SP HA
- Compact Field Unit (CFU)

Validity of the information on the components

- **Insulation, protection class and degree of protection**
  Information on insulation, protection class and degree of protection can be found in the system manual of the respective I/O system that is used, e.g. ET 200SP HA.
- **Standards and approvals**
  Information on standards and approvals can be found in the system manual of the respective I/O system that is used, e.g. ET 200SP HA.

Note

Markings and approvals

In the manual you can find the markings and approvals which are generally possible or planned in the system.

The identification or approval that is printed on the respective BusAdapter continues to be exclusively valid.

Special information

Note

Important note for maintaining operational safety of your plant

Plants with safety-related features are subject to special operational safety requirements on the part of the operator. Even suppliers are required to observe special measures during product monitoring. This is why we inform you about product developments and features that are or might become important for the operation of plants with regard to safety in a special newsletter.

To ensure you are always up to date in this regard and can make changes to your system, if necessary, you need to subscribe to the corresponding newsletter.

Recycling and disposal

The products are low in pollutants and can be recycled. For environmentally compliant recycling and disposal of your electronic waste, contact a company certified for the disposal of electronic waste.

Additional support

- Information about the technical support available can be found in the appendix to this documentation (http://www.siemens.com/simatic-tech-doku-portal).
- The technical documentation for the individual SIMATIC products and systems is available on the Internet (https://mall.industry.siemens.com).
- The online catalog and the ordering system are available on the Internet (https://mall.industry.siemens.com).

Notifications – Always up-to-date with "mySupport"

In Industry Online Support, you can set "Filters" for various individual topics of interest (e.g. topics, configurations, products, etc.) or mark specific articles as "Favorites". To not have to check for yourself whether there is news or changes to these topics of interest, you can receive notifications from the Online Support, for example, by email.

You access this service on the following pages on the Internet (http://support.industry.siemens.com/My/ww/en/notifications).
You will find the following information in the header:

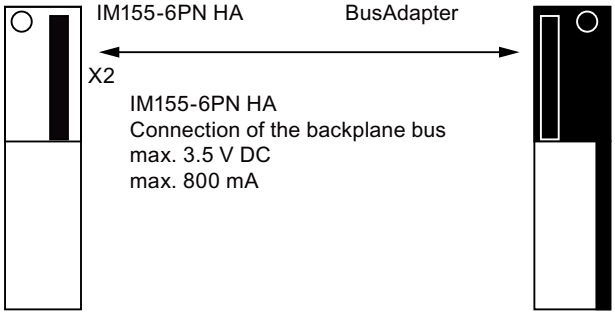
- **Language**: Language selection for "mySupport" page
- **Contact**: "Global and regional contacts"
- **Help:** Help for "mySupport" page
- **Support Request**: Requests submitted to technical specialists

Installation

4

4.1 Connections on the interface module and the BusAdapter

The following figure shows the connections on the interface module and the BusAdapter in schematic form.



4.2 Connecting a BusAdapter to the PROFINET IO system

Installing a PROFINET cable on the BusAdapter

Depending on the configuration of the PROFINET IO system, you select electrical or optical PROFINET IO cables for the connection of the distributed I/O.

- Electrical PROFINET IO cables:
  - PROFINET cable with RJ45 connector (electrical)
    - 8-wire cable
    - 2-wire cable - 2-wire transfer function (variable distance)
  - Connecting a FastConnect cable directly to the BusAdapter (electrical)
- Optical PROFINET IO cables:
  - Fiber-optic cable with LC connector (optical)

The type of connecting cable determines the BusAdapter required for connecting the distributed I/O.

Note

Strain relief of the bus cables

Make sure to secure the bus cables by installing an appropriate strain relief. Refer to the installation guidelines of the manufacturer.

PROFINET IO loop-through

2-port switches are integrated in all BusAadapters of ET 200SP HA. These switches allow you to loop-through the PROFINET IO system from one station to the next.

Number of media interfaces

Avoid a network structure in which there are more than 4 interfaces between electrical and optical media in a PROFINET IO system between the CPU and any IO device.

From this it follows, for example:

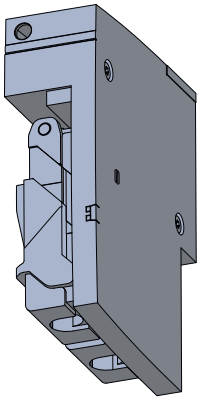
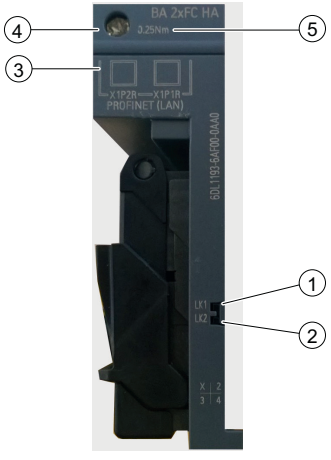
- CPU > **Media Interface** > IO Device > IO Device > **Media Interface** > **Media Interface** > IO Device > **Media Interface** > IO Device
  Result: Configuration of PROFINET IO system **OK**
- CPU > **Media Interface** > **Media Interface** > IO Device > > **Media Interface** > **Media Interface** > IO Device > > **Media Interface** > **Media Interface** > IO Device
  Result: Configuration of PROFINET IO system **NOT RECOMMENDED**

Additional information

- You can find information on the bus cables in the system manual SIMATIC NET Industrial Ethernet / PROFINET Passive Network Components (https://support.industry.siemens.com/cs/ww/en/view/84922825)
- Refer to the specifications in the "PROFINET Installation Guide (http://www.profibus.com)".

4.3 BusAdapter BA 2xFC

Introduction

Plug	Front view	Description
		① LED LK 1 - Status of Ethernet connection port 1 ② LED LK 2 - Status of Ethernet connection port 2 You can find information on this in section "Diagnostics via LED displays (Page 29)". ③ Connection diagram for the PROFINET connectors (view from below) ④ Fixing screw ⑤ Tightening torque

You connect the IO device to the PROFINET IO system via the BusAdapter BA 2×FC with FastConnect cables.

Required tools

Screwdriver:

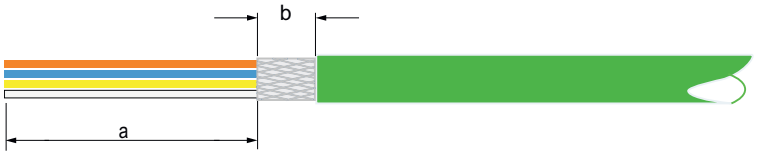
- TORX T10
  or
- 3.5 mm blade width

Required accessories

- If you are using FastConnect cables, we recommend you use the Industrial Ethernet FastConnect stripping tool (6GK1901-1GA00) with blade cassette green (6GK1901-1B...). This guarantees fast and safe stripping.
- FastConnect cables (recommended types):
  - IE FC TP Standard Cable GP 2x2 (6XV1840-2AH10)
  - IE FC TP Trailing Cable 2x2 (6XV1840-3AH10)
  - IE FC TP Marine Cable (6XV1840-4AH10)
  - IE FC TP Flexible Cable GP 2x2 (6XV1870-2B)
  - IE FC TP Trailing Cable 2x2 (6XV1870-2D)
  - IE TP Torsion Cable 2x2 (6XV1870-2F)
  - FC TP FRNC Cable GP (6XV1871-2F)
  - IE FC TP Food Cable GP 2x2 (6XV1871-2L)
  - IE FC TP Festoon Cable 2x2 (6XV1871-2S)

Preparation

1. Remove the BusAdapter BA 2xFC from the I/O.
2. Strip the jacket of the PROFINET connecting cable as follows:



Stripping length (outer jacket)	**Length of the remaining braided shield**
Distance a: 25 mm +-1 mm	Distance b: 5 mm

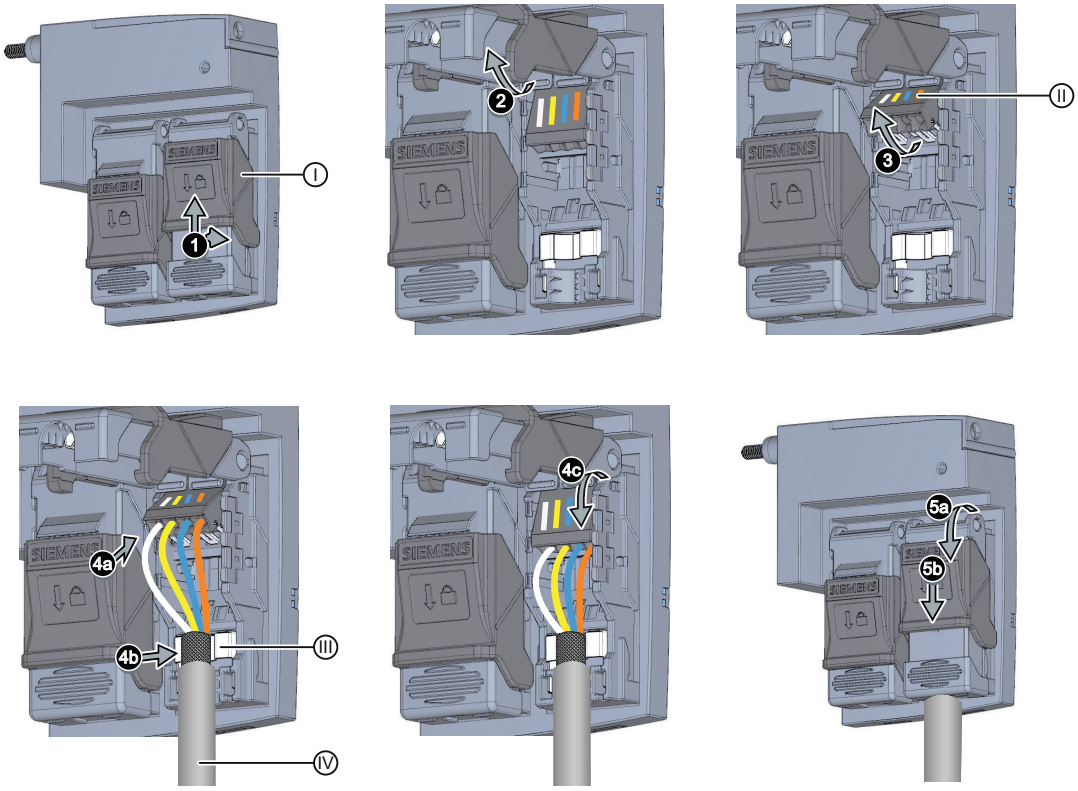
Figure 4-1 Stripping lengths PROFINET connecting cable

Installing a BusAdapter to distributed I/O

To connect the PROFINET IO to the device via the BusAdapter BA 2xFC, proceed as directed in the following figures:

Table 4-1 Objects in the figures

Object	Marking in the figures
Locking slide	I
Wire guide	II
Shield contact	III
PROFINET connecting cable	IV



Connecting the cable to the BusAdapter

① Push back the locking slide.

② Open the cover of the connection element.

③ Flip up the wire guide until it stops.

④ 4a Insert the **insulated** single wires of the PROFINET IO cable (according to the printed color coding) all the way into the wire guide.

4b Lay the cable shield on the shield contact.

4c Flip the wire guide firmly down until it stops.

⑤ 5a Close the cover of the connection element.

5b Slide the locking slide forward until it stops.

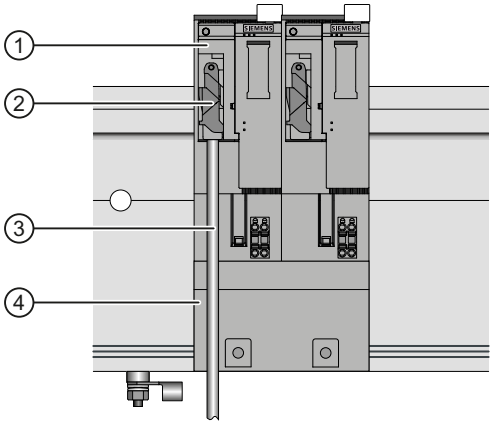
Figure 4-2 Connecting the PROFINET IO cable to the BusAdapter BA 2×FC

1. Install the FC cable to the BusAdapter.
2. Plug in the BusAdapter and screw it tight.
3. Secure the PROFINET IO cable to protect the plug from pulling.

Installing BusAdapter BA 2×FC

Note

The figure below is a basic representation using the ET 200SP HA as an example; it is also valid for other distributed I/O devices.



① BusAdapter BA 2×FC
② FC connection element
③ PROFINET IO cable
④ Interface module

Figure 4-3 Connecting a PROFINET IO cable to the device via BusAdapter BA 2×FC

Note

Configuration guidelines for modules with PROFINET IO interfaces

Only when all connected nodes are equipped with a SELV/PELV power supply (or have equivalent protection) is it permitted to operate the modules with PROFINET IO interfaces in LANs (Local Area Networks).

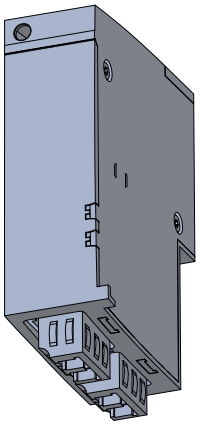
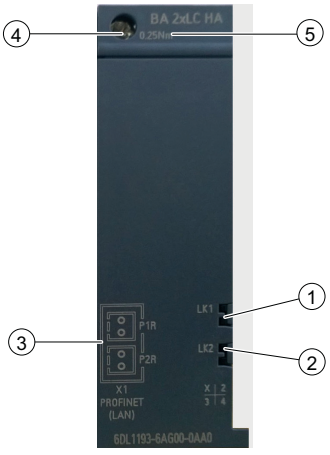
A data transfer point is prescribed for connection to the WAN (Wide Area Network) that guarantees this degree of safety.

Additional information

- System manual "SIMATIC NET; Industrial Ethernet / PROFINET; Passive Network Components (https://support.industry.siemens.com/cs/ww/en/view/84922825)"
- Pin assignment of the FC outlet (4-pin connector) (Page 32)

4.4 BusAdapter BA 2xLC

Introduction

Plug	Front view	Description
		① LED LK 1 - Status of Ethernet connection port 1 ② LED LK 2 - Status of Ethernet connection port 2 You can find information on this in section "Diagnostics via LED displays (Page 29)". ③ Connection diagram for the PROFINET connectors (view from left) ④ Fixing screw ⑤ Tightening torque

You connect the IO device to the PROFINET IO system via the BusAdapter BA 2×LC with fiber-optic cables.

Derating with redundant configuration

If you use the BusAdapter BA 2xLC in a redundant configuration of an ET 200SP HA with 2 interface modules, an additional reduction of the permissible ambient temperature must be observed (see section "Technical specifications"; "SIMATIC BusAdapter BA 2xLC (6DL1193-6AG00-0AA0) (Page 37)").

Required accessories

- If you are fabricating the IE FC FO Cable with the IE FC LC plug, we recommend you use the FC FO termination kit; for FC LC plug. You precisely break (cleave) the glass fibers with the supplied tool.

CAUTION
Cleaving the glassfiber • Wear protective glasses during the cleaving process. • Dispose of the remaining fibers in a suitable waste container.

- LC plug connector for PROFINET connection: IE FC LC Plug (10 duplex plugs: 6GK1900-1RB00-2AB0)
- Cables

Cable type	Article number
FO Standard Cable GP	6XV1847-2A
FO Trailing Cable	6XV1847-2C
FO Robust Cable GP	6XV1873-5R

Maximum length of the PROFINET IO cables: 3 km

Requirements

- Fabricate the PROFINET IO cables (connect fiber-optic cables to LC plug connectors). You can find information about the tools required for specific cables in the system manual "SIMATIC NET; Industrial Ethernet / PROFINET; Passive Network Components (https://support.industry.siemens.com/cs/ww/en/view/84922825)".
- If the device is the last node of the FOC network, you need to terminate the unoccupied FOC interface with a blanking plug. When the modules ship, the blanking plugs are inserted in the PROFINET sockets of the BusAdapter.

NOTICE
Derating when using a redundant ET 200SP HA When using a redundant ET 200SP HA, read the information about the permissible ambient temperature.

Required tools

Screwdriver:

- TORX T10
  or
- 3.5 mm blade width

Installing a BusAdapter to distributed I/O

To connect PROFINET IO to the device via the BusAdapter BA 2xLC, proceed as follows:

1. Plug in the BusAdapter and screw it tight.
2. Remove the protective caps of the LC plug connector, if present.
3. Grasp the assembled LC plug connector on the enclosure and insert it into the PROFINET socket on the BusAdapter BA 2XLC until it clicks. The LC plug connectors are coded to ensure correct connection.

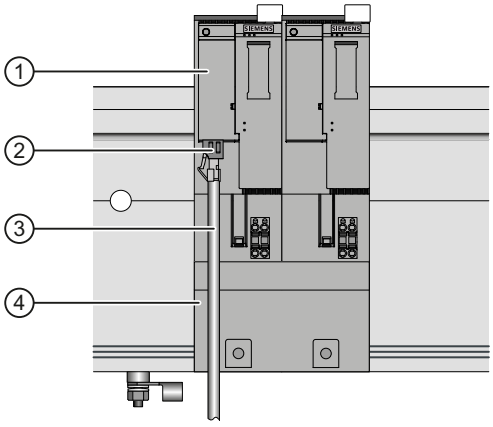
> **⚠ CAUTION**
>
> **Risk of damage to eyes**
>
> Do not look directly into the opening of the optical transmitter diodes. The emitted light beam could damage your eyes.

4. Secure the PROFINET IO cable to protect the plug from pulling.

Installing BusAdapter BA 2xLC

Note

The figure below is a basic representation using the ET 200SP HA as an example; it is also valid for other distributed I/O devices.



① BusAdapter BA 2xLC
② LC connector
③ PROFINET IO cable: Fiber-optic cable
④ Interface module

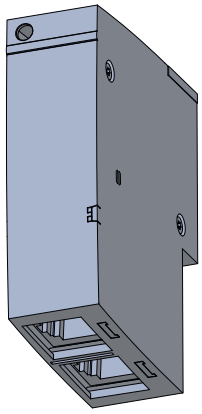
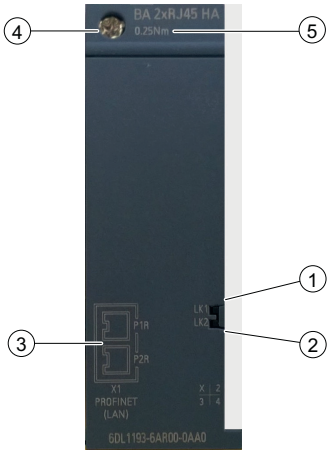
Figure 4-4 Connecting a PROFINET IO cable to the device via BusAdapter BA 2×LC

Additional information

You can find information about the installation guidelines and installation of fiber optic cables in the documentation "SIMATIC NET; Industrial Ethernet / PROFINET; Passive Network Components (https://support.industry.siemens.com/cs/ww/en/view/84922825)".

4.5 BusAdapter BA 2xRJ45

Introduction

Plug	Front view	Description
		① LED LK 1 - Status of Ethernet connection port 1 ② LED LK 2 - Status of Ethernet connection port 2 You can find information on this in section "Diagnostics via LED displays (Page 29)".
		③ Connection diagram for the PROFINET connectors (view from below)
		④ Fixing screw
		⑤ Tightening torque

You connect the IO device to the PROFINET IO system via the BusAdapter BA 2×RJ45 with Industrial Ethernet cables.

Required tools

Screwdriver:

- TORX T10
  or
- 3.5 mm blade width

Installing the RJ45 connector

You can use FastConnect cables with the "IE FC RJ45 Plug 180" connector when installed in an enclosure.
You can find information on this in the system manual "SIMATIC NET; Industrial Ethernet / PROFINET; Passive Network Components (https://support.industry.siemens.com/cs/ww/en/view/84922825)".

Installing a BusAdapter to distributed I/O

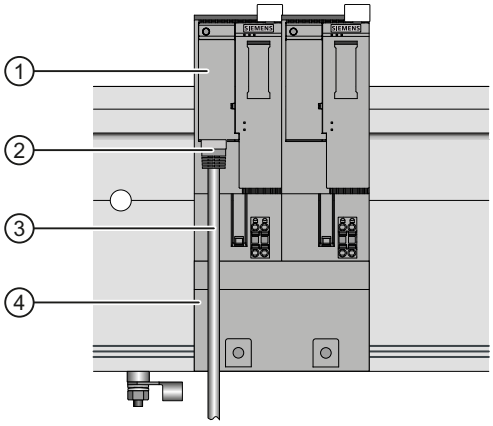
To connect PROFINET IO to the device via the BusAdapter BA 2×RJ45, proceed as follows:

1. Plug in the BusAdapter BA 2×RJ45 and screw it tight.
2. Insert the RJ45 connector(s) into the PROFINET port on BusAdapter BA 2×RJ45.
3. Secure the PROFINET IO cable to protect the plug from pulling.

Installing BusAdapter BA 2×RJ45

Note

The figure below is a basic representation using the ET 200SP HA as an example; it is also valid for other distributed I/O devices.



① BusAdapter BA 2×RJ45
② RJ45 connector
③ PROFINET IO cable
④ Interface module

Figure 4-5 Connecting a PROFINET IO cable to the device via BusAdapter BA 2×RJ45

Note

Configuration guidelines for modules with PROFINET IO interfaces

You may only operate the modules with PROFINET IO interfaces in LANs (Local Area Networks) if all connected nodes are equipped with SELV/PELV power supplies (or have equivalent protection).

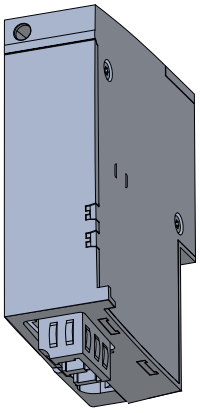
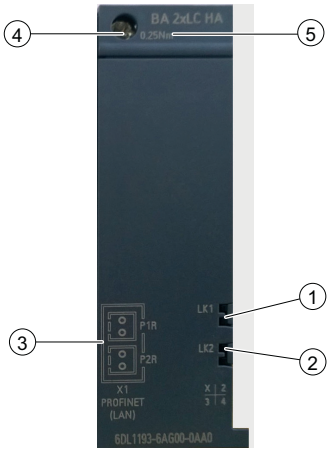
A data transfer terminal that guarantees this level of safety must be used for the interface to the WAN (Wide Area Network).

Additional information

Pin assignment of the RJ45 connection plug (Page 31)

4.6 BusAdapter BA LC/FC

Introduction

Plug	Front view	Description
		① LED LK 1 - Status of Ethernet connection port 1 ② LED LK 2 - Status of Ethernet connection port 2 You can find information on this in section "Diagnostics via LED displays (Page 29)".
		③ Connection diagram for the PROFINET connectors (view from below) • IO port 1 = LC (optical connection) • IO port 2 = FC (electrical connection)
		④ Fixing screw
		⑤ Tightening torque

You connect the IO device to the PROFINET IO system via BusAdapter BA LC/FC.
The node communicates via two ports.

- Port 1 offers the option of connecting an LC connector.
  When data is transferred via port 1, it is first sent as a differential signal to the LC transceiver. It is converted there for optical data transmission and vice versa.
- Port 2 allows the connection of a FastConnect cable.
  When data is transmitted via port 2, the differential signals of the base device are output electrically isolated via the BusAdapter.

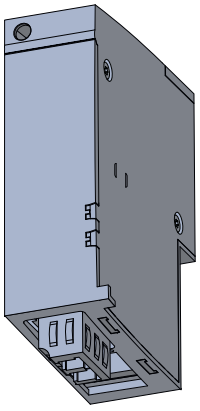
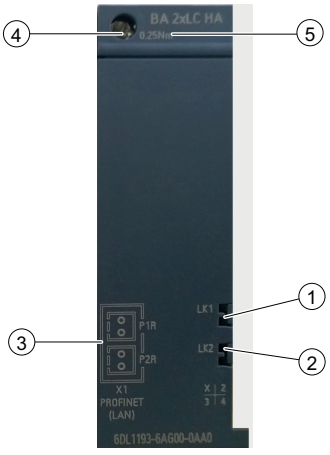
The overvoltage protection must be implemented by the base device. The reverse polarity protection is realized by the BA housing.

Assembling the cable

- You can find information on assembling the FC cables in the section "Pin assignment of the FC outlet (4-pin connector) (Page 32)".

4.7 BusAdapter BA LC/RJ45

Introduction

Plug	Front view	Description
		① LED LK 1 - Status of Ethernet connection port 1 ② LED LK 2 - Status of Ethernet connection port 2 You can find information on this in section "Diagnostics via LED displays (Page 29)".
		③ Connection diagram for the PROFINET connectors (view from below) • IO port 1 = LC (optical connection) • IO port 2 = RJ45 (electrical connection)
		④ Fixing screw
		⑤ Tightening torque

You connect the IO device to the PROFINET IO system via BusAdapter BA LC/RJ45.

The node communicates via two ports.

- Port 1 offers the option of connecting an LC connector.
  When data is transferred via port 1, it is first sent as a differential signal to the LC transceiver. It is converted there for optical data transmission and vice versa.
- Port 2 allows the connection of an RJ45 connector.
  When data is transmitted via port 2, the differential signals of the IO device are output electrically isolated via the BusAdapter.

Assembling the cable

- You can information on assembling the RJ45 cables in the section "Pin assignment of the RJ45 connection plug (Page 31)".

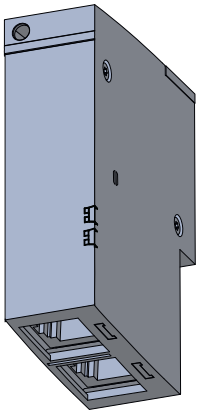
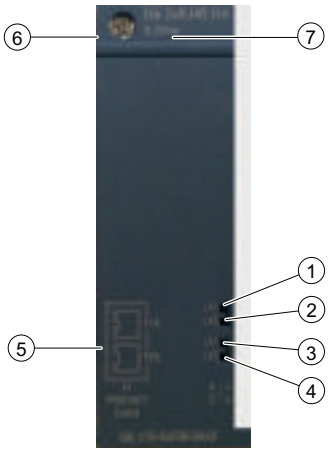
4.8 BusAdapter 2xRJ45VD HA

Note

Information on SIMATIC BusAdapter BA 2xRJ45VD HA (6GK5991-2VA00-8AA2)

You can find technical specifications and additional information about this BusAdapter in the Internet:

SIMATIC NET; Industrial Ethernet / PROFINET; Passive Network Components (https://support.industry.siemens.com/cs/ww/en/view/109759611)

Plug	Front view	Description
		① LED LK 1 - Status of Ethernet connection port 1 ② LED without function ③ LED LK 2 - Status of Ethernet connection port 2 ④ LED without function You can find information on this in section "Diagnostics via LED displays (Page 29)".
		⑤ Connection diagram for the PROFINET connectors (view from below)
		⑥ Fixing screw
		⑦ Tightening torque

You connect the IO device to the PROFINET IO system using a 2-wire system with copper wires via the BA 2xRJ45VD HA BusAdapter.

NOTICE
Application of the BusAdapter If you want to use this BusAdapter in the system, you need to note the following: • Ensure that the approved transfer rate of 100 Mbps is maintained. • The "Time stamping" function with modules of the distributed I/O (ET 200SP HA) cannot be used.

See also

Pin assignment of RJ45-connection plug for 2-wire system (Page 31)

Maintenance 5

5.1 Exchanging the BusAdapter or interface of the distributed I/O

The device name of the distributed I/O device is saved at the following locations when transferring the device name to the distributed I/O:

- In the BusAdapter
- In the interface of the distributed I/O device (e.g. interface module or I/O device itself)

Note

Replacing a BusAdapter (removing/inserting)

Removing/inserting the BusAdapter under voltage is prohibited.

Device replacement without transfer of topological configuration

The following scenarios are the result of saving the device name on the BusAdapter and in the interface when exchanging the two components:

	Interface non-programmed (without device name)	Interface with device name
BusAdapter non-programmed (without device name)	No device names	When the supply voltage is switched on, the device name is copied from the interface to the BusAdapter.
BusAdapter with device name	When the supply voltage is switched on, the device name is copied from the BusAdapter to the interface.	

Note

Restoring the factory settings

Resetting to factory settings deletes the device name in the interface and in the BusAdapter.

Diagnostics

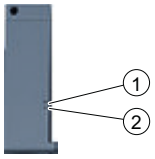
6

6.1 Diagnostics via LED displays

Below, you will find tables containing information on the status and error messages on the BusAdapter.

LEDs on the BusAdapter

The following LEDs are located on the front of the BusAdapter.



	Marking	Color	Meaning
①	LK1	Green	LED displays on the BusAdapter to visualize the status of the Ethernet connection
②	LK2		

Table 6-1 Legend for the following tables:

■	LED lit
☼	LED display flashes
Off	LED not lit

LED displays on the BusAdapter

Table 6-2 Status display "LK1" and "LK2" on the BusAdapter

LEDs "LK1" and "LK2"	Meaning	Solution
■ ON	There is an Ethernet connection between the PROFINET IO interface and a communication partner (for example, an IO controller).	-
Off	There is no Ethernet connection between the PROFINET IO interface and a communication partner (for example IO controller).	Check whether the bus cable to the switch/IO controller is interrupted.
☼ Flashes	The "Node flashing test" is performed. You can use the "Node flash test" to determine which IO controller connected on the same bus provides a direct connection.	-

Connection setup

Note

Connection configuration with BusAdapter BA 2xRJ45VD HA for long cable lengths

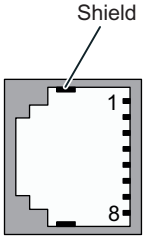
It can take up to 2 minutes to establish a connection with the maximum permissible cable length of 500 m.

Pin assignments

A

A.1 Pin assignment of the RJ45 connection plug

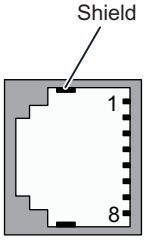
Table A-1 Pin assignment of the RJ45 connector

View RJ45-plug socket	Contact	assignment
	1	TD (Transmit Data +)
	2	TD_N (Transmit Data –)
	3	RD (Receive Data +)
	4	Ground
	5	Ground
	6	RD_N (Receive Data –)
	7	Ground
	8	Ground

Core pair	Pins	EIA/TIA 568A	EIA/TIA 568B	IEC	REA	DIN 47.100	IE hybrid cable	FC RJ45
3	1/2	White/green	White/ orange	Black/gray	White/ orange	Gray/pink	Yellow/ orange	or-ws/or
2	3/6	White/ orange	White/green	Red/orange	Turquoise/ violet	Green/ yellow	White/blue	gn/gn-ws
1	4/5	Blue/white	Blue/white	White/blue	White/blue	White/brown		bl/bl-ws
4	7/8	White/brown	White/brown	Yellow/ brown	Turquoise/ violet	Blue/red		bn-ws/bn

A.2 Pin assignment of RJ45-connection plug for 2-wire system

Table A-2 Pin assignment of the RJ45 connector

View RJ45-plug socket	Contact	Assignment for 2-wire system (PROFIBUS cable)
	1	Green wire (contact: yellow)
	2	Red wire (contact: orange)
	3	- (Contact: white)
	4	-
	5	-
	6	- (Contact: blue)
	7	-
	8	-

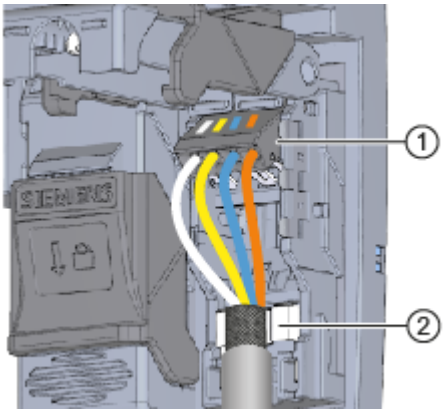
Note

Shield support and lightning protection design

If you connect a BA 2xRJ45VD HA BusAdapter to existing PROFIBUS cabling, the same specifications regarding shielding and lightning protection concept apply as for PROFIBUS.

A.3 Pin assignment of the FC outlet (4-pin connector)

Table A-3 Pin assignment of the FC outlets

View of FC outlet	Contact		Color	Assignment (from left to right)
	①	1	White	TX+ (Transmit Data +)
		2	Yellow	RX+ (Receive Data +)
		3	Blue	TX- (Transmit Data -)
		4	Orange	RX+ (Receive Data -)
	②			GND (functional earth - FE)

Note

Using PROFIBUS standard cable GP with FC connector

If you use the PROFIBUS standard cable GP, the wires must be stripped before inserting them into the FC connector.

Technical specifications

B

B.1 Ambient conditions

Information on the documentation

Note

Higher-priority documentation

The information for the specific components takes precedence over the information in this documentation. The statements in the product information always takes precedence over all other information.

Use in hazardous area

Read section "Special conditions for safe use of the BusAdapter (Page 7)".

Climatic ambient conditions

The following table shows the permissible climatic ambient conditions for the ET 200SP HA distributed I/O system.

Table B-1 Climatic ambient conditions

Ambient conditions	Permissible range	Comments
Temperature	• Horizontal installation: From -40 °C to max. temperature (see comments) • Vertical installation: from -40 °C to 60 °C Note: No icing	Observe any load-dependent limitations. Refer to the documentation of the employed component. The maximum permissible upper temperature depends on the BusAdapter used. Tested according to IEC 60068-2-2 (Dry heat)
Air pressure	• From 1 080 hPa (corresponds to a depth of approximately -1 000 m) • Up to 606 hPa (corresponds to an elevation of approximately 4 000 m)	The cooling effect of air depends on the density of the air. The locally occurring air pressure (operating altitude) might restrict the maximum permissible ambient temperature. The density of the air decreases with increasing altitude. The cooling effect of air corresponding to the typical operating altitude is shown in the following derating table.
Relative humidity	From 10% to 95% Max. 95% at +25 °C	Without condensation, corresponds to relative humidity (RH) stress grade 2 in accordance with IEC 61131 part 2 Tested according to IEC 60068-2-78 (Damp heat)

Ambient conditions	Permissible range	Comments
Concentration of pollutants	• SO_2: <0.5 ppm • RH: <60%, no condensation • H_2S: <0.1 ppm • RH: <60%, no condensation	Test: 10 ppm; 4 days Test: 1 ppm; 4 days
	ISA-S71.04 severity level G1; G2; G3	-

Derating

The cooling effect of air decreases at higher altitudes as a result of its lower density.

The table shows the derating factor for the maximum permissible ambient temperature depending on the use of the devices at an elevation above sea level.

Table B-2 Derating when devices are used at an elevation above sea level

Elevation above sea level [1]	Derating factor for ambient temperature [2]
(-1 000 m) up to 2 000 m	1.0
3 000 m	0.9
4 000 m	0.8

[1] Note that I/O modules with relay contacts are only suitable for an elevation up to 3 000 m.

[2] Relating to the maximum permissible ambient temperature in °C for 2 000 m

B.2 SIMATIC BusAdapter BA 2xRJ45 (6DL1193-6AR00-0AA0)

Article number	6DL1193-6AR00-0AA0
General information	
Product type designation	BA 2x RJ45
Interfaces	
Number of PROFINET interfaces	1; 2 ports (switch) RJ45
Supports protocol for PROFINET IO	
• Number of RJ45 ports	2
Cable length	
– Cu conductors	100 m
Ambient conditions	
Ambient temperature during operation	
• min.	-40 °C
• max.	70 °C
Dimensions	
Width	20 mm
Height	69.5 mm
Depth	59 mm
Weights	
Weight, approx.	46 g

B.3 SIMATIC BusAdapter BA LC/RJ45 (6DL1193-6AG20-0AA0)

Article number	6DL1193-6AG20-0AA0
General information	
Product type designation	BA LC/RJ45
Interfaces	
Number of PROFINET interfaces	1; 2 ports (switch) LC / RJ45
Supports protocol for PROFINET IO	
• Number of RJ45 ports	1
• Number of LC ports	1; Wavelength of 1 270 ... 1 380 nm, corresponds to 100BASE-FX
Cable length	
– Cu conductors	100 m
– Multimode graded-index fiber 50/125 µm	3 km
– Multimode graded-index fiber 62.5/125 µm	3 km
Standards, approvals, certificates	
RoHS conformity	Yes
China RoHS compliance	Yes
Ambient conditions	
Ambient temperature during operation	
• min.	-40 °C
• max.	70 °C; = Tmax for horizontal installation; for vertical installation Tmax = 60 °C; redundant setup (2x 6DL1155-6AU00-0PM0): max. 65 °C horizontally, max. 60 °C vertically. When using different IO Devices, the derating specified there must be observed.
Dimensions	
Width	20 mm
Height	75 mm; Without protective caps (approx. 8 mm)
Depth	59 mm
Weights	
Weight, approx.	32 g

B.4 SIMATIC BusAdapter BA 2xLC (6DL1193-6AG00-0AA0)

Article number	6DL1193-6AG00-0AA0
General information	
Product type designation	BA 2xLC
Interfaces	
Number of PROFINET interfaces	1; 2 ports (switch) LC Multimode Glass Fibre
Supports protocol for PROFINET IO	
• Number of LC ports	2
Cable length	
– Multimode graded-index fiber 50/125 µm	3 km
– Multimode graded-index fiber 62.5/125 µm	3 km
Ambient conditions	
Ambient temperature during operation	
• min.	-40 °C
• max.	65 °C; Redundant design (2x 6DL1155-6AU00-0PM0): max. 60 °C horizontal, max. 50 °C vertical. When using different I/O devices, the derating specified there must be observed.
Dimensions	
Width	20 mm
Height	75 mm; Without protective caps (approx. 8 mm)
Depth	59 mm
Weights	
Weight, approx.	60 g

B.5 SIMATIC BusAdapter BA LC/FC (6DL1193-6AG40-0AA0)

Article number	6DL1193-6AG40-0AA0
General information	
Product type designation	BA LC/FC
Interfaces	
Number of PROFINET interfaces	1; 2 ports (switch) LC / FC
Supports protocol for PROFINET IO	
• Number of FC (FastConnect) connections	1
• Number of LC ports	1; Wavelength of 1 270 ... 1 380 nm, corresponds to 100BASE-FX
Cable length	
– Cu conductors	100 m
– Multimode graded-index fiber 50/125 µm	3 km
– Multimode graded-index fiber 62.5/125 µm	3 km
Standards, approvals, certificates	
RoHS conformity	Yes
China RoHS compliance	Yes
Ambient conditions	
Ambient temperature during operation	
• min.	-40 °C
• max.	65 °C; = Tmax for horizontal installation; for vertical installation Tmax = 60 °C; redundant setup (2x 6DL1155-6AU00-0PM0): max. 60 °C horizontally, max. 55 °C vertically. When using different IO Devices, the derating specified there must be observed.
Dimensions	
Width	20 mm
Height	75 mm; Without protective caps (approx. 8 mm)
Depth	59 mm
Weights	
Weight, approx.	50 g

B.6 SIMATIC BusAdapter BA 2xFC (6DL1193-6AF00-0AA0)

Article number	6DL1193-6AF00-0AA0
General information	
Product type designation	BA 2xFC
Interfaces	
Number of PROFINET interfaces	1; 2 ports (switch) FC
Supports protocol for PROFINET IO	
• Number of FC (FastConnect) connections	2
Cable length	
– Cu conductors	100 m
Ambient conditions	
Ambient temperature during operation	
• min.	-40 °C
• max.	70 °C
Dimensions	
Width	20 mm
Height	69.5 mm
Depth	59 mm
Weights	
Weight, approx.	53 g

Contact

C

Department	Contact
Repair service Repair Service Facility	Siemens AG Digital Industries Factory Automation Operative Q functions DI FA MF EWA QM 31 Mr. Alexander Luber Werner-von-Siemens-Str. 50 92224 Amberg Germany Tel.: +49 9621 80-3447
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