AMIKON TECHNICAL DOCUMENTATION

Installation Instructions

Siemens 6ES7155-5MU00-0CN0

MultiFieldbus High Feature Interface

SUPPLY	BACKPLANE	PROTOCOLS	PORTS
24 V DC	16 W infeed	PN / EIP / Modbus TCP	2 via adapter

For qualified personnel only. Isolate the equipment and follow the complete manufacturer and site safety procedures. This reference does not replace the approved project design or the full installation manual.

01 PREPARATION AND WIRING CHECKS

- Use this equipment manual together with the S7-1500/ET 200MP system manual and qualified personnel requirements.
- Supply the interface with the documented 24 V DC SELV/PELV source and select the correct separate BusAdapter.
- The X80 positive and ground terminal pairs are bridged internally; supply loop-through is limited to 10 A.
- Match the Connection to supply voltage L+ parameter to front-fed or upstream-system-power-supply operation.
- Budget the actual module power before using the active-backplane or U-connector maximum arrangement.
- For PROFINET IO configuration control, the controller program must provide control data record 196 before the I/O modules can operate.

02 ORIGINAL WIRING REFERENCE

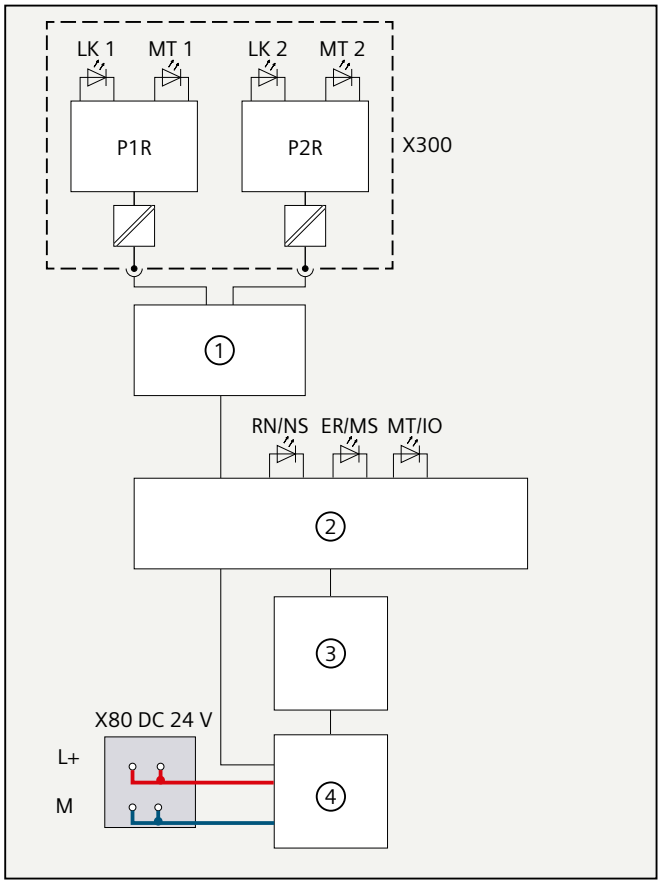
Original source PDF pages: MM pp. 76,2,6,12-18,20,75,77-80; AB pp. 1-2,13. The following pages retain the original Siemens drawings and printed page numbers.

Siemens original installation documentation

Siemens 11/2024; AB source pp. 1-2,13

7.2 Block diagram

Schematic circuit diagram



①	Switch	L+	24 V DC supply voltage
②	ET 200MP backplane bus interface and electronics	M	Ground
③	Backplane bus	LK 1,2	Link TX/RX LED (green)
④	Internal power supply	MT 1,2	MAINTENANCE FiberOptic LED (SCRJ port, yellow)
X80 24 V D-C	Supply voltage infeed	RN	RUN LED (green)
X300	BusAdapter (For BusAdapters with RJ45 interface, the shielding is connected to functional grounding)	ER	ERROR LED (red)
P1R	PROFINET interface X1 Port 1	MT	MAINTENANCE LED (yellow)
P2R	PROFINET interface X1 port 2		

Figure 7-1 Schematic circuit diagram of the IM 155-5 MF HF interface module

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 persons are those who, because of their training and experience, are familiar with the installation, assembly, commissioning, operation, decommissioning and disassembly of the product and can recognize risks and avoid possible hazards.

Proper use of Siemens products

Note the following:

⚠ WARNING

Siemens products may only be used for the application described in the catalog and the associated usage information. 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.

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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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Introduction

1

Purpose of the documentation

This manual supplements the system manual S7-1500, ET 200MP Automation system (https://support.industry.siemens.com/cs/ww/en/view/59191792). Functions that generally relate to the system are described in this manual.

The information provided in this manual and in the system/function manuals supports you in commissioning the system.

Conventions

Please also observe notes labeled as follows:

NOTE

A note contains important information on the product described in the documentation, on the handling of the product, or on the section of the documentation to which particular attention should be paid.

Recycling and disposal

For environmentally friendly recycling and disposal of your old equipment, contact a certified electronic waste disposal company and dispose of the equipment according to the applicable regulations in your country.

ID link for the digital nameplate



The ID link is a globally unique identifier according to IEC 61406-1, which you will find in the future as a QR code on your product.

The figure shows an example of an ID link for the interface module IM 155-5 MF HF.

You can recognize the ID link by the frame with a black corner at the bottom right. The ID link takes you to the digital nameplate of your product.

Industrial cybersecurity 2

2.1 Introduction to industrial cybersecurity

Due to the digitalization and increasing networking of machines and industrial plants, the risk of cyber attacks is also growing. Appropriate protective measures are therefore mandatory, particularly in the case of critical infrastructure facilities.

Refer to the SIMATIC S7-1500/ET 200MP automation system (https://support.industry.siemens.com/cs/ww/en/view/59191792) System Manual for general information and measures regarding industrial cybersecurity.

This section provides an overview of security-relevant information pertaining to your SIEMENS device.

2.2 Cybersecurity information

Siemens provides products and solutions with industrial cybersecurity 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 cybersecurity 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 cybersecurity measures that may be implemented, please visit
https://www.siemens.com/cybersecurity-industry.

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 Cybersecurity RSS Feed under
https://new.siemens.com/cert.

2.3 Cybersecurity-relevant information

Observe all cybersecurity-relevant information.

Topics with cybersecurity-relevant information	Reference
Operational application environment and security assumptions	
Requirements for the operational application environment of the system and security assumptions	This section is found in the System Manual (https://support.industry.siemens.com/cs/ww/en/view/59191792).
Security properties of the product	
Access protection	Note the information on the topic of access protection in the "Protection" section of the System Manual (https://support.industry.siemens.com/cs/ww/en/view/59191792).
Data integrity	The topic of data integrity is described in the "Industrial cybersecurity" section of the System Manual (https://support.industry.siemens.com/cs/ww/en/view/59191792).
Signed firmware update	The topic of signed firmware updates is described in the "Industrial cybersecurity" section of the System Manual (https://support.industry.siemens.com/cs/ww/en/view/59191792).
Secure Boot	The topic of secure boot is described in the "Industrial cybersecurity" section of the System Manual (https://support.industry.siemens.com/cs/ww/en/view/59191792).
PROFINET Security Class 1 • The device supports PROFINET Security Class 1. • With the introduction of PROFINET Security Class 1, additional security settings have been integrated into the PROFINET communication.	Detailed information about PROFINET Security Class 1 and the additional security settings can be found in the PROFINET with STEP 7 Function Manual (https://support.industry.siemens.com/cs/us/en/view/49948856)
Supported Ethernet services	You can find information on supported services in the Technical specifications (Page 96) section. You can find detailed information on supported Ethernet services in the Communication Function Manual (https://support.industry.siemens.com/cs/us/en/view/59192925).
Interfaces, ports, protocols and services	
Information on the following is security-relevant: • Communication layer and communication role • Default states • Enabling/disabling of ports and services	You can find detailed information on these topics in the Communication Function Manual (https://support.industry.siemens.com/cs/us/en/view/59192925).
Secure operation	
Recommendations for safe operation	Cross-system information on the safe operation of interface modules can be found in the System Manual (https://support.industry.siemens.com/cs/ww/en/view/59191792).

Topics with cybersecurity-relevant information	**Reference**
Corrective measures for known risks	Corrective measures for known risks are announced on the Siemens ProductCERT and Siemens CERT (https://siemens.com/productcert) web page. For more information on SIEMENS ProductCERT, refer to the System Manual (https://support.industry.siemens.com/cs/ww/en/view/59191792).
Security checks	Application-specific security measures such as cyclic checks of the configuration via checksums are described in the "Industrial cybersecurity" section of the System Manual (https://support.industry.siemens.com/cs/ww/en/view/59191792).
Secure decommissioning Products that contain security-relevant data must be securely decommissioned before disposal or resale.	Information on secure decommissioning can be found in the "Safe operation of the system" section of the System Manual (https://support.industry.siemens.com/cs/ww/en/view/59191792).

Product overview

3

3.1 Properties

Article number

6ES7155-5MU00-0CN0

View of the module

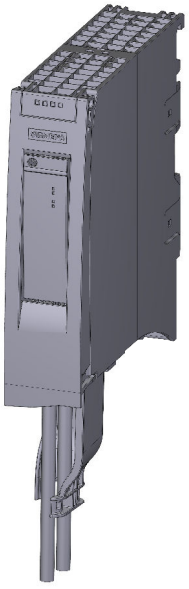


Figure 3-1 View of the IM 155-5 MF HF interface module

Advantages

- The interface module supports multiple fieldbus protocols.
  - PROFINET IO
  - EtherNet/IP
  - Modbus TCP
- Functionally compatible with the 155-5 PN HF interface module (except for prioritized startup; isochronous mode must be reconfigured)
- I/O system The system benefits of the ET 200MP distributed I/O system can also be used with the EtherNet/IP and Modbus TCP fieldbus protocols:
  - MF Shared Device: The fieldbus can be selected for each submodule.
  - Highest channel density
  - Comprehensive range of modules (see "Applicable modules with EtherNet/IP (Page 47)" and "Applicable modules with Modbus TCP (Page 64)" sections)
  - Multi hot swapping on the active backplane bus
  - Dynamic reconfiguration of the modules on the active backplane bus via the user program
- No system change or replacement of the I/O interface module is required when using different controllers.

  (series machine manufacturers with end users in various regions around the world)
- Use of different fieldbus protocols is possible depending on the region and application.

Properties

The module has the following technical properties:

- Connects the ET 200MP distributed I/O system with
  - PROFINET IO
  - EtherNet/IP
  - Modbus TCP
- 24 V DC supply voltage (SELV/PELV)
- Fieldbus connection via selectable BusAdapters
  - BA 2×RJ45 for RJ45 bus connector
  - BA 2×FC for direct connection of the bus cable
  - BA 2xM12 for bus cable with M12 plug
- Supported topologies
  - Linear bus topology
  - Star topology
  - Tree topology
- Pulling and plugging I/O modules on the active backplane bus (multi hot swapping)
- You can find more information in the Active backplane bus (https://support.industry.siemens.com/cs/ww/en/view/109769815) Equipment Manual.

You can find information on the functions supported by the module here:

- PROFINET IO functions (Page 21)
- EtherNet/IP functions (Page 46)
- Modbus TCP functions (Page 62)

Active backplane bus maximum configuration

- The integrated power supply of the interface module feeds 16 W into the backplane bus. Up to 12 I/O modules can be supplied in this way when operating with an active backplane bus. The exact number of operable modules is determined by the power budget calculation (see relevant section in the S7-1500/ET 200MP Automation system (https://support.industry.siemens.com/cs/ww/en/view/59191792) System Manual).

U-connector setup maximum configuration

- A maximum of one power supply module (PS) upstream from the interface module and two downstream from the interface module is possible.
- If you use a power supply module (PS) upstream from the interface module, the maximum possible configuration is a total of 32 modules (up to 30 modules downstream from the interface module).

Maximum amount of I/O data (PROFINET IO)

Maximum amount of I/O data

The sum of the gross data for all I/O controllers for input and output data must not exceed the following value:

- 5760 bytes

NOTE

With system redundancy S2, the I/O data lengths used for the H system must be included twice in the calculation of the maximum amount of I/O data.

When using the TIA Portal, the maximum net data length is calculated automatically.

The following data and calculations apply equally to input and output data.

Maximum gross data length:

- 1440 bytes per IO controller (independent of the S2 system redundancy)

Maximum net data length without calculation:

The following net data lengths can be used without explicit calculation of the maximum net data length:

- 932 bytes per IO controller (independent of the S2 system redundancy)

Maximum net data length with calculation:
The number of maximum net data lengths for input and output data depends on the number and type of I/O modules used:

Maximum gross data length

- Number of I/O submodules (without payload, input or output data)
- Number of I/O modules (input and output data)
- 4 bytes for interface module
- 1 byte for active backplane bus

Accessories

You order the following accessories separately:

- BusAdapter BA 2×RJ45 (6ES7193-6AR00-0AA0)
  (https://support.industry.siemens.com/cs/ww/en/pv/6ES7193-6AR00-0AA0/pi?dl=en)
- BusAdapter BA 2×FC (6ES7193-6AF00-0AA0)
  (https://support.industry.siemens.com/cs/ww/en/pv/6ES7193-6AF00-0AA0/pi?dl=en)
- BusAdapter BA 2xM12 (6ES7193-6AM00-0AA0)
  (https://support.industry.siemens.com/cs/ww/en/pv/6ES7193-6AM00-0AA0/pi?dl=en)
- Strain relief for PROFINET cable (6ES7590-5DA00-0AA0)
  (https://support.industry.siemens.com/cs/ww/en/pv/6ES7590-5DA00-0AA0/pi?dl=en)

Information on the BusAdapters is available in the BusAdapter (https://support.industry.siemens.com/cs/ww/en/view/109751716) Equipment Manual.

For more information on accessories, refer to the S7-1500/ET 200MP Automation system (https://support.industry.siemens.com/cs/ww/en/view/59191792) System Manual.

See also

24 V DC connector
(https://support.industry.siemens.com/cs/ww/en/pv/6ES7193-4JB50-0AA0/pi?dl=en)

3.4 Compatibility and limitations

Non-supported functions compared to IM 155-5 PN HF

- No prioritized startup
- No support for I&M4 data for use by the user

Restrictions on compatibility with IM 155-5 PN HF in regard to spare parts

You can replace a IM 155-5 PN HF with the firmware ≤ V4.4 with an IM 155-5 MF HF >=V5.0 without updating the configuration. In this case, the following restrictions apply:

- The BA2xRJ45 BusAdapter must be plugged in. Other BusAdapters are not compatible
- Isochronous real-time communication (IRT) must not be configured
- The device must be reconfigured as IM 155-5 MF HF for isochronous mode.
- Prioritized startup lasts significantly longer due to Secure Boot
- No support for I&M4 data for use by the user
- Possible restriction in case of topological configuration. You can find more information in the next section. In the case of unsuitably configured cable lengths, you receive the "Cable length mismatch" diagnostics.

There may be limitations of the industrial cybersecurity functions.

Workaround for topological configuration

If you receive the "Cable length mismatch" diagnosis, perform the following workaround:

1. Accept the diagnosis. If you cannot accept the diagnosis, continue with step 2.
2. Deselect the diagnosis in your engineering system. Alternatively, perform step 3.
3. Replace the IM 155-5 PN HF with an IM 155-5 MF HF V5.0 in the configuration.

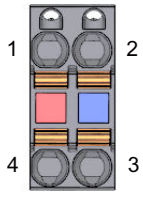
Wiring

7

7.1 Pin assignment

24 V DC supply voltage (X80)

Table 7-1 Terminal assignment 24 V DC supply voltage

View Connector	Signal name [1]		Designation
	1	1L+	+ 24 V DC of the supply voltage
	2	1M	Ground of the supply voltage
	3	2M	Ground of the supply voltage for loop-through [2]
	4	2L+	+ 24 V DC of the supply voltage for loop-through [2]

[1] 1L+ and 2L+ as well as 1M and 2M are bridged internally

[2] Maximum 10 A permitted

Additional information

You can find additional information on connecting the interface module and on accessories (selectable BusAdapters) in the system manual S7-1500, ET 200MP Automation system (https://support.industry.siemens.com/cs/ww/en/view/59191792).

Further information on connecting the BusAdapters can be found in the BusAdapter (https://support.industry.siemens.com/cs/us/en/view/109751716) Equipment Manual.

Parameter

8

8.1 Parameters

Table 8-1 Parameters for IM 155-5 MF HF interface module

Parameters	Value range	Default setting	Effective range
Connection to supply voltage L+	Connection/no connection	Connection	ET 200MP
Configuration control [1]	Disable/enable	Disable	ET 200MP
Type of fieldbus	• PROFINET • EtherNet/IP • Modbus TCP	PROFINET	ET 200MP
I/O data alignment [3]	• Byte • Word • Flexible	Byte	ET 200MP
Connection hold time [2]	0... 30,000 ms	5,000 ms	ET 200MP
Hold time after connection reset [2]	0... 30,000 ms	0 ms	ET 200MP

1 Only for PROFINET IO

2 Only for Modbus TCP

3 Only for EtherNet/IP and Modbus TCP

8.2 Description of parameters

8.2.1 Connection to supply voltage L+

Parameter "Connection to supply voltage L+"

This parameter is used

- For diagnostics of the ET 200MP:

  If the actual configuration is different from the preset configuration of the interface module supply voltage set with this parameter, the ET 200MP generates a diagnostic alarm.

- To check the power budget for the configuration with STEP 7 V13:

  Depending on how the parameter is set, either the infeed power for the interface module into the backplane bus or the power consumption from the backplane bus is entered into the calculation of the power budget.

The default setting "Connection to supply voltage L+" means that the front of the interface module is supplied with 24 VDC and feeds power into the backplane bus.

NOTE

We recommend that you always supply the front of the interface module with 24 VDC because if you then insert a power supply module (PS) **upstream** of the interface module, both the power of the power supply module (PS) and the power of the integrated power supply of the interface module are available for the I/O modules (power addition of PS infeed power + IM infeed power in power segment 1).

In this case, you do not have to change the default setting of the parameter in STEP 7.

The setting "No connection to supply voltage L+" means that the interface module is not supplied with 24 VDC on the front. This can only be the case when a power supply module (PS) is inserted upstream from the interface module and supplies the interface module and the downstream modules. In the case of an interface module without power supply, its power consumption from the backplane bus must be considered as consumer in the power budget and the power segments must be formed accordingly.

Reference

See the section on the power budget and the forming of power segments in the system manual S7-1500, ET 200MP Automation system (https://support.industry.siemens.com/cs/ww/en/view/59191792).

Requirement

In order to generate diagnostics, the IM 155-5 MF HF interface module parameters must have been assigned once.

See also

Diagnostic alarms (Page 42)

8.2.2 Configuration control (option handling)

"Configuration control" parameter

You can use this parameter to enable the configuration control function in the ET 200MP Distributed I/O System.

NOTE

If you configure the enable, the ET 200MP distributed I/O system requires a control data record 196 from the user program in order for the ET 200MP distributed I/O system to operate the I/O modules.

Reference

You can find more information on the control data record in chapter Configuration control (option handling) (Page 82) and in the STEP 7 online help.

8.2.3 Type of fieldbus

Type of fieldbus

Select the desired fieldbus with the parameter "Type of fieldbus":

- PROFINET
- EtherNet/IP
- Modbus TCP

8.2.4 I/O data alignment

I/O data alignment

For information on the "I/O data alignment" parameter, refer to the "MultiFieldbus (https://support.industry.siemens.com/cs/us/en/view/109773209)" Function Manual.

8.2.5 Connection hold time

Connection hold time

You use the parameter "Connection hold time" to define the hold time of the outputs after the last valid write access with Modbus TCP to output register.

8.2.6 Hold time after connection reset

Hold time after connection reset

You use the parameter "Hold time after connection reset" to define the hold time of the outputs after a reset of the connection via Modbus TCP.

8.3 Configuration control (option handling)

8.3.1 Configuration control and control data record

Operating principle

You can use the configuration control to operate different real configurations (options) with a single configuration of the ET 200MP distributed I/O system. This is made possible by a configurable assignment of configured station modules to actually existing ones.

We distinguish between the following procedures:

- Configuring configuration control without empty slots (option handling)
- Expanding configuration (step-by-step commissioning)

Requirements

Configuration control can only be used with PROFINET.

Enable the "Configuration control" parameter during configuration for this function. Control takes place with control data record 196 to specify the required configuration.

Configuration control is not ready for operation without control data record:

- All I/O modules of the ET 200MP distributed I/O system fail (substitute value behavior, if configured).
- The interface module continues to exchange data.

SIEMENS

SIMATIC

S7-1500H, ET 200MP Active backplane bus ST 1+12 slot, active backplane bus ST 1+8 slot, active backplane bus ST 1+4 slot

Equipment Manual

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Product overview 3

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Alarm and system messages 7

Technical specifications 8

Dimension drawings 9

Spare parts/accessories 10

List of I/O modules A

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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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Properties

The active backplane bus can be used for ET 200MP with:

Designation	Article number	As of hardware functional status	As of firmware version
IM 155-5 PN HF	6ES7155-5AA00-0AC0	FS01	V4.4
IM 155-5 MF HF	6ES7155-5MU00-0CN0	FS01	V5.0
Digital input modules DI and F-DI	See List of I/O modules ET 200MP (Page 35)		
Digital output modules DQ and F-DQ			
Analog input modules AI			
Analog output modules AQ			
System power supply			
Technology modules			
Communications modules			

The active backplane bus can be used for S7-1500H with:

Designation	Article number	As of hardware functional status	As of firmware version
CPU 1517H-3 PN	6ES7517-3HP00-0AB0	FS01	V3.1
CPU 1517H-4 PN	6ES7517-4HQ10-0AB0	FS01	V4.0
CPU 1518HF-4 PN	6ES7518-4JP00-0AB0	FS01	V3.1
	6ES7518-4JT10-0AB0	FS01	V4.0
CP 1543-1 communications module	6GK7543-1AX00-0XE0		V3.0
System power supply	See List of I/O modules S7-1500H (Page 34)		

The active backplane bus supports:

- Identification data I&M0 to 3
- Firmware update
- Prioritized startup (only applies for ET 200MP)

The following restriction applies for operating the ET 200MP with the active backplane bus

Pulling and plugging during operation (hotswap) cannot be performed in isochronous mode.

If any I/O module is plugged or unplugged in a station configured for isochronous mode, the connection to the controller is re-established and the I/O modules are temporarily inaccessible.