AMIKON TECHNICAL DOCUMENTATION

Installation Instructions

Siemens 6ES7155-5AA00-0AC0

ET 200MP PROFINET Interface

SUPPLY	BACKPLANE	STATION I/O	SHARING
24 V DC	**14 W infeed**	**512 B per direction**	**4 controllers**

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 the exact IM155-5 PN HF manual together with the S7-1500/ET200MP system manual; work is restricted to qualified personnel.
- Use the specified 24 V DC SELV/PELV supply and check the station power budget.
- X80 supply pairs 1L+/2L+ and 1M/2M are internally bridged; loop-through is limited to 10 A.
- Follow the original RJ45 terminal assignment and keep the source wiring diagram intact.
- Match the Connection to supply voltage L+ parameter to the actual front-supply or upstream-PS arrangement.

02 ORIGINAL WIRING REFERENCE

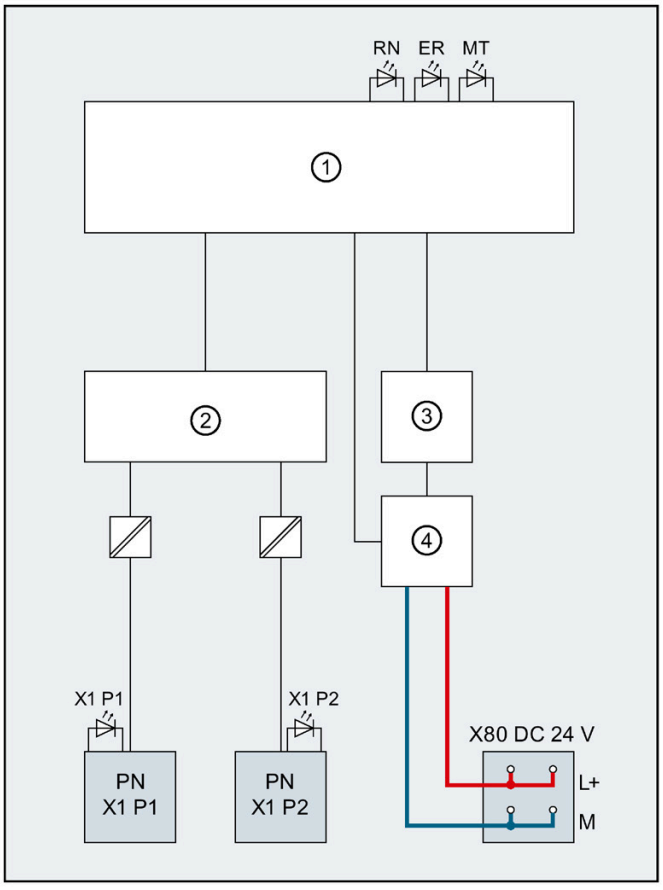
Original source PDF pages: MM pp. 22,3-5,11-13,20-21,23-24; DS pp. 1-3. The following pages retain the original Siemens drawings and printed page numbers.

Siemens original installation documentation

Siemens Data sheet 6ES7155-5AA00-0AC0; 2023-07-10; appended source pp. 1-3

3.2 Block diagram

Block diagram



①	Electronics	L+	24 V DC supply voltage
②	PROFINET 2-port switch	M	Ground
③	Backplane bus interface	RN	RUN LED (green)
④	Internal supply voltage	ER	ERROR LED (red)
X80 24 V DC	Infeed of supply voltage	MT	MAINT LED (yellow)
PN X1 P1	PROFINET interface X1 port 1	X1 P1, X1 P2	Link TX/RX LED (green/yellow)
PN X1 P2	PROFINET interface X1 port 2		

Figure 3-1 Block diagram of the IM 155-5 PN 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 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.

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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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Preface

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.

Security information

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.

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To stay informed about product updates, subscribe to the Siemens Industrial Security RSS Feed visit (https://www.siemens.com/industrialsecurity).

Product overview

2

2.1 Properties

Order number

6ES7155-5AA00-0AC0

View of the module

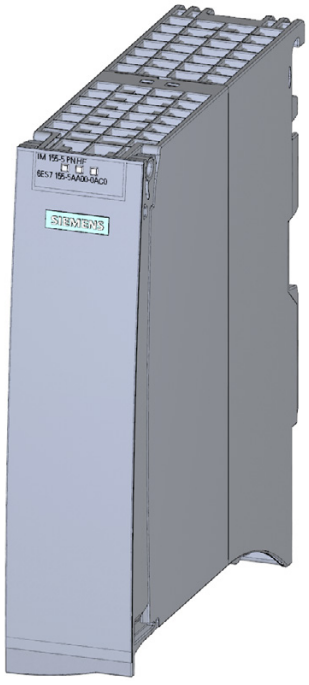


Figure 2-1 View of the IM 155-5 PN HF interface module

Properties

- Technical properties
  - Connects the ET 200MP distributed I/O system with PROFINET IO
  - 24 VDC supply voltage (SELV/PELV)
  - PROFINET IO connection using RJ45 bus connector
  - Pulling and plugging I/O modules on the active backplane bus (multi hot swapping)

    You can find additional information, in the Active backplane bus (https://support.industry.siemens.com/cs/ww/en/view/109769815)Equipment Manual.
- Supported functions (Page 14)

Maximum configuration

- 512 bytes I/O data per station
- The integrated power supply of the interface module feeds 14 W into the backplane bus. Up to 12 I/O modules can be supplied with this. The exact number of operable modules is determined by the power budget (see relevant section in the system manual S7-1500, ET 200MP Automation system (https://support.industry.siemens.com/cs/ww/en/view/59191792)).
- 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:

- 4000 bytes

Maximum gross data length per IO controller (for input and output data):

Without system redundancy S2:

- 1020 bytes

With system redundancy S2:

- 2 x 1020 bytes

The actual gross data length for input and output data depends on the number and type of I/O modules used and is calculated as follows:

- Actual gross data length = net data length + number of I/O submodules (without user data, input or output data) + number of I/O modules (input and output data) + 4 bytes for interface module + 1 byte for active backplane bus

The result of the actual gross data length calculation applies to both input and output data.

Maximum gross data length per IO controller (for input and output data):

Without system redundancy S2:

- 512 bytes

With system redundancy S2:

- 2 x 512 bytes

2.2.2 Configuration control (option handling)

Properties

Configuration control allows you to prepare your distributed I/O system for future extensions or changes. Configuration control means that you can configure the planned maximum configuration of your distributed I/O system in advance and vary it later in a flexible manner by means of the user program.

Reference

You can find more information

- In chapter Configuration control (option handling) (Page 25)
- On the Internet (http://support.automation.siemens.com/WW/view/en/29430270)
- In the STEP 7 online help.

2.2.3 System redundancy on S7-400H

Interface to H-CPUs with system redundancy

When system redundancy is used, you can connect the IM 155-5 PN HF (6ES7155-5AA00-0AC0) interface module to CPUs 41x-5H PN/DP (version 6.0 or higher) of the S7-400.

These CPUs allow you to operate the interface module as a component of a redundant system.

Requirements for the IM 155-5 PN HF interface module:

- With STEP 7 V5.5 SP3 and higher, the IM 155-5 PN HF is configured as a system redundancy device.
- The connection setting (transmission medium/duplex) must be set to "Full duplex".

Examples of system redundancy can be found in the manual Fault-tolerant systems S7-400H (http://support.automation.siemens.com/WW/view/en/60458386).

Combination of system redundancy and Shared Device

The IM 155-5 PN HF interface module can be connected to up to four IO controllers but only to one H-CPU pair. As a result, a combination of system redundancy and Shared Device operation is not possible when redundancy operation is used exclusively.

However, you can operate some of the I/O modules of the interface module in system redundancy on the H-CPU pair and the other I/O modules with up to two additional IO controllers in Shared Device operation.

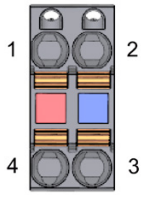
Wiring

3

3.1 Pin assignment

24 V DC supply voltage (X80)

Table 3- 1 Terminal assignment 24 V DC supply voltage

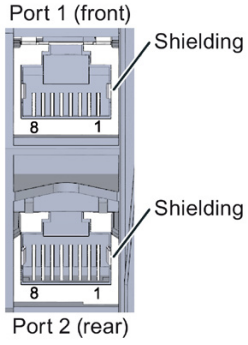
View Connector	Signal name [1]		Designation
	1	1L+	+ 24 V DC of the supply voltage
	2	1M	Ground of the supply voltage
	3	2M	Ground of the supply voltage for loop-through [2]
	4	2L+	+ 24 V DC of the supply voltage for loop-through [2]

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

[2] Maximum 10 A permitted

PROFINET IO with RJ45

Table 3- 2 PROFINET IO pin assignment with RJ45

Bottom view IM	Signal name		Designation
	1	TD	Transmit data +
	2	TD_N	Transmit data -
	3	RD	Receive data +
	4	GND	Ground
	5	GND	Ground
	6	RD_N	Receive data -
	7	GND	Ground
	8	GND	Ground

Additional information

You can find additional information on connecting the interface module and on accessories (RJ45 bus connector) in the system manual S7-1500, ET 200MP Automation system (https://support.industry.siemens.com/cs/ww/en/view/59191792).

Parameter

4

4.1 Parameters

Table 4- 1 Parameters for IM 155-5 PN HF interface module

Parameters	Value range	Default setting	Efficiency range
Connection to supply voltage L+	Connection/No connection	Connection	ET 200MP
Configuration control	Disable/enable	Disable	ET 200MP

4.2 Description of parameters

4.2.1 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 PN HF interface module parameters must have been assigned once.

See also

Diagnostic alarms (Page 42)

SIEMENS

Data sheet 6ES7155-5AA00-0AC0



SIMATIC ET 200MP. PROFINET IO device Interface module IM 155-5 PN HF, for ET 200MP electronic modules; Up to 12 IO modules without PS; Up to 30 IO modules with additional PS; Integrated 2-port switch; RJ45 shared device; MRP; IRT >=0.25 ms; Isochronous mode FW update; I&M0...3; Prioritized startup, S2 redundancy; Shared device with 4 controllers Suitable for operation with active backplane bus (FW V4.4 or higher)

General information	
Product type designation	IM 155-5 PN HF
HW functional status	From FS03
Firmware version	V4.4
● FW update possible	Yes
Vendor identification (VendorID)	002AH
Device identifier (DeviceID)	0X0312
Product function	
● I&M data	Yes; I&M0 to I&M3
● Module swapping during operation (hot swapping)	Yes; In combination with active backplane bus
● Isochronous mode	Yes
Engineering with	
● STEP 7 TIA Portal configurable/integrated from version	V16 with HSP 308
● STEP 7 configurable/integrated from version	V5.5 SP3 / -
● PROFINET from GSD version/GSD revision	V2.3 / -
Configuration control	
via user data	No
via dataset	Yes
Supply voltage	
Rated value (DC)	24 V
permissible range, lower limit (DC)	19.2 V
permissible range, upper limit (DC)	28.8 V
Reverse polarity protection	Yes
Short-circuit protection	Yes
Mains buffering	
● Mains/voltage failure stored energy time	5 ms
Input current	
Current consumption (rated value)	0.2 A
Current consumption, max.	1.2 A
Inrush current, max.	9 A
I^2t	0.09 $A^2 \cdot s$
Power	
Infeed power to the backplane bus	14 W
Power available from the backplane bus	2.3 W
Power loss	
Power loss, typ.	4.5 W
Address area	
Address space per module	
● Address space per module, max.	256 byte; per input / output
Address space per station	

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● Address space per station, max.	512 byte; per input / output
Hardware configuration	
Integrated power supply	Yes
System power supply can be plugged in to left of IM	Yes; only with design with U-connectors
Number of permissible power segments	3
Rack	
● Modules per rack, max.	30; I/O modules
Submodules	
● Number of submodules per station, max.	256
Interfaces	
Number of PROFINET interfaces	1
1. Interface	
Interface types	
● RJ 45 (Ethernet)	Yes
● Number of ports	2
● integrated switch	Yes
Protocols	
● PROFINET IO Device	Yes
● Open IE communication	Yes
● Media redundancy	Yes
PROFINET IO Device	
Services	
— IRT	Yes
— PROFIenergy	No
— Prioritized startup	Yes
— Shared device	Yes
— Number of IO Controllers with shared device, max.	4
Interface types	
RJ 45 (Ethernet)	
● Transmission procedure	PROFINET with 100 Mbit/s full duplex (100BASE-TX)
● 100 Mbps	Yes
● Autonegotiation	Yes
● Autocrossing	Yes
Protocols	
Redundancy mode	
● PROFINET system redundancy (S2)	Yes
— on S7-1500R/H	Yes
— on S7-400H	Yes; With GSDML file as of STEP 7 V5.5 SP3
● PROFINET system redundancy (R1)	No
● H-Sync forwarding	Yes
Media redundancy	
— MRP	Yes
— MRPD	Yes
Open IE communication	
● TCP/IP	Yes
● SNMP	Yes
● LLDP	Yes
Isochronous mode	
Equidistance	Yes
shortest clock pulse	250 µs
max. cycle	4 ms
Interrupts/diagnostics/status information	
Status indicator	Yes
Alarms	Yes
Diagnostics function	Yes
Diagnostics indication LED	
● RUN LED	Yes; green LED
● ERROR LED	Yes; red LED
● MAINT LED	Yes; Yellow LED
● Connection display LINK TX/RX	Yes; 2x green-yellow LEDs

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Potential separation	
between backplane bus and electronics	No
between PROFINET and all other circuits	Yes; 1 500 V AC
between supply and all other circuits	No
Isolation	
Isolation tested with	707 V DC (type test)
Ambient conditions	
Ambient temperature during operation	
● horizontal installation, min.	-25 °C; from FS04
● horizontal installation, max.	60 °C
● vertical installation, min.	-25 °C; from FS04
● vertical installation, max.	40 °C
Altitude during operation relating to sea level	
● Installation altitude above sea level, max.	5 000 m; Restrictions for installation altitudes > 2 000 m, see manual
connection method	
ET-Connection	
● via BU/BA Send	No
Dimensions	
Width	35 mm
Height	147 mm
Depth	129 mm
Weights	
Weight, approx.	350 g

last modified: 3/31/2023

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