AMIKON TECHNICAL DOCUMENTATION

Installation Instructions

Siemens 6ES7157-1AB00-0AB0

ET 200AL PROFINET Interface

SUPPLY	NETWORK	PROTECTION	SHARING
24 V DC	**2 M12 ports**	**IP65 / IP67**	**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 qualified personnel and the complete ET200AL system instructions with this device manual.
- Do not interchange M8 ET-Connection cables and supply-voltage cables; the manufacturer warns that this can destroy the module.
- Check the separate X80 supply input and X81 supply loop-through assignments against the original pin table.
- When autonegotiation is disabled, account for the different X1 P1 R and X1 P2 R PROFINET pin assignments.
- All devices connected through PROFINET must have SELV/PELV power supplies.
- If configuration control is enabled, control data record 196 is required for I/O operation.

02 ORIGINAL WIRING REFERENCE

Original source PDF pages 25, 2, 5, 10, 11, 12, 13, 14, 26, 27, 28, 29. The following pages retain the original Siemens drawings and printed page numbers.

Siemens original installation documentation

Wiring

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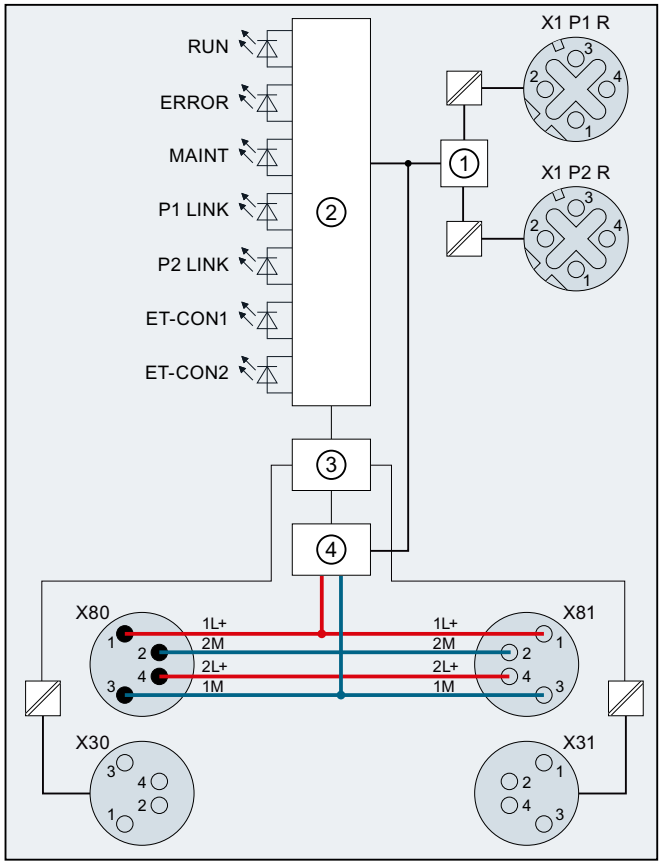
4.1 Terminal and block diagram

The image below shows the terminal and block diagram of the IM 157-1 PN interface module.



①	Switch	1L+	Supply voltage 1L+ (non-switched)
②	Electronics	1M	Ground 1M (non-switched)
③	ET-Connection interface	2L+	Load voltage 2L+ (switched)
④	Internal supply voltage	2M	Ground 2M (switched)
X1 P1 R	1. PROFINET interface	RUN	LED operating state (green)
X1 P2 R	2. PROFINET interface	ERROR	LED diagnostics status (red)
X80	Infeed of supply voltages	MAINT	LED diagnostics status (yellow)
X81	Loop-through of supply voltages	P1 LINK, P2 LINK	PROFINET LEDs (green)
X30	Infeed of the ET-Connection	ET-CON1, ET-CON2	ET-Connection LEDs (green)
X31	Loop-through of the ET-Connection		

Figure 4-1 Terminal and block diagram

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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A5E32347036-AF
Ⓟ 04/2025 Subject to change

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Introduction

1

Purpose of the documentation

This manual supplements the ET 200AL distributed I/O system (http://support.automation.siemens.com/WW/view/en/89254965) System Manual. Functions that are generally applicable to the ET 200AL distributed I/O system are described there.

The information provided in this Equipment Manual, the System Manual, and the Function Manuals enables you to commission the ET 200AL distributed I/O system.

Changes compared to the previous version

This manual contains the following changes/additions compared to the previous version:

- Supplement to the Industrial cybersecurity (Page 10) section
- Adaptations in the Cycle times (Page 43) section
- Adaptations in the Technical specifications (Page 38) section

Conventions

Please also observe notes marked as follows:

NOTE

Indicates important product information to which particular attention should be paid.

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 ET 200AL Distributed I/O system (https://support.industry.siemens.com/cs/ww/en/view/89254965) 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	You can find this section in the System Manual (https://support.industry.siemens.com/cs/ww/en/view/89254965).
Security properties of the product	
Access protection	Note the information on access protection in the Protection chapter of the System Manual (https://support.industry.siemens.com/cs/ww/en/view/89254965).
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/89254965).
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/89254965).
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	Information about supported services can be found in the Technical specifications (Page 38) section. You can find detailed information on the 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	You can find cross-system information on the safe operation of interface modules in the System Manual (https://support.industry.siemens.com/cs/ww/en/view/89254965).
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. You can find more information on SIEMENS ProductCERT in the System Manual (https://support.industry.siemens.com/cs/ww/en/view/89254965).

Topics with cybersecurity-relevant information	Reference
Security checks	You can find descriptions of specific security measures, such as cyclic checks of the configuration via checksums, in the Industrial cybersecurity section of the System Manual (https://support.industry.siemens.com/cs/ww/en/view/89254965).
Secure decommissioning Products that contain security-relevant data must be securely decommissioned before disposal or resale.	You can find information on secure decommissioning in the Secure operation of the system section in the System Manual (https://support.industry.siemens.com/cs/ww/en/view/89254965).

Product overview

3

3.1 Properties

Article number

6ES7157-1AB00-0AB0

View of the module

Figure 3-1 View of the IM 157-1 PN interface module

Properties

The module has the following technical properties:

- Connects the ET 200AL distributed I/O system with PROFINET IO
- 24 V DC supply voltage
- Support for 2 ET-Connection lines
- Dimensions: 45 x 159 mm

The functions supported by the module are found in the chapter Functions (Page 16).

Maximum configuration

The module has the following maximum configuration:

- 1430 bytes input data
- 1430 bytes output data
- 32 I/O modules, up to 16 I/O modules can be connected for each ET-Connection line

NOTE

- In the case of a shared device configuration, the sum of the I/O data of all controllers that share the device applies.
- If more than two (max. four) controllers share the device, the maximum amount of I/O data including user data qualifier is limited to 360 bytes per controller.

Accessories

The following component is included with the module in the packaging:

- Identification labels

Other components

The following component can be ordered as spare part:

- Identification labels

The following components can be ordered as accessories:

- Connectors
- Cables
- Stripping Tool for PROFINET
- Stripping Tool for ET-Connection
- M8 sealing cap
- M12 sealing cap

See also

You will find additional information on accessories and the other components in the Accessories/Spare parts section of the ET 200AL Distributed I/O System (http://support.automation.siemens.com/WW/view/en/89254965) system manual.

4.2 Pin assignment

NOTE

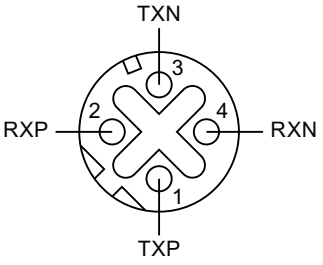
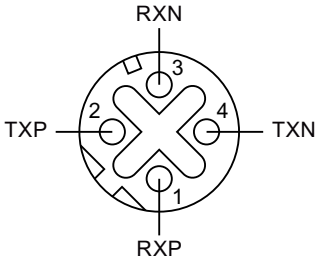
Color coding

The sockets for ET-Connection and the power supply of the modules are color-coded. These colors correspond to the colors of the offered cables.

Pin assignment of the sockets for PROFINET

The following table shows the pin assignment of the two sockets for PROFINET.

Table 4-1 Pin assignment of the PROFINET sockets

Pin	Assignment		Front view of the sockets	
	X1 P1 R Socket	X1 P2 R Socket	X1 P1 R	X1 P2 R
1	TXP	RXP		
2	RXP	TXP		
3	TXN	RXN		
4	RXN	TXN		
Shield-ing	Functional earth FE			

NOTE

Pin assignments

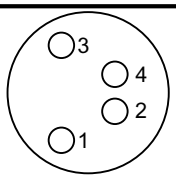
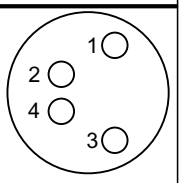
If you disable "Autonegotiation" in STEP 7, you must pay attention to the different pin assignments of X1 P1 R and X1 P2 R.

Pin assignment of the sockets for ET-Connection

The table below shows the pin assignments of the 2 sockets for the connection of ET-Connection.

Table 4-2 Pin assignment for ET-Connection

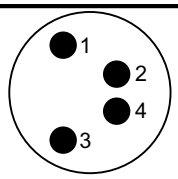
Pin	Assignment		Assignment of the wire color of the bus line cable for ET-Connection	Front view of the sockets	
	X30 socket (ET-Connection1)	X31 socket (ET-Connection2)		X30	X31
1	RXP	RXP	Yellow		
2	TXP	TXP	White		

Pin	Assignment		Assignment of the wire color of the bus line cable for ET-Connection	Front view of the sockets	
	X30 socket (ET-Connection1)	X31 socket (ET-Connection2)		X30	X31
3	TXN	TXN	Blue		
4	RXN	RXN	Orange		
Shield-ing	Functional earth FE		-		

Pin assignment of the connector for infeed of the supply voltage

The following table shows the pin assignment for infeed of the supply voltage.

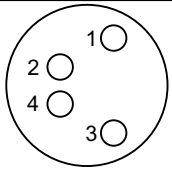
Table 4-3 Pin assignment of the supply voltage connector

Pin	Assignment	Assignment of the wire color of the power line cable	Front view of the connector
	X80 connector (power input)		
1	Supply voltage 1L+ (non-switched)	Brown	
2	Ground 2M (switched)	White	
3	Ground 1M (non-switched)	Blue	
4	Load voltage 2L+ (switched)	Black	

Pin assignment of the socket for loop-through of the supply voltage

The following table shows the pin assignment for loop-through of the supply voltage.

Table 4-4 Pin assignment of the supply voltage socket

Pin	Assignment	Assignment of the wire color of the power line cable	Front view of the socket
	X81 Socket (power output)		
1	Supply voltage 1L+ (non-switched)	Brown	
2	Ground 2M (switched)	White	
3	Ground 1M (non-switched)	Blue	
4	Load voltage 2L+ (switched)	Black	

NOTICE

ET-Connection/supply voltage

Observe the correct wiring of the M8 sockets for ET-Connection and the supply voltage.

Mixing up the ET-Connection connectors and the connectors for the supply voltage can destroy the module.

⚠ CAUTION

PROFINET IO

Modules with PROFINET interfaces may only be operated under the following condition:
All connected devices must be equipped with SELV/PELV power supplies.

Parameters

5

5.1 Parameters

The following table shows the parameters for the IM 157-1 PN interface module.

Table 5-1 Parameters (GSD file)

Parameters	Value range	Default	Efficiency range
Configuration control	• Disable • Enable	Disable	ET 200AL

5.2 Explanation of the parameters

Configuration control

You can use this parameter to enable the configuration control function in the ET 200AL distributed I/O system.

NOTE

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

Reference

You will find more information in the section Configuration control (option handling) and in the STEP 7 online help.