

Overview

Thanks to their wide scope of functions, the interface modules of the scalable SIMATIC ET 200SP I/O system, even in their basic versions, cover a wide range of applications. The basic functions of the interface modules include:

- Short data update times of typically 1 ms
- Single Hot Swap (withdrawing and insertion of an I/O module during operation without impairing the communication with the remaining modules)
- Operation with gaps (empty BaseUnits)
- Complete diagnostic support, extending to channel-by-channel diagnostics
- Configuration control / option handling (adaptation of the actual configuration via user software)
- Device replacement without programming device
- I&M data 0 to 3 (electronic rating plate with non-volatile storage of plant data)
- Firmware update
- Pluggable 24 V DC supply connection
- Network / power failure bridging time of 5 ms
- Labeling option via optional labeling strips and equipment labeling plates

When using PROFINET interface modules, the following basic functions are also included:

- Media redundancy (MRP)
- Integrated 2-port switch
- Freely selectable connection system (Standard function class and above) and physical connection (High Feature function class and above) by means of SIMATIC BusAdapters, also as system-integrated media converter from fiber-optic to copper cable
- Reset button for simple return to factory settings without the need for programming device
- Replacement without programming device even in case of non-topological configuration with subsequent automatic launching
- Automatic synchronization of the backplane bus to the PROFINET cycle to minimize the response time fluctuations (jitter)

Listed below is a short overview of the interface modules available for the ET 200SP, showing the essential differences. A clear and more precise comparison of functions of the different interface modules is offered by the TIA Selection Tool.

SIMATIC IM155-6DP High Feature with PROFIBUS connection

- Max. 32 I/O modules, also PROFIsafe modules with complete diagnostic support
- Expansion option with max. 16 modules from the ET 200AL series using the BU-Send BaseUnit and the BA-Send BusAdapter
- Max. 244 bytes in each case for input and output data per module and per station
- Data update time: typ. 5 ms
- PROFIBUS connection via 9-pin sub D female connector
- Package inclusive of server module and PROFIBUS connector with programming device socket

SIMATIC IM155-6PN Basic with PROFINET access

- Max. 12 I/O modules, no PROFIsafe modules, with complete diagnostic support
- Max. 32 bytes in each case for input and output data per module and per station
- Data update time: typ. 1 ms
- PROFINET connection via 2 integrated RJ45 sockets (integrated 2-port switch)
- Package inclusive of server module

SIMATIC IM155-6PN Standard with PROFINET interface

- Max. 32 I/O modules, also PROFIsafe modules, with complete diagnostic support
- Expansion option with max. 16 modules from the ET 200AL series using the BU-Send BaseUnit and the BA-Send BusAdapter
- Max. 256 bytes in each case for input and output data per module and max. 512 bytes per station (depending on configuration)
- Data update time: typ. 1 ms
- Selection of the type of connection of the PROFINET by means of SIMATIC BusAdapter (BusAdapter for copper cables only)
- Two forms of delivery:
 - As package with IM155-6PN ST, with pre-assembled BA 2xRJ45 BusAdapter, including server module
 - As package with IM155-6PN ST, without BusAdapter, including server module

I/O systems

SIMATIC ET 200 systems for the control cabinet SIMATIC ET 200SP

Interface modules > IM 155-6

Overview (continued)

SIMATIC IM155-6PN High Feature with PROFINET interface

- Max. 64 I/O modules, also PROFI-safe modules, with complete diagnostic support
- Expansion option with max. 16 modules from the ET 200AL series using the BU-Send BaseUnit and the BA-Send BusAdapter
- Max. 288 bytes in each case for input and output data per module and max. 1440 bytes per station (depending on configuration)
- Fast data refresh time: isochronous mode from 250 µs
- S2 system redundancy
- Choice of connection type and physical connection of the PROFINET by means of SIMATIC BusAdapter. All BusAdapters with a connection for copper and/or fiber-optic cables can be used; BusAdapter must be ordered separately
- Package includes server module

SIMATIC IM155-6PN High Speed with PROFINET interface

- Max. 30 I/O modules, also PROFI-safe modules, with complete diagnostic support
- Max. 32 bytes in each case for input and output data per module and max. 968 bytes per station (depending on configuration)
- Fast data refresh time: isochronous mode from 125 µs
- Performance upgrade for PROFINET
- Choice of connection type and physical connection of the PROFINET by means of SIMATIC BusAdapter. All BusAdapters with a connection for copper and/or fiber-optic cables can be used; BusAdapter must be ordered separately
- Package inclusive of server module

Technical specifications

Article number	6ES7155-6AR00-0AN0 ET 200SP, IM155-6PN BASIC	6ES7155-6AA00-0BN0 ET 200SP, IM155-6PN ST INCL. BA 2XRJ45	6ES7155-6AU00-0BN0 ET 200SP, IM155-6PN ST	6ES7155-6AU00-0CN0 ET 200SP, IM155-6PN HF	6ES7155-6AU00-0DN0 ET 200SP, IM155-6PN HS	6ES7155-6BA00-0CN0 ET 200SP, IM155-6DP HF INCL. DP-CONNECT.
General information						
Product type designation	IM 155-6 PN BA with 2x RJ45 ports and server module	IM 155-6 PN ST with BA 2xRJ45 and server module	IM 155-6 PN ST with server module	IM 155-6 PN HF with server module	ET 200SP, IM 155-6 PN HS with server module	IM155-6DP HF with PROFIBUS connector and server module
Product function						
• I&M data	Yes; I&M0 to I&M3	Yes; I&M0 to I&M3	Yes; I&M0 to I&M3	Yes; I&M0 to I&M4	Yes; I&M0 to I&M3	Yes; I&M0 to I&M3
Engineering with						
• STEP 7 TIA Portal configurable/integrated as of version	V13 SP1	V13 SP1	V13 SP1	V13 SP1 Update 6	STEP 7 V14 or higher	V13 SP1
• STEP 7 configurable/integrated as of version	V5.5 SP4 and higher	V5.5 SP4 and higher	V5.5 SP4 and higher	V5.5 SP4 and higher	V5.5 SP4 and higher	V5.5 SP4 and higher
• PROFIBUS as of GSD version/GSD revision						One GSD file each, Revision 3 and 5 and higher
• PROFINET as of GSD version/GSD revision	V2.3 / -	V2.3 / -	V2.3 / -	- / V2.3	- / V2.3	
Supply voltage						
Type of supply voltage						DC
Rated value (DC)	24 V	24 V	24 V	24 V	24 V	24 V
Reverse polarity protection	Yes	Yes	Yes	Yes	Yes	Yes
Mains buffering						
• Mains/voltage failure stored energy time	5 ms	5 ms	5 ms	5 ms	5 ms	5 ms
Hardware configuration						
Rack						
• Modules per rack, max.	12	32; + 16 ET 200AL modules	32; + 16 ET 200AL modules	64; + 16 ET 200AL modules	30	32; + 16 ET 200AL modules
Submodules						
• Number of submodules per station, max.		256	256	256	125	
Interfaces						
Number of PROFINET interfaces	1; 2 ports (switch)	1; 2 ports (switch)	1; 2 ports (switch)	1; 2 ports (switch)	1; 2 ports (switch)	
Number of PROFIBUS interfaces						1

Technical specifications (continued)

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1. Interface						
Interface types						
- Number of ports - integrated switch - RJ 45 (Ethernet)	2 Yes Yes; 2 integrated RJ45 ports	2 Yes Yes; Pre-assembled BusAdapter BA 2x RJ45	2 Yes	2 Yes	2 Yes	
- RS 485 - BusAdapter (PROFINET)	No	Yes; Applicable BusAdapter: BA 2x RJ45, BA 2x FC	Yes; Applicable BusAdapter: BA 2x RJ45, BA 2x FC	Yes; Compatible BusAdapter: BA 2x RJ45, BA 2x FC, BA 2x SCRJ (from FS03, V2.2), BA SCRJ / RJ45 (from FS03, V3.1), BA SCRJ / FC (from FS03, V3.1), BA 2x LC (from FS03, V3.3), BA LC / RJ45 (from FS03, V3.3), BA LC / FC (from FS03, V3.3)	Yes; Compatible BusAdapter: BA 2x RJ45, BA 2x FC, BA 2x SCRJ, BA SCRJ / RJ45, BA SCRJ / FC, BA 2x LC, BA LC / RJ45, BA LC / FC	Yes
Output current of the interface, max.						90 mA
Functionality						
- PROFINET IO Device - PROFIBUS DP slave - Open IE communication - Media redundancy	Yes Yes Yes; PROFINET MRP	Yes Yes; PROFINET MRP	Yes Yes; PROFINET MRP	Yes Yes; PROFINET MRP	Yes Yes; As MRP or MRPD client; max. 50 or 30 devices in the ring	Yes
Interface types						
RJ 45 (Ethernet)						
- Transmission procedure 10 Mbps 100 Mbps - Autonegotiation - Autocrossing	PROFINET with 100 Mbit/s full duplex (100BASE-TX) No Yes; PROFINET with 100 Mbit/s full duplex (100BASE-TX) Yes Yes	PROFINET with 100 Mbit/s full duplex (100BASE-TX) No Yes; PROFINET with 100 Mbit/s full duplex (100BASE-TX) Yes Yes	PROFINET with 100 Mbit/s full duplex (100BASE-TX) No Yes; PROFINET with 100 Mbit/s full duplex (100BASE-TX) Yes Yes	PROFINET with 100 Mbit/s full duplex (100BASE-TX) No Yes; PROFINET with 100 Mbit/s full duplex (100BASE-TX) Yes Yes	PROFINET with 100 Mbit/s full duplex (100BASE-TX) No Yes; PROFINET with 100 Mbit/s full duplex (100BASE-TX) Yes Yes	
RS 485						
Transmission rate, max.						12 Mbit/s
PROFINET IO Device						
Services						
- Isochronous mode - Open IE communication - IRT	No Yes No	No Yes Yes; with send cycles of between 250 µs and 4 ms in increments of 125 µs	No Yes Yes; with send cycles of between 250 µs and 4 ms in increments of 125 µs	Yes; Bus cycle time: min. 250 µs Yes Yes; 250 µs, 500 µs, 1 ms, 2 ms, 4 ms additionally with IRT with high performance: 250 µs to 4 ms in 125 µs frame	Yes; Bus cycle time: min. 125 µs Yes Yes; 125 µs, 250 µs, 500 µs, 1 ms, 2 ms, 4 ms additionally with IRT with high performance: 250 µs to 4 ms in 125 µs frame	

I/O systems

SIMATIC ET 200 systems for the control cabinet

SIMATIC ET 200SP

Interface modules > IM 155-6

Technical specifications (continued)

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Services (continued)						
- MRP	Yes	Yes	Yes	Yes	Yes	
- MRPD	No	No	No	No	Yes	
- PROFINET system redundancy	No	No	No	Yes; NAP S2	No	
- PROFinergy	No	Yes	Yes	Yes	Yes	
- Prioritized startup	No	Yes	Yes	Yes	Yes	
- Shared device	No	Yes	Yes	Yes	Yes	
- Number of IO Controllers with shared device, max.		2	2	4	4	
Open IE communication						
• TCP/IP	Yes	Yes	Yes	Yes	Yes	
• SNMP	Yes	Yes	Yes	Yes	Yes	
• LLDP	Yes	Yes	Yes	Yes	Yes	
PROFIBUS						
Services						
- SYNC capability						Yes
- FREEZE capability						Yes
- DPV0						Yes
- DPV1						Yes
Isochronous mode						
Isochronous operation (application synchronized up to terminal)	No	No	No	Yes	Yes	No
Equidistance	No	No	No	Yes	Yes	
shortest clock pulse				250 µs	125 µs	
max. cycle				4 ms	4 ms	
Bus cycle time (TDP), min.				250 µs	125 µs	
Interrupts/diagnostics/status information						
Status indicator	Yes	Yes	Yes	Yes	Yes	Yes
Alarms	Yes	Yes	Yes	Yes	Yes	Yes
Diagnostic functions	Yes	Yes	Yes	Yes	Yes	Yes
Diagnostics indication LED						
• RUN LED	Yes; Green LED	Yes; Green LED	Yes; Green LED	Yes; Green LED	Yes; Green LED	Yes; Green LED
• ERROR LED	Yes; Red LED	Yes; Red LED	Yes; Red LED	Yes; Red LED	Yes; Red LED	Yes; Red LED
• MAINT LED	Yes; yellow LED	Yes; yellow LED	Yes; yellow LED	Yes; yellow LED	Yes; yellow LED	Yes; yellow LED
• Monitoring of the supply voltage (PWR-LED)	Yes; green PWR LED	Yes; green PWR LED	Yes; green PWR LED	Yes; green PWR LED	Yes; green PWR LED	Yes; green PWR LED
• Connection display LINK TX/RX	Yes; 2x green LED	Yes; 2x green link LEDs on BusAdapter	Yes; 2x green link LEDs on BusAdapter	Yes; 2x green link LEDs on BusAdapter	Yes; 2x green link LEDs on BusAdapter	
• Connection display DP						Yes; Green DP LED
Isolation						
Isolation tested with		707 V DC between supply voltage and electronics; 1 500 V AC between Ethernet and electronics	707 V DC between supply voltage and electronics; 1 500 V AC between Ethernet and electronics	707 V DC between supply voltage and electronics (type test); 1 500 V AC between Ethernet and electronics (type test)	707 V DC between supply voltage and electronics (type test); 1 500 V AC between Ethernet and electronics (type test)	707 V DC (type test)
Standards, approvals, certificates						
Network loading class	2	2	2	3	3	
Security level		According to Security Level 1 Test Cases V1.1.1	According to Security Level 1 Test Cases V1.1.1	According to Security Level 1 Test Cases V1.1.1	According to Security Level 1 Test Cases V1.1.1	

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Ambient conditions						
Ambient temperature during operation						
• horizontal installation, min.	0 °C	0 °C	0 °C	0 °C	0 °C	0 °C
• horizontal installation, max.	60 °C	60 °C	60 °C	60 °C	60 °C	60 °C
• vertical installation, min.	0 °C	0 °C	0 °C	0 °C	0 °C	0 °C
• vertical installation, max.	50 °C	50 °C	50 °C	50 °C	50 °C	50 °C
Dimensions						
Width	35 mm	50 mm	50 mm	50 mm	50 mm	50 mm
Height	117 mm	117 mm	117 mm	117 mm	117 mm	117 mm
Depth	74 mm	74 mm	74 mm	74 mm	74 mm	74 mm
Weights						
Weight, approx.	125 g	191 g; IM155PN ST with BA 2x RJ45 (mounted)	147 g; without BusAdapter	147 g; without BusAdapter	147 g; without BusAdapter	150 g

Ordering data

Article No.

Article No.

IM155-6PN Basic PROFINET interface module

With server module;
two integrated RJ45 sockets

6ES7155-6AR00-0AN0**IM155-6PN Basic PROFINET interface module**

With server module

- With attached
SIMATIC BA 2xRJ45 BusAdapter
- Without SIMATIC BusAdapter

6ES7155-6AA00-0BN0**6ES7155-6AU00-0BN0****IM155-6PN High Feature PROFINET interface module**

With server module, without
SIMATIC BusAdapter

6ES7155-6AU00-0CN0**IM155-6PN High Speed PROFINET interface module**

With server module,
without SIMATIC BusAdapter

6ES7155-6AU00-0DN0**IM155-6DP High Feature PROFIBUS interface module**

With server module, with
PROFIBUS plug with PG socket

6ES7155-6BA00-0CN0**Accessories****SIMATIC BA 2xRJ45 BusAdapter**

For PROFINET interface modules
from Standard function class or
above; max. cable length 50 m

6ES7193-6AR00-0AA0**SIMATIC BA 2xFC BusAdapter**

For PROFINET interface modules
from Standard function class or
above; for increased vibration and
EMC loads; max. cable length 50 m

6ES7193-6AF00-0AA0**SIMATIC BA 2xSCRJ BusAdapter**

For PROFINET interface modules
from High Feature function class or
above; fiber-optic cable connection
for POF or PCF; for increased
vibration and EMC load capacity;
max. cable length 50 m (POF) or
100 m (PCF)

6ES7193-6AP00-0AA0**SIMATIC BA SCRJ/RJ45 BusAdapter**

For PROFINET interface modules
from High Feature function class
or above; with media converter
FOC-Cu; for increased vibration
and EMC loads; max. cable length
50 m (POF, copper) or 100 m (PCF)

6ES7193-6AP20-0AA0**SIMATIC BA SCRJ/FC BusAdapter**

For PROFINET interface modules
from High Feature function class
or above; with media converter
FOC-Cu; for increased vibration
and EMC loads; max. cable length
50 m (POF, copper) or 100 m (PCF)

6ES7193-6AP40-0AA0**SIMATIC BA 2XLC BusAdapter**

For PROFINET interface modules
from High Feature function class or
above; with LC fiber-optic connec-
tion; for increased vibration and
EMC load capacity; max. cable
length 2 km

6ES7193-6AG00-0AA0**SIMATIC BA LC/RJ45 BusAdapter**

For PROFINET interface modules
from High Feature function class
or above; with media converter
FOC-Cu; for increased vibration
and EMC loads; max. cable length
2 km (glass) or 50 m (copper)

6ES7193-6AG20-0AA0**SIMATIC BA LC/FC BusAdapter**

For PROFINET interface modules
from High Feature function class
or above; with media converter
FOC-Cu; for increased vibration
and EMC loads; max. cable length
2 km (glass) or 50 m (copper)

6ES7193-6AG40-0AA0