

I/O systems



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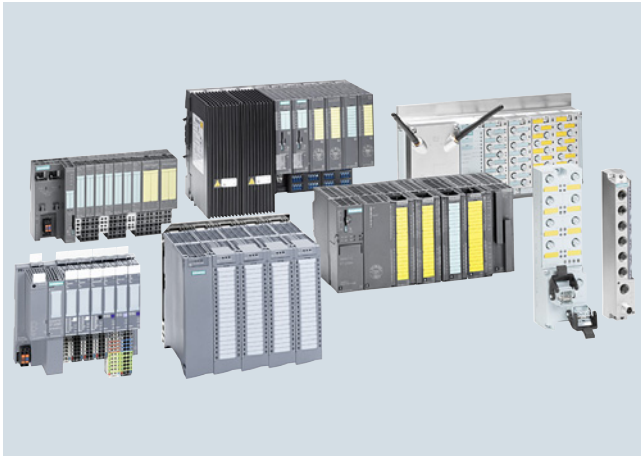
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Overview

**SIMATIC ET 200 offers the right solution for every application**

With SIMATIC ET 200 a wide range of distributed I/O systems is available - for solutions in the control cabinet or without a control cabinet directly at the machine, as well as for applications in hazardous areas. The modular design makes it possible to scale and expand the ET 200 systems simply and in small stages. Already integrated add-on modules reduce costs and at the same time offer a widely diverse range of possible applications. You can choose from many different combination options: digital and analog inputs/outputs, intelligent modules with CPU functionality, safety systems, motor starters, pneumatic devices, frequency converters, as well as various different technology modules (e.g. for counting, positioning).

Communication over PROFINET and PROFIBUS, uniform engineering, transparent diagnostic possibilities as well as optimal interfacing to SIMATIC controllers and HMI units prove the unique integration of Totally Integrated Automation.

PROFINET

PROFINET is the open, cross-vendor Industrial Ethernet standard (IEC 61158/61784) for automation.

Based on Industrial Ethernet, PROFINET enables direct communication between field devices (IO devices) and controllers (IO Controllers), up to and including the solution of isochronous drive controls for motion control applications.

As PROFINET is based on Standard Ethernet according to IEEE 802.3, any devices from the field level to the management level can be connected.

In this way, PROFINET enables system-wide communication, supports plant-wide engineering and applies IT standards, such as web server or FTP, right down to field level. Tried and tested fieldbus systems, such as PROFIBUS or AS-Interface, can be easily integrated without any modification to the existing devices.

PROFIBUS

PROFIBUS is the international standard (IEC 61158/61784) for the field level. It is the only fieldbus to allow communication both in manufacturing applications and in process-oriented applications.

PROFIBUS is used to connect field devices, e.g. distributed I/O devices or drives, to automation systems such as SIMATIC S7, SIMOTION, SINUMERIK, or PCs.

PROFIBUS is standardized in accordance with IEC 61158 and is a powerful, open and rugged fieldbus system with short response times. PROFIBUS is available in different forms for various applications.

PROFIBUS DP (Distributed I/O)

PROFIBUS DP is used for connecting distributed field devices, e.g. SIMATIC ET 200, or drives with extremely fast response times. PROFIBUS DP is used when sensors or actuators are distributed at the machine or in the plant (e.g. field level).

AS-Interface

AS-Interface is the international standard (IEC 62026/EN 50295) which, as an alternative to the cable harness, links especially cost-effective sensors and actuators by means of a two-wire line. This two-wire line is also used to supply the individual stations with power. This makes the AS-Interface the ideal partner for PROFINET and PROFIBUS DP. AS-i communication modules in the ET 200SP enable the flexible combination of AS-Interface and distributed I/Os. AS-Interface transmits standard data and safety data up to PL e / SIL 3 in the same AS-i network. AS-Interface is not only suitable for efficient transmission of digital and analog I/O signals but also ideal for the user-friendly connection of EMERGENCY STOP pushbuttons and protective doors.

IO-Link

The communication standard IO-Link permits the intelligent connection of sensors and switching devices to the control level. IO-Link facilitates the integration of all components in the control cabinet and on the field level - for maximum integration and seamless communication on the final meters to the process.

IO-Link solutions from Siemens ensure maximum precision and cost-effectiveness in any production system. IO-Link is completely integrated in Totally Integrated Automation (TIA) and offers many advantages.

- The open standard permits the networking of devices from different manufacturers
- Simple wiring facilitates the installation process
- Reduced wiring effort saves time and money during installation
- Efficient engineering facilitates configuration and commissioning
- High-speed diagnostics ensures short plant standstill times and high plant availability
- High process transparency permits, for example, efficient power management

I/O systems

SIMATIC ET 200 systems for the control cabinet

SIMATIC ET 200SP

Overview

SIMATIC ET 200SP



The scalable SIMATIC ET 200SP I/O system is a highly flexible, modular I/O system with IP20 degree of protection. Via an interface module with PROFINET or PROFIBUS interface it can exchange IO data of the connected I/O modules with a higher-level control system. Alternatively, as further head-end stations, various PLC, F-PLC and Open Controllers are available as compact S7-1500 controllers (distributed controllers). ET 200SP components are available as SIPLUS version for extreme requirements and a high degree of robustness.

Compact design

- Modular configuration with up to 64 modules
- System-integrated self-assembling load group supply without power module via light BaseUnits
- Small size and highly flexible due to the modular design and comprehensive product range
- Up to 16 channels per module
- Permanent wiring
- Hot swapping: Module replacement without tools in RUN
- Operation with gaps

Flexible connection system

- Push-in terminals for cross-sections up to 1.5 mm² with wire end ferrule, and up to 2.5 mm² without wire end ferrule
- BaseUnits for 1-wire or direct multi-wire connection
- Optimum accessibility for wiring due to spring release and measuring tap next to the conductor opening
- Flexible PROFINET connection via BusAdapter (RJ45, FastConnect, plastic or glass fiber-optic cables), also as integrated media converter

Safety Integrated

- Easy integration of fail-safe modules
- Easy F parameter assignment via software
- Group-by-group disconnection of non-fail-safe modules

High performance

- Isochronous PROFINET
- Internal data transfer with up to 100 Mbps
- Record analog values and output as of 50 µs
- Record digital values and output as of 1 µs

High-performance technology

- Modules for the functions Counting, Positioning, Weighing

Energy efficiency

- Energy meter for recording electrical variables
- System-integrated PROFenergy with interval substitute values

Advanced functions

- Configuration control: application-based adaptation of the actual configuration via user software (option handling)
- Time-based IO: time stamping of the signals to the µs
- MSI/MSO: Simultaneous access to I/O data from up to 4 PLCs
- Oversampling: n-fold acquisition or output of digital and analog signals within a PN cycle
- Adaptation of measuring range: increased resolution by adapting the measuring range to a limited section of a measuring range supported by the analog input module
- Scaling of measured values: permits the transmission of the analog value normalized to the required physical value as a REAL value (32-bit floating point)

Communication standards

- PROFINET IO
- PROFIBUS DP V0/V1
- ET connection for connecting the ET 200AL (IP67)
- IO-Link V1.1
- AS-Interface
- Point-to-point (RS 232, RS 485, RS 422)

CPU

- PROFINET connection with 3 ports
- IO controller and PN IO device
- Optional expansion as DP master/slave
- Also as fail-safe version and Open Controller

Labeling of I/O modules

- Meaningful labeling on the front of the I/O modules
- Optionally expandable with
 - Labeling strips
 - Equipment labeling plate

Overview (continued)

Overview of ET 200SP components

Basic components	Function
DIN rail according to EN 60715	The DIN rail is the module support of the ET 200SP. The ET 200SP is mounted on the DIN rail.
CPU	The CPU: • executes the user program • is used as IO controller, I-device on PROFINET IO, or as stand-alone CPU • connects the ET 200SP with the IO devices or the IO controller • exchanges data with the I/O modules via the backplane bus Further functions of the CPU: • Communication via PROFIBUS DP (in combination with the CM DP communication module, the CPU can be used as DP master or slave) • Integrated web server • Integrated technology • Integrated trace functionality • Integrated system diagnostics • Integrated safety
Open controller	As the first controller of this type, the SIMATIC ET 200SP Open Controller combines the functions of a PC-based software controller with visualization, PC applications and central I/Os (inputs/outputs) in a single, compact device. • All in one • High system availability • Compact and modular • Rugged • User-friendly design • Efficient engineering in the TIA Portal
Interface module for PROFINET IO (IM 155-6PN)	The interface module: • is used as IO device on the PROFINET IO • connects the ET 200SP with the IO controller • exchanges data with the I/O modules via the backplane bus
Interface module for PROFIBUS DP (IM 155-6DP)	The interface module: • is used as DP slave on the PROFIBUS DP • connects the ET 200SP with the DP master • exchanges data with the I/O modules via the backplane bus
BusAdapter (BA)	BusAdapters permit the free selection of the connection method and connection technology for head-end stations with PROFINET interface. Various versions are available for the connection of copper cables or plastic and glass fiber-optic cables. Hybrid copper/fiber-optic versions are also available as integrated media converters. Cable length between 2 stations: - max. 100 m (Cu), - max. 50 m (POF), - max. 100 m (PCF), - max. 3 km (glass FOC). For expanding the station with the I/O systems ET 200AL via ET connection, the BA-Send BusAdapter is available.

Basic components	Function
BaseUnit (BU)	The BaseUnits provide the electrical and mechanical connection for the ET 200SP components. • Bright BaseUnits permit a new potential group up to max. 10 A • Dark BaseUnits forward the self-assembling voltage busbars P1, P2 and AUX from the left to the right BaseUnit • Suitable BaseUnits with 12 to 28 terminals are available for different connection systems (single or direct multi-conductor connection) and functions • The I/O module is plugged onto the desired BaseUnit and determines the potential assignment of the terminals on the BaseUnit • For expanding the station with the I/O systems ET 200AL via ET connection, the BaseUnit BU-Send is available
I/O modules and fail-safe I/O modules	The I/O module determines the function at the terminals. The controller detects the current process state via the connected sensors and triggers corresponding responses via the connected actuators. Some I/O modules feature extended functions, in part they are also designed as individual operating mode. I/O modules are divided into the following module types; the fail-safe versions are identified by a preceding "F-" and a yellow module enclosure. • DI (digital input) • DQ (digital output) • AI (analog input) • AQ (analog output) • TM (technology modules) • CM (communication modules) • SM (special modules)
Protective cover (BU cover)	The ET 200SP system can be operated with any number of slot gaps (BU slot without I/O module). Applications for this include: • partial commissioning • pre-wired, and currently unequipped options To protect against damage, such slot gaps must be covered by a BU cover. Within the BU cover, an equipment labeling plate can be kept for the possible later use of an I/O module. Versions: • for BaseUnits with a width of 15 mm • for BaseUnits with a width of 20 mm
Server module	The server module concludes the setup of an ET 200SP station. On the server module there are holders for 3 spare fuses (5 × 20 mm). The server module is included in the scope of delivery of all head-end stations.

I/O systems

SIMATIC ET 200 systems for the control cabinet

SIMATIC ET 200SP

Overview (continued)

Basic components	Function
Coding element	When plugging an I/O module onto a BaseUnit for the first time, the coding element moves from the I/O module to the BaseUnit. There it prevents the destruction of the ET 200SP components in the event of a subsequent module replacement with incorrectly selected I/O module. The coding element is available in two versions: • Mechanical coding element • Electronic coding element: Additionally features an electronic, re-writable memory for the redundant storage of module-specific configuration data (e.g. F target address for fail-safe modules, parameter data for IO-Link master). Thus these data are automatically backed up during a module replacement
Shield connection	The shield connection permits the connection of cable shields. Compared to external shield supports, the system offers the following advantages: • Quick installation without tools by plugging the shield connection element onto the BaseUnit • Automatic low-impedance connection to the functional ground (DIN rail) • Optimized EMC properties by separating the supply voltage lines from the signal lines by means of the shield connection element and short, unshielded cable lengths • Low space requirements
Labeling strips	Optionally, for system-specific marking the head-end stations and I/O modules can be equipped with labeling strips (13 x 31 mm). The labeling strips can be inscribed mechanically. Labeling strips are available in two versions in the colors light gray and yellow: • 500 strips on the roll, for printing on thermal transfer printers. Core diameter 40 mm, external diameter 70 mm, width 62 mm • 10 DIN A4 sheets with 100 strips each, card 180 g/mm², perforated, for printing with a laser printer direct from TIA Portal or via print templates

Basic components	Function
Equipment labeling plate	Optionally, one equipment labeling plate each can be plugged onto head-end stations, BusAdapters, BaseUnits, and I/O modules. Equipment labeling plates are supplied in packs of 10 sheets with 16 labels each. The labels can be printed with thermal transfer card printers or plotters, or stickers can be attached to them. Advantages compared to labels that are attached directly: • The inscription on the front is not covered • Simple label replacement when replacing a module • No parallax errors when marking the BaseUnits on the mounting plate The size of the inscribable area of the labels is 14.8 x 10.5 mm (W x H)
Color-coded labels	The I/O modules that are plugged onto the BaseUnits determine the potentials connected at the process terminals. The +/- potentials can optionally be identified using module-specific color-coded labels. The potentials of the AUX and add-on terminals can also be marked using color-coded labels. Advantages of the color-coded labels: • Quick installation (one label for marking 16 terminals) • Avoidance of wiring errors • Simple detection of potentials during servicing

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)

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

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.
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	

Technical specifications (continued)

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.
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

I/O systems

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

Interface modules > IM 155-6

Ordering data	Article No.		Article No.
Station expansion with IP67 I/O system ET 200AL		SIMATIC Manual Collection	6ES7998-8XC01-8YE0
ET 200SP BA-Send 1 x FC BusAdapter	6ES7193-6AS00-0AA0	Electronic manuals on DVD, multi-language: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC	
BaseUnit BU-Send	6ES7193-6BN00-0NE0	SIMATIC Manual Collection update service for 1 year	6ES7998-8XC01-8YE2
Additional accessories		Current "Manual Collection" DVD and the three subsequent updates	
Labeling strips		Spare parts	
500 labeling strips on roll, light gray, for inscription with thermal transfer roll printer	6ES7193-6LR10-0AA0	Server module	6ES7193-6PA00-0AA0
500 labeling strips on roll, yellow, for inscription with thermal transfer roll printer	6ES7193-6LR10-0AG0	Terminates an ET 200SP station; included in the scope of delivery of the interface modules	
1000 labeling strips DIN A4, light gray, card, perforated, for inscription with laser printer	6ES7193-6LA10-0AA0	Power supply connector for interface module	
1000 labeling strips DIN A4, yellow, card, perforated, for inscription with laser printer	6ES7193-6LA10-0AG0	For connecting the 24 V DC supply voltage	
Equipment labeling plate	6ES7193-6LF30-0AW0	with push-in terminals (10 units)	6ES7193-4JB00-0AA0
10 sheets of 16 labels, for printing with thermal transfer card printer or plotter		with screw-type terminals (10 units)	6ES7193-4JB50-0AA0
DIN rail 35 mm			
Length: 483 mm for 19" cabinets	6ES5710-8MA11		
Length: 530 mm for 600 mm cabinets	6ES5710-8MA21		
Length: 830 mm for 900 mm cabinets	6ES5710-8MA31		
Length: 2 m	6ES5710-8MA41		
Manuals for ET 200SP distributed I/O system			
SIMATIC ET 200SP Manual Collection: PDF file with the following content:			
- Basic information System manual, product information, overview tables, correction information or manual supplements - Device-specific information Device manuals for the interface modules, PLC, OC and I/O modules, including fail-safe - Comprehensive information Function manuals			
The Manual Collection can be downloaded from the Internet as a PDF file:			
https://support.industry.siemens.com/cs/de/en/view/84133942			

Overview



- Interface module for linking the I/O modules to a higher level controller with PROFINET or PROFIBUS
- Server module included in the scope of supply
- Station expansion with IP67 I/O system ET 200AL via ET connection to BU-Send / BA-Send
- PROFINET bus connection
 - 2 ports for line configuration
 - PN connection selected via BusAdapter (ST, HF)
 - Two integrated RJ45 sockets (BA)
- PROFIBUS bus connection
 - 9-pin sub D socket
 - PROFIBUS connector included in scope of delivery
 - Hot swapping (module replacement during operation)
 - Startup and operation with gaps
 - Dynamic re-parameterization in RUN mode
 - Configuration control (option handling)
 - Pluggable 24 V DC supply connector
 - Electronically readable rating plate (I&M data)

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

Technical specifications

Article number	6AG1155-6AA00-7BN0	6AG1155-6AU00-4CN0	6AG1155-6BA00-7CN0
Based on	6ES7155-6AA00-0BN0	6ES7155-6AU00-0CN0	6ES7155-6BA00-0CN0
	SIPLUS ET 200SP IM155-6PN ST	SIPLUS ET 200SP IM155-6PN HF	SIPLUS ET 200SP IM155-6DP HF
Ambient conditions			
Ambient temperature during operation			
• horizontal installation, min.	-40 °C; = Tmin; Startup @ -25 °C	0 °C	-40 °C; = Tmin; Startup @ -25 °C
• horizontal installation, max.	70 °C; = Tmax	60 °C	70 °C; = Tmax
• vertical installation, min.	-40 °C; = Tmin; Startup @ -25 °C	0 °C	-40 °C; = Tmin; Startup @ -25 °C
• vertical installation, max.	50 °C; = Tmax	50 °C	50 °C; = Tmax
Extended ambient conditions			
• relative to ambient temperature-atmospheric pressure-installation altitude	Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m)	Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m)	Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m)
Relative humidity			
- With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation/frost (no commissioning under condensation conditions)	100 %; RH incl. condensation/frost (no commissioning under condensation conditions)	100 %; RH incl. condensation/frost (no commissioning under condensation conditions)
Resistance			
- against biologically active substances / conformity with EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!
- against chemically active substances / conformity with EN 60721-3-3	Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!
- against mechanically active substances / conformity with EN 60721-3-3	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!

I/O systems

SIMATIC ET 200 systems for the control cabinet

SIMATIC ET 200SP

Interface modules > SIPLUS interface modules

Ordering data	Article No.		Article No.
SIPLUS interface module Standard (Extended temperature range and exposure to media) IM 155-6PN ST, with server module and installed BA 2xRJ45 BusAdapter	6AG1155-6AA00-7BN0	Accessories	See SIMATIC ET 200SP, IM 155-6 interface module, page 9/11
SIPLUS interface module High Feature (Extended temperature range and exposure to media) - IM 155-6DP HF, with server module, with multi-hot-swap, incl. PROFIBUS connector (Exposure to media) - IM 155-6PN HF, incl. server module, without BusAdapter	6AG1155-6BA00-7CN0 6AG1155-6AU00-4CN0		

Overview



- 4, 8 and 16-channel digital input (DI) modules
 - Apart from the standard delivery form in an individual package, selected I/O modules and BaseUnits are also available in a pack of 10 units. The pack of 10 units enables the amount of waste to be reduced considerably, as well as saving the time of unpacking individual modules.
- For different requirements, the digital input modules offer:
- Function classes Basic, Standard, High Feature and High-Speed as well as fail-safe DI
 - BaseUnits for single or multiple-conductor connection with automatic slot coding
 - Individual system-integrated load group formation with self-assembling voltage distribution bars (a separate power module is no longer required for ET 200SP)
 - Connection option of sensors compliant with IEC 61131 Type 1, 2 or 3 (module-dependent) for rated voltages of up to 24 V DC or 230 V AC

- PNP (sink input) and NPN (source input) versions
- Clear labeling on front of module
- LEDs for diagnostics, status, power supply and faults
- Electronically readable and non-volatile writable rating plate (I&M data 0 to 3)
- Extended functions and additional operating modes in some cases
 - MSI operating mode (simultaneous reading of input data from as many as three other controllers)
 - Counting operating mode (multi-channel counter for pulse generators with 32-bit counting width and up to 10 kHz counting frequency)
 - Oversampling operating mode (n-fold equidistant acquisition of digital values within one PN cycle for increasing the time resolution for slow CPU cycles)
 - Parameterizable input delay time
 - Isochronous mode (simultaneous equidistant reading of all input channels)
 - Hardware interrupts
 - Pulse extension
 - Re-parameterization during operation
 - Firmware update
 - Diagnosis of wire break and short-circuit (on channel or module basis)
 - Value status (optional binary validity information of the input signal in the process image)
 - Supports the PROFlenergy profile
- Optional accessories
 - Labeling strips (film or card)
 - Equipment labeling plate
 - Color-coded label with module-specific CC Code
 - Shielding terminal

A quick and clear comparison of the functions of the different DI modules is offered by the TIA Selection Tool.

Overview of digital input modules

Digital input	PU	Article No.	CC Code	BU type
DI 16 x 24 V DC ST	1	6ES7131-6BH00-0BA0	CC00	A0
DI 16 x 24 V DC ST	10	6ES7131-6BH00-2BA0	CC00	A0
DI 8 x 24 V DC BA	1	6ES7131-6BF00-0AA0	CC01	A0
DI 8 x 24 V DC BA	10	6ES7131-6BF00-2AA0	CC01	A0
DI 8 x 24 V DC SRC BA	1	6ES7131-6BF60-0AA0	CC02	A0
DI 8 x 24 V DC ST	1	6ES7131-6BF00-0BA0	CC01	A0
DI 8 x 24 V DC ST	10	6ES7131-6BF00-2BA0	CC01	A0
DI 8 x 24 V DC HF	1	6ES7131-6BF00-0CA0	CC01	A0
DI 8 x NAMUR HF	1	6ES7131-6TF00-0CA0	CC01	A0
DI 8 x 24 V DC HS	1	6ES7131-6BF00-0DA0	CC01	A0
With three operating modes:				
• High-speed isochronous DI				
• 4 pulse counters, 32-bit, 10 kHz				
• Oversampling				
DI 4 x 120...230 V AC ST	1	6ES7131-6FD00-0BB1	CC41	B1

I/O systems

SIMATIC ET 200 systems for the control cabinet

SIMATIC ET 200SP

I/O modules > Digital input modules**Overview** (continued)

Overview of BaseUnits

BaseUnit	PU	Article No.	CC Codes for process terminals	CC Codes for AUX terminals
BU type A0 • New load group (light) • 16 process terminals • With 10 AUX terminals	1	6ES7193-6BP20-0DA0	CC01 to CC05	CC71 to CC73
BU type A0 • New load group (light) • 16 process terminals • With 10 AUX terminals	10	6ES7193-6BP20-2DA0	CC01 to CC05	CC71 to CC73
BU type A0 • New load group (light) • 16 process terminals • Without AUX terminals	1	6ES7193-6BP00-0DA0	CC01 to CC05	--
BU type A0 • New load group (light) • 16 process terminals • Without AUX terminals	10	6ES7193-6BP00-2DA0	CC01 to CC05	--
BU type A0 • Forwarding of load group (dark) • 16 process terminals • With 10 AUX terminals	1	6ES7193-6BP20-0BA0	CC01 to CC05	CC71 to CC73
BU type A0 • Forwarding of load group (dark) • 16 process terminals • With 10 AUX terminals	10	6ES7193-6BP20-2BA0	CC01 to CC05	CC71 to CC73
BU type A0 • Forwarding of load group (dark) • 16 process terminals • Without AUX terminals	1	6ES7193-6BP00-0BA0	CC01 to CC05	--
BU type A0 • Forwarding of load group (dark) • 16 process terminals • Without AUX terminals	10	6ES7193-6BP00-2BA0	CC01 to CC05	--
BU type B1 • Forwarding of load group (dark) • 12 process terminals • 2 x 2 (1L, 2L, 1N, 2N) direct infeed module • Without AUX terminals	1	6ES7193-6BP20-0BB1	CC41	--

Technical specifications

Article number	6ES7131-6BF00-0AA0 ET 200SP, DI 8x24VDC BASIC	6ES7131-6BF60-0AA0 ET 200SP, DI 8x24VDC SOURCE BA	6ES7131-6BF00-0BA0 ET 200SP, DI 8x24VDC ST	6ES7131-6BH00-0BA0 ET 200SP, DI 16x24VDC ST
General information				
Product type designation	ET 200SP, DI 8x 24 V DC BA, PU 1	ET 200SP, DI 8x 24 V DC SRC BA, PU 1	ET 200SP, DI 8x 24 V DC ST, PU 1	ET 200SP, DI 16x 24 V DC ST, PU 1
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&M3
Engineering with				
• STEP 7 TIA Portal configurable/ integrated as of version	V13 SP1	V13 / V13	V11 SP2 / V13	V13 SP1
• STEP 7 configurable/integrated as of version	V5.5 SP3 / -	V5.5 SP3 / -	V5.5 SP3 / -	V5.5 / -
• PCS 7 configurable/integrated as of version			V8.1 SP1	V8.1 SP1
• PROFIBUS as of GSD version/ GSD revision	GSD Revision 5	GSD Revision 5	GSD Revision 5	GSD Revision 5
• PROFINET as of GSD version/ GSD revision	GSDML V2.3	GSDML V2.3	GSDML V2.3	GSDML V2.3
Operating mode				
• DI	Yes	Yes	Yes	Yes
• Counter	No	No	No	No
• Oversampling	No	No	No	No
• MSI	No	No	No	No
Supply voltage				
Type of supply voltage	DC	24 V DC	DC	DC
Rated value (DC)	24 V	24 V	24 V	24 V
Reverse polarity protection	Yes	Yes	Yes	Yes
Encoder supply				
Number of outputs	8		8	
Output voltage encoder supply, min.	19.2 V		19.2 V	
Short-circuit protection	No	No	Yes; per module	No
24 V encoder supply				
• 24 V	Yes		Yes	No
• Short-circuit protection	Yes		Yes	No
• Output current, max.	700 mA		700 mA; Total current of all encoders	
Digital inputs				
Number of digital inputs	8	8	8	16
Source/sink input	P-reading	Yes; m-reading	P-reading	P-reading
Input characteristic curve in accordance with IEC 61131, type 1	Yes	Yes	Yes	Yes
Input characteristic curve in accordance with IEC 61131, type 2	Yes	No	No	No
Input characteristic curve in accordance with IEC 61131, type 3	Yes	Yes	Yes	Yes
Pulse extension	No	No	No	No
Input voltage				
• Type of input voltage	DC	DC	DC	DC
• Rated value (DC)	24 V	24 V	24 V	24 V
• for signal "0"	-30 to +5V	30 V to -5 V (reference potential is L+)	-30 to +5V	-30 to +5V
• for signal "1"	+11 to +30V	-11 V to -30 V (reference potential is L+)	+11 to +30V	+11 to +30V
Input current				
• for signal "1", typ.	6.8 mA	6 mA	2.5 mA	2.5 mA

I/O systems

SIMATIC ET 200 systems for the control cabinet

SIMATIC ET 200SP

I/O modules > Digital input modules

Technical specifications (continued)

Article number	6ES7131-6BF00-0AA0 ET 200SP, DI 8X24VDC BASIC	6ES7131-6BF60-0AA0 ET 200SP, DI 8X24VDC SOURCE BA	6ES7131-6BF00-0BA0 ET 200SP, DI 8X24VDC ST	6ES7131-6BH00-0BA0 ET 200SP, DI 16X24VDC ST
Input delay (for rated value of input voltage)				
for standard inputs				
- parameterizable	Yes; None / 0.05 / 0.1 / 0.4 / 0.8 / 1.6 / 3.2 / 12.8 / 20 ms (in each case + delay of 30 µs to 500 µs, depending on line length)	Yes; 0.05 / 0.1 / 0.4 / 0.8 / 1.6 / 3.2 / 12.8 / 20 ms (in each case + delay of 30 to 500 µs, depending on line length)	Yes; 0.05 / 0.1 / 0.4 / 0.8 / 1.6 / 3.2 / 12.8 / 20 ms (in each case + delay of 30 to 500 µs, depending on line length)	Yes; 0.05 / 0.1 / 0.4 / 0.8 / 1.6 / 3.2 / 12.8 / 20 ms (in each case + delay of 30 to 500 µs, depending on line length)
for interrupt inputs				
- parameterizable	No	No	No	No
for counter/technological functions				
- parameterizable	No	No	No	No
Cable length				
• shielded, max.	1 000 m	1 000 m	1 000 m	1 000 m
• unshielded, max.	600 m	200 m	600 m	600 m
Encoder				
Connectable encoders				
• 2-wire sensor	Yes	Yes	Yes	Yes
- permissible quiescent current (2-wire sensor), max.	2 mA	1.5 mA	1.5 mA	1.5 mA
Isochronous mode				
Isochronous operation (application synchronized up to terminal)	No	No	No	No
Interrupts/diagnostics/ status information				
Diagnostics function	Yes	Yes	Yes	Yes
Alarms				
• Diagnostic alarm	Yes	Yes	Yes	Yes
• Hardware interrupt		No		
Diagnostic messages				
• Diagnostic information readable	Yes	Yes	Yes	Yes
• Monitoring the supply voltage	Yes	Yes	Yes	Yes
- parameterizable	Yes	Yes	Yes	Yes
• Monitoring of encoder power supply	No	No	Yes; Module-wise	No
• Wire-break	No	No	Yes; Module-by-module, optional protective circuit for preventing wire-break diagnostics in the case of simple encoder contacts: 25 kOhm to 45 kOhm	Yes; Module-by-module, optional protective circuit for preventing wire-break diagnostics in the case of simple encoder contacts: 25 kOhm to 45 kOhm
• Short-circuit	No	No	Yes; Module-wise	No
• Group error		Yes		Yes
Diagnostics indication LED				
• Monitoring of the supply voltage (PWR-LED)	Yes; green PWR LED	Yes; green PWR LED	Yes; green PWR LED	Yes; green PWR LED
• Channel status display	Yes; Green LED	Yes; Green LED	Yes; Green LED	Yes; Green LED
• for channel diagnostics	No	No	No	No
• for module diagnostics	Yes; green/red DIAG LED	Yes; green/red DIAG LED	Yes; green/red DIAG LED	Yes; green/red DIAG LED
Potential separation				
Potential separation channels				
• between the channels and backplane bus	Yes	Yes	Yes	Yes
Isolation				
Isolation tested with	707 V DC (type test)	707 V DC (type test)	707 V DC (type test)	707 V DC (type test)
Standards, approvals, certificates				
Suitable for safety functions	No	No	No	No
Dimensions				
Width	15 mm	15 mm	15 mm	15 mm
Height	73 mm	73 mm	73 mm	73 mm
Depth	58 mm	58 mm	58 mm	58 mm
Weights				
Weight, approx.	28 g	28 g	28 g	28 g

Technical specifications (continued)

Article number	6ES7131-6BF00-0CA0 ET 200SP, DI 8x24VDC HF	6ES7131-6BF00-0DA0 ET 200SP, DI 8x24VDC HIGH SPEED	6ES7131-6TF00-0CA0 ET 200SP, DI 8xNAMUR HF	6ES7131-6FD00-0BB1 ET 200SP, DI 4x120...230VAC ST
General information				
Product type designation	ET 200SP, DI 8x 24 V DC HF, PU 1	ET 200SP, DI 8x 24 V DC High Speed, PU 1	DI 8xNAMUR HF	DI 4x120 ... 230VAC ST
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&M3
Engineering with				
• STEP 7 TIA Portal configurable/integrated as of version	V13 SP1 / -	V13 SP1	V13 / V13	V13 / V13
• STEP 7 configurable/integrated as of version	V5.5 / -	V5.5 SP3 / -	V5.5 SP3 / -	V5.5 SP3 / -
• PCS 7 configurable/integrated as of version	V8.1 SP1			
• PROFIBUS as of GSD version/GSD revision	GSD Revision 5	GSD Revision 5	GSD Revision 5	GSD Revision 5
• PROFINET as of GSD version/GSD revision	GSDML V2.3	GSDML V2.3	GSDML V2.3	GSDML V2.3
Operating mode				
• DI	Yes	Yes	Yes	Yes
• Counter	No	Yes	No	No
• Oversampling	No	Yes	No	No
• MSI	Yes	No	No	No
Supply voltage				
Type of supply voltage	DC	DC	24 V DC	100 - 240 V AC
Rated value (DC)	24 V	24 V	24 V	
Rated value (AC)				230 V
Reverse polarity protection	Yes	Yes	Yes	No
Encoder supply				
Number of outputs			8	4
Short-circuit protection			Yes	No; when using BU type B1, a fuse with 10 A tripping current must be provided
Output current				
• up to 60 °C, max.				10 A
24 V encoder supply				
• 24 V	Yes	Yes	No	No
• Short-circuit protection	Yes; per channel, electronic	Yes; per module, electronic	No	No
• Output current, max.	700 mA; Per channel	700 mA		
Digital inputs				
Number of digital inputs	8	8	8	4
Digital inputs, parameterizable			Yes	
Type			NAMUR	
Source/sink input	P-reading	P-reading		No
Input characteristic curve in accordance with IEC 61131, type 1	Yes			
Input characteristic curve in accordance with IEC 61131, type 2	No			
Input characteristic curve in accordance with IEC 61131, type 3	Yes			Yes
Pulse extension	Yes; Pulse duration from 4 µs	Yes	Yes; 0.5 s, 1 s, 2 s	No
• Length	2 s; 50 ms, 100 ms, 200 ms, 500 ms, 1 s, 2 s	2 s; 50 ms, 100 ms, 200 ms, 500 ms, 1 s, 2 s		
Edge evaluation	Yes; rising edge, falling edge, edge change		Yes; rising edge, falling edge, edge change	
Signal change flutter			Yes; 2 to 32 signal changes	
Flutter observation window			Yes; 0.5 s, 1 s to 100 s in 1-s steps	

I/O systems

SIMATIC ET 200 systems for the control cabinet

SIMATIC ET 200SP

I/O modules > Digital input modules

Technical specifications (continued)

Article number	6ES7131-6BF00-0CA0 ET 200SP, DI 8X24VDC HF	6ES7131-6BF00-0DA0 ET 200SP, DI 8X24VDC HIGH SPEED	6ES7131-6TF00-0CA0 ET 200SP, DI 8XNAMUR HF	6ES7131-6FD00-0BB1 ET 200SP, DI 4X120..230VAC ST
Digital input functions, parameterizable				
• Gate start/stop • Freely usable digital input • Counter - Number, max. - Counting frequency, max. - Counting width - Counting direction up/down • Digital input with oversampling - Number, max. - Values per cycle, max. - Resolution, min.		Yes Yes Yes 4 10 kHz 32 bit Yes Yes 8 32 7.8125 µs		
Input voltage				
• Type of input voltage • Rated value (DC) • Rated value (AC) • for signal "0" • for signal "1"	DC 24 V -30 to +5V +11 to +30V	DC 24 V -30 to +5V +11 to +30V	DC 8.2 V	120/230V AC (47 Hz to 63 Hz) 230 V 0V AC to 40V AC 74 V AC to 264 V AC
Input current				
• for signal "1", typ.	2.5 mA	6 mA		10.8 mA
for 10 k switched contact				
- for signal "0" - for signal "1"			0.35 to 1.2 mA 2.1 to 7 mA	
for unswitched contact				
- for signal "0", max. (permissible quiescent current) - for signal "1"			0.5 mA typ. 8 mA	
for NAMUR encoders				
- for signal "0" - for signal "1"			0.35 to 1.2 mA 2.1 to 7 mA	
Input delay (for rated value of input voltage)				
• tolerated changeover time for changeover contacts			300 ms	
for standard inputs				
- parameterizable	Yes; 0.05 / 0.1 / 0.4 / 0.8 / 1.6 / 3.2 / 12.8 / 20 ms (in each case + delay of 30 to 500 µs, depending on line length)	Yes; none / 0.05 / 0.1 / 0.4 / 0.8 / 1.6 / 3.2 / 12.8 / 20 ms	No	No
for interrupt inputs				
- parameterizable	Yes	Yes		
for counter/technological functions				
- parameterizable	No	Yes		
for NAMUR inputs				
- at "0" to "1", max. - at "1" to "0", max.			12 ms 12 ms	
Cable length				
• shielded, max. • unshielded, max.	1 000 m 600 m	50 m 50 m	200 m	1 000 m 600 m

Technical specifications (continued)

Article number	6ES7131-6BF00-0CA0 ET 200SP, DI 8X24VDC HF	6ES7131-6BF00-0DA0 ET 200SP, DI 8X24VDC HIGH SPEED	6ES7131-6TF00-0CA0 ET 200SP, DI 8XNAMUR HF	6ES7131-6FD00-0BB1 ET 200SP, DI 4X120...230VAC ST
Encoder				
Connectable encoders				
• NAMUR encoder/changeover contact according to EN 60947			Yes	
• Single contact / changeover contact unconnected			Yes	
• Single contact / changeover contact connected with 10 kΩ			Yes	
• 2-wire sensor	Yes	Yes		Yes
- permissible quiescent current (2-wire sensor), max.	1.5 mA	1.5 mA		
Isochronous mode				
Isochronous operation (application synchronized up to terminal)	Yes	Yes	No	No
Filtering and processing time (TCI), min.	420 μs			
Bus cycle time (TDP), min.	500 μs	125 μs		
Interrupts/diagnostics/status information				
Diagnostics function	Yes	Yes	Yes	
Alarms				
• Diagnostic alarm	Yes; channel by channel	Yes	Yes; channel by channel	No
• Hardware interrupt	Yes; Parameterizable, channels 0 to 7	Yes	Yes; Parameterizable, channels 0 to 7	No
Diagnostic messages				
• Diagnostic information readable	Yes	Yes	Yes	
• Monitoring the supply voltage	Yes	Yes	Yes	
- parameterizable	Yes	Yes	Yes	
• Monitoring of encoder power supply	Yes; channel by channel	Yes; Module-wise	Yes; channel by channel	
• Wire-break	Yes; Channel by channel, optional protective circuit for preventing wire-break diagnostics in the case of simple encoder contacts: 25 kOhm to 45 kOhm	No	Yes; channel by channel	No
• Short-circuit	Yes; channel by channel	Yes; Module-wise	Yes; channel by channel	No
• Group error			Yes	Yes
Diagnostics indication LED				
• Monitoring of the supply voltage (PWR-LED)	Yes; green PWR LED	Yes; green PWR LED	Yes; green PWR LED	Yes; green PWR LED
• Channel status display	Yes; Green LED	Yes; Green LED	Yes; Green LED	Yes; Green LED
• for channel diagnostics	Yes; Red LED	No	Yes; Red LED	No
• for module diagnostics	Yes; green/red DIAG LED	Yes; green/red DIAG LED	Yes; green/red DIAG LED	Yes; green/red DIAG LED
Potential separation				
Potential separation channels				
• between the channels and backplane bus	Yes	Yes	Yes	Yes
Isolation				
Isolation tested with	707 V DC (type test)	707 V DC (type test)	707 V DC (type test)	2 545 V DC/2 s (routine test)
Standards, approvals, certificates				
Suitable for safety functions	No	No	No	No
Dimensions				
Width	15 mm	15 mm	15 mm	20 mm
Height	73 mm	73 mm	73 mm	73 mm
Depth	58 mm	58 mm	58 mm	58 mm
Weights				
Weight, approx.	28 g	28 g	32 g	36 g

I/O systems

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

I/O modules > Digital input modules

Ordering data

Article No.

Article No.

Digital input modules

Delivery options:

Apart from the standard delivery form in an individual package, selected I/O modules and BaseUnits are also available in a pack of 10 units. The pack of 10 units enables the amount of waste to be reduced considerably, as well as saving the time of unpacking individual modules.

The number of modules required is the number of modules ordered. The type of packaging is chosen by selecting the article number. Packs of 10 can therefore only be ordered in integer multiples of 10.

Digital input module DI 8x24 V DC, Basic, BU type A0, color code CC01

- PU: 1 unit
- PU: 10 units

6ES7131-6BF00-0AA0
6ES7131-6BF00-2AA0

Digital input module DI 8x24 V DC Source Input, Basic, BU type A0, color code CC02; PU: 1 unit

6ES7131-6BF60-0AA0

Digital input module DI 8x24 V DC Standard, BU type A0, color code CC01

- PU: 1 unit
- PU: 10 units

6ES7131-6BF00-0BA0
6ES7131-6BF00-2BA0

Digital input module DI 16x24 V DC Standard, BU type A0, color code CC00

- PU: 1 unit
- PU: 10 units

6ES7131-6BH00-0BA0
6ES7131-6BH00-2BA0

Digital input module DI 8x24 V DC High Feature, BU type A0, color code CC01, channel-specific diagnostics, isochronous mode, shared input (MSI); PU: 1 unit

6ES7131-6BF00-0CA0

Digital input module DI 8x24 V DC High Speed, BU type A0, color code CC01; 3 operating modes (fast isochronous DI, 4 pulse counters 32-bit 10 kHz, oversampling); PU: 1 unit

6ES7131-6BF00-0DA0

Digital input module DI 8xNAMUR High Feature, BU type A0, color code CC01; PU: 1 unit

6ES7131-6TF00-0CA0

Digital input module DI 4x120 V AC - 230 V AC Standard, BU type B1, color code CC41; PU: 1 unit

6ES7131-6FD00-0BB1

Usable BaseUnits

BU15-P16+A10+2D

BU type A0; BaseUnit (light) with 16 process terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1 A to 10 A); for starting a new load group (max. 10 A)

- 1 unit
- 10 units

6ES7193-6BP20-0DA0
6ES7193-6BP20-2DA0

BU15-P16+A0+2D

BU type A0; BaseUnit (light) with 16 process terminals to the module; for starting a new load group (max. 10 A)

- 1 unit
- 10 units

6ES7193-6BP00-0DA0
6ES7193-6BP00-2DA0

BU15-P16+A10+2B

BU type A0; BaseUnit (dark) with 16 process terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1 A to 10 A); for continuing the load group

- 1 unit
- 10 units

6ES7193-6BP20-0BA0
6ES7193-6BP20-2BA0

BU15-P16+A0+2B

BU type A0; BaseUnit (dark) with 16 process terminals to the module; for continuing the load group

- 1 unit
- 10 units

6ES7193-6BP00-0BA0
6ES7193-6BP00-2BA0

BU20-P12+A0+4B

BU type B1; BaseUnit (dark) with 12 process terminals to the module; for continuing the load group; 1 unit

6ES7193-6BP20-0BB1

Ordering data	Article No.		Article No.
Accessories		Color-coded labels for 15 mm-wide BaseUnits	
Equipment labeling plate 10 sheets of 16 labels, for printing with thermal transfer card printer or plotter	6ES7193-6LF30-0AW0	Color code CC00, for 16 process terminals, for BU type A0, A1, gray (terminals 1 to 8), red (terminals 9 to 16); 10 units	6ES7193-6CP00-2MA0
Labeling strips 500 labeling strips on roll, light gray, for inscription with thermal transfer roll printer	6ES7193-6LR10-0AA0	Color code CC01, for 16 process terminals, for BU type A0, A1, gray (terminals 1 to 8), red (terminals 9 to 16); 10 units	6ES7193-6CP01-2MA0
500 labeling strips on roll, yellow, for inscription with thermal transfer roll printer	6ES7193-6LR10-0AG0	Color code CC02, for 16 process terminals, for BU type A0, A1, gray (terminals 1 to 8), blue (terminals 9 to 16); 10 units	6ES7193-6CP02-2MA0
1000 labeling strips DIN A4, light gray, card, perforated, for inscription with laser printer	6ES7193-6LA10-0AA0	Color code CC71, for 10 AUX terminals, BU type A0, yellow/green (terminals 1 A to 10 A); 10 units	6ES7193-6CP71-2AA0
1000 labeling strips DIN A4, yellow, card, perforated, for inscription with laser printer	6ES7193-6LA10-0AG0	Color code CC72, for 10 AUX terminals, BU type A0, red (terminals 1 A to 10 A); 10 units	6ES7193-6CP72-2AA0
BU cover For covering empty slots (gaps); 5 units		Color code CC73, for 10 AUX terminals, BU type A0, blue (terminals 1 A to 10 A); 10 units	6ES7193-6CP73-2AA0
• 15 mm wide	6ES7133-6CV15-1AM0		
Shield connection 5 shield supports and 5 shield terminals	6ES7193-6SC00-1AM0	Color-coded labels for 20 mm-wide BaseUnits Color code CC41, for 16 push-in terminals; for BU type B1, gray (terminals 1 to 4), red (terminals 5 to 8), blue (terminals 9 to 12); 10 units	6ES7193-6CP41-2MB0

I/O systems

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

I/O modules > Digital output modules

Overview



- 4, 8 and 16-channel digital output (DQ) modules
- Apart from the standard delivery form in an individual package, selected I/O modules and BaseUnits are also available in a pack of 10 units. The pack of 10 units enables the amount of waste to be reduced considerably, as well as saving the time of unpacking individual modules.

For different requirements, the digital output modules offer:

- Function classes Basic, Standard, High Feature and High-Speed as well as fail-safe DQ (see "Fail-safe I/O modules")
- BaseUnits for single or multiple-conductor connection with automatic slot coding
- Individual system-integrated load group formation with self-assembling voltage distribution bars (a separate power module is no longer required for ET 200SP)
- Option of connecting actuators with rated load voltages of up to 120 V DC or 230 V AC and load currents of up to 5 A (depending on module)
- Relay modules
 - NO contact or changeover contact
 - for load or signal voltages (coupling relay)
 - with manual operation (as simulation module for inputs and outputs, jog mode for commissioning or emergency operation on failure of controller)
- PNP (source output) and NPN (sink output) versions
- Clear labeling on front of module
- LEDs for diagnostics, status, power supply and faults

- Electronically readable and non-volatile writable rating plate (I&M data 0 to 3)
- Extended functions and additional operating modes in some cases
 - MSO operating mode (simultaneous reading of input data from as many as three other controllers)
 - Pulse width modulation mode (output value as pulse-pause ratio of between 0.0% and 100.0% for controlling the output current)
 - Oversampling (n-fold equidistant output of digital values within a PN cycle for the precise time control of an output or a sequence of output values)
 - Isochronous mode (simultaneous equidistant output of all output channels)
 - Output of substitute value in the event of interruptions to communication (0, 1 or last value retained)
 - Re-parameterization during operation
 - Firmware update
 - Valve control (output signal does not switch automatically after a set pickup time to a current-saving PWM output)
 - Diagnosis of wire break and short-circuit (on channel or module basis)
 - Value status (optional binary validity information of the output signal in the process image)
 - Supports the PROFlenergy profile
- Optional accessories
 - Labeling strips (film or card)
 - Equipment labeling plate
 - Color-coded label with module-specific CC code
 - Shielding terminal

A quick and clear comparison of the functions of the different DQ modules is offered by the TIA Selection Tool.

Overview (continued)Overview of digital output modules

Digital output	PU	Article No.	CC code	BU type
DQ 16 x 24 V DC/0.5 A ST	1	6ES7132-6BH00-0BA0	CC00	A0
DQ 16 x 24 V DC/0.5 A ST	10	6ES7132-6BH00-2BA0	CC00	A0
DQ 8 x 24 V DC/0.5 A SNK BA	1	6ES7132-6BF00-0AA0	CC01	A0
DQ 8 x 24 V DC/0.5 A BA	1	6ES7132-6BF00-0AA0	CC02	A0
DQ 8 x 24 V DC/0.5 A BA	10	6ES7132-6BF00-2AA0	CC02	A0
DQ 8 x 24 V DC/0.5 A ST	1	6ES7132-6BF00-0BA0	CC02	A0
DQ 8 x 24 V DC/0.5 A ST	10	6ES7132-6BF00-2BA0	CC02	A0
DQ 8 x 24 V DC/0.5 A HF	1	6ES7132-6BF00-0CA0	CC02	A0
DQ 4 x 24 V DC/2 A ST	1	6ES7132-6BD20-0BA0	CC02	A0
DQ 4 x 24 V DC/2 A ST	10	6ES7132-6BD20-2BA0	CC02	A0
DQ 4 x 24 V DC/2 A HF	1	6ES7132-6BD20-0CA0	CC02	A0
DQ 4 x 24 V DC/2 A HS	1	6ES7132-6BD20-0DA0	CC02	A0
With three operating modes: • Fast isochronous DQ with valve control • Pulse width modulation • Oversampling				
DQ 4 x 24...230 V AC/2 A ST	1	6ES7132-6FD00-0BB1	CC41	B0, B1
DQ 4 x 24 ... 230 V AC/2 A ST	10	6ES7132-6FD00-2BB1	CC41	B0, B1
RQ 4 x 24 V UC/2 A CO ST	1	6ES7132-6GD50-0BA0	--	A0
RQ 4 x 120 V DC-230 V AC/5 A NO ST	1	6ES7132-6HD00-0BB1	--	B0, B1
RQ 4 x 120 V DC-230 V AC/5 A NO ST	10	6ES7132-6HD00-2BB1	--	B0, B1
RQ MA 4 x 120 V DC...230 V AC/5 A NO ST	1	6ES7132-6MD00-0BB1	--	B0, B1

Overview of BaseUnits

BaseUnit	PU	Article No.	CC codes for process terminals	CC codes for AUX terminals
BU type A0 • New load group (light) • 16 process terminals • With 10 AUX terminals	1	6ES7193-6BP20-0DA0	CC01 to CC05	CC71 to CC73
BU type A0 • New load group (light) • 16 process terminals • With 10 AUX terminals	10	6ES7193-6BP20-2DA0	CC01 to CC05	CC71 to CC73
BU type A0 • New load group (light) • 16 process terminals • Without AUX terminals	1	6ES7193-6BP00-0DA0	CC01 to CC05	--
BU type A0 • New load group (light) • 16 process terminals • Without AUX terminals	10	6ES7193-6BP00-2DA0	CC01 to CC05	--
BU type A0 • Forwarding of load group (dark) • 16 process terminals • With 10 AUX terminals	1	6ES7193-6BP20-0BA0	CC01 to CC05	CC71 to CC73
BU type A0 • Forwarding of load group (dark) • 16 process terminals • With 10 AUX terminals	10	6ES7193-6BP20-2BA0	CC01 to CC05	CC71 to CC73

I/O systems

SIMATIC ET 200 systems for the control cabinet

SIMATIC ET 200SP

I/O modules > Digital output modules

Overview (continued)

BaseUnit	PU	Article No.	CC codes for process terminals	CC codes for AUX terminals
BU type A0 • Forwarding of load group (dark) • 16 process terminals • Without AUX terminals	1	6ES7193-6BP00-0BA0	CC01 to CC05	--
BU type A0 • Forwarding of load group (dark) • 16 process terminals • Without AUX terminals	10	6ES7193-6BP00-2BA0	CC01 to CC05	--
BU type B0 • Forwarding of load group (dark) • 12 process terminals • With 4 AUX terminals	1	6ES7193-6BP20-0BB0	CC41	CC81 to CC83
BU type B0 • Forwarding of load group (dark) • 12 process terminals • With 4 AUX terminals	10	6ES7193-6BP20-0BB0	CC41	CC81 to CC83
BU type B1 • Forwarding of load group (dark) • 12 process terminals • 2 x 2 (1L, 2L, 1N, 2N) direct infeed module • Without AUX terminals	1	6ES7193-6BP20-0BB1	CC41	--

Technical specifications

Article number	6ES7132-6BH00-0BA0 ET 200SP, DQ 16x24VDC/0,5A ST	6ES7132-6BF60-0AA0 ET 200SP, DQ 8x24VDC/0,5A SINK BASIC	6ES7132-6BF00-0AA0 ET 200SP, DQ 8x24VDC/0,5A BASIC, PU 1	6ES7132-6BF00-0BA0 ET 200SP, DQ 8x24VDC/0,5A ST	6ES7132-6BF00-0CA0 ET 200SP, DQ 8x24VDC/0,5A HF
General information					
Product type designation	ET 200SP, DQ 16x 24 V DC/0.5 A ST, PU 1	DQ 8x24VDC/0.5A SNK BA	ET 200SP, DQ 8x 24 V DC/0.5 A BA, PU 1	ET 200SP, DQ 8x 24 V DC/0.5 A ST, PU 1	ET 200SP, DQ 8x 24 V DC/0.5 A HF, PU 1
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&M3	Yes; I&M0 to I&M3
Engineering with					
• STEP 7 TIA Portal configurable/ integrated as of version	V11 SP2 / V13	V13 / V13	V13 SP1 / -	V11 SP2 / V13	V13 SP1 / -
• STEP 7 configurable/integrated as of version	V5.5 SP3 / -	V5.5 SP3 / -	V5.5 SP3 / -	V5.5 SP3 / -	V5.5 / -
• PCS 7 configurable/integrated as of version	V8.1 SP1			V8.1 SP1	V8.1 SP1
• PROFIBUS as of GSD version/ GSD revision	GSD Revision 5	GSD Revision 5	GSD Revision 5	GSD Revision 5	One GSD file each, Revision 3 and 5 and higher
• PROFINET as of GSD version/ GSD revision	GSDML V2.3	GSDML V2.3	GSDML V2.3	GSDML V2.3	GSDML V2.3
Operating mode					
• DQ	Yes	Yes	Yes	Yes	Yes
• DQ with energy-saving function	No	No	No	No	No
• PWM	No	No	No	No	No
• Oversampling	No	No	No	No	No
• MSO	No	No	No	No	Yes
Supply voltage					
Type of supply voltage	DC	DC	DC	DC	DC
Rated value (DC)	24 V	24 V	24 V	24 V	24 V
Reverse polarity protection	Yes		Yes	Yes	Yes

Technical specifications (continued)

Article number	6ES7132-6BH00-0BA0 ET 200SP, DQ 16X24VDC/0,5A ST	6ES7132-6BF60-0AA0 ET 200SP, DQ 8X24VDC/0,5A SINK BASIC	6ES7132-6BF00-0AA0 ET 200SP, DQ 8X24VDC/0,5A BASIC, PU 1	6ES7132-6BF00-0BA0 ET 200SP, DQ 8X24VDC/0,5A ST	6ES7132-6BF00-0CA0 ET 200SP, DQ 8X24VDC/0,5A HF
Digital outputs					
Type of digital output	Source output (PNP, current-sourcing)	Source output (PNP, current-sourcing)	Source output (PNP, current-sourcing)	Source output (PNP, current-sourcing)	Source output (PNP, current-sourcing)
Number of digital outputs	16	8	8	8	8
Current-sinking	No	Yes	No	No	No
Current-sourcing	Yes	No	Yes	Yes	Yes
Digital outputs, parameterizable	Yes	Yes	Yes	Yes	Yes
Short-circuit protection	Yes	Yes	Yes; per channel, electronic	Yes	Yes
Open-circuit detection		No			
Limitation of inductive shutdown voltage to	Typ. L+ (-50 V)	Typ. 47 V	Typ. L+ (-53 V)	Typ. L+ (-50 V)	Typ. L+ (-50 V)
Controlling a digital input	Yes	Yes	Yes	Yes	Yes
Switching capacity of the outputs					
• with resistive load, max.	0.5 A	0.5 A	0.5 A	0.5 A	0.5 A
• on lamp load, max.	5 W	5 W	5 W	5 W	5 W
Load resistance range					
• lower limit	48 Ω	48 Ω	48 Ω	48 Ω	48 Ω
• upper limit	12 kΩ	3 400 Ω	100 kΩ	12 kΩ	12 kΩ
Output voltage					
• Type of output voltage	DC	DC	DC	DC	DC
Output current					
• for signal "1" rated value	0.5 A	0.5 A	0.5 A	0.5 A	0.5 A
• for signal "0" residual current, max.	0.1 mA	5 μA	1 mA	0.1 mA	0.1 mA
Output delay with resistive load					
• "0" to "1", typ.	50 μs				50 μs
• "0" to "1", max.		300 μs	100 μs; at rated load	50 μs; at rated load	
• "1" to "0", typ.	100 μs				100 μs
• "1" to "0", max.		600 μs	150 μs; at rated load	100 μs; at rated load	
Parallel switching of two outputs					
• for uprating	No	No	No	No	No
• for redundant control of a load	Yes	Yes	Yes; per module	Yes	Yes
Switching frequency					
• with resistive load, max.	100 Hz	100 Hz	100 Hz	100 Hz	100 Hz
• with inductive load, max.	2 Hz	0.5 Hz	2 Hz	2 Hz	2 Hz
• on lamp load, max.	10 Hz	10 Hz	10 Hz	10 Hz	10 Hz
Total current of the outputs					
• Current per channel, max.	0.5 A	0.5 A	0.5 A	0.5 A	0.5 A
• Current per module, max.	8 A	4 A	4 A	4 A	4 A
Total current of the outputs (per module)					
horizontal installation					
- up to 30 °C, max.	8 A				
- up to 40 °C, max.	8 A				
- up to 50 °C, max.	6 A				
- up to 60 °C, max.	4 A	4 A	4 A	4 A	4 A
vertical installation					
- up to 30 °C, max.	8 A				
- up to 40 °C, max.	6 A				
- up to 50 °C, max.	4 A		4 A	4 A	4 A; in all other mounting positions
- up to 60 °C, max.	4 A	4 A			
Cable length					
• shielded, max.	1 000 m	1 000 m	1 000 m	1 000 m	1 000 m
• unshielded, max.	600 m	600 m	600 m	600 m	600 m

I/O systems

SIMATIC ET 200 systems for the control cabinet

SIMATIC ET 200SP

I/O modules > Digital output modules

Technical specifications (continued)

Article number	6ES7132-6BH00-0BA0 ET 200SP, DQ 16X24VDC/0,5A ST	6ES7132-6BF60-0AA0 ET 200SP, DQ 8X24VDC/0,5A SINK BASIC	6ES7132-6BF00-0AA0 ET 200SP, DQ 8X24VDC/0,5A BASIC, PU 1	6ES7132-6BF00-0BA0 ET 200SP, DQ 8X24VDC/0,5A ST	6ES7132-6BF00-0CA0 ET 200SP, DQ 8X24VDC/0,5A HF
Isochronous mode					
Isochronous operation (application synchronized up to terminal)	No	No	No	No	Yes
Execution and activation time (TCO), min.					48 µs
Bus cycle time (TDP), min.					500 µs
Interrupts/diagnostics/status information					
Diagnostics function	Yes	Yes	Yes	Yes	Yes
Substitute values connectable	Yes	No	Yes	Yes	Yes
Alarms					
• Diagnostic alarm	Yes	Yes	Yes	Yes	Yes
Diagnostic messages					
• Monitoring the supply voltage	Yes	Yes	Yes	Yes	Yes
• Wire-break	Yes; Module-wise	No	No	Yes; Module-wise	Yes; channel by channel
• Short-circuit	Yes; Module-wise	No	No	Yes; Module-wise	Yes; channel by channel
• Group error	Yes	Yes	Yes	Yes	Yes
Diagnostics indication 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
• Channel status display	Yes; Green LED	Yes; Green LED	Yes; Green LED	Yes; Green LED	Yes; Green LED
• for channel diagnostics	No	No	No	No	Yes; Red LED
• for module diagnostics	Yes; green/red DIAG LED	Yes; green/red DIAG LED	Yes; green/red DIAG LED	Yes; green/red DIAG LED	Yes; green/red DIAG LED
Potential separation					
Potential separation channels					
• between the channels and backplane bus	Yes	Yes	Yes	Yes	Yes
Isolation					
Isolation tested with	707 V DC (type test)	707 V DC (type test)	707 V DC (type test)	707 V DC (type test)	707 V DC (type test)
Standards, approvals, certificates					
Suitable for safety functions	No	No	No	No	No
Dimensions					
Width	15 mm	15 mm	15 mm	15 mm	15 mm
Height	73 mm	73 mm	73 mm	73 mm	73 mm
Depth	58 mm	58 mm	58 mm	58 mm	58 mm
Weights					
Weight, approx.	28 g	30 g	28 g	28 g	30 g

Technical specifications (continued)

Article number	6ES7132-6BD20-0BA0 ET 200SP, DQ 4x24VDC/2A ST	6ES7132-6BD20-0CA0 ET 200SP, DQ 4x24VDC/2A HF	6ES7132-6BD20-0DA0 ET 200SP, DQ 4x24VDC/2A HIGH SPEED, PU 1	6ES7132-6FD00-0BB1 ET 200SP, DQ 4x24...230VAC/2A ST	6ES7132-6GD50-0BA0 ET 200SP, RQ 4x24VDC/2A CO ST
General information					
Product type designation	ET 200SP, DQ 4x 24 V DC/2 A ST, PU 1	ET 200SP, DQ 4x 24 V DC/2 A HF, PU 1	ET 200SP, DQ 4x 24 V DC/2 A High Speed, PU 1	ET 200SP, DQ 4x 24 ... 230 V AC/ 2 A ST, PU 1	RQ 4x24VUC/2A CO ST
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&M3	Yes; I&M0 to I&M3
Engineering with					
• STEP 7 TIA Portal configurable/ integrated as of version	V11 SP2 / V13	V13 / V13	V13 SP1	V13 / V13	V13 / V13
• STEP 7 configurable/integrated as of version	V5.5 SP3 / -	V5.5 SP3 / -	V5.5 SP3 / -	V5.5 SP3 / -	V5.5 SP3 / -
• PCS 7 configurable/integrated as of version	V8.1 SP1				
• PROFIBUS as of GSD version/ GSD revision	GSD Revision 5	GSD Revision 5	GSD Revision 5	GSD Revision 5	GSD Revision 5
• PROFINET as of GSD version/ GSD revision	GSDML V2.3	GSDML V2.3	GSDML V2.3	GSDML V2.3	GSDML V2.3
Operating mode					
• DQ	Yes	Yes	Yes	Yes	Yes
• DQ with energy-saving function	No	No	Yes; Valve control	No	No
• PWM	No	No	Yes	No	No
• Oversampling	No	No	Yes	No	No
• MSO	No	Yes	No	No	No
Supply voltage					
Type of supply voltage	DC	DC	DC	24V AC to 230V AC	DC
Rated value (DC)	24 V	24 V	24 V		24 V
Rated value (AC)				230 V	
Reverse polarity protection	Yes	Yes	Yes		
Digital outputs					
Type of digital output	Source output (PNP, current-sourcing)	Source output (PNP, current-sourcing)	Source output (PNP, current-sourcing)	Triac with zero point detection	Relays
Number of digital outputs	4	4	4	4	4
Current-sinking	No	No	No	No	
Current-sourcing	Yes	Yes	Yes; Push-pull output	Yes	
Digital outputs, parameterizable	Yes	Yes	Yes	No	
Short-circuit protection	Yes	Yes	Yes	No; When using BU type B1, a miniature, quick-response fuse with 10 A tripping current must be provided	No
Limitation of inductive shutdown voltage to	Typ. L+ (-50 V)	L+ -(37 to 41V)	M (-1 V)		
Controlling a digital input	Yes	Yes; Minimum current consumption 7 mA	No	Yes	
Digital output functions, parameterizable					
• PWM output			Yes		
- Number, max.			4		
- Cycle duration, parameterizable			Yes; 0 ms, 0.2 ms, 0.4 ms, 0.93 ms, 1.33 ms, 4.27 ms, 10.67 ms, 21.33 ms, 34.13 ms, 59.73 ms		
• Digital output with oversampling			Yes		
- Number, max.			4		
- Values per cycle, max.			32		
- Resolution, min.			100 µs		
Switching capacity of the outputs					
• with resistive load, max.	2 A	2 A	2 A	2 A	
• on lamp load, max.	10 W	10 W	10 W	100 W	

I/O systems

SIMATIC ET 200 systems for the control cabinet

SIMATIC ET 200SP

I/O modules > Digital output modules

Technical specifications (continued)

Article number	6ES7132-6BD20-0BA0 ET 200SP, DQ 4X24VDC/2A ST	6ES7132-6BD20-0CA0 ET 200SP, DQ 4X24VDC/2A HF	6ES7132-6BD20-0DA0 ET 200SP, DQ 4X24VDC/2A HIGH SPEED, PU 1	6ES7132-6FD00-0BB1 ET 200SP, DQ 4X24...230VAC/2A ST	6ES7132-6GD50-0BA0 ET 200SP, RQ 4X24VDC/2A CO ST
Load resistance range					
• lower limit	12 Ω	12 Ω	12 Ω		
• upper limit	3 400 Ω	3 400 Ω	3 400 Ω		
Output voltage					
• Type of output voltage	DC	DC	DC	24V AC to 230V AC	DC
• for signal "1", min.				20.4 V	
• permissible voltage at output, min.				20.4 V	
• permissible voltage at output, max.				264 V	
Output current					
• for signal "1" rated value	2 A	2 A	2 A	2 A	
• for signal "0" residual current, max.	0.1 mA	0.1 mA	0.1 mA	460 µA	
Output delay with resistive load					
• "0" to "1", typ.	50 µs	50 µs			
• "0" to "1", max.	50 µs		1 µs	10 ms	
• "1" to "0", typ.	100 µs	100 µs			
• "1" to "0", max.	100 µs		1 µs	10 ms	
Parallel switching of two outputs					
• for logic links				No	
• for uprating	No	No	No	No	
• for redundant control of a load	Yes			Yes	
Switching frequency					
• with resistive load, max.	100 Hz	100 Hz	5 kHz	10 Hz	2 Hz
• with inductive load, max.	2 Hz	2 Hz	5 kHz	0.5 Hz; Higher frequencies are possible, see Equipment Manual / Product Information	
• on lamp load, max.	10 Hz	10 Hz	5 kHz	1 Hz	
Total current of the outputs					
• Current per channel, max.	2 A	2 A	2 A	2 A	2 A
• Current per module, max.	8 A	8 A	8 A	8 A	8 A
Total current of the outputs (per module)					
horizontal installation					
- up to 30 °C, max.	8 A	8 A	8 A; DQ mode		
- up to 40 °C, max.	8 A	8 A	6.9 A; DQ mode	8 A	
- up to 50 °C, max.	6 A	6 A	4.7 A; DQ mode	6 A	
- up to 60 °C, max.	4 A	4 A	2.5 A; DQ mode	4 A	8 A
vertical installation					
- up to 30 °C, max.	8 A	8 A	7.2 A; DQ mode	8 A	
- up to 40 °C, max.	6 A	6 A	5.6 A; DQ mode	6 A	
- up to 50 °C, max.	4 A	4 A	4 A; DQ mode	4 A	
- up to 60 °C, max.	4 A	4 A	4 A; DQ mode		8 A
Relay outputs					
• Number of relay outputs					4
• Rated supply voltage of relay coil L+ (DC)					24 V
• Current consumption of relays (coil current of all relays), max.					40 mA
Switching capacity of contacts					
- with resistive load, max.					2 A
- Thermal continuous current, max.					2 A
- Switching current, min.					1 mA; 5 V DC
- Rated switching voltage (DC)					24 V
- Rated switching voltage (AC)					24 V

Technical specifications (continued)

Article number	6ES7132-6BD20-0BA0 ET 200SP, DQ 4X24VDC/2A ST	6ES7132-6BD20-0CA0 ET 200SP, DQ 4X24VDC/2A HF	6ES7132-6BD20-0DA0 ET 200SP, DQ 4X24VDC/2A HIGH SPEED, PU 1	6ES7132-6FD00-0BB1 ET 200SP, DQ 4X24...230VAC/2A ST	6ES7132-6GD50-0BA0 ET 200SP, RQ 4X24VDC/2A CO ST
Triac outputs • Size of motor starters according to NEMA, max.				5	
Cable length • shielded, max. • unshielded, max.	1 000 m 600 m	1 000 m 600 m	50 m 50 m	1 000 m 600 m	1 000 m 200 m
Isochronous mode Isochronous operation (application synchronized up to terminal) Bus cycle time (TDP), min.	No	Yes 500 µs	Yes; Operating modes DQ and OVS only 125 µs	No	No
Interrupts/diagnostics/ status information Diagnostics function Substitute values connectable	Yes Yes	Yes Yes	Yes Yes	No Yes	Yes Yes
Alarms • Diagnostic alarm	Yes	Yes	Yes	No	Yes
Diagnostic messages • Monitoring the supply voltage • Wire-break • Short-circuit • Group error	Yes Yes; Module-wise Yes; Module-wise Yes	Yes Yes; channel by channel Yes; channel by channel Yes	Yes No Yes; Module-wise Yes	No No No Yes	Yes No No Yes
Diagnostics indication LED • Monitoring of the supply voltage (PWR-LED) • Channel status display • for channel diagnostics • for module diagnostics	Yes; green PWR LED Yes; Green LED No Yes; green/red DIAG LED	Yes; green PWR LED Yes; Green LED Yes; Red LED Yes; green/red DIAG LED	Yes; green PWR LED Yes; Green LED No Yes; green/red DIAG LED	Yes; green PWR LED Yes; Green LED No Yes; green/red DIAG LED	Yes; green PWR LED Yes; Green LED No Yes; green/red DIAG LED
Potential separation Potential separation channels • between the channels and backplane bus	Yes	Yes	Yes	Yes	Yes
Isolation Isolation tested with	707 V DC (type test)	707 V DC (type test)	707 V DC (type test)	2 545 V DC/2 s (routine test)	707 V DC (type test)
Standards, approvals, certificates Suitable for safety functions	No	No	No	No	No
Dimensions Width Height Depth	15 mm 73 mm 58 mm	15 mm 73 mm 58 mm	15 mm 73 mm 58 mm	20 mm 73 mm 58 mm	15 mm 73 mm 58 mm
Weights Weight, approx.	30 g	30 g	31 g	50 g	30 g

I/O systems

SIMATIC ET 200 systems for the control cabinet

SIMATIC ET 200SP

I/O modules > Digital output modules

Technical specifications (continued)

Article number	6ES7132-6HD00-0BB1 ET 200SP, RQ NO 4X120VDC..230VAC/5A ST	6ES7132-6MD00-0BB1 ET 200SP,RQ NO-MA 4X120VDC..230VAC/5A ST
General information		
Product type designation	ET 200SP, RQ 4x120VDC-230VAC/5A NO ST, PU 1	ET 200SP, RQ 4x120VDC-230VAC/5A NO MA ST
Product function		
• I&M data	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
• STEP 7 configurable/integrated as of version	V5.5 SP3 / -	V5.5 SP3 / -
• PROFIBUS as of GSD version/ GSD revision	GSD Revision 5	GSD Revision 5
• PROFINET as of GSD version/ GSD revision	GSDML V2.3	GSDML V2.3
Operating mode		
• DQ	Yes	Yes
• DQ with energy-saving function	No	No
• PWM	No	No
• Oversampling	No	No
• MSO	No	No
Supply voltage		
Type of supply voltage	DC	DC
Rated value (DC)	24 V	24 V
Reverse polarity protection	Yes	Yes
Digital outputs		
Type of digital output	Relays	Relays
Number of digital outputs	4	4
Short-circuit protection	No	No
Output voltage		
• Type of output voltage	AC/DC	AC/DC
Switching frequency		
• with resistive load, max.	2 Hz	2 Hz
• with inductive load, max.	0.5 Hz	0.5 Hz
• on lamp load, max.	2 Hz	2 Hz
Total current of the outputs		
• Current per channel, max.	5 A	5 A
• Current per module, max.	20 A	20 A
Total current of the outputs (per module)		
horizontal installation		
- up to 50 °C, max.		20 A
- up to 60 °C, max.	20 A	16 A
vertical installation		
- up to 40 °C, max.		20 A
- up to 50 °C, max.		16 A
- up to 60 °C, max.	20 A	
Relay outputs		
• Number of relay outputs	4	4
• Rated supply voltage of relay coil L+ (DC)	24 V	24 V
• Current consumption of relays (coil current of all relays), max.	40 mA	40 mA
• external protection for relay outputs	Yes, with 6A	Yes, with 6A
• Number of operating cycles, max.	7 000 000; see additional description in the manual	7 000 000; see additional description in the manual
Switching capacity of contacts		
- with inductive load, max.	2 A; see additional description in the manual	2 A; see additional description in the manual
- with resistive load, max.	5 A; see additional description in the manual	5 A; see additional description in the manual
- Thermal continuous current, max.	5 A; Max. 1 385 VA, 150 W	5 A
- Switching current, min.	100 mA; 5 V DC	100 mA; 5 V DC
- Rated switching voltage (DC)	24 V DC to 120 V DC	24 V DC to 120 V DC
- Rated switching voltage (AC)	24V AC to 230V AC	24V AC to 230V AC

Technical specifications (continued)

Article number	6ES7132-6HD00-0BB1 ET 200SP, RQ NO 4X120VDC..230VAC/5A ST	6ES7132-6MD00-0BB1 ET 200SP,RQ NO-MA 4X120VDC..230VAC/5A ST
Cable length		
• shielded, max.	1 000 m	1 000 m
• unshielded, max.	200 m	200 m
Isochronous mode		
Isochronous operation (application synchronized up to terminal)	No	No
Interrupts/diagnostics/ status information		
Diagnostics function	Yes	Yes
Substitute values connectable	Yes	Yes
Alarms		
• Diagnostic alarm	Yes	Yes
Diagnostic messages		
• Monitoring the supply voltage	Yes	Yes
• Wire-break	No	No
• Short-circuit	No	No
• Group error	Yes	Yes
Diagnostics indication LED		
• Monitoring of the supply voltage (PWR-LED)	Yes; green PWR LED	Yes; green PWR LED
• Channel status display	Yes; Green LED	Yes; Green LED
• for channel diagnostics	No	No
• for module diagnostics	Yes; green/red DIAG LED	Yes; green/red DIAG LED
Potential separation		
Potential separation channels		
• between the channels and backplane bus	Yes	Yes
Isolation		
Isolation tested with	2 500 V DC (type test)	2 500 V DC (type test)
tested with		
• between channels and backplane bus/supply voltage	2500 V DC	2500 V DC
• between backplane bus and supply voltage	707 V DC (type test)	707 V DC (type test)
Standards, approvals, certificates		
Suitable for safety functions	No	No
Dimensions		
Width	20 mm	20 mm
Height	73 mm	73 mm
Depth	58 mm	58 mm
Weights		
Weight, approx.	40 g	45 g

I/O systems

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

I/O modules > Digital output modules

Ordering data

Article No.

Article No.

Digital output modules

Delivery options:

Apart from the standard delivery form in an individual package, selected I/O modules and BaseUnits are also available in a pack of 10 units. The pack of 10 units enables the amount of waste to be reduced considerably, as well as saving the time of unpacking individual modules.

The number of modules required is the number of modules ordered. The type of packaging is chosen by selecting the article number. Packs of 10 can therefore only be ordered in integer multiples of 10.

Digital output module
DQ 16x24 V DC/0.5 A Standard,
BU type A0, color code CC00

- PU: 1 unit
- PU: 10 units

Digital output module
DQ 8x24 V DC/0.5 A sink output,
basic, BU type A0,
color code CC01; PU: 1 unit

Digital output module
DQ 8x24 V DC/0.5 A basic,
BU type A0, color code CC02

- PU: 1 unit
- PU: 10 units

Digital output module
DQ 8x24 V DC/0.5 A Standard,
BU type A0, color code CC02

- PU: 1 unit
- PU: 10 units

Digital output module
DQ 8x24 V DC/0.5 A High Feature,
BU type A0, color code CC02;
PU: 1 unit

Digital output module
DQ 4x24 V DC/2 A Standard,
BU type A0, color code CC02

- PU: 1 unit
- PU: 10 units

Digital output module
DQ 4x24 V DC/2 A High Feature,
BU type A0, color code CC02,
channel-precise diagnostics,
isochronous mode,
shared output (MSO); PU: 1 unit

Digital output module
DQ 4x24 V DC/2 A High Feature,
BU type A0, color code CC02,
3 operating modes
(fast isochronous DQ with valve
control, pulse width modulation,
oversampling); PU: 1 unit

Digital output module
DQ 4x24 V AC...230 V AC/2 A
Standard for BU type B1,
color code CC41

- PU: 1 unit
- PU: 10 units

6ES7132-6BH00-0BA0

6ES7132-6BH00-2BA0

6ES7132-6BF60-0AA0

6ES7132-6BF00-0AA0

6ES7132-6BF00-2AA0

6ES7132-6BF00-0BA0

6ES7132-6BF00-2BA0

6ES7132-6BF00-0CA0

6ES7132-6BD20-0BA0

6ES7132-6BD20-2BA0

6ES7132-6BD20-0CA0

6ES7132-6BD20-0DA0

6ES7132-6FD00-0BB1

6ES7132-6FD00-2BB1

Digital output modules (continued)

Signal relay module
RQ CO 4x24 V UC/2 A Standard,
changeover contact, BU type A0,
color code CC00; PU: 1 unit

Relay module
RQ NO 4x120 V DC-230 V AC/5 A
Standard, NO contact,
BU type B0, B1

- PU: 1 unit
- PU: 10 units

Relay module
RQ NO 4x120 V DC-230 V AC/5 A
Standard, NO contact, with manual
operation, BU type B0, B1

Usable BaseUnits

BU15-P16+A10+2D

BU type A0; BaseUnit (light) with
16 process terminals (1...16) to the
module and an additional 10 inter-
nally jumpered AUX terminals
(1 A to 10 A); for starting a new load
group (max. 10 A)

- PU: 1 unit
- PU: 10 units

BU15-P16+A0+2D

BU type A0; BaseUnit (light) with
16 process terminals to the module;
for starting a new load group
(max. 10 A)

- PU: 1 unit
- PU: 10 units

BU15-P16+A10+2B

BU type A0; BaseUnit (dark) with
16 process terminals (1...16) to the
module and an additional
10 internally jumpered AUX termi-
nals (1 A to 10 A); for continuing
the load group

- PU: 1 unit
- PU: 10 units

BU15-P16+A0+2B

BU type A0; BaseUnit (dark) with
16 process terminals to the module;
for continuing the load group

- PU: 1 unit
- PU: 10 units

BU20-P12+A4+0B

BU type B0; BaseUnit (dark) with
12 process terminals (1...12) to the
module and an additional 4 inter-
nally jumpered AUX terminals
(1 A to 4 A); for continuing the load
group

- PU: 1 unit
- PU: 10 units

BU20-P12+A0+4B

BU type B1; BaseUnit (dark) with
12 process terminals to the module;
for continuing the load group;
PU: 1 unit

6ES7132-6GD50-0BA0

6ES7132-6HD00-0BB1

6ES7132-6HD00-2BB1

6ES7132-6MD00-0BB1

6ES7193-6BP20-0DA0

6ES7193-6BP20-2DA0

6ES7193-6BP00-0DA0

6ES7193-6BP00-2DA0

6ES7193-6BP20-0BA0

6ES7193-6BP20-2BA0

6ES7193-6BP00-0BA0

6ES7193-6BP00-2BA0

6ES7193-6BP20-0BB0

6ES7193-6BP20-2BB0

6ES7193-6BP20-0BB1

Ordering data	Article No.		Article No.
Accessories		Color-coded labels for 20 mm-wide BaseUnits	
Equipment labeling plate 10 sheets of 16 labels, for printing with thermal transfer card printer or plotter	6ES7193-6LF30-0AW0	Color code CC41, for 16 push-in terminals; for BU type B1, gray (terminals 1 to 4), red (terminals 5 to 8), blue (terminals 9 to 12); 10 units	6ES7193-6CP41-2MB0
Labeling strips 500 labeling strips on roll, light gray, for inscription with thermal transfer roll printer	6ES7193-6LR10-0AA0	Color code CC81, for 4 AUX terminals, BU type B0, yellow/green (terminals 1 A to 4 A); 10 units	6ES7193-6CP81-2AB0
500 labeling strips on roll, yellow, for inscription with thermal transfer roll printer	6ES7193-6LR10-0AG0	Color code CC82, for 4 AUX terminals, BU type B0, red (terminals 1 A to 4 A); 10 units	6ES7193-6CP82-2AB0
1000 labeling strips DIN A4, light gray, card, perforated, for inscription with laser printer	6ES7193-6LA10-0AA0	Color code CC83, for 4 AUX terminals, BU type B0, blue (terminals 1 A to 4 A); 10 units	6ES7193-6CP83-2AB0
1000 labeling strips DIN A4, yellow, card, perforated, for inscription with laser printer	6ES7193-6LA10-0AG0		
BU cover for covering empty slots (gaps); 5 units			
• 15 mm wide	6ES7133-6CV15-1AM0		
• 20 mm wide	6ES7133-6CV20-1AM0		
Shield connection 5 shield supports and 5 shield terminals	6ES7193-6SC00-1AM0		
Color-coded labels for 15 mm-wide BaseUnits Color code CC00, for 16 process terminals, for BU type A0, A1, gray (terminals 1 to 8), red (terminals 9 to 16); 10 units	6ES7193-6CP00-2MA0		
Color code CC01, for 16 process terminals, for BU type A0, A1, gray (terminals 1 to 8), red (terminals 9 to 16); 10 units	6ES7193-6CP01-2MA0		
Color code CC02, for 16 process terminals, for BU type A0, A1, gray (terminals 1 to 8), blue (terminals 9 to 16); 10 units	6ES7193-6CP02-2MA0		
Color code CC71, for 10 AUX terminals, BU type A0, yellow/green (terminals 1 A to 10 A); 10 units	6ES7193-6CP71-2AA0		
Color code CC72, for 10 AUX terminals, BU type A0, red (terminals 1 A to 10 A); 10 units	6ES7193-6CP72-2AA0		
Color code CC73, for 10 AUX terminals, BU type A0, blue (terminals 1 A to 10 A); 10 units	6ES7193-6CP73-2AA0		

I/O systems

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

I/O modules > Analog input modules

Overview



- 2, 4 and 8-channel analog input (AI) modules
- Apart from the standard delivery form in an individual package, selected I/O modules and BaseUnits are also available in a pack of 10 units. The pack of 10 units enables the amount of waste to be reduced considerably, as well as saving the time of unpacking individual modules.

For different requirements, the digital output modules offer:

- Function classes Basic, Standard, High Feature and High-Speed
- BaseUnits for single or multiple-conductor connection with automatic slot coding
- Individual system-integrated load group formation with self-assembling voltage distribution bars (a separate power module is no longer required for ET 200SP)
- Option of connecting current, voltage and resistance sensors, as well as thermocouples
- Energy Meter for recording up to 200 electrical variables
- Clear labeling on front of module
- LEDs for diagnostics, status, power supply and faults
- Electronically readable and non-volatile writable rating plate (I&M data 0 to 3)

- Extended functions and additional operating modes in some cases
 - MSI operating mode (simultaneous reading of input data from as many as three other controllers)
 - Oversampling operating mode (n-fold equidistant acquisition of analog values within one PN cycle for increasing the time resolution for slow CPU cycles)
 - Isochronous mode (simultaneous equidistant reading in of all analog values)
 - Scalable measuring range (adaptation of measuring range, increase of the 16-bit resolution by adapting the measuring range to a limited section)
 - Scaling of the measured values (transmission of the analog value normalized to the required physical value as a 32-bit floating point value)
 - Internal compensation of the line resistance for thermocouples by means of terminal temperature measurement in the BaseUnit for BU type A1
 - Internal compensation also for 2-conductor resistance measurement by means of adjustable line resistance
 - Calibration during runtime
 - Single-channel electrical isolation
 - HART communication
 - Re-parameterization during operation
 - Firmware update
 - Diagnosis of wire break, short circuit, overflow, underflow
 - Two upper and lower hardware interrupts in each case, interference frequency suppression, smoothing
 - Value status (optional binary validity information of the analog signal in the process image)
 - Supports the PROFlenergy profile
- Optional accessories
 - Labeling strips (film or card)
 - Equipment labeling plate
 - Color-coded label with module-specific CC code
 - Shielding terminal

A quick and clear comparison of the functions of the AI modules is offered by the TIA Selection Tool.

Overview (continued)

Overview of analog input modules

Analog input	PU	Article No.	CC code	BU type
AI 8 x I 2/4-wire BA	1	6ES7134-6GF00-0AA1	CC01	A0, A1
AI 2 x U ST	1	6ES7134-6FB00-0BA1	CC00	A0, A1
AI 8 x U BA	1	6ES7134-6FF00-0AA1	CC02	A0, A1
AI 4 x U/I 2-wire ST	1	6ES7134-6HD00-0BA1	CC03	A0, A1
AI 4 x U/I 2-wire ST	10	6ES7134-6HD00-2BA1	CC03	A0, A1
AI 2 x I 2/4-wire ST	1	6ES7134-6GB00-0BA1	CC05	A0, A1
AI 4 x I 2/4-wire ST	1	6ES7134-6GD00-0BA1	CC03	A0, A1
AI 4 x I 2-wire 4...20 mA HART	1	6ES7134-6TD00-0CA1	CC03	A0, A1
AI 2 x U/I 2/4-wire HF	1	6ES7134-6HB00-0CA1	CC05	A0, A1
AI 2xU/I 2/4-wire HS	1	6ES7134-6HB00-0DA1	CC00	A0, A1
With two operating modes: • High-speed isochronous AI • Oversampling				
AI 8 x RTD/TC 2-wire HF	1	6ES7134-6JF00-0CA1	CC00	A0, A1
AI 8 x RTD/TC 2-wire HF	10	6ES7134-6JF00-2CA1	CC00	A0, A1
AI 4 x RTD/TC 2/3/4-wire HF	1	6ES7134-6JD00-0CA1	CC00	A0, A1
AI 4 x RTD/TC 2/3/4-wire HF	10	6ES7134-6JD00-2CA1	CC00	A0, A1
AI Energy Meter 400 V AC ST	1	6ES7134-6PA01-0BD0	--	D0
AI Energy Meter 480 V AC ST	1	6ES7134-6PA20-0BD0	--	D0

Overview of BaseUnits

BaseUnit	PU	Article No.	CC codes for process terminals	CC codes for AUX terminals
BU type A0 • New load group (light) • 16 process terminals • With 10 AUX terminals	1	6ES7193-6BP20-0DA0	CC01 to CC05	CC71 to CC73
BU type A0 • New load group (light) • 16 process terminals • With 10 AUX terminals	10	6ES7193-6BP20-2DA0	CC01 to CC05	CC71 to CC73
BU type A0 • New load group (light) • 16 process terminals • Without AUX terminals	1	6ES7193-6BP00-0DA0	CC01 to CC05	--
BU type A0 • New load group (light) • 16 process terminals • Without AUX terminals	10	6ES7193-6BP00-2DA0	CC01 to CC05	--
BU type A0 • Forwarding of load group (dark) • 16 process terminals • With 10 AUX terminals	1	6ES7193-6BP20-0BA0	CC01 to CC05	CC71 to CC73
BU type A0 • Forwarding of load group (dark) • 16 process terminals • With 10 AUX terminals	10	6ES7193-6BP20-2BA0	CC01 to CC05	CC71 to CC73
BU type A0 • Forwarding of load group (dark) • 16 process terminals • Without AUX terminals	1	6ES7193-6BP00-0BA0	CC01 to CC05	--
BU type A0 • Forwarding of load group (dark) • 16 process terminals • Without AUX terminals	10	6ES7193-6BP00-2BA0	CC01 to CC05	--

I/O systems

SIMATIC ET 200 systems for the control cabinet

SIMATIC ET 200SP

I/O modules > Analog input modules

Overview (continued)

BaseUnit	PU	Article No.	CC codes for process terminals	CC codes for AUX terminals
BU type A1 - New load group (light) - With temperature sensor 16 process terminals - With 2x5 additional terminals	1	6ES7193-6BP40-0DA1	CC01 to CC05	CC74
BU type A1 - New load group (light) - With temperature sensor 16 process terminals - Without 2x5 additional terminals	1	6ES7193-6BP00-0DA1	CC01 to CC05	--
BU type A1 - Forwarding of load group (dark) - With temperature sensor 16 process terminals - With 2x5 additional terminals	1	6ES7193-6BP40-0BA1	CC01 to CC05	CC74
BU type A1 - Forwarding of load group (dark) - With temperature sensor 16 process terminals - Without 2x5 additional terminals	1	6ES7193-6BP00-0BA1	CC01 to CC05	--
BU type D0 - Forwarding of load group (dark) 12 process terminals - Without AUX terminals	1	6ES7193-6BP00-0BD0	--	--

Technical specifications

Article number	6ES7134-6GF00-0AA1 ET 200SP, AI 8xI 2/4-WIRE BASIC	6ES7134-6FB00-0BA1 ET 200SP, AI 2xU STANDARD, PU 1	6ES7134-6FF00-0AA1 ET 200SP, AI 8xU BASIC	6ES7134-6HD00-0BA1 ET 200SP, AI 4xU/I 2-WIRE ST	6ES7134-6GB00-0BA1 ET 200SP, AI 2xI 2/4-WIRE ST, PU 1
General information					
Product type designation	ET 200SP, AI 8xI 2-wire Basic	ET 200SP, AI 2xU Standard	ET 200SP, 8xU Basic	AI 4xU/I 2-wire ST	ET 200SP, AI 2xI 2/4-wire ST, PU 1
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&M3	Yes; I&M0 to I&M3
• Measuring range scalable	No	No	No	No	No
Engineering with					
• STEP 7 TIA Portal configurable/ integrated as of version	V13 SP1	V13 SP1	V13 SP1	V11 SP2 / V13	V13 SP1
• STEP 7 configurable/integrated as of version	V5.5 SP3 / -	V5.5 SP3 / -	V5.5 SP3 / -	V5.5 SP3 / -	V5.5 SP3
• PCS 7 configurable/integrated as of version				V8.1 SP1	
• PROFIBUS as of GSD version/ GSD revision	GSD Revision 5	GSD Revision 5	GSD Revision 5	GSD Revision 5	GSD Revision 5
• PROFINET as of GSD version/ GSD revision	GSDML V2.3	GSDML V2.3	GSDML V2.3	GSDML V2.3	V2.3 / -
Operating mode					
• Oversampling	No	No	No	No	No
• MSI	No	No	No	No	No
CiR – Configuration in RUN					
Reparameterization possible in RUN	Yes	Yes	Yes	Yes	Yes
Calibration possible in RUN	No	No	No	No	No
Supply voltage					
Type of supply voltage	DC	DC	DC	DC	DC
Rated value (DC)	24 V	24 V	24 V	24 V	24 V
Reverse polarity protection	Yes	Yes	Yes	Yes	Yes

I/O systems

SIMATIC ET 200 systems for the control cabinet

SIMATIC ET 200SP

I/O modules > Analog input modules

Technical specifications (continued)

Article number	6ES7134-6GF00-0AA1 ET 200SP, AI 8XI 2/4-WIRE BASIC	6ES7134-6FB00-0BA1 ET 200SP, AI 2XU STANDARD, PU 1	6ES7134-6FF00-0AA1 ET 200SP, AI 8XU BASIC	6ES7134-6HD00-0BA1 ET 200SP, AI 4XU/I 2-WIRE ST	6ES7134-6GB00-0BA1 ET 200SP, AI 2XI 2/4-WIRE ST, PU 1
Analog inputs					
Number of analog inputs	8; Single-ended	2	8; Single-ended	4; Differential inputs	2
permissible input voltage for voltage input (destruction limit), max.		30 V	30 V	30 V	
permissible input current for current input (destruction limit), max.	50 mA			50 mA	50 mA
Cycle time (all channels), min.	1 ms; per channel	500 µs	1 ms; per channel	Sum of the basic conversion times and additional processing times (depending on the parameterization of the active channels)	500 µs
Input ranges (rated values), voltages					
• 0 to +10 V		Yes; 15 bit	Yes; 15 bit	Yes; 15 bit	
• 1 V to 5 V		Yes; 15 bit		Yes; 15 bit	
• -10 V to +10 V		Yes; 16 bit incl. sign	Yes; 16 bit incl. sign	Yes; 16 bit incl. sign	
• -5 V to +5 V		Yes; 16 bit incl. sign		Yes; 16 bit incl. sign	
Input ranges (rated values), currents					
• 0 to 20 mA	Yes			Yes; 15 bit	Yes; 15 bit
• -20 mA to +20 mA	Yes				Yes; 16 bit incl. sign
• 4 mA to 20 mA	Yes			Yes; 15 bit	Yes; 15 bit
Cable length					
• shielded, max.	200 m	200 m	200 m	1 000 m; 200 m for voltage measurement	1 000 m
Analog value generation for the inputs					
Integration and conversion time/resolution per channel					
• Resolution with overrange (bit including sign), max.	16 bit	16 bit	16 bit	16 bit	16 bit
• Integration time, parameterizable	Yes	Yes	Yes	Yes	Yes
• Interference voltage suppression for interference frequency f1 in Hz	16.67 / 50 / 60 / 4 800 (16.67 / 50 / 60)	16.6 / 50 / 60 Hz / off	16.67 / 50 / 60 / 4 800 (16.67 / 50 / 60)	16.6 / 50 / 60 Hz	16.6 / 50 / 60 Hz / off
• Conversion time (per channel)	180 / 60 / 50 / 0.625 (67.5 / 22.5 / 18.75) ms	50 ms @ 60 Hz, 60 ms @ 50 Hz, 180 ms @ 16.6 Hz, 250 µs without filter	180 / 60 / 50 / 0.625 (67.5 / 22.5 / 18.75) ms	180 / 60 / 50 ms	50 ms @ 60 Hz, 60 ms @ 50 Hz, 180 ms @ 16.6 Hz, 250 µs without filter
Smoothering of measured values					
• Number of smoothing levels	4; None; 4/8/16 times	4	4; None; 4/8/16 times	4; None; 4/8/16 times	4
• parameterizable	Yes	Yes	Yes	Yes	Yes
Encoder					
Connection of signal encoders					
• for voltage measurement	No	Yes	Yes	Yes	
• for current measurement as 2-wire transducer	Yes			Yes	Yes
- Burden of 2-wire transmitter, max.	650 Ω			650 Ω	650 Ω
• for current measurement as 4-wire transducer	Yes		No	No	Yes
Errors/accuracies					
Basic error limit (operational limit at 25 °C)					
• Voltage, relative to input range, (+/-)		0.3 %	0.3 %	0.3 %	
• Current, relative to input range, (+/-)	0.3 %			0.3 %	0.3 %

I/O systems

SIMATIC ET 200 systems for the control cabinet

SIMATIC ET 200SP

I/O modules > Analog input modules

Technical specifications (continued)

Article number	6ES7134-6GF00-0AA1 ET 200SP, AI 8XI 2/4-WIRE BASIC	6ES7134-6FB00-0BA1 ET 200SP, AI 2XU STANDARD, PU 1	6ES7134-6FF00-0AA1 ET 200SP, AI 8XU BASIC	6ES7134-6HD00-0BA1 ET 200SP, AI 4XU/I 2-WIRE ST	6ES7134-6GB00-0BA1 ET 200SP, AI 2XI 2/4-WIRE ST, PU 1
Interference voltage suppression for $f = n \times (f_1 \pm 1 \%)$, f_1 = interference frequency					
- Series mode interference (peak value of interference < rated value of input range), min. - Common mode voltage, max. - Common mode interference, min.	70 dB; With conversion time 67.5 / 22.5 / 18.75 ms: 40 dB	70 dB 10 V 90 dB	70 dB; With conversion time 67.5 / 22.5 / 18.75 ms: 40 dB	70 dB 10 V 90 dB	70 dB 10 V 90 dB
Isochronous mode					
Isochronous operation (application synchronized up to terminal)	No	No	No	No	No
Interrupts/diagnostics/status information					
Diagnostics function	Yes	Yes	Yes		Yes
Alarms					
- Diagnostic alarm - Limit value alarm	Yes No	Yes No	Yes No	Yes No	Yes No
Diagnostic messages					
- Monitoring the supply voltage - Wire-break - Short-circuit	Yes Yes; at 4 to 20 mA Yes; Sensor supply to M; module by module	Yes No Yes; at 1 to 5 V	Yes No No	Yes Yes; at 4 to 20 mA Yes; with 1 to 5 V or 2-wire mode: Short-circuit of the encoder supply to ground or of an input to the encoder supply	Yes Yes; at 4 to 20 mA Yes; Short-circuit of the encoder supply
- Group error - Overflow/underflow	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes
Diagnostics indication LED					
- Monitoring of the supply voltage (PWR-LED) - Channel status display - for channel diagnostics - for module diagnostics	Yes; Green LED Yes; Green LED No Yes; green/red DIAG LED	Yes; green PWR LED Yes; Green LED No Yes; green/red DIAG LED	Yes; green PWR LED Yes; Green LED No Yes; green/red DIAG LED	Yes; Green LED Yes; Green LED No Yes; Green/red LED	Yes; green PWR LED Yes; Green LED No Yes; green/red DIAG LED
Potential separation					
Potential separation channels					
between the channels and backplane bus	Yes	Yes	Yes	Yes	Yes
Isolation					
Isolation tested with	707 V DC (type test)	707 V DC (type test)	707 V DC (type test)	707 V DC (type test)	707 V DC (type test)
Standards, approvals, certificates					
Suitable for safety functions	No	No	No	No	No
Dimensions					
Width	15 mm	15 mm	15 mm	15 mm	15 mm
Height	73 mm	73 mm	73 mm	73 mm	73 mm
Depth	58 mm	58 mm	58 mm	58 mm	58 mm
Weights					
Weight, approx.	31 g	31 g	31 g	31 g	32 g

Technical specifications (continued)

Article number	6ES7134-6GD00-0BA1 ET 200SP, AI 4xI 2/4-WIRE ST	6ES7134-6TD00-0CA1 ET 200SP, AI 4xI 2-WIRE 4...20mA HART	6ES7134-6HB00-0CA1 ET 200SP AI 2 X U/I 2, 4-WIRE HF	6ES7134-6HB00-0DA1 ET 200SP AI 2 X U/I 2, 4-WIRE HS
General information				
Product type designation	ET 200SP, AI 4xI 2-/4-wire ST, PU 1	AI 4xI 2-wire 4 ... 20 mA HART	ET 200SP, AI 2x U/I 2-/4-wire High Feature, PU 1	ET 200SP, AI 2xU/I 2-/4-wire High Speed
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&M3
• Measuring range scalable	No	No	No	No
• Scalable measured values				No
• Adjustment of measuring range				No
Engineering with				
• STEP 7 TIA Portal configurable/integrated as of version	V11 SP2 / V13	V13 SP1	V13	V13 SP1
• STEP 7 configurable/integrated as of version	V5.5 SP3 / -	V5.5 SP4 and higher	V5.5 / -	V5.5 SP3 / -
• PCS 7 configurable/integrated as of version	V8.1 SP1	V8.1 SP1	V8.1 SP1	
• PROFIBUS as of GSD version/GSD revision	GSD Revision 5	GSD Revision 5	GSD Revision 5	GSD Revision 5
• PROFINET as of GSD version/GSD revision	GSDML V2.3	GSDML V2.3	GSDML V2.3	GSDML V2.3
Operating mode				
• Oversampling	No	No	No	Yes; 2 channels per module
• MSI	No	No	Yes	No
CiR – Configuration in RUN				
Reparameterization possible in RUN	Yes	Yes	Yes	Yes
Calibration possible in RUN	No	No	Yes	No
Supply voltage				
Type of supply voltage	DC	DC	DC	DC
Rated value (DC)	24 V	24 V	24 V	24 V
Reverse polarity protection	Yes	Yes	Yes	Yes
Analog inputs				
Number of analog inputs	4; Differential inputs	4; Differential inputs	2; Differential inputs	2; Differential inputs
permissible input voltage for voltage input (destruction limit), max.			30 V	30 V
permissible input current for current input (destruction limit), max.	50 mA	50 mA	50 mA	50 mA
Cycle time (all channels), min.	Sum of the basic conversion times and additional processing times (depending on the parameterization of the active channels)			125 µs
Analog input with oversampling			No	Yes
• Values per cycle, max.				16
• Resolution, min.				50 µs
Standardization of measured values			Yes	
Input ranges (rated values), voltages				
• 0 to +10 V			Yes; 15 bit	Yes; 15 bit
• 1 V to 5 V			Yes; 15 bit	Yes; 13 bit
• -10 V to +10 V			Yes; 16 bit incl. sign	Yes; 16 bit incl. sign
• -5 V to +5 V			Yes; 16 bit incl. sign	Yes; 15 bit incl. sign
Input ranges (rated values), currents				
• 0 to 20 mA	Yes	No	Yes; 15 bit	Yes; 15 bit
• -20 mA to +20 mA	Yes	No	Yes; 16 bit incl. sign	Yes; 16 bit incl. sign
• 4 mA to 20 mA	Yes	Yes; 15 bit + sign	Yes; 15 bit	Yes; 14 bit
Cable length				
• shielded, max.	1 000 m	800 m	1 000 m; 200 m for voltage measurement	1 000 m; 200 m for voltage measurement

I/O systems

SIMATIC ET 200 systems for the control cabinet

SIMATIC ET 200SP

I/O modules > Analog input modules

Technical specifications (continued)

Article number	6ES7134-6GD00-0BA1 ET 200SP, AI 4XI 2/4-WIRE ST	6ES7134-6TD00-0CA1 ET 200SP, AI 4XI 2-WIRE 4...20MA HART	6ES7134-6HB00-0CA1 ET 200SP AI 2 X U/I 2, 4-WIRE HF	6ES7134-6HB00-0DA1 ET 200SP AI 2 X U/I 2, 4-WIRE HS
Analog value generation for the inputs				
Integration and conversion time/resolution per channel				
• Resolution with overrange (bit including sign), max.	16 bit	16 bit	16 bit	16 bit
• Integration time, parameterizable	Yes	Yes; channel by channel	Yes	
• Integration time (ms)			67.5 / 22.5 / 18.75 / 10 / 5 / 2.5 / 1.25 / 0.625 ms	
• Basic conversion time, including integration time (ms)			68.03 / 22.83 / 19.03 / 10.28 / 5.23 / 2.68 / 1.43 / 0.730 ms	
• Interference voltage suppression for interference frequency f1 in Hz	16.6 / 50 / 60 Hz	10 / 50 / 60 Hz	16.6 / 50 / 60 / 300 / 600 / 1 200 / 2 400 / 4 800	No
• Conversion time (per channel)	180 / 60 / 50 ms			10 µs
• Basic execution time of the module (all channels released)			1 ms	
Smoothing of measured values				
• Number of smoothing levels	4; None; 4/8/16 times	4; None; 4/8/16 times	6; none; 2-/4-/8-/16-/32-fold	7; none; 2-/4-/8-/16-/32-/64-fold
• parameterizable	Yes	Yes	Yes	Yes
Encoder				
Connection of signal encoders				
• for voltage measurement	No	No	Yes	Yes
• for current measurement as 2-wire transducer	Yes	Yes	Yes	Yes
- Burden of 2-wire transmitter, max.	650 Ω		650 Ω	650 Ω
• for current measurement as 4-wire transducer	Yes		Yes	Yes
Errors/accuracies				
Basic error limit (operational limit at 25 °C)				
• Voltage, relative to input range, (+/-)			0.05 %; 0.1 % at SFU 4.8 kHz	0.2 %
• Current, relative to input range, (+/-)	0.3 %	0.3 %	0.05 %; 0.1 % at SFU 4.8 kHz	0.2 %
Interference voltage suppression for f = n x (f1 +/- 1 %), f1 = interference frequency				
• Series mode interference (peak value of interference < rated value of input range), min.	70 dB	60 dB		
• Common mode voltage, max.	10 V		35 V	35 V
• Common mode interference, min.	90 dB		90 dB	90 dB
Isochronous mode				
Isochronous operation (application synchronized up to terminal)	No	No	Yes	Yes
Filtering and processing time (TCI), min.			800 µs	80 µs
Bus cycle time (TDP), min.			1 ms	125 µs; Starting from firmware Version V2.0.1
Interrupts/diagnostics/status information				
Diagnostics function	Yes	Yes	Yes	
Alarms				
• Diagnostic alarm	Yes	Yes	Yes	Yes
• Limit value alarm	No	Yes	Yes; two upper and two lower limit values in each case	Yes; two upper and two lower limit values in each case

Technical specifications (continued)

Article number	6ES7134-6GD00-0BA1 ET 200SP, AI 4XI 2/4-WIRE ST	6ES7134-6TD00-0CA1 ET 200SP, AI 4XI 2-WIRE 4...20MA HART	6ES7134-6HB00-0CA1 ET 200SP AI 2 X U/I 2, 4-WIRE HF	6ES7134-6HB00-0DA1 ET 200SP AI 2 X U/I 2, 4-WIRE HS
Diagnostic messages				
• Monitoring the supply voltage	Yes	Yes	Yes	Yes; channel-by-channel, at 4 to 20 mA only
• Wire-break	Yes; at 4 to 20 mA	Yes; channel by channel	Yes; Measuring range 4 to 20 mA only	Yes; channel-by-channel, at 4 to 20 mA only
• Short-circuit	Yes; 2-wire mode: Short-circuit of the encoder supply to ground or of an input to the encoder supply	Yes; Channel-by-channel, short-circuit of the encoder supply to ground or of an input to the encoder supply	Yes; channel-by-channel, at 1 to 5 V or for short-circuit in encoder supply	Yes; channel-by-channel, at 1 to 5 V or for current measuring ranges short-circuit in encoder supply
• Group error	Yes	Yes	Yes	Yes
• Overflow/underflow	Yes	Yes; channel by channel	Yes	Yes
Diagnostics indication LED				
• Monitoring of the supply voltage (PWR-LED)	Yes; Green LED	Yes; green PWR LED	Yes; green PWR LED	Yes; green PWR LED
• Channel status display	Yes; Green LED	Yes; Green LED	Yes; Green LED	Yes; Green LED
• for channel diagnostics	No	Yes; Red LED	Yes; Red LED	Yes; Red LED
• for module diagnostics	Yes; Green/red LED	Yes; green/red DIAG LED	Yes; green/red DIAG LED	Yes; green/red DIAG LED
Potential separation				
Potential separation channels				
• between the channels and backplane bus	Yes	Yes	Yes	Yes
Isolation				
Isolation tested with	707 V DC (type test)	707 V DC (type test)	707 V DC (type test)	707 V DC (type test)
Standards, approvals, certificates				
Suitable for safety functions	No		No	No
Dimensions				
Width	15 mm	15 mm	15 mm	15 mm
Height	73 mm	73 mm	73 mm	73 mm
Depth	58 mm	58 mm	58 mm	58 mm
Weights				
Weight, approx.	31 g	31 g	32 g	32 g

Article number	6ES7134-6JF00-0CA1 ET 200SP, AI 8XRTD/TC 2-WIRE HF	6ES7134-6JD00-0CA1 ET 200SP, AI 4XRTD/TC 2/3/4-WIRE HF
General information		
Product type designation	ET 200SP, AI 8x RTD/TC 2-wire HF, PU 1	ET 200SP, AI 4x RTD/TC 2-/3-/4-wire HF, PU 1
Product function		
• I&M data	Yes; I&M0 to I&M3	Yes; I&M0 to I&M3
Engineering with		
• STEP 7 TIA Portal configurable/integrated as of version	V13	V12 SP1 / V13
• STEP 7 configurable/integrated as of version	V5.5 / -	V5.5 SP3 / V5.5 SP4
• PCS 7 configurable/integrated as of version		V8.1 SP1
• PROFIBUS as of GSD version/GSD revision	GSD Revision 5	GSD Revision 5
• PROFINET as of GSD version/GSD revision	GSDML V2.3	GSDML V2.3
Operating mode		
• Oversampling	No	No
• MSI	No	No
CiR – Configuration in RUN		
Reparameterization possible in RUN	Yes	Yes
Calibration possible in RUN	Yes	Yes
Supply voltage		
Type of supply voltage	DC	DC
Rated value (DC)	24 V	24 V
Reverse polarity protection	Yes	Yes

I/O systems

SIMATIC ET 200 systems for the control cabinet

SIMATIC ET 200SP

I/O modules > Analog input modules

Technical specifications (continued)

Article number	6ES7134-6JF00-0CA1 ET 200SP, AI 8XRTD/TC 2-WIRE HF	6ES7134-6JD00-0CA1 ET 200SP, AI 4XRTD/TC 2/3/4-WIRE HF
Analog inputs		
Number of analog inputs	8	4
permissible input voltage for voltage input (destruction limit), max.	30 V	30 V
Constant measurement current for resistance-type transmitter, typ.	2 mA	0.7 mA; 1.7 mA for Cu10 sensors
Cycle time (all channels), min.	Sum of the basic conversion times and additional processing times (depending on the parameterization of the active channels)	Sum of the basic conversion times and additional processing times (depending on the parameterization of the active channels); for line compensation in case of a three-wire connection, an additional cycle is necessary
Technical unit for temperature measurement adjustable	Yes; °C/°F/K	Yes; °C/°F/K
Input ranges (rated values), voltages		
• -1 V to +1 V	Yes; 16 bit incl. sign	Yes; 16 bit incl. sign
• -250 mV to +250 mV	Yes; 16 bit incl. sign	Yes; 16 bit incl. sign
• -50 mV to +50 mV	Yes; 16 bit incl. sign	Yes; 16 bit incl. sign
• -80 mV to +80 mV	Yes; 16 bit incl. sign	Yes; 16 bit incl. sign
Input ranges (rated values), thermocouples		
• Type B	Yes; 16 bit incl. sign	Yes; 16 bit incl. sign
• Type C	Yes; 16 bit incl. sign	Yes; 16 bit incl. sign
• Type E	Yes; 16 bit incl. sign	Yes; 16 bit incl. sign
• Type J	Yes; 16 bit incl. sign	Yes; 16 bit incl. sign
• Type K	Yes; 16 bit incl. sign	Yes; 16 bit incl. sign
• Type L	Yes; 16 bit incl. sign	Yes; 16 bit incl. sign
• Type N	Yes; 16 bit incl. sign	Yes; 16 bit incl. sign
• Type R	Yes; 16 bit incl. sign	Yes; 16 bit incl. sign
• Type S	Yes; 16 bit incl. sign	Yes; 16 bit incl. sign
• Type T	Yes; 16 bit incl. sign	Yes; 16 bit incl. sign
• Type U	Yes; 16 bit incl. sign	Yes; 16 bit incl. sign
• Type TXK/TXK(L) to GOST	Yes; 16 bit incl. sign	Yes; 16 bit incl. sign
Input ranges (rated values), resistance thermometer		
• Cu 10		Yes; 16 bit incl. sign
• Ni 100	Yes; 16 bit incl. sign	Yes; 16 bit incl. sign
• Ni 1000	Yes; 16 bit incl. sign	Yes; 16 bit incl. sign
• LG-Ni 1000	Yes; 16 bit incl. sign	Yes; 16 bit incl. sign
• Ni 120	Yes; 16 bit incl. sign	Yes; 16 bit incl. sign
• Ni 200	Yes; 16 bit incl. sign	Yes; 16 bit incl. sign
• Ni 500	Yes; 16 bit incl. sign	Yes; 16 bit incl. sign
• Pt 100	Yes; 16 bit incl. sign	Yes; 16 bit incl. sign
• Pt 1000	Yes; 16 bit incl. sign	Yes; 16 bit incl. sign
• Pt 200	Yes; 16 bit incl. sign	Yes; 16 bit incl. sign
• Pt 500	Yes; 16 bit incl. sign	Yes; 16 bit incl. sign
Input ranges (rated values), resistors		
• 0 to 150 ohms	Yes; 15 bit	Yes; 15 bit
• 0 to 300 ohms	Yes; 15 bit	Yes; 15 bit
• 0 to 600 ohms	Yes; 15 bit	Yes; 15 bit
• 0 to 3000 ohms	Yes; 15 bit	Yes; 15 bit
• 0 to 6000 ohms	Yes; 15 bit	Yes; 15 bit
• PTC	Yes; 15 bit	Yes; 15 bit
Thermocouple (TC)		
Temperature compensation		
- parameterizable	Yes	Yes
Cable length		
• shielded, max.	200 m; 50 m with thermocouples	200 m; 50 m with thermocouples

Technical specifications (continued)

Article number	6ES7134-6JF00-0CA1 ET 200SP, AI 8XRTD/TC 2-WIRE HF	6ES7134-6JD00-0CA1 ET 200SP, AI 4XRTD/TC 2/3/4-WIRE HF
Analog value generation for the inputs		
Integration and conversion time/resolution per channel		
• Resolution with overrange (bit including sign), max.	16 bit	16 bit
• Integration time, parameterizable	Yes	Yes
• Basic conversion time, including integration time (ms)		
- additional processing time for wire-break check	2 ms; In the ranges resistance thermometers, resistors and thermocouples	2 ms; In the ranges resistance thermometers, resistors and thermocouples
- additional power line wire-break check		2 ms; for 3/4 wire transducer (resistance thermometer and resistor)
• Interference voltage suppression for interference frequency f1 in Hz	16.6 / 50 / 60 Hz	16.6 / 50 / 60 Hz
• Conversion time (per channel)	180 / 60 / 50 ms	180 / 60 / 50 ms
Smoothing of measured values		
• Number of smoothing levels	4; None; 4/8/16 times	4; None; 4/8/16 times
• parameterizable	Yes	Yes
Encoder		
Connection of signal encoders		
• for voltage measurement	Yes	Yes
• for resistance measurement with two-wire connection	Yes	Yes
• for resistance measurement with three-wire connection	No	Yes
• for resistance measurement with four-wire connection	No	Yes
Errors/accuracies		
Basic error limit (operational limit at 25 °C)		
• Voltage, relative to input range, (+/-)	0.05 %	0.05 %
• Resistance, relative to input range, (+/-)	0.05 %	0.05 %
Interference voltage suppression for $f = n \times (f1 \pm 1 \%)$, f1 = interference frequency		
• Series mode interference (peak value of interference < rated value of input range), min.	70 dB	70 dB
• Common mode voltage, max.	10 V	10 V
• Common mode interference, min.	90 dB	90 dB
Isochronous mode		
Isochronous operation (application synchronized up to terminal)	No	No
Interrupts/diagnostics/status information		
Diagnostics function	Yes	Yes
Alarms		
• Diagnostic alarm	Yes	Yes
• Limit value alarm	Yes; two upper and two lower limit values in each case	Yes; two upper and two lower limit values in each case
Diagnostic messages		
• Monitoring the supply voltage	Yes	Yes
• Wire-break	Yes; channel by channel	Yes; channel by channel
• Group error	Yes	Yes
• Overflow/underflow	Yes; channel by channel	Yes; channel by channel
Diagnostics indication LED		
• Monitoring of the supply voltage (PWR-LED)	Yes; green PWR LED	Yes; green PWR LED
• Channel status display	Yes; Green LED	Yes; Green LED
• for channel diagnostics	Yes; Red LED	Yes; Red LED
• for module diagnostics	Yes; green/red DIAG LED	Yes; green/red DIAG LED

I/O systems

SIMATIC ET 200 systems for the control cabinet

SIMATIC ET 200SP

I/O modules > Analog input modules

Technical specifications (continued)

Article number	6ES7134-6JF00-0CA1 ET 200SP, AI 8XRTD/TC 2-WIRE HF	6ES7134-6JD00-0CA1 ET 200SP, AI 4XRTD/TC 2/3/4-WIRE HF
Potential separation		
Potential separation channels		
• between the channels and backplane bus	Yes	Yes
Isolation		
Isolation tested with	707 V DC (type test)	707 V DC (type test)
Standards, approvals, certificates		
Suitable for safety functions	No	No
Dimensions		
Width	15 mm	15 mm
Height	73 mm	73 mm
Depth	58 mm	58 mm
Weights		
Weight, approx.	32 g	30 g

Article number	6ES7134-6PA01-0BD0 ET 200SP AI ENERGY METER 400VAC ST	6ES7134-6PA20-0BD0 ET 200SP AI ENERGY METER 480VAC ST
General information		
Product type designation	ET 200SP, AI Energy Meter 400 V AC ST, PU 1	ET 200SP, AI Energy Meter 480 V AC ST, PU 1
Product function		
• Voltage measurement	Yes	Yes
• Voltage measurement with voltage transformers	No	Yes
• Current measurement	Yes	Yes
• Phase current measurement without current transformers	No	No
• Phase current measurement with current transformers	Yes	Yes
• Energy measurement	Yes	Yes
• Frequency measurement	Yes	Yes
• Power measurement	Yes	Yes
• Active power measurement	Yes	Yes
• Reactive power measurement	Yes	Yes
• I&M data	Yes; I&M0 to I&M3	Yes; I&M0 to I&M3
• Isochronous mode	No	No
Engineering with		
• STEP 7 TIA Portal configurable/integrated as of version	V13 SP1	V13 SP1
• STEP 7 configurable/integrated as of version	V5.5 SP4 and higher	V5.5 SP4 and higher
• PROFIBUS as of GSD version/GSD revision	GSD Revision 5	GSD Revision 5
• PROFINET as of GSD version/GSD revision	V2.3	V2.3
Operating mode		
• cyclic measurement	Yes	Yes
• acyclic measurement	Yes	Yes
• Acyclic measured value access	Yes	Yes
• Fixed measured value sets	Yes	Yes
• Freely definable measured value sets	No	Yes
CiR – Configuration in RUN		
Reparameterization possible in RUN	Yes	Yes
Calibration possible in RUN	No	Yes
Installation type/mounting		
Mounting position	Any	Any

Technical specifications (continued)

Article number	6ES7134-6PA01-0BD0 ET 200SP AI ENERGY METER 400VAC ST	6ES7134-6PA20-0BD0 ET 200SP AI ENERGY METER 480VAC ST
Supply voltage		
Design of the power supply	Supply via voltage measurement channel L1	Supply via voltage measurement channel L1
Type of supply voltage	100 - 240 V AC	AC 100 - 277 V
permissible range, lower limit (AC)	90 V	90 V
permissible range, upper limit (AC)	264 V	293 V
Line frequency		
• permissible range, lower limit	47 Hz	47 Hz
• permissible range, upper limit	63 Hz	63 Hz
Address area		
Address space per module		
• Address space per module, max.	44 byte; 32 byte input / 12 byte output	268 byte; 256 byte input / 12 byte output
Analog inputs		
Cycle time (all channels), typ.	50 ms; Time for consistent update of all measured and calculated values (cyclic und acyclic data)	50 ms; Time for consistent update of all measured and calculated values (cyclic und acyclic data)
Interrupts/diagnostics/ status information		
Alarms		
• Diagnostic alarm	Yes	Yes
• Limit value alarm	No	Yes
• Hardware interrupt	No	Yes; Monitoring of up to 16 freely selectable process values (exceeding or undershooting of value)
Diagnostics indication LED		
• Monitoring of the supply voltage (PWR-LED)	Yes	Yes
• Channel status display	Yes; Green LED	Yes; Green LED
• for channel diagnostics	Yes; red Fn LED	Yes; red Fn LED
• for module diagnostics	Yes; green/red DIAG LED	Yes; green/red DIAG LED
Integrated Functions		
Measuring functions		
• Measuring procedure for voltage measurement	TRMS	TRMS
• Measuring procedure for current measurement	TRMS	TRMS
• Type of measured value acquisition	seamless	seamless
• Curve shape of voltage	Sinusoidal or distorted	Sinusoidal or distorted
• Buffering of measured variables	No	Yes
• Parameter length	38 byte	74 byte
• Bandwidth of measured value acquisition	2 kHz; Harmonics: 39 / 50 Hz, 32 / 60 Hz	2 kHz; Harmonics: 39 / 50 Hz, 32 / 60 Hz
Operating mode for measured value acquisition		
- automatic detection of line frequency	No; Parameterizable	No; Parameterizable
Measuring range		
- Frequency measurement, min.	45 Hz	45 Hz
- Frequency measurement, max.	65 Hz	65 Hz
Measuring inputs for voltage		
- Measurable line voltage between phase and neutral conductor	230 V	277 V
- Measurable line voltage between the line conductors	400 V	480 V
- Measurable line voltage between phase and neutral conductor, min.	90 V	90 V
- Measurable line voltage between phase and neutral conductor, max.	264 V	293 V
- Measurable line voltage between the line conductors, min.	155 V	155 V
- Measurable line voltage between the line conductors, max.	460 V	508 V
- Measurement category for voltage measurement in accordance with IEC 61010-2-030	CAT II; CAT III in case of guaranteed protection level of 1.5 kV	CAT II; CAT III in case of guaranteed protection level of 1.5 kV
- Internal resistance line conductor and neutral conductor	3.4 MΩ	3.4 MΩ

I/O systems

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Technical specifications (continued)

Article number	6ES7134-6PA01-0BD0 ET 200SP AI ENERGY METER 400VAC ST	6ES7134-6PA20-0BD0 ET 200SP AI ENERGY METER 480VAC ST
Measuring inputs for voltage (continued)		
- Power consumption per phase	20 mW	20 mW
- Impulse voltage resistance 1,2/50µs	1 kV	1 kV
Measuring inputs for current		
- measurable relative current (AC), min.	5 %; Relative to the secondary rated current; 1 A, 5 A	1 %; Relative to the secondary rated current 5 A
- measurable relative current (AC), max.	100 %; Relative to the secondary rated current; 1 A, 5 A	100 %; Relative to the secondary rated current 5 A
- Continuous current with AC, maximum permissible	5 A	5 A
- Apparent power consumption per phase for measuring range 5 A	0.6 V·A	0.6 V·A
- Rated value short-time withstand current restricted to 1 s	100 A	100 A
- Input resistance measuring range 0 to 5 A	25 mΩ; At the terminal	25 mΩ; At the terminal
- Zero point suppression	Parameterizable: 20 - 250 mA, default 50 mA	Parameterizable: 2 - 250 mA, default 50 mA
- Surge strength	10 A; for 1 minute	10 A; for 1 minute
Accuracy class according to IEC 61557-12		
- Measured variable voltage	0.5	0.2
- Measured variable current	0.5	0.2
- Measured variable apparent power	1	0.5
- Measured variable active power	1	0.5
- Measured variable reactive power	1	1
- Measured variable power factor	0.5	0.5
- Measured variable active energy	1	0.5
- Measured variable reactive energy	2	1
- Measured variable neutral current		0.5; calculated
- Measured variable phase angle	±1 °; not covered by IEC 61557-12	±1 °; not covered by IEC 61557-12
- Measured variable frequency	0.05	0.05
Potential separation		
Potential separation channels		
• between the channels and backplane bus	Yes; 3 700V AC (type test) CAT III	Yes; 3 700V AC (type test) CAT III
Isolation		
Isolation tested with	2 300V AC for 1 min. (type test)	2 300V AC for 1 min. (type test)
Ambient conditions		
Ambient temperature during operation		
• horizontal installation, min.	0 °C	0 °C
• horizontal installation, max.	60 °C	60 °C
• vertical installation, min.	0 °C	0 °C
• vertical installation, max.	50 °C	50 °C
Dimensions		
Width	20 mm	20 mm
Height	73 mm	73 mm
Depth	58 mm	58 mm
Weights		
Weight (without packaging)	45 g	45 g
Data for selecting a current transformer		
• Burden power current transformer x/1A, min.	As a function of cable length and cross section, see device manual	As a function of cable length and cross section, see device manual
• Burden power current transformer x/5A, min.	As a function of cable length and cross section, see device manual	As a function of cable length and cross section, see device manual

Ordering data	Article No.	Article No.
Analog input modules Delivery options: Apart from the standard delivery form in an individual package, selected I/O modules and BaseUnits are also available in a pack of 10 units. The pack of 10 units enables the amount of waste to be reduced considerably, as well as saving the time of unpacking individual modules. The number of modules required is the number of modules ordered. The type of packaging is chosen by selecting the article number. Packs of 10 can therefore only be ordered in integer multiples of 10. Analog input module AI 8xI 2/4-wire BA, BU type A0 or A1, color code CC01 Analog input module AI 2xU ST, BU type A0 or A1, color code CC00 Analog input module AI 8xU BA, BU type A0 or A1, color code CC02 Analog input module AI 4xU/I 2-wire Standard, BU type A0 or A1, color code CC03, 16-bit, $\pm 0.3\%$ • 1 unit • 10 units Analog input module AI 2xI 2/4-wire Standard, BU type A0 or A1, color code CC05, 16-bit Analog input module AI 4xI 2/4-wire Standard, BU type A0 or A1, color code CC03, 16-bit, $\pm 0.3\%$ Analog input module AI 4xI 2-wire 4...20 mA HART, BU type A0 or A1, color code CC03 Analog input module AI 2xU/I 2/4-wire High Feature, BU type A0 or A1, color code CC05, 16-bit, $\pm 0.1\%$, independent channel isolation, isochronous mode above 1 ms Analog input module AI 2xU/I 2/4-wire High Speed, BU type A0 or A1, color code CC00, 16-bit, $\pm 0.3\%$, isochronous mode above 250 μ s, oversampling above 50 μ s Analog input module AI 8xRTD/TC 2-wire High Feature, BU type A0 or A1, color code CC00, 16-bit, $\pm 0.1\%$, scalable measuring range • 1 unit • 10 units	6ES7 134-6GF00-0AA1 6ES7134-6FB00-0BA1 6ES7 134-6FF00-0AA1 6ES7134-6HD00-0BA1 6ES7134-6HD00-2BA1 6ES7134-6GB00-0BA1 6ES7134-6GD00-0BA1 6ES7134-6TD00-0CA1 6ES7134-6HB00-0CA1 6ES7134-6HB00-0DA1 6ES7134-6JF00-0CA1 6ES7134-6JF00-2CA1	Analog input modules (continued) Analog input module AI 4xRTD/TC 2, 3, 4-wire High Feature, BU type A0 or A1, color code CC00, 16-bit, $\pm 0.1\%$, scalable measuring range • 1 unit • 10 units Analog input module AI Energy Meter Standard, 400 V AC, BU type D0 Analog input module AI Energy Meter Standard, 480 V AC, BU type D0 Usable type A0 BaseUnits BU15-P16+A10+2D BU type A0; BaseUnit (light) with 16 process terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1 A to 10 A); for starting a new load group (max. 10 A) • 1 unit • 10 units 6ES7134-6JD00-0CA1 6ES7134-6JD00-2CA1 6ES7134-6PA01-0BD0 6ES7134-6PA20-0BD0 BU15-P16+A0+2D BU type A0; BaseUnit (light) with 16 process terminals to the module; for starting a new load group (max. 10 A) • 1 unit • 10 units 6ES7193-6BP20-0DA0 6ES7193-6BP20-2DA0 BU15-P16+A10+2B BU type A0; BaseUnit (dark) with 16 process terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1 A to 10 A); for continuing the load group • 1 unit • 10 units 6ES7193-6BP00-0DA0 6ES7193-6BP00-2DA0 BU15-P16+A0+2B BU type A0; BaseUnit (dark) with 16 process terminals to the module; for continuing the load group • 1 unit • 10 units 6ES7193-6BP20-0BA0 6ES7193-6BP20-2BA0 6ES7193-6BP00-0BA0 6ES7193-6BP00-2BA0

I/O systems

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I/O modules > Analog input modules

Ordering data	Article No.		Article No.
Usable type A1 BaseUnits (temperature detection)		Shield connection	6ES7193-6SC00-1AM0
BU15-P16+A0+12D/T	6ES7193-6BP40-0DA1	5 shield supports and 5 shield terminals	
BU type A1; BaseUnit (light) with 16 process terminals (1...16) to the module and an additional 2x5 internally jumpered additional terminals (1 B to 5 B and 1 C to 5 C); for starting a new load group (max. 10 A)		Color-coded labels	6ES7193-6CP00-2MA0
BU15-P16+A0+2D/T	6ES7193-6BP00-0DA1	Color code CC00, for 16 process terminals, for BU type A0, A1, gray (terminals 1 to 8), red (terminals 9 to 16); 10 units	
BU type A1; BaseUnit (light) with 16 process terminals to the module; for starting a new load group (max. 10 A)		Color code CC01, for 16 process terminals, for BU type A0, A1, gray (terminals 1 to 8), red (terminals 9 to 16); 10 units	6ES7193-6CP01-2MA0
BU15-P16+A0+12B/T	6ES7193-6BP40-0BA1	Color code CC02, for 16 process terminals, for BU type A0, A1, gray (terminals 1 to 8), blue (terminals 9 to 16); 10 units	6ES7193-6CP02-2MA0
BU type A1; BaseUnit (dark) with 16 process terminals (1...16) to the module and an additional 2x5 internally jumpered additional terminals (1 B to 5 B and 1 C to 5 C); for continuing the load group		Color code CC03, for 16 push-in terminals, for BU type A0, A1 gray (terminals 1 to 8), red (terminals 9 to 12), gray (terminals 13 to 16); 10 units	6ES7193-6CP03-2MA0
BU15-P16+A0+2B/T	6ES7193-6BP00-0BA1	Color code CC05, for 16 push-in terminals, for BU type A0, A1, gray (terminals 1 to 12), red (terminals 13 to 14), blue (terminals 15 to 16); 10 units	6ES7193-6CP05-2MA0
BU type A1; BaseUnit (dark) with 16 process terminals to the module; for continuing the load group		Color code CC71, for 10 AUX terminals, BU type A0, yellow/green (terminals 1 A to 10 A); 10 units	6ES7193-6CP71-2AA0
Usable type D0 BaseUnits		Color code CC72, for 10 AUX terminals, BU type A0, red (terminals 1 A to 10 A); 10 units	6ES7193-6CP72-2AA0
BU20-P12+A0+0B	6ES7193-6BP00-0BD0	Color code CC73, for 10 AUX terminals, BU type A0, blue (terminals 1 A to 10 A); 10 units	6ES7193-6CP73-2AA0
BU type D0; BaseUnit with 12 push-in terminals, without AUX terminals, bridged to the left		Color code CC74, for 2x5 additional terminals, BU type A1, red (terminals 1B to 5B), blue (terminals 1C to 5C); 10 units	6ES7193-6CP74-2AA0
Accessories			
Equipment labeling plate	6ES7193-6LF30-0AW0		
10 sheets of 16 labels, for printing with thermal transfer card printer or plotter			
Labeling strips			
500 labeling strips on roll, light gray, for inscription with thermal transfer roll printer	6ES7193-6LR10-0AA0		
500 labeling strips on roll, yellow, for inscription with thermal transfer roll printer	6ES7193-6LR10-0AG0		
1000 labeling strips DIN A4, light gray, card, perforated, for inscription with laser printer	6ES7193-6LA10-0AA0		
1000 labeling strips DIN A4, yellow, card, perforated, for inscription with laser printer	6ES7193-6LA10-0AG0		
BU cover			
for covering empty slots (gaps); 5 units			
• 15 mm wide	6ES7133-6CV15-1AM0		
• 20 mm wide	6ES7133-6CV20-1AM0		

Overview



- 2 and 4-channel analog output (AQ) modules
- Apart from the standard delivery form in an individual package, selected I/O modules and BaseUnits are also available in a pack of 10 units. The pack of 10 units enables the amount of waste to be reduced considerably, as well as saving the time of unpacking individual modules.

For different requirements, the digital output modules offer:

- Function classes Standard, High Feature and High-Speed
- BaseUnits for single or multiple-conductor connection with automatic slot coding
- Individual system-integrated load group formation with self-assembling voltage distribution bars (a separate power module is no longer required for ET 200SP)
- Option for connecting current and voltage actuators

- Clear labeling on front of module
- LEDs for diagnostics, status, power supply and faults
- Electronically readable and non-volatile writable rating plate (I&M data 0 to 3)
- Extended functions and additional operating modes in some cases
 - Oversampling (n-fold equidistant output of an analog value within one PN cycle and thus the precisely timed output of an analog value or a sequence of analog values)
 - Isochronous mode (simultaneous equidistant output of analog values)
 - Output of substitute value in the event of interruptions to communication (shutdown, output adjustable substitute value, or keep last value)
 - Calibration during runtime
 - Re-parameterization during operation
 - Firmware update
 - Diagnosis of wire break, short circuit, overflow, underflow
 - Value status (optional binary validity information of the analog signal in the process image)
 - Supports the PROFlenergy profile
- Optional accessories
 - Labeling strips (film or card)
 - Equipment labeling plate
 - Color-coded label with module-specific CC code
 - Shielding terminal

A quick and clear comparison of the functions of the AQ modules is offered by the TIA Selection Tool.

Overview of analog output modules

Analog output	PU	Article No.	CC code	BU type
AQ 2 x U ST	1	6ES7135-6FB00-0BA1	CC00	A0, A1
AQ 2 x I ST	1	6ES7135-6GB00-0BA1	CC00	A0, A1
AQ 4 x U/I ST	1	6ES7135-6HD00-0BA1	CC00	A0, A1
AQ 2 x U/I HF	1	6ES7135-6HB00-0CA1	CC00	A0, A1
AQ 2 x U/I HS	1	6ES7135-6HB00-0DA1	CC00	A0, A1

With two operating modes:

- High-speed isochronous AQ
- Oversampling

I/O systems

SIMATIC ET 200 systems for the control cabinet

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I/O modules > Analog output modules**Overview** (continued)

Overview of BaseUnits

BaseUnit	PU	Article No.	CC codes for process terminals	CC codes for AUX terminals
BU type A0 • New load group (light) • 16 process terminals • With 10 AUX terminals	1	6ES7193-6BP20-0DA0	CC01 to CC05	CC71 to CC73
BU type A0 • New load group (light) • 16 process terminals • With 10 AUX terminals	10	6ES7193-6BP20-2DA0	CC01 to CC05	CC71 to CC73
BU type A0 • New load group (light) • 16 process terminals • Without AUX terminals	1	6ES7193-6BP00-0DA0	CC01 to CC05	--
BU type A0 • New load group (light) • 16 process terminals • Without AUX terminals	10	6ES7193-6BP00-2DA0	CC01 to CC05	--
BU type A0 • Forwarding of load group (dark) • 16 process terminals • With 10 AUX terminals	1	6ES7193-6BP20-0BA0	CC01 to CC05	CC71 to CC73
BU type A0 • Forwarding of load group (dark) • 16 process terminals • With 10 AUX terminals	10	6ES7193-6BP20-2BA0	CC01 to CC05	CC71 to CC73
BU type A0 • Forwarding of load group (dark) • 16 process terminals • Without AUX terminals	1	6ES7193-6BP00-0BA0	CC01 to CC05	--
BU type A0 • Forwarding of load group (dark) • 16 process terminals • Without AUX terminals	10	6ES7193-6BP00-2BA0	CC01 to CC05	--
BU type A1 • New load group (light) • With temperature sensor • 16 process terminals • With 2x5 additional terminals	1	6ES7193-6BP40-0DA1	CC01 to CC05	CC74
BU type A1 • New load group (light) • With temperature sensor • 16 process terminals • Without 2x5 additional terminals	1	6ES7193-6BP00-0DA1	CC01 to CC05	--
BU type A1 • Forwarding of load group (dark) • With temperature sensor • 16 process terminals • With 2x5 additional terminals	1	6ES7193-6BP40-0BA1	CC01 to CC05	CC74
BU type A1 • Forwarding of load group (dark) • With temperature sensor • 16 process terminals • Without 2x5 additional terminals	1	6ES7193-6BP00-0BA1	CC01 to CC05	--

Technical specifications

Article number	6ES7135-6FB00-0BA1 ET 200SP, AQ 2xU STANDARD, PU 1	6ES7135-6GB00-0BA1 ET 200SP, AQ 2xI STANDARD, PU 1	6ES7135-6HD00-0BA1 ET 200SP, AQ 4xU/I ST	6ES7135-6HB00-0DA1 ET 200SP, AQ 2 X U/I HIGH SPEED	6ES7135-6HB00-0CA1 ET 200SP, AQ 2 X U/I HIGH FEATURE
General information					
Product type designation	ET 200SP, AQ 2xU Standard	ET 200SP, AQ 2xI Standard	ET 200SP, AQ 4xU/I Standard	ET 200SP, AQ 2xU/I High Speed	AQ 2xU/I HF
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&M3	Yes; I&M0 to I&M3
• Output range scalable	No	No	No		
Engineering with					
• STEP 7 TIA Portal configurable/ integrated as of version	V13 SP1 / -	V13 SP1 / -	V11 SP2 / V13	V13 SP1	V13 / V13
• STEP 7 configurable/integrated as of version	V5.5 SP3 / -	V5.5 SP3 / -	V5.5 SP3 / -	V5.5 SP3 / -	V5.5 SP3 / -
• PCS 7 configurable/integrated as of version			V8.1 SP1		V8.1 SP1
• PROFIBUS as of GSD version/ GSD revision	GSD Revision 5	GSD Revision 5	GSD Revision 5	GSD Revision 5	GSD Revision 5
• PROFINET as of GSD version/ GSD revision	GSDML V2.3	GSDML V2.3	GSDML V2.3	GSDML V2.3	GSDML V2.3
Operating mode					
• Oversampling	No	No	No	Yes; 2 channels per module	No
• MSO	No	No	No	No	No
CiR – Configuration in RUN					
Reparameterization possible in RUN	Yes	Yes	Yes	Yes	Yes
Calibration possible in RUN	No	No	No	Yes	Yes
Supply voltage					
Type of supply voltage	DC	DC	DC	DC	DC
Rated value (DC)	24 V	24 V	24 V	24 V	24 V
Reverse polarity protection	Yes	Yes	Yes	Yes	Yes
Analog outputs					
Number of analog outputs	2	2	4	2	2
Cycle time (all channels), min.	1 ms	1 ms	5 ms	125 µs	750 µs
Analog output with oversampling	No	No	No	Yes	
• Values per cycle, max.				16	
• Resolution, min.				45 µs; (2 channels), 35 µs (1 channel)	
Output ranges, voltage					
• 0 to 10 V	Yes; 15 bit		Yes; 15 bit	Yes; 15 bit	Yes; 15 bit
• 1 V to 5 V	Yes; 13 bit		Yes; 13 bit	Yes; 13 bit	Yes; 13 bit
• -5 V to +5 V	Yes; 15 bit incl. sign		Yes; 15 bit incl. sign	Yes; 15 bit incl. sign	Yes; 15 bit incl. sign
• -10 V to +10 V	Yes; 16 bit incl. sign		Yes; 16 bit incl. sign	Yes; 16 bit incl. sign	Yes; 16 bit incl. sign
Output ranges, current					
• 0 to 20 mA		Yes; 15 bit	Yes; 15 bit	Yes; 15 bit	Yes; 15 bit
• -20 mA to +20 mA		Yes; 16 bit incl. sign	Yes; 16 bit incl. sign	Yes; 16 bit incl. sign	Yes; 16 bit incl. sign
• 4 mA to 20 mA		Yes; 14 bit	Yes; 14 bit	Yes; 14 bit	Yes; 14 bit
Connection of actuators					
• for voltage output two-wire connection	Yes		Yes	Yes	Yes
• for voltage output four-wire connection	No		Yes	Yes	Yes
• for current output two-wire connection		Yes	Yes	Yes	Yes

I/O systems

SIMATIC ET 200 systems for the control cabinet

SIMATIC ET 200SP

I/O modules > Analog output modules

Technical specifications (continued)

Article number	6ES7135-6FB00-0BA1 ET 200SP, AQ 2XU STANDARD, PU 1	6ES7135-6GB00-0BA1 ET 200SP, AQ 2XI STANDARD, PU 1	6ES7135-6HD00-0BA1 ET 200SP, AQ 4XU/I ST	6ES7135-6HB00-0DA1 ET 200SP, AQ 2 X U/I HIGH SPEED	6ES7135-6HB00-0CA1 ET 200SP, AQ 2 X U/I HIGH FEATURE
Load impedance (in rated range of output)					
• with voltage outputs, min.	2 kΩ		2 kΩ	2 kΩ	2 kΩ
• with voltage outputs, capacitive load, max.	1 μF		1 μF	1 μF	1 μF
• with current outputs, max.		500 Ω	500 Ω	500 Ω	500 Ω
• with current outputs, inductive load, max.		1 mH	1 mH	1 mH	1 mH
Cable length					
• shielded, max.	200 m	1 000 m	1 000 m; 200 m for voltage output	1 000 m; 200 m for voltage output	1 000 m; 200 m for voltage output
Analog value generation for the outputs					
Integration and conversion time/resolution per channel					
• Resolution with overrange (bit including sign), max.	16 bit	16 bit	16 bit	16 bit	16 bit
Settling time					
• for resistive load	0.1 ms	0.1 ms; Typical value	0.1 ms	0.05 ms	0.05 ms
• for capacitive load	1 ms		1 ms	0.05 ms; Max. 47 nF and 20 m cable length	0.05 ms; Max. 47 nF and 20 m cable length
• for inductive load		0.5 ms	0.5 ms	0.05 ms	0.05 ms
Errors/accuracies					
Basic error limit (operational limit at 25 °C)					
• Voltage, relative to output range, (+/-)	0.3 %	0.3 %	0.3 %	0.1 %	0.1 %
• Current, relative to output range, (+/-)	0.3 %	0.3 %	0.3 %	0.1 %	0.1 %
Isochronous mode					
Isochronous operation (application synchronized up to terminal)	No	No	No	Yes	Yes
Execution and activation time (TCO), min.				70 μs	500 μs
Bus cycle time (TDP), min.				125 μs	750 μs
Interrupts/diagnostics/status information					
Diagnostics function	Yes	Yes	Yes	Yes	Yes
Substitute values connectable	Yes	Yes	Yes	Yes	Yes
Alarms					
• Diagnostic alarm	Yes	Yes	Yes	Yes	Yes
Diagnostic messages					
• Monitoring the supply voltage	Yes	Yes	Yes	Yes	Yes
• Wire-break		Yes	Yes	Yes; channel-by-channel, only for output type "current"	Yes; channel-by-channel, only for output type "current"
• Short-circuit	Yes		Yes	Yes; channel-by-channel, only for output type "voltage"	Yes; channel-by-channel, only for output type "voltage"
• Group error	Yes	Yes	Yes	Yes	Yes
• Overflow/underflow	Yes	Yes	Yes	Yes	Yes
Diagnostics indication 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
• Channel status display	Yes; Green LED	Yes; Green LED	Yes; Green LED	Yes; Green LED	Yes; Green LED
• for channel diagnostics	No	No	No	Yes; Red LED	Yes; Red LED
• for module diagnostics	Yes; green/red DIAG LED	Yes; green/red DIAG LED	Yes; green/red DIAG LED	Yes; green/red DIAG LED	Yes; green/red DIAG LED
Potential separation					
Potential separation channels					
• between the channels and backplane bus	Yes	Yes	Yes	Yes	Yes
Isolation					
Isolation tested with	707 V DC (type test)	707 V DC (type test)	707 V DC (type test)	707 V DC (type test)	707 V DC (type test)

Technical specifications (continued)

Article number	6ES7135-6FB00-0BA1 ET 200SP, AQ 2XU STANDARD, PU 1	6ES7135-6GB00-0BA1 ET 200SP, AQ 2XI STANDARD, PU 1	6ES7135-6HD00-0BA1 ET 200SP, AQ 4XU/I ST	6ES7135-6HB00-0DA1 ET 200SP, AQ 2 X U/I HIGH SPEED	6ES7135-6HB00-0CA1 ET 200SP, AQ 2 X U/I HIGH FEATURE
Ambient conditions					
Ambient temperature during operation					
• horizontal installation, min.	0 °C	0 °C	0 °C	0 °C	0 °C
• horizontal installation, max.	60 °C	60 °C	60 °C; Observe derating	60 °C	60 °C
• vertical installation, min.	0 °C	0 °C	0 °C	0 °C	0 °C
• vertical installation, max.	50 °C	50 °C	50 °C; Observe derating	50 °C	50 °C
Dimensions					
Width	15 mm	15 mm	15 mm	15 mm	15 mm
Height	73 mm	73 mm	73 mm	73 mm	73 mm
Depth	58 mm	58 mm	58 mm	58 mm	58 mm
Weights					
Weight, approx.	31 g	31 g	31 g	31 g	31 g

Ordering data

Article No.

Article No.

Analog output modules

Analog output module
AQ 2xU Standard,
BU type A0 or A1,
color code CC00, 16-bit

6ES7135-6FB00-0BA1

Analog output module
AQ 2xl Standard, BU type A0 or A1,
color code CC00, 16-bit

6ES7135-6GB00-0BA1

Analog output module
AQ 4xU/I Standard,
BU type A0 or A1,
color code CC00, 16-bit, $\pm 0.3\%$

6ES7135-6HD00-0BA1

Analog output module
AQ 2xU/I High Feature,
BU type A0 or A1,
color code CC00, 16-bit, $\pm 0.1\%$

6ES7135-6HB00-0CA1

Analog output module
AQ 2xU/I High Speed,
BU type A0 or A1,
color code CC00, 16-bit, $\pm 0.3\%$

6ES7135-6HB00-0DA1

Usable type A0 BaseUnits

Delivery options:
Apart from the standard delivery form in an individual package, selected BaseUnits are also available in a pack of 10 units. The pack of 10 units enables the amount of waste to be reduced considerably, as well as saving the time of unpacking individual modules.

The number of modules required is the number of modules ordered. The type of packaging is chosen by selecting the article number. Packs of 10 can therefore only be ordered in integer multiples of 10.

BU15-P16+A10+2D

BU type A0; BaseUnit (light) with 16 process terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1 A to 10 A); for starting a new load group (max. 10 A)

- 1 unit
- 10 units

6ES7193-6BP20-0DA0
6ES7193-6BP20-2DA0

BU15-P16+A0+2D

BU type A0; BaseUnit (light) with 16 process terminals to the module; for starting a new load group (max. 10 A)

- 1 unit
- 10 units

6ES7193-6BP00-0DA0
6ES7193-6BP00-2DA0

BU15-P16+A10+2B

BU type A0; BaseUnit (dark) with 16 process terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1 A to 10 A); for continuing the load group

- 1 unit
- 10 units

6ES7193-6BP20-0BA0
6ES7193-6BP20-2BA0

BU15-P16+A0+2B

BU type A0; BaseUnit (dark) with 16 process terminals to the module; for continuing the load group

- 1 unit
- 10 units

6ES7193-6BP00-0BA0
6ES7193-6BP00-2BA0

I/O systems

SIMATIC ET 200 systems for the control cabinet

SIMATIC ET 200SP

I/O modules > Analog output modules

Ordering data	Article No.		Article No.
Usable type A1 BaseUnits (temperature detection)		Accessories	
BU15-P16+A0+12D/T BU type A1; BaseUnit (light) with 16 process terminals (1...16) to the module and an additional 2x5 internally jumpered additional terminals (1 B to 5 B and 1 C to 5 C); for starting a new load group (max. 10 A)	6ES7193-6BP40-0DA1	Equipment labeling plate 10 sheets of 16 labels, for printing with thermal transfer card printer or plotter	6ES7193-6LF30-0AW0
BU15-P16+A0+2D/T BU type A1; BaseUnit (light) with 16 process terminals to the module; for starting a new load group (max. 10 A)	6ES7193-6BP00-0DA1	Labeling strips 500 labeling strips on roll, light gray, for inscription with thermal transfer roll printer	6ES7193-6LR10-0AA0
BU15-P16+A0+12B/T BU type A1; BaseUnit (dark) with 16 process terminals (1...16) to the module and an additional 2x5 internally jumpered additional terminals (1 B to 5 B and 1 C to 5 C); for continuing the load group	6ES7193-6BP40-0BA1	500 labeling strips on roll, yellow, for inscription with thermal transfer roll printer	6ES7193-6LR10-0AG0
BU15-P16+A0+2B/T BU type A1; BaseUnit (dark) with 16 process terminals to the module; for continuing the load group	6ES7193-6BP00-0BA1	1000 labeling strips DIN A4, light gray, card, perforated, for inscription with laser printer	6ES7193-6LA10-0AA0
		1000 labeling strips DIN A4, yellow, card, perforated, for inscription with laser printer	6ES7193-6LA10-0AG0
		BU cover for covering empty slots (gaps); 5 units	
		• 15 mm	6ES7133-6CV15-1AM0
		• 20 mm	6ES7133-6CV20-1AM0
		Shield connection 5 shield supports and 5 shield terminals	6ES7193-6SC00-1AM0
		Color-coded labels Color code CC00, for 16 process terminals, for BU type A0, A1, gray (terminals 1 to 8), red (terminals 9 to 16); 10 units	6ES7193-6CP00-2MA0
		Color code CC71, for 10 AUX terminals, BU type A0, yellow/green (terminals 1 A to 10 A); 10 units	6ES7193-6CP71-2AA0
		Color code CC72, for 10 AUX terminals, BU type A0, red (terminals 1 A to 10 A); 10 units	6ES7193-6CP72-2AA0
		Color code CC73, for 10 AUX terminals, BU type A0, blue (terminals 1 A to 10 A); 10 units	6ES7193-6CP73-2AA0
		Color code CC74, for 2x5 additional terminals, BU type A1, red (terminals 1B to 5B), blue (terminals 1C to 5C); 10 units	6ES7193-6CP74-2AA0

Overview



- 8 and 16-channel digital input modules for the ET 200SP
- Can be plugged onto Type A0 BaseUnits (BU) with automatic coding
- LED display for error, operation, supply voltage and status
- Clear labeling on front of module
 - Plain text identification of the module type and function class
 - 2D matrix code (order and serial number)
 - Connection diagram
 - Color coding of the DI module type: white
 - Hardware and firmware version
 - Color code (CC) for module-specific color coding of the potentials at the terminals of the BU
 - Complete Article No.
- Optional labeling accessories
 - Labeling strips
 - Reference identification label
- Optional module-specific color identification of the terminals according to the color code (CC)
- Optional system-integrated shield connection

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

Technical specifications

Article number	6AG1131-6BF00-7BA0	6AG1131-6BH00-7BA0
Based on	6ES7131-6BF00-0BA0 SIPLUS ET 200SP DI 8x24VDC ST	6ES7131-6BH00-0BA0 SIPLUS ET 200SP DI 16x24VDC ST
Ambient conditions		
Ambient temperature during operation		
• horizontal installation, min.	-40 °C; = Tmin; Startup @ -25 °C	-40 °C; = Tmin; Startup @ -25 °C
• horizontal installation, max.	70 °C; = Tmax; > +60 °C number of simultaneously controllable inputs max. 6	70 °C; = Tmax; > +60 °C number of simultaneously controllable inputs max. 4
• vertical installation, min.	-40 °C; = Tmin; Startup @ -25 °C	-40 °C; = Tmin; Startup @ -25 °C
• vertical installation, max.	50 °C; = Tmax	50 °C; = Tmax
Extended ambient conditions		
• relative to ambient temperature-atmospheric pressure-installation altitude	Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m)	Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m)
Relative humidity		
- With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation/frost (no commissioning under condensation conditions)	100 %; RH incl. condensation/frost (no commissioning under condensation conditions)
Resistance		
- against biologically active substances / conformity with EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!
- against chemically active substances / conformity with EN 60721-3-3	Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!
- against mechanically active substances / conformity with EN 60721-3-3	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!

I/O systems

SIMATIC ET 200 systems for the control cabinet

SIMATIC ET 200SP

I/O modules > SIPLUS digital inputs

Ordering data	Article No.		Article No.
SIPLUS digital input modules (Extended temperature range and exposure to media) DI 8x24 V DC Standard, BU type A0, color code CC01 DI 16x24 V DC Standard, BU type A0, color code CC00	6AG1131-6BF00-7BA0 6AG1131-6BH00-7BA0		
Usable SIPLUS BaseUnits			
BU15-P16+A0+2D (Extended temperature range and exposure to media) BU type A0; BaseUnit (light) with 16 process terminals to the module; for starting a new load group (max. 10 A)	6AG1193-6BP00-7DA0	BU15-P16+A10+2D (Extended temperature range and exposure to media) BU type A0; BaseUnit (light) with 16 process terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1 A to 10 A); for starting a new load group (max. 10 A)	6AG1193-6BP20-7DA0
BU15-P16+A0+2B (Extended temperature range and exposure to media) BU type A0; BaseUnit (dark) with 16 process terminals to the module; for continuing the load group	6AG1193-6BP00-7BA0	BU15-P16+A10+2B (Extended temperature range and exposure to media) BU type A0; BaseUnit (dark) with 16 process terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1 A to 10 A); for continuing the load group	6AG1193-6BP20-7BA0
		Accessories	See SIMATIC ET 200SP, digital input modules, page 9/23

Overview

- 4, 8 and 16-channel DQ modules
- 4-channel RQ modules
- BaseUnits for single conductor or multiple-conductor connection
- Function classes Basic, Standard, High Feature and High-Speed as well as fail-safe DQ and RQ
- Clear labeling on front of module
- LEDs for diagnostics, status and errors
- Individual system-integrated load group formation with self-assembling potential multi-terminal busbars (power module not required for ET 200SP)
- Electronically readable rating plate (I&M data)
- Additional operating modes in some cases
- Optional accessories:
 - Labeling strips
 - Equipment marking label
 - Color-coded label with module-specific CC code
 - Shielding terminal

Overview of digital output modules

Digital output	Article No.	CC code	BU type	VPE
DQ 16 x 24 V DC/0.5 A ST	6AG1132-6BH00-7BA0	CC00	A0	1
DQ 8 x 24 V DC/0.5 A ST	6AG1132-6BF00-7BA0	CC02	A0	1
DQ 8 x 24 V DC/0.5 A HF	6AG1132-6BF00-7CA0	CC02	A0	1
DQ 4 x 24 V DC/2 A ST	6AG1132-6BD20-7BA0	CC02	A0	1
RQ 4 x 24 V UC/2 A CO ST	6AG1132-6GD50-2BA0	CC00	A0	1
RQ 4 x 120 V DC-230 V AC/5 A NO ST	6AG1132-6HD00-7BB0	CC00	B0	1

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

I/O systems

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

I/O modules > SIPLUS digital outputs

Technical specifications

Article number	6AG1132-6BD20-7BA0 6ES7132-6BD20-0BA0	6AG1132-6BF00-7BA0 6ES7132-6BF00-0BA0	6AG1132-6BH00-7BA0 6ES7132-6BH00-0BA0
Based on	SIPLUS ET 200SP DQ 4x24VDC/2A ST	SIPLUS ET 200SP DQ 8x24VDC/0,5A ST	SIPLUS ET 200SP DQ 16x24VDC/0,5A ST
Ambient conditions			
Ambient temperature during operation			
• horizontal installation, min.	-40 °C; = Tmin; Startup @ -25 °C	-40 °C; = Tmin; Startup @ -25 °C	-40 °C; = Tmin; Startup @ -25 °C
• horizontal installation, max.	70 °C; = Tmax ; > +60 °C number of simultaneously controllable outputs max. 2 x 0.25 A or max. 4 x 0.125 A, max. total current 0.5 A	70 °C; = Tmax; > +60 °C max. total current 1.0 A	70 °C; = Tmax; > +60 °C max. total current 1.0 A
• vertical installation, min.	-40 °C; = Tmin; Startup @ -25 °C	-40 °C; = Tmin; Startup @ -25 °C	-40 °C; = Tmin; Startup @ -25 °C
• vertical installation, max.	50 °C; = Tmax	50 °C; = Tmax	50 °C; = Tmax
Extended ambient conditions			
• relative to ambient temperature-atmospheric pressure-installation altitude	Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m)	Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m)	Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m)
Relative humidity			
- With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation/frost (no commissioning under condensation conditions)	100 %; RH incl. condensation/frost (no commissioning under condensation conditions)	100 %; RH incl. condensation/frost (no commissioning under condensation conditions)
Resistance			
- against biologically active substances / conformity with EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!
- against chemically active substances / conformity with EN 60721-3-3	Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!
- against mechanically active substances / conformity with EN 60721-3-3	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!

Technical specifications (continued)

Article number	6AG1132-6BF00-7CA0 6ES7132-6BF00-0CA0 SIPLUS ET 200SP DQ 8X24VDC/0,5A HF	6AG1132-6GD50-2BA0 6ES7132-6GD50-0BA0 SIPLUS ET 200SP RQ 4X24VDC/2A CO ST	6AG1132-6HD00-7BB1 6ES7132-6HD00-0BB0 SIPLUS ET 200SP RQ 4x120VDC/230VAC/5A
Ambient conditions			
Ambient temperature during operation			
- horizontal installation, min. - horizontal installation, max.	-40 °C; = Tmin; Startup @ -25 °C 70 °C; = Tmax; > +60 °C max. total current 1.0 A	-40 °C; = Tmin; Startup @ -25 °C 60 °C; = Tmax	-40 °C; = Tmin 70 °C; = Tmax; see Derating BasedOn (e.g. manual), additionally Tmax > 60 °C max. continuous current of 3 A per relay
Extended ambient conditions			
relative to ambient temperature-atmospheric pressure-installation altitude	Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m)	Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m)	3 000 m with: Tmin ... Tmax at 1 080 hPa ... 795 hPa (-1 000 m ... +2 000 m) // Tmin ... (Tmax - 10 K) at 795 hPa ... 658 hPa (+2 000 m ... +3 500 m)
Relative humidity			
With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation
Resistance			
- against biologically active substances / conformity with EN 60721-3-3 - against chemically active substances / conformity with EN 60721-3-3 - against mechanically active substances / conformity with EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!

I/O systems

SIMATIC ET 200 systems for the control cabinet

SIMATIC ET 200SP

I/O modules > SIPLUS digital outputs

Ordering data	Article No.	Article No.
SIPLUS digital output modules (Extended temperature range and exposure to media) Digital output module DQ 4x24 V DC/2 A Standard, BU type A0, color code CC02 Digital output module DQ 8x24 V DC/0.5 A Standard, BU type A0, color code CC02 Digital output module DQ 8x24 V DC/0.5 A High Feature, BU type A0, color code CC02 Digital output module DQ 16x24 V DC/0.5 A Standard, BU type A0, color code CC00 Signal relay module RQ CO 4x24 V UC/2 A Standard, changeover contact, BU type A0, color code CC00 Relay module RQ NO 4x120 V DC - 230 V AC/5 A Standard, normally open, BU type B0, color code CC00	6AG1132-6BD20-7BA0 6AG1132-6BF00-7BA0 6AG1132-6BF00-7CA0 6AG1132-6BH00-7BA0 6AG1132-6GD50-2BA0 6AG1132-6HD00-7BB1	6AG1193-6BP20-7DA0 6AG1193-6BP20-7BA0 6AG1193-6BP20-7BB0
Usable SIPLUS BaseUnits BU15-P16+A0+2D (Extended temperature range and exposure to media) BU type A0; BaseUnit (light) with 16 process terminals to the module, for starting a new load group (max. 10 A)	6AG1193-6BP00-7DA0	BU15-P16+A10+2D (Extended temperature range and exposure to media) BU type A0; BaseUnit (light) with 16 process terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1 A to 10 A); for starting a new load group (max. 10 A)
BU15-P16+A0+2B (Extended temperature range and exposure to media) BU type A0; BaseUnit (dark) with 16 process terminals to the module; for continuing the load group	6AG1193-6BP00-7BA0	BU15-P16+A10+2B (Extended temperature range and exposure to media) BU type A0; BaseUnit (dark) with 16 process terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1 A to 10 A); for continuing the load group
		BU20-P12+A4+0B (Extended temperature range and exposure to media) BU type B0; BaseUnit (dark) with 12 process terminals (1...12) to the module and an additional 4 internally jumpered AUX terminals (1 A to 4 A); for continuing the load group; 1 unit
		Accessories See SIMATIC ET 200SP, digital output modules, page 9/35

Overview



- 2, 4 and 8-channel AI modules
- Measuring ranges for current, voltage, thermocouples, resistance thermometer, resistor and PTC
- BaseUnits for 2, 3 and 4-conductor connection
- Function classes Basic, Standard, High Feature and High Speed
- Clear labeling on front of module
- LEDs for diagnostics, status and errors
- Individual system-integrated load group formation with self-assembling potential multi-terminal busbars (power module not required for ET 200SP)
- Electronically readable rating plate (I&M data)
- Additional operating modes in some cases
- Optional accessories:
 - Labeling strips
 - Equipment marking label
 - Color-coded label with module-specific CC code
 - Shielding terminal

Overview of SIPLUS analog input modules

Analog input	Article No.	CC code	BU type	PU
AI 4 x U/I 2-wire ST	6AG1134-6HD00-7BA1	CC03	A0, A1	1
AI 4 x I 2/4-wire ST	6AG1134-6GD00-7BA1	CC03	A0, A1	1
AI 4 x I 2-wire 4...20 mA HART	6AG1134-6TD00-2CA1	CC03	A0, A1	1
AI 2 x U/I 2/4-wire HF	6AG1134-6HB00-2CA1	CC05	A0, A1	1
AI 2xU/I 2/4-wire HS With two operating modes: • High-speed isochronous AI • Oversampling	6AG1134-6HB00-2DA1	CC00	A0, A1	1
AI 8 x RTD/TC 2-wire HF	6AG1134-6JF00-2CA1	CC00	A0, A1	1
AI 4 x RTD/TC 2/3/4-wire HF	6AG1134-6JD00-2CA1	CC00	A0, A1	1
AI Energy Meter 400 V AC ST	6AG1134-6PA00-7BD0	--	D0	1

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

I/O systems

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

I/O modules > SIPLUS analog inputs

Technical specifications

Article number	6AG1134-6HD00-7BA1	6AG1134-6GD00-7BA1	6AG1134-6TD00-2CA1
Based on	6ES7134-6HD00-0BA1 SIPLUS ET 200SP AI 4xU/I 2-wire ST	6ES7134-6GD00-0BA1 SIPLUS ET 200SP AI 4xI 2/4-wire ST	6ES7134-6TD00-0CA1 SIPLUS ET 200SP AI 4XI 2-WIRE 4...20MA H
Ambient conditions			
Ambient temperature during operation			
• horizontal installation, min.	-40 °C; = Tmin; Startup @ -25 °C	-40 °C; = Tmin; Startup @ -25 °C	-40 °C; = Tmin; Startup @ -25 °C
• horizontal installation, max.	70 °C; = Tmax; > 60 °C max. 1x +/- 20 mA or 4x +/- 10 V permissible	70 °C; = Tmax; > 60 °C max. 1x +/- 20 mA permissible	60 °C
• vertical installation, min.	-40 °C; = Tmin; Startup @ -25 °C	-40 °C; = Tmin; Startup @ -25 °C	-40 °C; = Tmin; Startup @ -25 °C
• vertical installation, max.	50 °C; = Tmax	50 °C; = Tmax	50 °C
Extended ambient conditions			
• relative to ambient temperature-atmospheric pressure-installation altitude			Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m)
Relative humidity			
- With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation/frost (no commissioning under condensation conditions)	100 %; RH incl. condensation/frost (no commissioning under condensation conditions)	100 %; RH incl. condensation/frost (no commissioning under condensation conditions)
Resistance			
- against biologically active substances / conformity with EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!
- against chemically active substances / conformity with EN 60721-3-3	Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!
- against mechanically active substances / conformity with EN 60721-3-3	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!

Article number	6AG1134-6HB00-2CA1	6AG1134-6HB00-2DA1	6AG1134-6JF00-2CA1	6AG1134-6JD00-2CA1
Based on	6ES7134-6HB00-0CA1 SIPLUS ET 200SP AI 2 X U/I 2, 4-WIRE HF	6ES7134-6HB00-0DA1 SIPLUS ET 200SP AI 2 X U/I 2, 4-WIRE HS	6ES7134-6JF00-0CA1 SIPLUS ET 200SP AI 8XRTD/TC 2-WIRE HF	6ES7134-6JD00-0CA1 SIPLUS ET 200SP AI 4xRTD/TC HF
Ambient conditions				
Ambient temperature during operation				
• horizontal installation, min.	-40 °C; = Tmin; Startup @ -25 °C	-40 °C; = Tmin; Startup @ -25 °C	-40 °C; = Tmin; Startup @ -25 °C	-40 °C; = Tmin; Startup @ -25 °C
• horizontal installation, max.	60 °C; = Tmax	60 °C; = Tmax	60 °C	60 °C; = Tmax
• vertical installation, min.			-40 °C; = Tmin; Startup @ -25 °C	-40 °C; = Tmin; Startup @ -25 °C
• vertical installation, max.			50 °C	50 °C; = Tmax
Extended ambient conditions				
• relative to ambient temperature-atmospheric pressure-installation altitude	Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m)	Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m)	Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m)	

Technical specifications (continued)

Article number	6AG1134-6HB00-2CA1	6AG1134-6HB00-2DA1	6AG1134-6JF00-2CA1	6AG1134-6JD00-2CA1
Based on	6ES7134-6HB00-0CA1 SIPLUS ET 200SP AI 2 X U/I 2, 4-WIRE HF	6ES7134-6HB00-0DA1 SIPLUS ET 200SP AI 2 X U/I 2, 4-WIRE HS	6ES7134-6JF00-0CA1 SIPLUS ET 200SP AI 8XRTD/TC 2-WIRE HF	6ES7134-6JD00-0CA1 SIPLUS ET 200SP AI 4xRTD/TC HF
Relative humidity				
- With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation	100 %; RH incl. condensation/frost (no commissioning under condensation conditions)	100 %; RH incl. condensation/frost (no commissioning under condensation conditions)
Resistance				
- against biologically active substances / conformity with EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!
- against chemically active substances / conformity with EN 60721-3-3	Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!
- against mechanically active substances / conformity with EN 60721-3-3	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!

Article number	6AG1134-6PA00-7BD0
Based on	6ES7134-6PA00-0BD0 SIPLUS ET 200SP AI Energy Meter
Ambient conditions	
Ambient temperature during operation	
• horizontal installation, min.	-40 °C; = Tmin; Startup @ -25 °C
• horizontal installation, max.	70 °C; = Tmax; > +60 °C max. permissible current 1 A per phase
• vertical installation, min.	-40 °C; = Tmin; Startup @ -25 °C
• vertical installation, max.	50 °C; = Tmax
Extended ambient conditions	
• relative to ambient temperature-atmospheric pressure-installation altitude	Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m)
Relative humidity	
- With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation/frost (no commissioning under condensation conditions)

Article number	6AG1134-6PA00-7BD0
Based on	6ES7134-6PA00-0BD0 SIPLUS ET 200SP AI Energy Meter
Resistance	
- against biologically active substances / conformity with EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!
- against chemically active substances / conformity with EN 60721-3-3	Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!
- against mechanically active substances / conformity with EN 60721-3-3	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!

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

Ordering data

See SIMATIC ET 200SP,
analog input modules,
page 9/50

Overview



- 2 and 4-channel AQ modules
- Output ranges for current, voltage
- BaseUnits for 2, 3 and 4-conductor connection
- Function classes Standard, High Feature and High Speed
- Clear labeling on front of module
- LEDs for diagnostics, status and errors
- Individual system-integrated load group formation with self-assembling potential multi-terminal busbars (power module not required for ET 200SP)
- Electronically readable rating plate (I&M data)
- Additional operating modes in some cases
- Optional accessories
 - Labeling strips
 - Reference identification label
 - Color-coded label with module-specific CC code
 - Shielding terminal

Overview of analog output modules

Analog output	Article No.	CC code	BU type	PU
AQ 4 x U/I ST	6AG1135-6HD00-7BA1	CC00	A0, A1	1
AQ 2xU/I HS	6AG1135-6HB00-2DA1	CC00	A0, A1	1

With two operating modes:

- High-speed isochronous AQ
- Oversampling

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

Technical specifications

Article number	6AG1135-6HD00-7BA1	6AG1135-6HB00-2DA1
Based on	6ES7135-6HD00-0BA1 SIPLUS ET 200SP AQ 4xU/I ST	6ES7135-6HB00-0DA1 SIPLUS ET 200SP AQ 2 X U/I HIGH SPEED
Ambient conditions		
Ambient temperature during operation		
• horizontal installation, min.	-40 °C; = Tmin; Startup @ -25 °C	-40 °C; = Tmin; Startup @ -25 °C
• horizontal installation, max.	70 °C; = Tmax; > +60 °C max. 2x +/- 10 V permissible	60 °C; = Tmax
• vertical installation, min.	-40 °C; = Tmin; Startup @ -25 °C	
• vertical installation, max.	50 °C; = Tmax	
Extended ambient conditions		
• relative to ambient temperature-atmospheric pressure-installation altitude	Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m)	Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m)
Relative humidity		
- With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation/frost (no commissioning under condensation conditions)	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation
Resistance		
- against biologically active substances / conformity with EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!
- against chemically active substances / conformity with EN 60721-3-3	Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3C4 incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!
- against mechanically active substances / conformity with EN 60721-3-3	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!

I/O systems

SIMATIC ET 200 systems for the control cabinet

SIMATIC ET 200SP

I/O modules > SIPLUS analog outputs

Ordering data	Article No.		Article No.
SIPLUS analog output modules (Extended temperature range and exposure to media) AQ 4XU/I Standard, BU type A0 or A1, color code CC03 Analog output module AQ 2xU/I High Speed, BU type A0 or A1, color code CC00, 16-bit, ± 0.3%	6AG1135-6HD00-7BA1 6AG1135-6HB00-2DA1		
Usable SIPLUS BaseUnits type A0		Usable SIPLUS BaseUnits type A1 (temperature detection)	
BU15-P16+A0+2D (Extended temperature range and exposure to media) BU type A0; BaseUnit (light) with 16 process terminals to the module, for starting a new load group (max. 10 A)	6AG1193-6BP00-7DA0	BU15-P16+A0+2D/T (Extended temperature range and exposure to media) BU type A1; BaseUnit (light) with 16 process terminals to the module, for starting a new load group (max. 10 A)	6AG1193-6BP00-7DA1
BU15-P16+A0+2B (Extended temperature range and exposure to media) BU type A0; BaseUnit (dark) with 16 process terminals to the module; for continuing the load group	6AG1193-6BP00-7BA0	BU15-P16+A0+2B/T (Extended temperature range and exposure to media) BU type A1; BaseUnit (dark) with 16 process terminals to the module; for continuing the load group	6AG1193-6BP00-7BA1
BU15-P16+A0+12D/T (Extended temperature range and exposure to media) BU type A1; BaseUnit (light) with 16 process terminals (1...16) to the module and an additional 2x5 internally jumpered AUX terminals (1 B to 5 B and 1 C to 5 C); for starting a new load group (max. 10 A)	6AG1193-6BP40-7DA1		
BU15-P16+A10+2D (Extended temperature range and exposure to media) BU type A0; BaseUnit (light) with 16 process terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1 A to 10 A); for starting a new load group (max. 10 A)	6AG1193-6BP20-7DA0	BU15-P16+A0+12D/T (Extended temperature range and exposure to media) BU type A1; BaseUnit (light) with 16 process terminals (1...16) to the module and an additional 2x5 internally jumpered AUX terminals (1 B to 5 B and 1 C to 5 C); for starting a new load group (max. 10 A)	6AG1193-6BP40-7DA1
BU15-P16+A10+2B (Extended temperature range and exposure to media) BU type A0; BaseUnit (dark) with 16 process terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1 A to 10 A); for continuing the load group	6AG1193-6BP20-7BA0	BU15-P16+A0+12B/T (Extended temperature range and exposure to media) BU type A1; BaseUnit (dark) with 16 process terminals (1...16) to the module and an additional 2x5 internally jumpered AUX terminals (1 B to 5 B and 1 C to 5 C); for continuing the load group	6AG1193-6BP40-7BA1
		Accessories	See SIMATIC ET 200SP, analog output modules, page 9/56

Overview



Technical properties

- Counter module for ET 200SP
- Interfaces:
 - 24 V encoder signals A, B and N from P, M or push-pull-switching encoders and sensors
 - 24 V encoder supply output, short-circuit proof
 - 3 digital inputs for controlling the count operation, for saving or for setting the count value
 - 2 digital outputs for fast reactions regardless of the counter status or measured value

- Counting frequency 200 kHz (800 kHz with quadruple evaluation)
- Counting range: +/- 31-bits
- Measurement function
- Parameterizable hardware interrupts
- Parameterizable input filters for suppressing interferences at sensor and digital inputs

Supported types of encoders/signals

- 24 V incremental encoder with and without signal N
- 24 V pulse encoder with direction signal
- 24 V pulse encoder without direction signal
- 24 V pulse encoder for pulse up and down respectively

Supported system functions

- Isochronous mode
- Firmware update
- Identification data I&M

Technical specifications

Article number	6ES7138-6AA00-0BA0 ET 200SP, TM COUNT 1X24V
General information	
Product type designation	TM Count 1x24V
Product function	
• I&M data	Yes; I&M0 to I&M3
Engineering with	
• STEP 7 TIA Portal configurable/integrated as of version	V13 / -
• STEP 7 configurable/integrated as of version	V5.5 SP3 / -
• PROFIBUS as of GSD version/GSD revision	GSD Revision 5
• PROFINET as of GSD version/GSD revision	GSDML V2.3
Installation type/mounting	
Rack mounting	Yes
Rail mounting	Yes
Supply voltage	
Load voltage L+	
• Rated value (DC)	24 V
• Reverse polarity protection	Yes
Input current	
Current consumption, max.	60 mA; without load
Encoder supply	
Number of outputs	1
24 V encoder supply	
• 24 V	Yes; L+ (-0.8 V)
• Short-circuit protection	Yes; electronic/thermal
• Output current, max.	300 mA
Power loss	
Power loss, typ.	1 W

Article number	6ES7138-6AA00-0BA0 ET 200SP, TM COUNT 1X24V
Digital inputs	
Number of digital inputs	3
Digital inputs, parameterizable	Yes
Input characteristic curve in accordance with IEC 61131, type 3	Yes
Digital input functions, parameterizable	
• Gate start/stop	Yes
• Capture	Yes
• Synchronization	Yes
• Freely usable digital input	Yes
Input voltage	
• Rated value (DC)	24 V
• for signal "0"	-30 to +5V
• for signal "1"	+11 to +30V
• permissible voltage at input, min.	-30 V
• permissible voltage at input, max.	30 V
Input current	
• for signal "1", typ.	2.5 mA
Input delay (for rated value of input voltage) for standard inputs	
- parameterizable	Yes; none / 0.05 / 0.1 / 0.4 / 0.8 / 1.6 / 3.2 / 12.8 / 20 ms
- at "0" to "1", min.	6 µs; for parameterization "none"
- at "1" to "0", min.	6 µs; for parameterization "none"
for counter/technological functions	
- parameterizable	Yes
Cable length	
• shielded, max.	1 000 m
• unshielded, max.	600 m

I/O systems

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

I/O modules > Technology modules > TM Count 1x24V counter module

Technical specifications (continued)

Article number	6ES7138-6AA00-0BA0 ET 200SP, TM COUNT 1X24V
Digital outputs	
Type of digital output	Transistor
Number of digital outputs	2
Digital outputs, parameterizable	Yes
Short-circuit protection	Yes; electronic/thermal
Limitation of inductive shutdown voltage to	L+ (-33 V)
Controlling a digital input	Yes
Digital output functions, parameterizable	
• Switching tripped by comparison values	Yes
• Freely usable digital output	Yes
Switching capacity of the outputs	
• with resistive load, max.	0.5 A; Per digital output
• on lamp load, max.	5 W
Load resistance range	
• lower limit	48 Ω
• upper limit	12 kΩ
Output voltage	
• for signal "1", min.	23.2 V; L+ (-0.8 V)
Output current	
• for signal "1" rated value	0.5 A; Per digital output
• for signal "0" residual current, max.	0.5 mA
Output delay with resistive load	
• "0" to "1", max.	50 μs
• "1" to "0", max.	50 μs
Switching frequency	
• with resistive load, max.	10 kHz
• with inductive load, max.	0.5 Hz; Acc. to IEC 60947-5-1, DC-13; observe derating curve
• on lamp load, max.	10 Hz
Total current of the outputs	
• Current per module, max.	1 A
Cable length	
• shielded, max.	1 000 m
• unshielded, max.	600 m
Encoder	
Connectable encoders	
• 2-wire sensor	Yes
- permissible quiescent current (2-wire sensor), max.	1.5 mA
Encoder signals, incremental encoder (asymmetrical)	
• Input voltage	24 V
• Input frequency, max.	200 kHz
• Counting frequency, max.	800 kHz; with quadruple evaluation
• Cable length, shielded, max.	600 m; depending on input frequency, encoder and cable quality; max. 50 m at 200 kHz
• Signal filter, parameterizable	Yes
• Incremental encoder with A/B tracks, 90° phase offset	Yes
• Incremental encoder with A/B tracks, 90° phase offset and zero track	Yes
• Pulse encoder	Yes
• Pulse encoder with direction	Yes
• Pulse encoder with one impulse signal per count direction	Yes

Article number	6ES7138-6AA00-0BA0 ET 200SP, TM COUNT 1X24V
Encoder signal 24 V	
- permissible voltage at input, min.	-30 V
- permissible voltage at input, max.	30 V
Interface types	
• Input characteristic curve in accordance with IEC 61131, type 3	Yes
• Source/sink input	Yes
Isochronous mode	
Isochronous operation (application synchronized up to terminal)	Yes
Interrupts/diagnostics/status information	
Substitute values connectable	Yes; Parameterizable
Alarms	
• Diagnostic alarm	Yes
• Hardware interrupt	Yes
Diagnostic messages	
• Monitoring the supply voltage	Yes
• Wire-break	Yes
• Short-circuit	Yes
• A/B transition error at incremental encoder	Yes
• Group error	Yes
Diagnostics indication LED	
• Monitoring of the supply voltage (PWR-LED)	Yes; green PWR LED
• for module diagnostics	Yes; green/red DIAG LED
• Status indicator backward counting (green)	Yes
• Status indicator forward counting (green)	Yes
Integrated Functions	
Number of counters	1
Counting frequency (counter) max.	800 kHz; with quadruple evaluation
Counting functions	
• Can be used with TO High_Speed_Counter	Yes
• Continuous counting	Yes
• Counter response parameterizable	Yes
• Hardware gate via digital input	Yes
• Software gate	Yes
• Event-controlled stop	Yes
• Synchronization via digital input	Yes
• Counting range, parameterizable	Yes
Comparator	
- Number of comparators	2
- Direction dependency	Yes
- Can be changed from user program	Yes
Position detection	
• Incremental acquisition	Yes
• Suitable for S7-1500 Motion Control	Yes
Measuring functions	
• Measuring time, parameterizable	Yes
• Dynamic measurement period adjustment	Yes
• Number of thresholds, parameterizable	2

Technical specifications (continued)

Article number	6ES7138-6AA00-0BA0 ET 200SP, TM COUNT 1X24V
Measuring range	
- Frequency measurement, min.	0.04 Hz
- Frequency measurement, max.	800 kHz
- Cycle duration measurement, min.	1.25 µs
- Cycle duration measurement, max.	25 s
Accuracy	
- Frequency measurement	100 ppm; depending on measuring interval and signal evaluation
- Cycle duration measurement	100 ppm; depending on measuring interval and signal evaluation
- Velocity measurement	100 ppm; depending on measuring interval and signal evaluation

Article number	6ES7138-6AA00-0BA0 ET 200SP, TM COUNT 1X24V
Potential separation	
Potential separation channels	
• between the channels and backplane bus	Yes
Isolation	
Isolation tested with	707 V DC (type test)
Dimensions	
Width	15 mm
Height	73 mm
Depth	58 mm
Weights	
Weight, approx.	45 g

Ordering data**Article No.**

TM Count 1x24V counter module	
With one channel, max. 200 kHz; for 24 V encoder	6ES7138-6AA00-0BA0
Usable BaseUnits	
BU15-P16+A0+2D	
BU type A0; BaseUnit (light) with 16 process terminals to the module; for starting a new load group (max. 10 A)	
• 1 unit	6ES7193-6BP00-0DA0
• 10 units	6ES7193-6BP00-2DA0
BU15-P16+A0+2B	
BU type A0; BaseUnit (dark) with 16 process terminals to the module; for continuing the load group	
• 1 unit	6ES7193-6BP00-0BA0
• 10 units	6ES7193-6BP00-2BA0
BU15-P16+A10+2D	
BU type A0; BaseUnit (light) with 16 process terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1 A to 10 A); for starting a new load group (max. 10 A)	
• 1 unit	6ES7193-6BP20-0DA0
• 10 units	6ES7193-6BP20-2DA0
BU15-P16+A10+2B	
BU type A0; BaseUnit (dark) with 16 process terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1 A to 10 A); for continuing the load group	
• 1 unit	6ES7193-6BP20-0BA0
• 10 units	6ES7193-6BP20-2BA0

Article No.

Accessories	
Reference identification label	6ES7193-6LF30-0AW0
10 sheets of 16 labels	
Labeling strips	
500 labeling strips on roll, light gray, for inscription with thermal transfer roll printer	6ES7193-6LR10-0AA0
500 labeling strips on roll, yellow, for inscription with thermal transfer roll printer	6ES7193-6LR10-0AG0
1000 labeling strips DIN A4, light gray, card, for inscription with laser printer	6ES7193-6LA10-0AA0
1000 labeling strips DIN A4, yellow, card, for inscription with laser printer	6ES7193-6LA10-0AG0
BU cover	
for covering empty slots (gaps); 5 units	
• 15 mm wide	6ES7133-6CV15-1AM0
• 20 mm wide	6ES7133-6CV20-1AM0
Shield connection	6ES7193-6SC00-1AM0
5 shield supports and 5 shield terminals	
Color-coded labels	
• Color code CC71, for 10 AUX terminals 1 A to 10 A, for BU type A0, yellow/green, with push-in terminals; 10 units	6ES7193-6CP71-2AA0
• Color code CC72, for 10 AUX terminals 1 A to 10 A, for BU type A0, red, with push-in terminals; 10 units	6ES7193-6CP72-2AA0
• Color code CC73, for 10 AUX terminals 1 A to 10 A, for BU type A0, blue, with push-in terminals; 10 units	6ES7193-6CP73-2AA0

I/O systems

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

I/O modules > Technology modules > TM PosInput 1 counting and position detection module

Overview



Technical properties

- Counting and position detection module for ET 200SP
- Interfaces:
 - Encoder signals A, B and N for 5 V TTL or RS 422 differential signals
 - SSI interface with clock and data for RS 422 differential signals
 - 24 V encoder supply output, short-circuit proof
 - 2 digital inputs for controlling the counting process, for saving or setting the counter or position value
 - 2 digital outputs for fast reactions depending on the counter reading, position value or measured value

- Counter frequency 1 MHz (4 MHz with four-fold evaluation)
- Counting range: +/- 31 bits
- Measurement function
- Parameterizable hardware interrupts
- Parameterizable input filters for suppressing interferences at sensor and digital inputs

Supported types of encoders/signals

- Incremental encoders with or without N signal
- Pulse encoders with directional signal
- Pulse encoders without directional signal
- Pulse encoders for forward or reverse pulses
- SSI encoders with a frame length of 10 to 40 bits, of which up to 31 bits position value

Supported system functions

- Isochronous mode
- Firmware update
- Identification data (I&M)

Technical specifications

Article number	6ES7138-6BA00-0BA0 ET 200SP, TM POSINPUT 1
General information	
Product type designation	TM PosInput 1
Product function	
• I&M data	Yes; I&M0 to I&M3
Engineering with	
• STEP 7 TIA Portal configurable/integrated as of version	V13 / V13
• STEP 7 configurable/integrated as of version	V5.5 SP3 / V5.5 SP4
• PROFIBUS as of GSD version/GSD revision	GSD Revision 5
• PROFINET as of GSD version/GSD revision	GSDML V2.3
Installation type/mounting	
Rack mounting	Yes
Rail mounting	Yes
Supply voltage	
Load voltage L+	
• Rated value (DC)	24 V
• Reverse polarity protection	Yes
Input current	
Current consumption, max.	75 mA; without load

Article number	6ES7138-6BA00-0BA0 ET 200SP, TM POSINPUT 1
Encoder supply	
Number of outputs	1
24 V encoder supply	
• 24 V	Yes; L+ (-0.8 V)
• Short-circuit protection	Yes
• Output current, max.	300 mA
Power loss	
Power loss, typ.	1.9 W
Digital inputs	
Number of digital inputs	2
Digital inputs, parameterizable	Yes
Input characteristic curve in accordance with IEC 61131, type 3	Yes
Digital input functions, parameterizable	
• Gate start/stop	Yes; only for pulse and incremental encoders
• Capture	Yes
• Synchronization	Yes; only for pulse and incremental encoders
• Freely usable digital input	Yes
Input voltage	
• Rated value (DC)	24 V
• for signal "0"	-30 to +5V
• for signal "1"	+11 to +30V
• permissible voltage at input, min.	-30 V
• permissible voltage at input, max.	30 V

Technical specifications (continued)

Article number	6ES7138-6BA00-0BA0 ET 200SP, TM POSINPUT 1
Input current • for signal "1", typ.	2.5 mA
Input delay (for rated value of input voltage) for standard inputs - parameterizable - at "0" to "1", min. - at "1" to "0", min.	Yes; none / 0.05 / 0.1 / 0.4 / 0.8 / 1.6 / 3.2 / 12.8 / 20 ms 6 µs; for parameterization "none" 6 µs; for parameterization "none"
for counter/technological functions - parameterizable	Yes
Cable length • shielded, max. • unshielded, max.	1 000 m 600 m
Digital outputs Type of digital output Number of digital outputs Digital outputs, parameterizable Short-circuit protection Limitation of inductive shutdown voltage to Controlling a digital input	Transistor 2 Yes Yes; electronic/thermal L+ (-33 V) Yes
Digital output functions, parameterizable • Switching tripped by comparison values • Freely usable digital output	Yes Yes
Switching capacity of the outputs • with resistive load, max. • on lamp load, max.	0.5 A; Per digital output 5 W
Load resistance range • lower limit • upper limit	48 Ω 12 kΩ
Output voltage • for signal "1", min.	23.2 V; L+ (-0.8 V)
Output current • for signal "1" rated value • for signal "0" residual current, max.	0.5 A; Per digital output 0.5 mA
Output delay with resistive load • "0" to "1", max. • "1" to "0", max.	50 µs 50 µs
Switching frequency • with resistive load, max. • with inductive load, max. • on lamp load, max.	10 kHz 0.5 Hz; Acc. to IEC 60947-5-1, DC-13; observe derating curve 10 Hz
Total current of the outputs • Current per module, max.	1 A
Cable length • shielded, max. • unshielded, max.	1 000 m 600 m

Article number	6ES7138-6BA00-0BA0 ET 200SP, TM POSINPUT 1
Encoder signals, incremental encoder (symmetrical) • Input voltage • Input frequency, max. • Counting frequency, max. • Cable length, shielded, max. • Signal filter, parameterizable • Incremental encoder with A/B tracks, 90° phase offset • Incremental encoder with A/B tracks, 90° phase offset and zero track • Pulse encoder • Pulse encoder with direction • Pulse encoder with one impulse signal per count direction	RS 422 1 MHz 4 MHz; with quadruple evaluation 32 m; at 1 MHz Yes Yes Yes Yes Yes Yes Yes
Encoder signals, incremental encoder (asymmetrical) • Input voltage • Input frequency, max. • Counting frequency, max. • Signal filter, parameterizable • Incremental encoder with A/B tracks, 90° phase offset • Incremental encoder with A/B tracks, 90° phase offset and zero track • Pulse encoder • Pulse encoder with direction • Pulse encoder with one impulse signal per count direction	5 V TTL (push-pull encoders only) 1 MHz 4 MHz; with quadruple evaluation Yes Yes Yes Yes Yes Yes Yes
Encoder signals, absolute encoder (SSI) • Input signal • Telegram length, parameterizable • Clock frequency, max. • Binary code • Gray code • Cable length, shielded, max.	to RS-422 10 ... 40 bit 2 MHz; 125 kHz, 250 kHz, 500 kHz, 1 MHz, 1.5 MHz or 2 MHz Yes Yes 320 m; Cable length, RS-422 SSI absolute encoders, Siemens type 6FX2001-5, 24 V supply: 125 kHz, 320 meters shielded, max.; 250 kHz, 160 meters shielded, max.; 500 kHz, 60 meters shielded, max.; 1 MHz, 20 meters shielded, max.; 1.5 MHz, 10 meters shielded, max.; 2 MHz, 8 meters shielded, max.
• Parity bit, parameterizable • Monoflop time • Multiturn • Singleturn	Yes 16, 32, 48, 64 µs & automatic Yes Yes
Interface types • RS 422 • TTL 5 V	Yes Yes; push-pull encoders only

I/O systems

SIMATIC ET 200 systems for the control cabinet

SIMATIC ET 200SP

I/O modules > Technology modules > TM PosInput 1 counting and position detection module

Technical specifications (continued)

Article number	6ES7138-6BA00-0BA0 ET 200SP, TM POSINPUT 1
Isochronous mode	
Isochronous operation (application synchronized up to terminal)	Yes
Interrupts/diagnostics/status information	
Substitute values connectable	Yes; Parameterizable
Alarms	
• Diagnostic alarm	Yes
• Hardware interrupt	Yes
Diagnostic messages	
• Monitoring the supply voltage	Yes
• Wire-break	Yes
• Short-circuit	Yes
• A/B transition error at incremental encoder	Yes
• Telegram error at SSI encoder	Yes
• Group error	Yes
Diagnostics indication LED	
• Monitoring of the supply voltage (PWR-LED)	Yes; green PWR LED
• for module diagnostics	Yes; green/red DIAG LED
• Status indicator backward counting (green)	Yes
• Status indicator forward counting (green)	Yes
Integrated Functions	
Number of counters	1
Counting frequency (counter) max.	4 MHz; with quadruple evaluation
Counting functions	
• Can be used with TO High_Speed_Counter	Yes; only for pulse and incremental encoders
• Continuous counting	Yes
• Counter response parameterizable	Yes
• Hardware gate via digital input	Yes
• Software gate	Yes
• Event-controlled stop	Yes
• Synchronization via digital input	Yes
• Counting range, parameterizable	Yes
Comparator	
- Number of comparators	2
- Direction dependency	Yes
- Can be changed from user program	Yes
Position detection	
• Incremental acquisition	Yes
• Absolute acquisition	Yes
• Suitable for S7-1500 Motion Control	Yes
Measuring functions	
• Measuring time, parameterizable	Yes
• Dynamic measurement period adjustment	Yes
• Number of thresholds, parameterizable	2

Article number	6ES7138-6BA00-0BA0 ET 200SP, TM POSINPUT 1
Measuring range	
- Frequency measurement, min.	0.04 Hz
- Frequency measurement, max.	4 MHz
- Cycle duration measurement, min.	0.25 µs
- Cycle duration measurement, max.	25 s
Accuracy	
- Frequency measurement	100 ppm; depending on measuring interval and signal evaluation
- Cycle duration measurement	100 ppm; depending on measuring interval and signal evaluation
- Velocity measurement	100 ppm; depending on measuring interval and signal evaluation
Potential separation	
Potential separation channels	
• between the channels and backplane bus	Yes
Isolation	
Isolation tested with	707 V DC (type test)
Ambient conditions	
Ambient temperature during operation	
• horizontal installation, min.	0 °C
• horizontal installation, max.	60 °C; Observe derating
• vertical installation, min.	0 °C
• vertical installation, max.	50 °C; Observe derating
Dimensions	
Width	15 mm
Height	73 mm
Depth	58 mm
Weights	
Weight, approx.	45 g

Ordering data	Article No.		Article No.
TM PosInput 1 counting and position detection module With one channel, max. 1 MHz for 5 V TTL or RS 422 differential signals or SSI absolute encoder	6ES7138-6BA00-0BA0	Accessories Reference identification label 10 sheets of 16 labels	6ES7193-6LF30-0AW0
Usable BaseUnits BU15-P16+A0+2D BU type A0; BaseUnit (light) with 16 process terminals to the module; for starting a new load group (max. 10 A) • 1 unit • 10 units	6ES7193-6BP00-0DA0 6ES7193-6BP00-2DA0	Labeling strips 500 labeling strips on roll, light gray, for inscription with thermal transfer roll printer 500 labeling strips on roll, yellow, for inscription with thermal transfer roll printer 1000 labeling strips DIN A4, light gray, card, for inscription with laser printer 1000 labeling strips DIN A4, yellow, card, for inscription with laser printer	6ES7193-6LR10-0AA0 6ES7193-6LR10-0AG0 6ES7193-6LA10-0AA0 6ES7193-6LA10-0AG0
BU15-P16+A0+2B BU type A0; BaseUnit (dark) with 16 process terminals to the module; for continuing the load group • 1 unit • 10 units	6ES7193-6BP00-0BA0 6ES7193-6BP00-2BA0	BU cover for covering empty slots (gaps); 5 units • 15 mm wide • 20 mm wide	6ES7133-6CV15-1AM0 6ES7133-6CV20-1AM0
BU15-P16+A10+2D BU type A0; BaseUnit (light) with 16 process terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1 A to 10 A); for starting a new load group (max. 10 A) • 1 unit • 10 units	6ES7193-6BP20-0DA0 6ES7193-6BP20-2DA0	Shield connection 5 shield supports and 5 shield terminals	6ES7193-6SC00-1AM0
BU15-P16+A10+2B BU type A0; BaseUnit (dark) with 16 process terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1 A to 10 A); for continuing the load group • 1 unit • 10 units	6ES7193-6BP20-0BA0 6ES7193-6BP20-2BA0	Color-coded labels • Color code CC71, for 10 AUX terminals 1 A to 10 A, for BU type A0, yellow/green, with push-in terminals; 10 units • Color code CC72, for 10 AUX terminals 1 A to 10 A, for BU type A0, red, with push-in terminals; 10 units • Color code CC73, for 10 AUX terminals 1 A to 10 A, for BU type A0, blue, with push-in terminals; 10 units	6ES7193-6CP71-2AA0 6ES7193-6CP72-2AA0 6ES7193-6CP73-2AA0

I/O systems

SIMATIC ET 200 systems for the control cabinet

SIMATIC ET 200SP

I/O modules > Technology modules > TM Timer DIDQ 10x24V time-based I/O module

Overview



- 4 digital inputs, 6 digital outputs
- Inputs for detecting the input edges with μs accuracy
- Outputs for outputting the switching signals with μs accuracy
- 32x oversampling
- PWM output
- Counter function
- Outputs can be switched between 0.5 A standard and especially fast 0.1 A high-speed mode

Technical specifications

Article number	6ES7138-6CG00-0BA0 ET 200SP, TM TIMER DIDQ 10X24V
General information	
Product type designation	TM Timer DIDQ 10x24V
Product function	
• I&M data	Yes; I&M 0
Engineering with	
• STEP 7 TIA Portal configurable/integrated as of version	V13 Update 3
• STEP 7 configurable/integrated as of version	V5.5 SP3 / -
Supply voltage	
Load voltage L+	
• Rated value (DC)	24 V
• Reverse polarity protection	Yes; against destruction
Input current	
Current consumption, max.	50 mA; without load
Encoder supply	
Number of outputs	1
24 V encoder supply	
• 24 V	Yes; L+ (-0.8 V)
• Short-circuit protection	Yes
• Output current, max.	500 mA; Observe derating
Power loss	
Power loss, typ.	1.5 W
Digital inputs	
Number of digital inputs	4
Digital inputs, parameterizable	Yes
Input characteristic curve in accordance with IEC 61131, type 3	Yes

Article number	6ES7138-6CG00-0BA0 ET 200SP, TM TIMER DIDQ 10X24V
Digital input functions, parameterizable	
• Digital input with time stamp	Yes
- Number, max.	4
• Counter	Yes
- Number, max.	3
• Counter for incremental encoder	Yes
- Number, max.	1
• Digital input with oversampling	Yes
- Number, max.	4
• HW enable for digital input	Yes
- Number, max.	1
• HW enable for digital output	Yes
- Number, max.	3
Input voltage	
• Type of input voltage	DC
• Rated value (DC)	24 V
• for signal "0"	-30 to +5V
• for signal "1"	+11 to +30V
• permissible voltage at input, min.	-30 V
• permissible voltage at input, max.	30 V
Input current	
• for signal "1", typ.	2.5 mA
Input delay (for rated value of input voltage)	
• Minimum pulse width for program reactions	3 μs for parameterization "none"
for standard inputs	
- parameterizable	Yes; none / 0.05 / 0.1 / 0.4 / 0.8 ms
- at "0" to "1", min.	4 μs
- at "1" to "0", min.	4 μs
Cable length	
• shielded, max.	1 000 m; Depending on sensor, cable quality and rate of change
• unshielded, max.	600 m; Depending on sensor, cable quality and rate of change

Technical specifications (continued)

Article number	6ES7138-6CG00-0BA0 ET 200SP, TM TIMER DIDQ 10X24V
Digital outputs	
Type of digital output	Transistor
Number of digital outputs	6
Current-sinking	Yes; With High Speed output
Current-sourcing	Yes
Digital outputs, parameterizable	Yes
Short-circuit protection	Yes; electronic/thermal
Limitation of inductive shutdown voltage to	-0.8 V
Digital output functions, parameterizable	
• Digital output with time stamp	Yes
- Number, max.	6
• PWM output	Yes
- Number, max.	6
• Digital output with oversampling	Yes
- Number, max.	6
Switching capacity of the outputs	
• with resistive load, max.	0.5 A; 0.1 A with High Speed output
• on lamp load, max.	5 W; 1 W with High Speed output
Load resistance range	
• lower limit	48 Ω; 240 ohm with High Speed output
• upper limit	12 kΩ
Output voltage	
• Type of output voltage	DC
• for signal "0", max.	1 V; With High Speed output
• for signal "1", min.	23.2 V; L+ (-0.8 V)
Output current	
• for signal "1" rated value	0.5 A; 0.1 A with High Speed output, observe derating
• for signal "0" residual current, max.	0.5 mA
Output delay with resistive load	
• "0" to "1", max.	1 μs; With High Speed output, 5 μs with Standard output
• "1" to "0", max.	1 μs; With High Speed output, 6 μs with Standard output
Switching frequency	
• with resistive load, max.	10 kHz
• on lamp load, max.	10 Hz
Total current of the outputs	
• Current per module, max.	3.5 A; Observe derating
Cable length	
• shielded, max.	1 000 m; Depending on load and cable quality
• unshielded, max.	600 m; Depending on load and cable quality
Encoder	
Connectable encoders	
• Incremental encoder (asymmetrical)	Yes
• 24 V initiator	Yes
• 2-wire sensor	Yes
- permissible quiescent current (2-wire sensor), max.	1.5 mA

Article number	6ES7138-6CG00-0BA0 ET 200SP, TM TIMER DIDQ 10X24V
Encoder signals, incremental encoder (asymmetrical)	
• Input voltage	24 V
• Input frequency, max.	50 kHz
• Counting frequency, max.	200 kHz; with quadruple evaluation
• Cable length, shielded, max.	600 m; Depending on input frequency, encoder and cable quality; max. 200 m at 50 kHz
• Incremental encoder with A/B tracks, 90° phase offset	Yes
• Pulse encoder	Yes
Encoder signal 24 V	
- permissible voltage at input, min.	-30 V
- permissible voltage at input, max.	30 V
Interface types	
• Input characteristic curve in accordance with IEC 61131, type 3	Yes
Isochronous mode	
Isochronous operation (application synchronized up to terminal)	Yes
Bus cycle time (TDP), min.	375 μs
Interrupts/diagnostics/status information	
Diagnostics function	Yes
Substitute values connectable	Yes
Alarms	
• Diagnostic alarm	Yes
Diagnostic messages	
• Monitoring the supply voltage	Yes
• Short-circuit	Yes
Diagnostics indication LED	
• Monitoring of the supply voltage (PWR-LED)	Yes; green PWR LED
• Channel status display	Yes
• for module diagnostics	Yes; green/red DIAG LED
Integrated Functions	
Number of counters	3
Counting frequency (counter) max.	200 kHz; with quadruple evaluation
Counting functions	
• Continuous counting	Yes
Potential separation	
Potential separation channels	
• between the channels and backplane bus	Yes
Isolation	
Isolation tested with	707 V DC (type test)
Ambient conditions	
Ambient temperature during operation	
• horizontal installation, min.	0 °C
• horizontal installation, max.	60 °C; Observe derating
• vertical installation, min.	0 °C
• vertical installation, max.	50 °C; Observe derating
Decentralized operation	
to SIMATIC S7-1500	Yes
Dimensions	
Width	15 mm
Height	73 mm
Depth	58 mm
Weights	
Weight, approx.	45 g

I/O systems

SIMATIC ET 200 systems for the control cabinet

SIMATIC ET 200SP

I/O modules > Technology modules > TM Timer DIDQ 10x24V time-based I/O module

Ordering data	Article No.		Article No.
TM Timer DIDQ 10x24V time-based I/O module 4 time-controlled inputs, 6 time-controlled outputs	6ES7138-6CG00-0BA0	Accessories	
Usable BaseUnits		Reference identification label 10 sheets of 16 labels	6ES7193-6LF30-0AW0
BU15-P16+A0+2D BU type A0; BaseUnit (light) with 16 process terminals to the module; for starting a new load group (max. 10 A) • 1 unit • 10 units	6ES7193-6BP00-0DA0 6ES7193-6BP00-2DA0	Labeling strips 500 labeling strips on roll, light gray, for inscription with thermal transfer roll printer 500 labeling strips on roll, yellow, for inscription with thermal transfer roll printer 1000 labeling strips DIN A4, light gray, card, for inscription with laser printer 1000 labeling strips DIN A4, yellow, card, for inscription with laser printer	6ES7193-6LR10-0AA0 6ES7193-6LR10-0AG0 6ES7193-6LA10-0AA0 6ES7193-6LA10-0AG0
BU15-P16+A0+2B BU type A0; BaseUnit (dark) with 16 process terminals to the module; for continuing the load group • 1 unit • 10 units	6ES7193-6BP00-0BA0 6ES7193-6BP00-2BA0	BU cover for covering empty slots (gaps); 5 units • 15 mm wide • 20 mm wide	6ES7133-6CV15-1AM0 6ES7133-6CV20-1AM0
BU15-P16+A10+2D BU type A0; BaseUnit (light) with 16 process terminals (1...16) to the module and an additional 10 inter- nally jumpered AUX terminals (1 A to 10 A); for starting a new load group (max. 10 A) • 1 unit • 10 units	6ES7193-6BP20-0DA0 6ES7193-6BP20-2DA0	Shield connection 5 shield supports and 5 shield terminals	6ES7193-6SC00-1AM0
BU15-P16+A10+2B BU type A0; BaseUnit (dark) with 16 process terminals (1...16) to the module and an additional 10 inter- nally jumpered AUX terminals (1 A to 10 A); for continuing the load group • 1 unit • 10 units	6ES7193-6BP20-0BA0 6ES7193-6BP20-2BA0	Color-coded labels • Color code CC71, for 10 AUX terminals 1 A to 10 A, for BU type A0, yellow/green, with push-in terminals; 10 units • Color code CC72, for 10 AUX terminals 1 A to 10 A, for BU type A0, red, with push-in terminals; 10 units • Color code CC73, for 10 AUX terminals 1 A to 10 A, for BU type A0, blue, with push-in terminals; 10 units	6ES7193-6CP71-2AA0 6ES7193-6CP72-2AA0 6ES7193-6CP73-2AA0

Overview



2-channel pulse output module for ET 200SP

- Operating modes:
 - Single pulse with defined length
 - Pulse chain with defined number of pulses
 - Pulse width modulation (with flexible ON period, optional current control and dither function)
 - PWM signal for controlling a DC motor
 - ON and OFF delay; rising and falling edge can be delayed separately to the microsecond
 - Frequency output with defined output frequency
- Hardware:
 - 2 channels 24 V, 2 A output current
 - Parallel switching for enhanced performance on 4 A output current
 - Switching frequencies to 10 kHz; at reduced output current to 0.1 A up to 100 kHz
 - Push-pull output driver for especially steep edges at the outputs
 - Polarity change in DC motor operation for direction reversal
 - 1 high-speed 24 V digital input per channel with parameterizable input delay from 4 µs
- Channel functions:
 - HW enable; start of signal output with the onboard digital input
 - Parameterizable ON delay; for precise deceleration between the HW enable and the start of output
 - Current measurement in the operating modes pulse-width modulation and pulse chain; enables control of the output current mean value over a period. Temperature influences can thus be balanced to the resistance of the actuator
 - Cyclic control of the respective main setpoint from the PLC in every operating mode; other values can be modified flexibly from the user program
- Supported system functions:
 - Isochronous mode; enables precision-timed connection of the setpoint output to a higher-level controller
 - Firmware update
 - Identification data I&M

Technical specifications

Article number	6ES7138-6DB00-0BB1 ET 200SP, TM PULSE 2X24V
General information	
Product type designation	TM Pulse 2x24 V
Product function	
• I&M data	Yes; I&M 0
• Isochronous mode	Yes
Engineering with	
• STEP 7 TIA Portal configurable/integrated as of version	V13 SP1 + HSP
• STEP 7 configurable/integrated as of version	V5.5 SP4 and higher
• PROFIBUS as of GSD version/GSD revision	GSD Revision 5
• PROFINET as of GSD version/GSD revision	GSDML V2.31
Supply voltage	
Load voltage L+	
• Rated value (DC)	24 V
• Short-circuit protection	Yes
• Reverse polarity protection	Yes; against destruction

Article number	6ES7138-6DB00-0BB1 ET 200SP, TM PULSE 2X24V
Input current	
Current consumption, max.	70 mA; without load
Encoder supply	
Number of outputs	2; A common 24V encoder supply for both channels
24 V encoder supply	
• 24 V	Yes; L+ (-0.8 V)
• Short-circuit protection	Yes; per module, electronic
• Output current, max.	300 mA
Power loss	
Power loss, typ.	1.7 W
Digital inputs	
Number of digital inputs	2; 1 per channel
Digital inputs, parameterizable	Yes
Input characteristic curve in accordance with IEC 61131, type 3	Yes
Digital input functions, parameterizable	
• Freely usable digital input	Yes
• HW enable for digital output	Yes

I/O systems

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

I/O modules > Technology modules > TM Pulse 2x24V pulse output module

Technical specifications (continued)

Article number	6ES7138-6DB00-0BB1 ET 200SP, TM PULSE 2X24V
Input voltage	
• Type of input voltage	DC
• Rated value (DC)	24 V
• for signal "0"	-30 to +5V
• for signal "1"	+11 to +30V
• permissible voltage at input, min.	-30 V
• permissible voltage at input, max.	30 V
Input current	
• for signal "1", typ.	2.5 mA
Input delay (for rated value of input voltage) for standard inputs	
- parameterizable	Yes; none / 0.05 / 0.1 / 0.4 / 0.8 / 1.6 / 3.2 / 12.8 / 20 ms
- at "0" to "1", min.	4 µs; for parameterization "none"
- at "1" to "0", min.	4 µs; for parameterization "none"
Digital outputs	
Type of digital output	P- and M-switching
Number of digital outputs	2; 1 per channel
Current-sinking	Yes
Current-sourcing	Yes
Digital outputs, parameterizable	Yes
Short-circuit protection	Yes; electronic/thermal
Limitation of inductive shutdown voltage to	-0.8 V
Controlling a digital input	Yes
Digital output functions, parameterizable	
• Freely usable digital output	Yes
• PWM output	Yes
- Number, max.	2; 1 per channel
• Connection of a proportional valve	Yes
• Dithering	Yes
• Current measurement	Yes
• Current control	Yes
• Connection of a DC motor	Yes
• ON-delay	Yes
• OFF-delay	Yes
• Frequency output	Yes
• Pulse train	Yes
• Pulse output	Yes
Switching capacity of the outputs	
• with resistive load, max.	2 A
• on lamp load, max.	10 W; 1 W with High Speed output

Article number	6ES7138-6DB00-0BB1 ET 200SP, TM PULSE 2X24V
Load resistance range	
• lower limit	12 Ω; 240 ohm with High Speed output
• upper limit	12 kΩ
Output voltage	
• Type of output voltage	DC
• for signal "0", max.	1 V
• for signal "1", min.	23.2 V; L+ (-0.8 V)
Output current	
• for signal "1" rated value	2 A; 0.1 A with High Speed output, observe derating
Output delay with resistive load	
• "0" to "1", typ.	0 µs; With High Speed output, 4.5 µs with Standard output
• "0" to "1", max.	0.8 µs; With High Speed output, 9 µs with Standard output
• "1" to "0", typ.	0 µs; With High Speed output, 4.5 µs with Standard output
• "1" to "0", max.	0.8 µs; With High Speed output, 9 µs with Standard output
Parallel switching of two outputs	
• for uprating	Yes
Switching frequency	
• with resistive load, max.	100 kHz; With High Speed output, 10 kHz with standard output
• with inductive load, max.	100 kHz; With High Speed output, 10 kHz with standard output
• on lamp load, max.	10 Hz
Total current of the outputs	
• Current per channel, max.	2 A
• Current per group, max.	4 A
• Current per module, max.	4 A
Isochronous mode	
Isochronous operation (application synchronized up to terminal)	Yes
Bus cycle time (TDP), min.	250 µs; with 1 channel configuration, 375 µs with 2 channel configuration
Interrupts/diagnostics/status information	
Diagnostics function	Yes
Substitute values connectable	Yes; Parameterizable
Alarms	
• Diagnostic alarm	Yes
Diagnostic messages	
• Monitoring the supply voltage	Yes
• Short-circuit	Yes
Diagnostics indication LED	
• Monitoring of the supply voltage (PWR-LED)	Yes; green PWR LED
• Channel status display	Yes
• for module diagnostics	Yes; green/red DIAG LED

Technical specifications (continued)

Article number	6ES7138-6DB00-0BB1 ET 200SP, TM PULSE 2X24V
Potential separation	
Potential separation channels	
• between the channels	No
• between the channels and backplane bus	Yes
Isolation	
Isolation tested with	707 V DC (type test)
Ambient conditions	
Ambient temperature during operation	
• horizontal installation, max.	60 °C; Observe derating
• vertical installation, max.	50 °C; Observe derating

Article number	6ES7138-6DB00-0BB1 ET 200SP, TM PULSE 2X24V
Decentralized operation	
to SIMATIC S7-300	Yes
to SIMATIC S7-400	Yes
to SIMATIC S7-1200	Yes
to SIMATIC S7-1500	Yes
to standard PROFIBUS master	Yes
to standard PROFINET controller	Yes
Dimensions	
Width	20 mm
Height	73 mm
Depth	58 mm
Weights	
Weight, approx.	50 g

Ordering data**Article No.****TM Pulse 2x24V pulse output module**

PWM and pulse output,
2 channels of 2 A for proportional
valves and DC motors

6ES7138-6DB00-0BB1**Usable BaseUnits****BU20-P12+A0+4B**

BU type B1; BaseUnit (dark);
without AUX terminals;
for continuing the load group

6ES7193-6BP20-0BB1**Article No.****Accessories****Reference identification label**

10 sheets of 16 labels

6ES7193-6LF30-0AW0**Labeling strips**

500 labeling strips on roll, light gray,
for inscription with thermal transfer
roll printer

6ES7193-6LR10-0AA0

500 labeling strips on roll, yellow,
for inscription with thermal transfer
roll printer

6ES7193-6LR10-0AG0

1000 labeling strips DIN A4, light
gray, card, for inscription with laser
printer

6ES7193-6LA10-0AA0

1000 labeling strips DIN A4, yellow,
card, for inscription with laser
printer

6ES7193-6LA10-0AG0**BU cover**

for covering empty slots (gaps);
5 units

- 15 mm wide
- 20 mm wide

6ES7133-6CV15-1AM0
6ES7133-6CV20-1AM0

I/O systems

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

I/O modules > Technology modules > SIWAREX WP321

Overview



SIWAREX WP321 is a versatile and flexible weighing module for the seamless integration of a static scale into the SIMATIC automation environment.

The electronic weighing system is integrated in the SIMATIC ET 200SP series and uses all the features of a modern automation system, such as integrated communication, operator control and monitoring, diagnostic system and configuration tools in the TIA Portal, SIMATIC STEP 7, WinCC flexible and PCS 7.

Technical specifications

SIWAREX WP321	
Integration in automation systems	
SIMATIC S7-300, S7-400, S7-1200 and S7-1500	Via SIMATIC ET 200SP interface module (PROFIBUS or PROFINET)
Other manufacturers (with restrictions)	Via SIMATIC ET 200SP interface module (PROFIBUS or PROFINET)
Communication interfaces	
	• SIMATIC ET 200SP backplane bus • RS 485 (SIWATOOL, Siebert remote display)
Commissioning options	
	• Using SIWATOOL V7 • Using function block in SIMATIC CPU / Touch Panel
Measuring accuracy	
according to DIN 1319-1 of full-scale value at 20 °C ± 10 K (68 °F ± 10 K)	0.05%
Internal resolution	± 2 million parts
Measuring frequency	100 / 120 Hz
Digital filter	
	Variable adjustable low-pass and average filter
Typical applications	
	• Non-automatic weighing instruments • Force measurements • Fill-level monitoring • Belt tension monitors
Weighing functions	
Weight values	• Gross • Net • Tare
Limit values	• 2 x min/max • Empty
Zeroing	Via command by controller or HMI
Tare	Via command by controller or HMI
External tare specification	Via command by controller or HMI
Calibration commands	Via command by controller or HMI
Load cells	
	Full-bridge strain gauges in 4-wire or 6-wire system
Load cell powering	
Supply voltage (value applies at sensor, cable-related voltage drops of up to 5 V are controlled)	4.85 V DC ±2%

SIWAREX WP321	
Permissible load resistance	• R_{Lmin} > 40 Ω • R_{Lmax} < 4100 Ω
With SIWAREX IS Ex interface	• R_{Lmin} > 50 Ω • R_{Lmax} < 4100 Ω
Load cell characteristic	1 ... 4 mV/V
Permissible range of measuring signal (at greatest set characteristic value)	-21.3 ... +21.3 mV
Max. distance of load cells	1000 m (459.32 ft)
Connection to load cells in Ex zone 1	Optionally via SIWAREX IS Ex interface (compatibility of the load cells must be checked)
Approvals/certificates	• ATEX Zone 2 • UL • FM • EAC • KCC • IECEx • RCM
Auxiliary power supply	
Rated voltage	24 V DC
Max. power consumption	typ. 0.1 A @ 24 V DC (0.2 A max.)
Max. power consumption SIMATIC Bus	30 mA
IP degree of protection according to DIN EN 60529; IEC 60529	IP20
Climatic requirements	
$T_{min} (IND) ... T_{max} (IND)$ (operating temperature)	
• Vertical installation in SIMATIC S7 ¹⁾	-25 ... +50 °C (-13 ... 122 °F)
• Horizontal installation in SIMATIC S7 ¹⁾	-25 ... +60 °C (-13 ... 140 °F)
EMC requirements	according to IEC 61000-6-2, IEC 61000-6-4, OIML-R76-1
Dimensions (width)	15 mm (0.6 in)

¹⁾ The S7 standard modules may not be operated at temperatures below 0 °C (32 °F). For operating conditions below 0 °C (32 °F), SIMATIC modules from the SIPLUS series must be used.

Ordering data	Article No.	Article No.
TM SIWAREX WP321 weighing module Single-channel, for platform or hopper scales with analog load cells / full-bridge strain gauges (1 - 4 mV/V), 1 x LC, 1 x RS 485	7MH4138-6AA00-0BA0	
SIWAREX WP321 manual Available in a range of languages Free download from the Internet at: http://www.siemens.com/weighing-technology		
SIWAREX WP321 "Ready for Use" TIA Portal and SIMATIC Manager sample configuration Free download from the Internet at: http://www.siemens.com/weighing-technology		
SIWAREX WP321 configuration package for TIA Portal • "Ready for use" software for operating a scale with SIWAREX WP321 and a touch panel (in many different languages) • SIWATOOL V7.0 • Device manuals (PDF files in a variety of languages)	7MH4138-1AK01	
SIWAREX WP321 configuration package for PCS 7 V8.1 • APL function block and faceplate • SIWATOOL V7.0 • Device manuals (PDF files in a variety of languages)	7MH4138-1AK61	
Accessories (mandatory requirement)		
BaseUnit (Type A0 – one BaseUnit required for each WP321) • For opening a new potential group - BU15P-16+A0+2D or - BU15P-16+A10+2D • For continuing the potential group - BU15P-16+A0+2B - BU15P-16+A10+2B	6ES7193-6BP00-0DA0 6ES7193-6BP20-0DA0 6ES7193-6BP00-0BA0 6ES7193-6BP20-0BA0	
Shielded connection for BaseUnit (5 units / for 5 scales) For laying the load cell cable	6ES7193-6SC00-1AM0	
Accessories (optional)		
SIWAREX JB junction box, aluminum housing For connecting up to 4 load cells in parallel, and for connecting several junction boxes	7MH4710-1BA	
SIWAREX JB junction box, stainless steel housing For connecting up to 4 load cells in parallel	7MH4710-1EA	
SIWAREX JB junction box, stainless steel housing (ATEX) For parallel connection of up to 4 load cells (for zone allocation, see manual or type examination certificate)	7MH4710-1EA01	
Ex interface SIWAREX IS For intrinsically safe connection of load cells. With ATEX approval (not UL/FM). Suitable for SIWAREX electronic weighing system. Compatibility of load cells must be checked Approved for use in the EU • Short-circuit current < 199 mA DC • Short-circuit current < 137 mA DC		7MH4710-5BA 7MH4710-5CA
Cable (optional)		
Cable Li2Y 1 x 2 x 0.75 ST + 2 x (2 x 0.34 ST) – CY For connecting SIWAREX electronic weighing systems to junction box (JB), extension box (EB) and Ex interface or between two JB's. For permanent installation. Occasional bending is possible External diameter: approx. 10.8 mm (0.43 in) Permissible ambient temperature -40 ... +80 °C (-40 ... +176 °F). Sold by the meter. • Sheath color: orange • For potentially explosive atmospheres. Sheath color: blue		7MH4702-8AG 7MH4702-8AF
RS 485/USB interface converter Commercially available interface converter with FTDI chip, e.g. USB-Nano from CTI https://www.cti-shop.com/epages/15488632.sf/en_GB/?ViewObjectPath=%2FShops%2F15488632%2FProducts%2F95031010		
Remote display The Siebert S102 and S302 remote digital displays can be directly connected to the SIWAREX FTA via an RS 485 interface Siebert Industrieelektronik GmbH Postfach 1180D-65565 Eppelborn, Germany Tel.: +49 6806/980-9 Fax: +49 6806/980-999 Internet: http://www.siebert.de Detailed information is available from the manufacturer		

I/O systems

SIMATIC ET 200 systems for the control cabinet

SIMATIC ET 200SP

I/O modules > Communication > CM PtP serial interface

Overview



- CM PtP communication module; module for serial communication connections with RS 232 and RS 422 interfaces. RS 485 for the Freeport, 3964(R), Modbus RTU and USS protocols, max. 115.2 Kbps, 2 KB frame length, 4 KB receive buffer
- Protocols supported
 - Freeport: User-parameterizable frame format for universal communication
 - 3964(R) for improved transmission reliability
 - Modbus RTU master (requires instructions in SIMATIC S7)
 - Modbus RTU slave (requires instructions in SIMATIC S7)
 - USS, implemented through instructions
- Interface properties
 - RS 232 with auxiliary signals
 - RS 422 for full-duplex connections
 - RS 485 for half-duplex and multi-point connections
 - Transmission rates from 300 to 115200 bit/s
- Can be plugged onto Type A0 BaseUnits (BU) with automatic coding
- LED display for errors, operation and supply voltage
- Communication display for sending and receiving
- Clear labeling on front of module
 - Plain text identification of the module type and function class
 - 2D matrix code (order and serial number)
 - Connection diagram
 - Color coding of the CM module type: silver
 - Hardware and firmware version
 - Complete Article No.
- Optional labeling accessories
 - Labeling strips
 - Reference identification label
- Optional system-integrated shield connection

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Technical specifications

Article number	6ES7137-6AA00-0BA0 ET 200SP, CM PTP
General information	
Product type designation	ET 200SP CM PtP
Product function	
• I&M data	Yes; I&M0 to I&M3
Engineering with	
• STEP 7 TIA Portal configurable/ integrated as of version	V12 / V12
• STEP 7 configurable/integrated as of version	V5.5 SP2 with GSD file
• PROFIBUS as of GSD version/ GSD revision	GSD as of Revision 5
• PROFINET as of GSD version/ GSD revision	GSDML V2.3
Installation type/mounting	
Rack mounting	Yes
Rail mounting	Yes
Supply voltage	
Type of supply voltage	24 V DC
Rated value (DC)	24 V
Reverse polarity protection	Yes

Article number	6ES7137-6AA00-0BA0 ET 200SP, CM PTP
Input current	
Current consumption (rated value)	29 mA
Power loss	
Power loss, typ.	0.7 W
1. Interface	
Interface types	
• RS 485	Yes
• RS 422	Yes
• RS 232	Yes
RS 232	
• Transmission rate, max.	115.2 kbit/s
• Cable length, max.	15 m
• RS 232 auxiliary signals	RTS, CTS, DTR, DSR, RI, DCD
RS 485	
• Transmission rate, max.	115.2 kbit/s
• Cable length, max.	1 200 m
RS 422	
• Transmission rate, max.	115.2 kbit/s
• Cable length, max.	1 200 m
• 4-wire full duplex connection	Yes
• 4-wire multipoint connection	Yes

Technical specifications (continued)

Article number	6ES7137-6AA00-0BA0 ET 200SP, CM PTP
Integrated protocols	
Freeport	
- Telegram length, max.	2 kbyte
- Bits per character	7 or 8
- Number of stop bits	1 or 2 bit
- Parity	None, even, odd, always 1, always 0, any
3964 (R)	
- Telegram length, max.	2 kbyte
- Bits per character	7 or 8
- Number of stop bits	1 or 2 bit
- Parity	None, even, odd, always 1, always 0, any
Modbus RTU master	
- Address area	1 to 247, extended 1 to 65535
- Number of slaves, max.	32
MODBUS RTU slave	
- Address area	1 to 247, extended 1 to 65535
Telegram buffer	
• Buffer memory for telegrams	4 kbyte
• Number of telegrams which can be buffered	255
Interrupts/diagnostics/status information	
Diagnostics function	Yes
Alarms	
• Diagnostic alarm	Yes
• Hardware interrupt	No
Diagnostic messages	
• Wire-break	Yes

Article number	6ES7137-6AA00-0BA0 ET 200SP, CM PTP
Diagnostics indication LED	
• Monitoring of the supply voltage (PWR-LED)	Yes; green PWR LED
• for module diagnostics	Yes; green/red DIAG LED
• Receive RxD	Yes; Green LED
• Transmit TxD	Yes; Green LED
Potential separation	
between backplane bus and interface	Yes
Isolation	
Isolation tested with	707 V DC (type test)
Decentralized operation	
to SIMATIC S7-300	Yes
to SIMATIC S7-400	Yes
to SIMATIC S7-1200	Yes
to SIMATIC S7-1500	Yes
to standard PROFINET controller	Yes
Dimensions	
Width	15 mm
Height	73 mm
Depth	58 mm
Weights	
Weight, approx.	30 g

Ordering data

Article No.

CM PtP communication module	6ES7137-6AA00-0BA0
For serial communication connections with RS 232, RS 422, RS 485 interfaces, BU type A0, color code CC00	
Accessories	
BU15-P16+A0+2D	6ES7193-6BP00-0DA0
BU type A0; BaseUnit (light) with 16 process terminals to the module; for starting a new load group (max. 10 A)	
BU15-P16+A0+2B	6ES7193-6BP00-0BA0
BU type A0; BaseUnit (dark) with 16 process terminals to the module; for continuing the load group	
BU15-P16+A10+2D	6ES7193-6BP20-0DA0
BU type A0; BaseUnit (light) with 16 process terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1 A to 10 A); for starting a new load group (max. 10 A)	
BU15-P16+A10+2B	6ES7193-6BP20-0BA0
BU type A0; BaseUnit (dark) with 16 process terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1 A to 10 A); for continuing the load group	

Article No.

Reference identification label	6ES7193-6LF30-0AW0
10 sheets of 16 labels	
Labeling strips	6ES7193-6LR10-0AA0
500 labeling strips on roll, light gray, for inscription with thermal transfer roll printer	
Shield connection	6ES7193-6SC00-1AM0
5 shield supports and 5 shield terminals, for direct connection	

I/O systems

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

I/O modules > Communication > CM 4x IO-Link

Overview



- CM 4x IO-Link communication module
Serial communication module for connecting up to 4 IO-Link devices in accordance with IO-Link specification V1.0 and V1.1. The IO-Link parameters are configured using the Port Configuration Tool (PCT), version V3.0 and higher
- Time-based IO
Time-based IO ensures that signals are output with a precisely defined response time. By combining inputs and outputs, for example, passing products can be accurately measured or fluids dosed in precise quantities
- Supported data transfer rates
 - COM1 (4.8 Kbps)
 - COM2 (38.4 Kbps)
 - COM3 (230.4 Kbps)

- Expansion limits
 - Length of cable: Max. 20 m
 - Max. 32 bytes of input and output data per port
 - Max. 144 bytes of input data and 128 bytes of output data per module
- Supported ET 200SP system functions
 - Replacement without PG with automatic backup without the engineering tool of the IO-Link device parameter (V1.1 devices only) and the IO-Link master parameters by means of redundant saving of parameters on the e-coding element
 - Re-parameterization during operation
 - Identification data I&M
 - Firmware update
 - PROFlenergy
- Can be plugged onto Type A0 BaseUnits (BU) with automatic e-coding
- LEDs
 - DIAG: Operating state indicator (green/red) of the module
 - C1..C4: Port status indicator (green) for Port 1, 2, 3 and 4
 - Q1..Q4: Channel status indicator (green) for Port 1, 2, 3 and 4
 - F1..F4: Port fault indicator (red) for Port 1, 2, 3 and 4
 - PWR: Supply voltage indicator (green)
- Clear labeling on front of module
 - Plain text identification of the module type and function class
 - 2D matrix code (order and serial number)
 - Connection diagram
 - Color-coding of the CM module class: silver
 - Hardware and firmware version
 - Complete Article No.
- Optional accessories
 - Labeling strips
 - Equipment labeling plate
 - Color-coding plate with color code CC04
- Optional system-integrated shield connection

Overview of CM 4 x IO-Link

Communication module	Article No.	CC Code	BU type	PU
CM 4 x IO-Link	6ES7137-6BD00-0BA0	CC04	A0	1

Overview of BaseUnits

BaseUnit	Article No.	CC Codes for process terminals	CC Codes for AUX terminals	PU
BU type A0 • New load group (light) • 16 process terminals • With 10 AUX terminals	6ES7193-6BP20-0DA0	CC01 to CC05	CC71 to CC73	1
BU type A0 • New load group (light) • 16 process terminals • With 10 AUX terminals	6ES7193-6BP20-2DA0	CC01 to CC05	CC71 to CC73	10
BU type A0 • New load group (light) • 16 process terminals • Without AUX terminals	6ES7193-6BP00-0DA0	CC01 to CC05	--	1
BU type A0 • New load group (light) • 16 process terminals • Without AUX terminals	6ES7193-6BP00-2DA0	CC01 to CC05	--	10
BU type A0 • Forwarding of load group (dark) • 16 process terminals • With 10 AUX terminals	6ES7193-6BP20-0BA0	CC01 to CC05	CC71 to CC73	1

Overview (continued)

BaseUnit	Article No.	CC Codes for process terminals	CC Codes for AUX terminals	PU
BU type A0 • Forwarding of load group (dark) • 16 process terminals • With 10 AUX terminals	6ES7193-6BP20-2BA0	CC01 to CC05	CC71 to CC73	10
BU type A0 • Forwarding of load group (dark) • 16 process terminals • Without AUX terminals	6ES7193-6BP00-0BA0	CC01 to CC05	--	1
BU type A0 • Forwarding of load group (dark) • 16 process terminals • Without AUX terminals	6ES7193-6BP00-2BA0	CC01 to CC05	--	10

Technical specifications

Article number	6ES7137-6BD00-0BA0 ET 200SP, CM 4 X IO-LINK ST
General information	
Product type designation	ET 200SP, CM 4xIO-Link
Product function	
• I&M data	Yes
Engineering with	
• STEP 7 TIA Portal configurable/integrated as of version	V13 / V13
• STEP 7 configurable/integrated as of version	V5.5 / -
• PROFIBUS as of GSD version/GSD revision	GSD Revision 5
• PROFINET as of GSD version/GSD revision	V2.3 / -
Supply voltage	
Rated value (DC)	24 V
Reverse polarity protection	Yes
Input current	
Current consumption, max.	45 mA; without load
Encoder supply	
Number of outputs	4
Output current	
• Rated value	200 mA
Power loss	
Power loss, typ.	1 W
Isochronous mode	
Equidistance	Yes

Article number	6ES7137-6BD00-0BA0 ET 200SP, CM 4 X IO-LINK ST
Interrupts/diagnostics/status information	
Diagnostics function	Yes
Alarms	
• Diagnostic alarm	Yes; The port diagnosis is available in the IO-Link mode only.
Diagnostic messages	
• Monitoring the supply voltage	Yes
Diagnostics indication LED	
• Monitoring of the supply voltage (PWR-LED)	Yes; green PWR LED
• Channel status display	Yes; one green LED for channel status Qn (SIO mode) and port status Cn (IO-Link mode) per channel
• for channel diagnostics	Yes; red Fn LED
• for module diagnostics	Yes; green/red DIAG LED
Potential separation	
Potential separation channels	
• between the channels	No
• between the channels and backplane bus	Yes
Isolation	
Isolation tested with	707 V DC (type test)
Dimensions	
Width	15 mm
Weights	
Weight, approx.	30 g

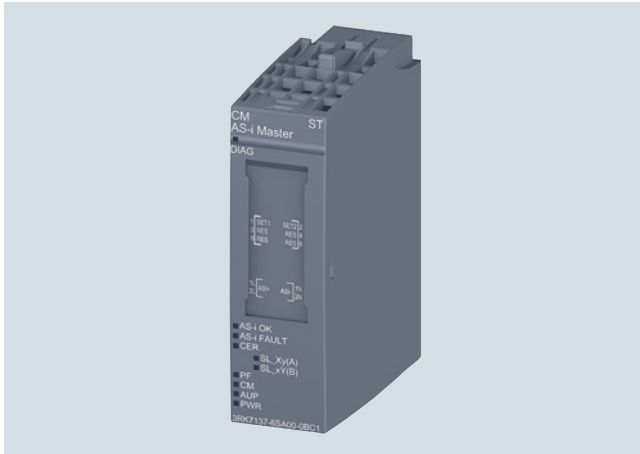
I/O systems

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

I/O modules > Communication > CM 4x IO-Link

Ordering data	Article No.		Article No.
CM 4x IO-Link master V1.1 Standard communication module Serial communication module for connecting up to 4 IO-Link devices, time-based IO, BU type A0, color code CC04	6ES7137-6BD00-0BA0	Labeling strips 500 labeling strips on roll, light gray, for inscription with thermal transfer roll printer 500 labeling strips on roll, yellow, for inscription with thermal transfer roll printer 1000 labeling strips DIN A4, light gray, card, perforated, for inscription with laser printer 1000 labeling strips DIN A4, yellow, card, perforated, for inscription with laser printer	6ES7193-6LR10-0AA0 6ES7193-6LR10-0AG0 6ES7193-6LA10-0AA0 6ES7193-6LA10-0AG0
Accessories			
Usable type A0 BaseUnits			
BU15-P16+A10+2D BU type A0; BaseUnit (light) with 16 process terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1 A to 10 A); for starting a new load group (max. 10 A)	6ES7193-6BP20-0DA0 6ES7193-6BP20-2DA0	Color-coding plates	6ES7193-6CP04-2MA0 6ES7193-6CP71-2AA0 6ES7193-6CP72-2AA0 6ES7193-6CP73-2AA0
BU15-P16+A0+2D BU type A0; BaseUnit (light) with 16 process terminals to the module; for starting a new load group (max. 10 A)	6ES7193-6BP00-0DA0 6ES7193-6BP00-2DA0	Color code CC04, for 16 push-in terminals, BU type A0, A1, gray (terminals 1 to 8), red (terminals 9 to 12), blue (terminals 13 to 16); 10 units Color code CC71, for 10 AUX terminals, BU type A0, yellow/green (terminals 1 A to 10 A); 10 units Color code CC72, for 10 AUX terminals, BU type A0, red (terminals 1 A to 10 A); 10 units Color code CC73, for 10 AUX terminals, BU type A0, blue (terminals 1 A to 10 A); 10 units	
BU15-P16+A10+2B BU type A0; BaseUnit (dark) with 16 process terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1 A to 10 A); for continuing the load group	6ES7193-6BP20-0BA0 6ES7193-6BP20-2BA0	Spare parts	
BU15-P16+A0+2B BU type A0; BaseUnit (dark) with 16 process terminals to the module; for continuing the load group	6ES7193-6BP00-0BA0 6ES7193-6BP00-2BA0	Electronic coding element type H Pack of 5 units; included in scope of supply of CM 4x IO-Link module	6ES7193-6EH00-1AA0
Equipment labeling plate 10 sheets of 16 labels, for printing with thermal transfer card printer or plotter	6ES7193-6LF30-0AW0		

Overview



CM AS-i Master ST for SIMATIC ET 200SP

The CM AS-i Master ST communication module is designed for use in the SIMATIC ET 200SP distributed I/O system and has the following features:

- As many as 62 AS-Interface slaves can be connected
- Supports all AS-Interface master functions according to the AS-Interface Specification V3.0
- User-friendly configuration with graphic display of the AS-i line in TIA Portal V12 and higher, or via GSD in other systems
- Supply via AS-Interface cable
- Suitable for AS-i Power24V and for AS-Interface with 30 V voltage
- Integrated ground-fault monitoring for the AS-Interface cable
- Through connection to AS-Interface, the number of digital inputs and outputs available for the control system is greatly increased (max. 496 DI/496 DO on the AS-Interface per CM AS-i Master ST)
- Integrated analog value processing

ET 200SP Distributed I/O System

SIMATIC ET 200SP is a scalable and highly flexible distributed I/O system for connecting the process signals to a central control system via PROFIBUS or PROFINET.

Up to eight CM AS-i Master STs can be plugged onto a SIMATIC ET 200SP with the IM 155-6 PN standard interface module.

For more information, see

"SIMATIC ET 200SP Distributed I/O system" System Manual,
<https://support.industry.siemens.com/cs/ww/en/view/58649293>.

Design

The CM AS-i Master ST module has an ET 200SP module enclosure with a width of 20 mm. A C0 type BaseUnit (BU) is required for use in the ET 200SP.

The communication module has LED indicators for diagnostics, operation, AS-i voltage and AS-i slave status and offers informative front-side module inscription for:

- Plain-text marking of the module type and function class
- 2D matrix code (Article No. and serial number)
- Connection diagram
- Color coding of the CM module type: light gray
- Hardware and firmware version
- Complete Article No.

Function

The CM AS-i Master ST supports all specified functions of the AS-Interface Specification V3.0.

The input/output values of the digital AS-i slaves can be activated via the cyclic process image. The values of the analog AS-i slaves can be attained via the cyclic process image (firmware V1.1 or higher) or via data record transfer.

If required, master calls can be performed with the command interface, e.g. read/write parameters, read/write configuration.

Changeover of the operating mode, automatic application of the slave configuration and the re-addressing of a connected AS-i slave can be implemented via the control panel of the CM AS-i Master ST in STEP 7.

Expansions from firmware version V1.1

In order to implement modular machine concepts, the AS-i slaves can be activated or deactivated via the PLC program (option handling). The configuration of AS-i slaves can be modified while being executed, thus enabling variable machine setups and tool changing with integrated input/output modules during ongoing operation. Without deactivating the controller, AS-i input/output modules can be added in the system.

An existing AS-i installation can be read into the STEP 7 hardware configuration and then adapted and documented in the project. Analog values are transmitted via the cyclic process image, the length of which is adjustable and extendable up to 288 bytes (depending on the interface module (IM) used).

Diagnostic information is accessed via automatic alarm indications, via the process image or data record reading in the user program or in the STEP 7 engineering system in a graphical overview matrix. The AS-i network's transmission quality can also be read out. To avoid configuration errors, duplicate addresses in the AS-i network can be detected.

The new functions are available with TIA Portal STEP 7 V13 SP1 or with STEP 7 V5.5 with HSP 2092 V3.0¹⁾. Configuration is possible with SIMATIC CPUs S7-300 up to S7-1500 and with a SINUMERIK 840D sl or other controller.

In the network view, the AS-i slaves' online diagnostics status can be displayed directly on the slaves (in the case of S7-1500 CPUs with updated TIA Portal STEP 7 V14 firmware or higher).

¹⁾ HSP 2092, see
<https://support.industry.siemens.com/cs/ww/en/view/23183356>.

I/O systems

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

I/O modules > Communication > CM AS-i Master ST for SIMATIC ET 200SP

Overview (continued)

Notes on safety

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 only represent one component of such a concept.

For more information on the topic of Industrial Security, see <http://www.siemens.com/industrialsecurity>.

Configuration

The following software is required for configuration of the CM AS-i Master ST module:

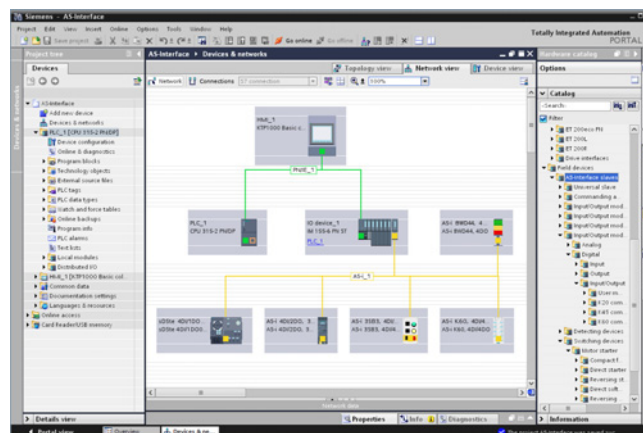
- STEP 7 (classic) V5.5 SP3 HF4 or higher with HSP 2092 or HSP 2092 V3.0 (for firmware V1.1) or
- STEP 7 (TIA Portal) V12 or higher or V13 SP1 or higher (for firmware V1.1) or
- the GSD file of the ET 200SP with STEP 7 or another engineering tool

STEP 7 enables user-friendly configuration and diagnostics of the AS-i master and any connected slaves.

Alternatively, you can also apply the AS-Interface ACTUAL configuration as the DESIRED configuration at the "touch of a button" via the control panel integrated in the TIA Portal or an optional expansion button. Configuration with the GSD file is possible only with the button.

The CM AS-i Master ST module occupies up to 288 input bytes and up to 288 output bytes in the I/O data of the ET 200SP station. The I/O assignment depends on the configuration in STEP 7.

Together with an ET 200SP CPU 1510SP/1512SP (firmware V1.8 or higher) or 1515SP PC, preprocessing of safe AS-i signals directly in the ET 200SP station and setting up of an independent AS-i station without a higher-level CPU are possible (TIA Portal V13 SP1 Update 4 and higher).



Configuration of an AS-Interface network with CM AS-i Master ST via TIA Portal

Ordering data	Article No.	Article No.
CM AS-i Master ST communication module - AS-Interface Master for SIMATIC ET 200SP - Can be plugged onto BaseUnit type C0 - Corresponds to AS-Interface Specification V3.0 - Dimensions (W x H x D / mm): 90 x 132 x 88.5	3RK7137-6SA00-0BC1	BusAdapters for PROFINET For connection of the Ethernet cable to the PROFINET IM 155-6 PN interface module 2 x RJ45 connection (supplied without RJ45 connector) 2 x FC connection (FastConnect) For more BusAdapters with fiber-optic cable connection, see Catalog IK PI "Industrial Communication" or the Industry Mall.
Accessories		6ES7193-6AR00-0AA0 6ES7193-6AF00-0AA0
BaseUnit BU20-P6+A2+4D - BaseUnit (light), BU type C0 - Suitable for the CM AS-i Master ST module - For connection of AS-Interface cable to the CM AS-i Master ST - Beginning of an AS-i network, disconnection of AS-i voltage to the left-hand module	6ES7193-6BP20-0DC0	
PROFINET IM 155-6 PN Basic interface module Max. 12 I/O modules, max. 32 bytes I/O data per station Including server module and BusAdapter 2 x RJ45 ports (supplied without RJ45 plug)	6ES7155-6AR00-0AN0	
PROFINET IM 155-6 PN Standard interface module Max. 32 I/O modules, max. 256 bytes I/O data per station - Including server module and BusAdapter 2 x RJ45 (supplied without RJ45 plug) - Including server module (BusAdapter must be ordered separately, see right)	6ES7155-6AA00-0BN0 6ES7155-6AU00-0BN0	AS-Interface addressing unit V3.0 - For AS-Interface modules and sensors and actuators with integrated AS-Interface according to AS-i Specification V3.0 - For setting the AS-i address of standard slaves, and slaves with extended addressing mode (A/B slaves) - With input/output test function and many other commissioning functions - Battery operation with four type AA batteries (IEC LR6, NEDA 15) - Degree of protection IP40 - Dimensions (W x H x D / mm): 84 x 195 x 35 - Scope of supply: - Addressing unit with 4 batteries - Addressing cable, with M12 plug to addressing plug (hollow plug), length 1.5 m
PROFINET IM 155-6 DP Standard High Feature interface module Max. 64 I/O modules, max. 1 440 bytes I/O data per station - Including server module BusAdapter must be ordered separately, see right) - Including server module and PROFIBUS connector	6ES7155-6AU00-0CN0 6ES7155-6BA00-0CN0	More information For the Manual "CM AS-i Master ST for SIMATIC ET 200SP", see https://support.industry.siemens.com/cs/ww/en/view/71756485. AS-Interface function block library for SIMATIC PCS 7 for easy connection of AS-Interface to PCS 7, see Catalog IC 10, Chapter 14, "Parameterization, Configuration and Visualization with SIRIUS".

I/O systems

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

I/O modules > Communication > CM DP for ET 200SP CPU

Overview



- PROFIBUS DP master/slave with electrical interface for connecting the ET 200SP CPUs to PROFIBUS at up to 12 Mbps
- Expands the ET 200SP CPUs 1510SP-1 PN / 1512SP-1 PN by one PROFIBUS connection
- For communication with lower-level PROFIBUS devices at bandwidths of 9.6 Kbps to 12 Mbps
- Communication services:
 - PROFIBUS DP
 - PG/OP communication
 - S7 communication:

This makes it possible to establish communication between the ET 200SP CPU and other devices, for example those from the SIMATIC S7-300/400/1500 range.
- Time synchronization
- Simple programming and configuration over PROFIBUS
- Cross-network PG communication using S7 routing
- Data set routing

Technical specifications

Article number	6ES7545-5DA00-0AB0 ET 200SP, CM DP FOR ET 200SP CPU
General information	
Product type designation	ET 200SP, CM DP
Engineering with	
• STEP 7 TIA Portal configurable/ integrated as of version	V13 Update 3
Installation type/mounting	
Rack mounting	No
Rail mounting	Yes; Standard - DIN rail
Supply voltage	
Type of supply voltage	24 V DC
Rated value (DC)	24 V
Reverse polarity protection	Yes
1. Interface	
Interface types	
• RS 485	Yes
Functionality	
• PROFIBUS DP master	Yes
• PROFIBUS DP slave	Yes
• SIMATIC communication	Yes
RS 485	
• Transmission rate, max.	12 Mbit/s
• Cable length, max.	100 m
Protocols	
PROFIBUS DP master	
Services	
- PG/OP communication	Yes
- S7 routing	Yes
- Data record routing	Yes
- Isochronous mode	No
- Equidistance	No
- Number of DP slaves	125
- Activation/deactivation of DP slaves	Yes

Article number	6ES7545-5DA00-0AB0 ET 200SP, CM DP FOR ET 200SP CPU
PROFIBUS DP slave	
• Transmission rate, max.	12 Mbit/s
• automatic baud rate search	Yes
• Address area, max.	120
• User data per address area, max.	128 byte
Services	
- PG/OP communication	Yes; Only with active interface
- Routing	Yes; Only with active interface
- S7 communication	Yes; Only with active interface
- Direct data exchange (slave-to-slave communication)	Yes; No subscriber possible - only passive publisher
- DPV1	Yes
Transfer memory	
- Inputs	244 byte
- Outputs	244 byte
Interrupts/diagnostics/ status information	
Diagnostics function	Yes
Diagnostics indication LED	
• for module diagnostics	Yes; green/red DIAG LED
Potential separation	
between backplane bus and interface	Yes
Ambient conditions	
Ambient temperature during operation	
• horizontal installation, min.	0 °C
• horizontal installation, max.	60 °C
• vertical installation, min.	0 °C
• vertical installation, max.	50 °C
Dimensions	
Width	35 mm
Height	117 mm
Depth	75 mm
Weights	
Weight, approx.	80 g

Ordering data	Article No.		Article No.
CM DP for ET 200SP CPU PROFIBUS DP master/slave with electrical interface for connecting the ET 200SP CPUs to PROFIBUS at up to 12 Mbps	6ES7545-5DA00-0AB0	PROFIBUS DP bus connector RS 485 with 90° cable outlet, max. transfer rate 12 Mbps • without PG interface • with PG interface	6ES7972-0BA12-0XA0 6ES7972-0BB12-0XA0
Accessories			
Reference identification label 10 sheets of 16 labels	6ES7193-6LF30-0AW0	with 90° cable outlet for FastConnect connection system, max. transfer rate 12 Mbps • without PG interface, 1 unit • without PG interface, 100 units • with PG interface, 1 unit • with PG interface, 100 units	6ES7972-0BA52-0XA0 6ES7972-0BA52-0XB0 6ES7972-0BB52-0XA0 6ES7972-0BB52-0XB0
Labeling strips 500 labeling strips on roll, light gray, for inscription with thermal transfer roll printer 500 labeling strips on roll, yellow, for inscription with thermal transfer roll printer 1000 labeling strips DIN A4, light gray, card, for inscription with laser printer 1000 labeling strips DIN A4, yellow, card, for inscription with laser printer	6ES7193-6LR10-0AA0 6ES7193-6LR10-0AG0 6ES7193-6LA10-0AA0 6ES7193-6LA10-0AG0	FastConnect bus cable Standard type with special design for quick mounting, 2-core, shielded, sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m	6XV1830-0EH10

I/O systems

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

I/O modules > Communication > CP 1542SP-1

Overview



The CP 1542SP-1 communications processor connects the ET 200SP Distributed Controller with Industrial Ethernet networks.

The module can also be used for integrating the ET 200SP Distributed Controller into an IPv6-based network. All functions are configured using STEP 7 Professional V14 (TIA Portal) or higher.

The CP 1542SP-1 supports the following communication services:

- PG/OP communication
- S7 communication
- Open communication (Open User Communication)
- IT communication
 - Sending emails via SMTP for authentication on an email server (also with IPv6)
 - SNMPv1 for transfer of network analysis information
- Integration of the ET 200SP Distributed Controller into IPv6-based networks

ISO	TCP/UDP	PN	MRP	IT	IP-R	PG/OP	S7
	●			●		●	●

G_K10_XX_50730

Technical specifications

Article number	6GK7542-6UX00-0XE0
Product type designation	CP 1542SP-1
Transmission rate	
Transfer rate	
• at the 1st interface	10 ... 100 Mbit/s
Interfaces	
Number of interfaces acc. to Industrial Ethernet	1
Number of electrical connections	
• at the 1st interface acc. to Industrial Ethernet	2
Type of electrical connection	
• at the 1st interface acc. to Industrial Ethernet	via ET200SP bus adaptor (RJ45, FC, LC, SCRJ), switch integrated
Supply voltage, current consumption, power loss	
Type of voltage of the supply voltage	DC
Supply voltage	24 V
Supply voltage	19.2 ... 28.8 V
Power loss [W]	2.64 W
Permitted ambient conditions	
Ambient temperature	
• for vertical installation during operation	0 ... 50 °C
• for horizontally arranged busbars during operation	0 ... 60 °C
• during storage	-40 ... +70 °C
• during transport	-40 ... +70 °C
Relative humidity at 25 °C without condensation during operation maximum	95 %
Protection class IP	IP20

Article number	6GK7542-6UX00-0XE0
Product type designation	CP 1542SP-1
Design, dimensions and weight	
Width	60 mm
Height	117 mm
Depth	74 mm
Net weight	0.18 kg
Mounting type	
• 35 mm DIN rail mounting	Yes
Product properties, functions, components general	
Number of units	
• per CPU maximum	2
• Note	2 CPs can be plugged in per CPU, simultaneous operation with BA Send and CM DP is possible
Performance data open communication	
Number of possible connections for open communication	
• by means of T blocks maximum	32
Amount of data	
• as user data per ISO on TCP connection for open communication by means of T blocks maximum	65 536 byte
Performance data S7 communication	
Number of possible connections for S7 communication	
• maximum	16
• with OP connections maximum	16

Technical specifications (continued)

Article number	6GK7542-6UX00-0XE0
Product type designation	CP 1542SP-1
Performance data multi-protocol mode	
Number of active connections with multi-protocol mode	32
Product function MIB support	Yes
Protocol is supported	
• SNMP v1	Yes
• SNMP v3	No
• DCP	Yes
• LLDP	Yes
Configuration software	
• required	STEP 7 Professional V14 (TIA Portal) or higher
Identification & maintenance function	
• I&MO - device-specific information	Yes
• I&M1 – higher-level designation/location designation	Yes
Product functions Diagnosis	
Product function Web-based diagnostics	Yes; yes, via ET 200SP CPU

Article number	6GK7542-6UX00-0XE0
Product type designation	CP 1542SP-1
Product functions Security	
Product function	
• Blocking of communication via physical ports	Yes
Product functions Time	
Product function SICLOCK support	Yes
Product function pass on time synchronization	No
Protocol is supported	
• NTP	Yes
• NTP (secure)	No
time synchronization	
• from NTP-server	Yes

Ordering data**Article No.**

CP 1542SP-1 communications processor	6GK7542-6UX00-0XE0
For connection of SIMATIC S7 ET 200SP to Industrial Ethernet, open IE communication (TCP/IP, ISO-ON-TCP, UDP), PG/OP, S7 routing, IP broadcast/multicast, SNMPv1, DHCP, email, IPv4/IPv6, time synchronization via NTP, access to web server of CPU, BusAdapter required	
Accessories	
SIMATIC BA 2xRJ45 BusAdapter	6ES7193-6AR00-0AA0
For PROFINET interface modules, Standard function class or above; max. cable length 50 m	
SIMATIC BA 2xFC BusAdapter	6ES7193-6AF00-0AA0
For PROFINET interface modules, Standard function class or above; for increased vibration and EMC loads; max. cable length 50 m	
SIMATIC BA 2xSCRJ BusAdapter	6ES7193-6AP00-0AA0
For PROFINET interface modules, 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)	

Article No.

SIMATIC BA SCRJ/RJ45 BusAdapter	6ES7193-6AP20-0AA0
For PROFINET interface modules, 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)	
SIMATIC BA SCRJ/FC BusAdapter	6ES7193-6AP40-0AA0
For PROFINET interface modules, 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)	
SIMATIC BA 2XLC BusAdapter	6ES7193-6AG00-0AA0
For PROFINET interface modules, High Feature function class or above; with LC fiber-optic connection; for increased vibration and EMC load capacity; max. cable length 2 km	
SIMATIC BA LC/RJ45 BusAdapter	6ES7193-6AG20-0AA0
For PROFINET interface modules, High Feature function class or above; with media converter FOC-Cu; for increased vibration and EMC loads; max. cable length 2 km (fiber-optic) or 50 m (copper)	
SIMATIC BA LC/FC BusAdapter	6ES7193-6AG40-0AA0
For PROFINET interface modules, High Feature function class or above; with media converter FOC-Cu; for increased vibration and EMC loads; max. cable length 2 km (fiber-optic) or 50 m (copper)	

I/O systems

SIMATIC ET 200 systems for the control cabinet

SIMATIC ET 200SP

I/O modules > Communication > CP 1542SP-1

Ordering data	Article No.		Article No.
IE FC RJ45 Plug 180 2 x 2 RJ45 plug connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; with 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface • 1 pack = 1 unit • 1 pack = 10 units • 1 pack = 50 units	6GK1901-1BB10-2AA0 6GK1901-1BB10-2AB0 6GK1901-1BB10-2AE0	IE FC Stripping Tool Preadjusted stripping tool for fast stripping of the Industrial Ethernet FC cables	6GK1901-1GA00
IE FC RJ45 Plug 4 x 2 RJ45 plug connector for Industrial Ethernet (10/100/1000 Mbps) with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface • 1 pack = 1 unit • 1 pack = 10 units • 1 pack = 50 units	6GK1901-1BB11-2AA0 6GK1901-1BB11-2AB0 6GK1901-1BB11-2AE0	Labeling strips 500 labeling strips on roll, light gray, for labeling with thermal transfer roll printer 500 labeling strips on roll, yellow, for labeling with thermal transfer roll printer 1000 labeling strips DIN A4, light gray, card, perforated, for labeling with laser printer 1000 labeling strips DIN A4, yellow, card, perforated, for labeling with laser printer	6ES7193-6LR10-0AA0 6ES7193-6LR10-0AG0 6ES7193-6LA10-0AA0 6ES7193-6LA10-0AG0
IE FC TP Standard Cable GP 2 x 2 (Type A) 4-core, shielded TP installation cable for connection to IE FC outlet RJ45/IE FC RJ45 plug; PROFINET-compatible; with UL approval; sold by the meter; max. length 1000 m, minimum order quantity 20 m	6XV1840-2AH10	Equipment labeling plate 10 sheets of 16 labels, for printing with thermal transfer card printer or plotter	6ES7193-6LF30-0AW0
IE FC TP Standard Cable GP 4 x 2 8-core, shielded TP installation cable for connection to IE FC RJ45 Modular Outlet for universal applications; with UL approval; sold by the meter; max. quantity 1000 m, minimum order 20 m • AWG22, for connection to IE FC RJ45 Modular Outlet • AWG24, for connection to IE FC RJ45 Plug 4 x 2	6XV1870-2E 6XV1878-2A	Spare parts Server module Terminates an ET 200SP station; included in the scope of delivery of the interface modules PE connection element for DIN rail 2000 mm 20 units Power supply connector Spare part; for connecting the 24 V DC supply voltage; with push-in terminals	6ES7193-6PA00-0AA0 6ES7590-5AA00-0AA0 6ES7193-4JB00-0AA0

Note:

You can find order information for software for communication with PC systems in Catalog IK PI or in the Industry Mall.

Overview



ISO	TCP/ UDP	PN	MRP	IT	IP-R	PG/OP	S7
	●			●		●	●

G_K10_XX_50730

The CP 1543SP-1 communications processor connects the ET 200SP Distributed Controller with Industrial Ethernet networks. By combining a variety of security features such as an SPI (Stateful Packet Inspection) firewall, VPN and data

encryption protocols (e.g. SNMPv3), the communications processor protects individual ET 200SP Distributed Controllers or even entire automation cells against unauthorized access.

The module can also be used for integrating the ET 200SP Distributed Controller into an IPv6-based network. All functions can be configured with STEP 7 Professional V14 (TIA Portal) and higher.

The CP 1543SP-1 supports the following communication services:

- PG/OP communication
- S7 communication
- Open communication (Open User Communication)
- IT communication
 - Sending emails via SMTP or ESMTP with "SMTP-Auth" for authentication on an email server (also with IPv6)
- Security functions
 - Stateful Packet Inspection (layer 3 and 4 firewall)
 - Secure communication via VPN (IPsec)
 - Secure access to the web server of the CPU via the HTTPS protocol
 - Secure transfer of the time of day (NTP)
 - SNMPv3 for tap-proof transfer of network analysis information
- Integration of the ET 200SP Distributed Controller into IPv6-based networks

Technical specifications

Article number	6GK7543-6WX00-0XE0
Product type designation	CP 1543SP-1
Transmission rate	
Transfer rate	
• at the 1st interface	10 ... 100 Mbit/s
Interfaces	
Number of interfaces acc. to Industrial Ethernet	1
Number of electrical connections	
• at the 1st interface acc. to Industrial Ethernet	2
Type of electrical connection	
• at the 1st interface acc. to Industrial Ethernet	via ET200SP bus adaptor (RJ45, FC, LC, SCRJ), switch integrated
Supply voltage, current consumption, power loss	
Type of voltage of the supply voltage	DC
Supply voltage	24 V
Supply voltage	19.2 ... 28.8 V
Power loss [W]	2.64 W
Permitted ambient conditions	
Ambient temperature	
• for vertical installation during operation	0 ... 50 °C
• for horizontally arranged busbars during operation	0 ... 60 °C
• during storage	-40 ... +70 °C
• during transport	-40 ... +70 °C
Relative humidity at 25 °C without condensation during operation maximum	95 %
Protection class IP	IP20

Article number	6GK7543-6WX00-0XE0
Product type designation	CP 1543SP-1
Design, dimensions and weight	
Width	60 mm
Height	117 mm
Depth	74 mm
Net weight	0.18 kg
Mounting type	
• 35 mm DIN rail mounting	Yes
Product properties, functions, components general	
Number of units	
• per CPU maximum	2
• Note	2 CPs can be plugged in per CPU, simultaneous operation with BA Send and CM DP is possible
Performance data open communication	
Number of possible connections for open communication	
• by means of T blocks maximum	32
Amount of data	
• as user data per ISO on TCP connection for open communication by means of T blocks maximum	65 536 byte
Performance data S7 communication	
Number of possible connections for S7 communication	
• maximum	16
• with OP connections maximum	16

I/O systems

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

I/O modules > Communication > CP 1543SP-1

Technical specifications (continued)

Article number	6GK7543-6WX00-0XE0
Product type designation	CP 1543SP-1
Performance data multi-protocol mode	
Number of active connections with multi-protocol mode	32
Product function MIB support	Yes
Protocol is supported	
• SNMP v1	Yes
• SNMP v3	Yes
• DCP	Yes
• LLDP	Yes
Configuration software	
• required	STEP 7 Professional V14 (TIA Portal) or higher
Identification & maintenance function	
• I&MO - device-specific information	Yes
• I&M1 – higher-level designation/ location designation	Yes
Product functions Diagnosis	
Product function Web-based diagnostics	Yes; yes, via ET 200SP CPU

Article number	6GK7543-6WX00-0XE0
Product type designation	CP 1543SP-1
Product functions Security	
Firewall version	stateful inspection
Product function with VPN connection	IPSec
Type of encryption algorithms with VPN connection	AES-256, AES-192, AES-128, 3DES-168, DES-56
Type of authentication procedure with VPN connection	Preshared key (PSK), X.509v3 certificates
Type of hashing algorithms with VPN connection	MD5, SHA-1
Number of possible connections with VPN connection	4
Product function	
• switch-off of non-required services	Yes
• Blocking of communication via physical ports	Yes
• log file for unauthorized access	Yes
Product functions Time	
Product function SICLOCK support	Yes
Product function pass on time synchronization	No
Protocol is supported	
• NTP	Yes
• NTP (secure)	Yes
time synchronization	
• from NTP-server	Yes

Ordering data

Article No.

CP 1543SP-1 communications processor

CP 1543SP-1 communications processor for connecting SIMATIC S7-ET 200SP to Industrial Ethernet, Security (firewall and VPN), open IE communication (TCP/IP, ISO-on-TCP, UDP) PG/OP, S7 routing, IP broadcast/multicast, SNMPv1/V3, DHCP, secure email, IPv4/IPv6, time synchronization via NTP, access to web server of CPU, BusAdapter required

6GK7543-6WX00-0XE0

Accessories

SIMATIC BA 2xRJ45 BusAdapter

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

6ES7193-6AR00-0AA0

SIMATIC BA 2xFC BusAdapter

For PROFINET interface modules, 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, 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

Article No.

SIMATIC BA SCRJ/RJ45 BusAdapter

For PROFINET interface modules, 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)

6ES7193-6AP20-0AA0

SIMATIC BA SCRJ/FC BusAdapter

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

6ES7193-6AG00-0AA0

SIMATIC BA LC/RJ45 BusAdapter

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

6ES7193-6AG20-0AA0

Ordering data	Article No.		Article No.
SIMATIC BA LC/FC BusAdapter For PROFINET interface modules, High Feature function class or above; with media converter FOC-Cu; for increased vibration and EMC loads; max. cable length 2 km (fiber-optic) or 50 m (copper)	6ES7193-6AG40-0AA0		
IE FC RJ45 Plug 180 2 x 2 RJ45 plug connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; with 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface • 1 pack = 1 unit • 1 pack = 10 units • 1 pack = 50 units	6GK1901-1BB10-2AA0 6GK1901-1BB10-2AB0 6GK1901-1BB10-2AE0	IE FC TP Standard Cable GP 4 x 2 8-core, shielded TP installation cable for connection to IE FC RJ45 Modular outlet for universal applications; with UL approval; sold by the meter; max. quantity 1000 m, minimum order quantity 20 m • AWG22, for connection to IE FC RJ45 Modular Outlet • AWG24, for connection to IE FC RJ45 Plug 4 x 2	6XV1870-2E 6XV1878-2A
IE FC RJ45 Plug 4 x 2 RJ45 plug connector for Industrial Ethernet (10/100/1000 Mbps) with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface • 1 pack = 1 unit • 1 pack = 10 units • 1 pack = 50 units	6GK1901-1BB11-2AA0 6GK1901-1BB11-2AB0 6GK1901-1BB11-2AE0	IE FC Stripping Tool Preadjusted stripping tool for fast stripping of the Industrial Ethernet FC cables	6GK1901-1GA00
		Labeling strips 500 labeling strips on roll, light gray, for labeling with thermal transfer roll printer 500 labeling strips on roll, yellow, for labeling with thermal transfer roll printer 1000 labeling strips DIN A4, light gray, card, perforated, for labeling with laser printer 1000 labeling strips DIN A4, yellow, card, perforated, for labeling with laser printer	6ES7193-6LR10-0AA0 6ES7193-6LR10-0AG0 6ES7193-6LA10-0AA0 6ES7193-6LA10-0AG0
		Equipment labeling plate 10 sheets of 16 labels, for printing with thermal transfer card printer or plotter	6ES7193-6LF30-0AW0
		Spare parts	
IE FC TP Standard Cable GP 2 x 2 (Type A) 4-core, shielded TP installation cable for connection to IE FC outlet RJ45/IE FC RJ45 plug; PROFINET-compatible; with UL approval; sold by the meter; max. length 1000 m, minimum order quantity 20 m	6XV1840-2AH10	Server module Terminates an ET 200SP station; included in the scope of delivery of the interface modules	6ES7193-6PA00-0AA0
		PE connection element for DIN rail 2000 mm 20 units	6ES7590-5AA00-0AA0
		Power supply connector Spare part; for connecting the 24 V DC supply voltage; with push-in terminals	6ES7193-4JB00-0AA0

Note:

You can find order information for software for communication with PC systems in Catalog IK PI or in the Industry Mall.

I/O systems

SIMATIC ET 200 systems for the control cabinet

SIMATIC ET 200SP

I/O modules > Communication > CP 1542SP-1 IRC

Overview



ISO	TCP/ UDP	PN	MRP	IT	IP-R	PG/OP	S7
	●			●		●	●

The CP 1542SP-1 IRC communications processor connects the ET 200SP Distributed Controller with Industrial Ethernet networks. In addition, control centers can be connected using various telecontrol protocols.

The CP is characterized by the following:

- Ethernet-based connection to TeleControl Server Basic, e.g. via Internet
- Ethernet-based connection to the control center via IEC 60870-5-104 or DNP3 protocol
- Data transfer of measured values, control variable values or alarms optimized for telecontrol systems
- Automatic sending of alert emails
- Data buffering of up to 100,000 values ensures a secure database, even with temporary connection failures
- Clearly laid out LED signaling for fast and easy diagnostics
- Fast commissioning thanks to easy configuration using STEP 7

The module can also be used for integrating the ET 200SP Distributed Controller into an IPv6-based network. All functions are configured using STEP 7 Professional V14 (TIA Portal) or higher.

The CP 1542SP-1 IRC supports the following communication services:

- Supports multiple telecontrol protocols such as DNP3, IEC 60870-5-104 and TeleControl Basic
- PG/OP communication
- S7 communication
- Open communication (Open User Communication)
- IT communication
 - Sending emails via SMTP or SMTPS with "SMTP-Auth" for authentication on an email server (also with IPv6)
 - Email transfer with addressing by program block
 - Email transfer via "Notifications" (alerts)

Technical specifications

Article number	6GK7542-6VX00-0XE0
Product type designation	CP 1542SP-1 IRC
Transmission rate	
Transfer rate	
• at the 1st interface	10 ... 100 Mbit/s
Interfaces	
Number of interfaces acc. to Industrial Ethernet	1
Number of electrical connections	
• at the 1st interface acc. to Industrial Ethernet	2
Type of electrical connection	
• at the 1st interface acc. to Industrial Ethernet	via ET200SP bus adaptor (RJ45, FC, LC, SCRJ), switch integrated
Supply voltage, current consumption, power loss	
Type of voltage of the supply voltage	DC
Supply voltage	24 V
Supply voltage	19.2 ... 28.8 V
Power loss [W]	2.64 W
Permitted ambient conditions	
Ambient temperature	
• for vertical installation during operation	0 ... 50 °C
• for horizontally arranged busbars during operation	0 ... 60 °C
• during storage	-40 ... +70 °C
• during transport	-40 ... +70 °C
Relative humidity at 25 °C without condensation during operation maximum	95 %
Protection class IP	IP20
Design, dimensions and weight	
Width	60 mm
Height	117 mm
Depth	74 mm
Net weight	0.18 kg
Mounting type	
• 35 mm DIN rail mounting	Yes
Product properties, functions, components general	
Number of units	
• per CPU maximum	2
• Note	2 CPs can be plugged in per CPU, simultaneous operation with BA Send and CM DP is possible
Performance data open communication	
Number of possible connections for open communication	
• by means of T blocks maximum	32
Amount of data	
• as user data per ISO on TCP connection for open communication by means of T blocks maximum	65 536 byte
Performance data S7 communication	
Number of possible connections for S7 communication	
• maximum	16
• with OP connections maximum	16

Article number	6GK7542-6VX00-0XE0
Product type designation	CP 1542SP-1 IRC
Performance data multi-protocol mode	
Number of active connections with multi-protocol mode	32
Performance data telecontrol	
Suitability for use	
• Node station	No
• substation	Yes
• TIM control center	No
Control center connection	IEC 60870-5, DNP3, (Modbus TCP using software components of the CPU) capable control stations and connection to Telecontrol Server Basic
• by means of a permanent connection	supported
• by means of demand-oriented connection	supported
• Note	Connection to SCADA system using IEC 60870-5 104, DNP3 and Telecontrol Server Basic
Protocol is supported	
• TCP/IP	Yes
• DNP3	Yes
• IEC 60870-5	Yes
Product function data buffering if connection is aborted	Yes
Number of data points per station maximum	500
Product function MIB support	Yes
Protocol is supported	
• SNMP v1	Yes
• SNMP v3	No
• DCP	Yes
• LLDP	Yes
Configuration software	
• required	STEP 7 Professional V14 (TIA Portal) or higher
Identification & maintenance function	
• I&M0 - device-specific information	Yes
• I&M1 - higher-level designation/location designation	Yes
Product functions Diagnosis	
Product function Web-based diagnostics	Yes; yes, via ET 200SP CPU
Product functions Security	
Product function	
• Blocking of communication via physical ports	Yes
Product functions Time	
Product function SICLOCK support	Yes
Product function pass on time synchronization	Yes
Protocol is supported	
• NTP	Yes
• NTP (secure)	No
time synchronization	
• from NTP-server	Yes
• from control center	Yes

I/O systems

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

I/O modules > Communication > CP 1542SP-1 IRC

Ordering data	Article No.	Article No.	
CP 1542SP-1 IRC communications processor CP 1542SP-1 IRC communications processor for connection of SIMATIC S7 ET 200SP to Industrial Ethernet, TeleControl Server Basic, IEC 60870-5-104 or DNP3 protocol to a control center; open IE communication (TCP/IP, ISO-on-TCP, UDP), IP broadcast/multicast, SNMPv1, DHCP, secure email, IPv4/IPv6, time synchronization via NTP, access to web server of CPU, BusAdapter required	6GK7542-6VX00-0XE0	SIMATIC BA LC/FC BusAdapter For PROFINET interface modules, High Feature function class or above; with media converter FOC-Cu; for increased vibration and EMC loads; max. cable length 2 km (fiber-optic) or 50 m (copper)	6ES7193-6AG40-0AA0
Accessories		IE FC RJ45 Plug 180 2 x 2 RJ45 plug connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; with 180° cable outlet; for network components and CPs/CPU with Industrial Ethernet interface	
SIMATIC BA 2xRJ45 BusAdapter For PROFINET interface modules, Standard function class or above; max. cable length 50 m	6ES7193-6AR00-0AA0	• 1 pack = 1 unit • 1 pack = 10 units • 1 pack = 50 units	6GK1901-1BB10-2AA0 6GK1901-1BB10-2AB0 6GK1901-1BB10-2AE0
SIMATIC BA 2xFC BusAdapter For PROFINET interface modules, Standard function class or above; for increased vibration and EMC loads; max. cable length 50 m	6ES7193-6AF00-0AA0	IE FC RJ45 Plug 4 x 2 RJ45 plug connector for Industrial Ethernet (10/100/1000 Mbps) with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; 180° cable outlet; for network components and CPs/CPU with Industrial Ethernet interface	
SIMATIC BA 2xSCRJ BusAdapter For PROFINET interface modules, 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	• 1 pack = 1 unit • 1 pack = 10 units • 1 pack = 50 units	6GK1901-1BB11-2AA0 6GK1901-1BB11-2AB0 6GK1901-1BB11-2AE0
SIMATIC BA SCRJ/RJ45 BusAdapter For PROFINET interface modules, 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)	6ES7193-6AP20-0AA0	IE FC TP Standard Cable GP 2 x 2 (Type A) 4-core, shielded TP installation cable for connection to IE FC outlet RJ45/IE FC RJ45 plug; PROFINET-compatible; with UL approval; sold by the meter; max. length 1000 m, minimum order quantity 20 m	6XV1840-2AH10
SIMATIC BA SCRJ/FC BusAdapter for PROFINET interface modules, 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	IE FC TP Standard Cable GP 4 x 2 8-core, shielded TP installation cable for connection to IE FC RJ45 Modular Outlet for universal applications; with UL approval; sold by the meter; max. quantity 1000 m, minimum order quantity 20 m	
SIMATIC BA 2XLC BusAdapter For PROFINET interface modules, High Feature function class or above; with LC fiber-optic connection; for increased vibration and EMC load capacity; max. cable length 2 km	6ES7193-6AG00-0AA0	• AWG22, for connection to IE FC RJ45 Modular Outlet • AWG24, for connection to IE FC RJ45 Plug 4 x 2	6XV1870-2E 6XV1878-2A
SIMATIC BA LC/RJ45 BusAdapter For PROFINET interface modules, High Feature function class or above; with media converter FOC-Cu; for increased vibration and EMC loads; max. cable length 2 km (fiber-optic) or 50 m (copper)	6ES7193-6AG20-0AA0		

Ordering data	Article No.		Article No.
IE FC Stripping Tool Preadjusted stripping tool for fast stripping of the Industrial Ethernet FC cables	6GK1901-1GA00	TeleControl Server Basic V3.0 Software for 8 to 5000 stations; single license for one installation; OPC (UA) server for GPRS and Ethernet/Internet communication with SIMATIC S7-1200 and SIMATIC S7-200 (GPRS only); connection management to remote stations; routing for connections between S7 stations; German and English operator interface; for Windows 7 Professional 32/64-bit + Service Pack 1 Windows 7 Enterprise 32/64-bit + Service Pack 1 Windows 7 Ultimate 32/64-bit + Service Pack 1 Windows Server 2008 32-bit + Service Pack 2 MS Windows Server 2008 R2 Standard 64-bit + Service Pack 1	
Labeling strips 500 labeling strips on roll, light gray, for labeling with thermal transfer roll printer	6ES7193-6LR10-0AA0	• TeleControl Server Basic 8 V3 Connection management for 8 SIMATIC S7-1200 or S7-200 stations	6NH9910-0AA21-0AA0
500 labeling strips on roll, yellow, for labeling with thermal transfer roll printer	6ES7193-6LR10-0AG0	• TeleControl Server Basic 32 V3 Connection management for 32 SIMATIC S7-1200 or S7-200 stations	6NH9910-0AA21-0AF0
1000 labeling strips DIN A4, light gray, card, perforated, for labeling with laser printer	6ES7193-6LA10-0AA0	• TeleControl Server Basic 64 V3 Connection management for 64 SIMATIC S7-1200 or S7-200 stations	6NH9910-0AA21-0AB0
1000 labeling strips DIN A4, yellow, card, perforated, for labeling with laser printer	6ES7193-6LA10-0AG0	• TeleControl Server Basic 256 V3 Connection management for 256 SIMATIC S7-1200 or S7-200 stations	6NH9910-0AA21-0AC0
Equipment labeling plate 10 sheets of 16 labels, for printing with thermal transfer card printer or plotter	6ES7193-6LF30-0AW0	• TeleControl Server Basic 1000 V3 Connection management for 1000 SIMATIC S7-1200 or S7-200 stations	6NH9910-0AA21-0AD0
Spare parts		• TeleControl Server Basic 5000 V3 Connection management for 5000 SIMATIC S7-1200 or S7-200 stations	6NH9910-0AA21-0AE0
Server module Terminates an ET 200SP station; included in the scope of delivery of the interface modules	6ES7193-6PA00-0AA0	• TeleControl Server Basic UPGR V3 Upgrade package from Version V2.x to V3 for all license sizes	6NH9910-0AA21-0GA0
PE connection element for DIN rail 2000 mm 20 units	6ES7590-5AA00-0AA0		
Power supply connector Spare part; for connecting the 24 V DC supply voltage; with push-in terminals	6ES7193-4JB00-0AA0		

Note:

You can find order information for software for communication with PC systems in Catalog IK PI or in the Industry Mall.

I/O systems

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

I/O modules > Communication > SCALANCE W761 RJ45 for the control cabinet

Overview



- Low-cost Access Point, suitable for applications where the device is to be mounted in the control cabinet

Technical specifications

Article number	6GK5761-1FC00-0AA0 6GK5761-1FC00-0AB0 ¹⁾
Product type designation	SCALANCE W761-1 RJ45
Transmission rate	
• Transfer rate with WLAN maximum	150 Mbit/s
• Transfer rate for Industrial Ethernet	10 Mbit/s, 100 Mbit/s, 10 Mbit/s, 100 Mbit/s
Interfaces	
Number of electrical connections	
• for network components or terminal equipment	1
• for power supply	1
• for redundant voltage supply	0
Type of electrical connection	
• for network components or terminal equipment	RJ45 socket
• for power supply	3-pole screw terminal
design of the removable storage	
• C-PLUG	No
• KEY-PLUG	No
Interfaces wireless	
Number of radio cards permanently installed	1
Number of electrical connections for external antenna(s)	1
Type of electrical connection for external antenna(s)	R-SMA (socket)
Product feature external antenna can be mounted directly on device	Yes
Supply voltage, current consumption, power loss	
Type of voltage of the supply voltage	DC
Supply voltage 1	
• from terminal block	19.2 V
Supply voltage 2	
• from terminal block	28.8 V
Consumed current	
• at DC at 24 V typical	0.15 A
Power loss [W]	
• at DC at 24 V typical	3.6 W

Article number	6GK5761-1FC00-0AA0 6GK5761-1FC00-0AB0 ¹⁾
Product type designation	SCALANCE W761-1 RJ45
Permitted ambient conditions	
Ambient temperature	
• during operation	0 ... 55 °C
• during storage	-40 ... +85 °C
• during transport	-40 ... +85 °C
Relative humidity at 25 °C without condensation during operation maximum	95 %
Ambient condition for operation	When used under hazardous conditions (Zone 2), the SCALANCE W761-1 RJ45 or W72x-1 RJ45 product must be installed in an enclosure. To comply with EN 50021, this enclosure must meet the requirements of at least IP 54 in compliance with EN 60529.
Protection class IP	IP20
Design, dimensions and weight	
Width	50 mm
Height	114 mm
Depth	74 mm
Width of the enclosure without antenna	50 mm
Height of the enclosure without antenna	114 mm
Depth of the enclosure without antenna	74 mm
Net weight	0.13 kg
Mounting type	
• S7-300 rail mounting	No
• S7-1500 rail mounting	No
• 35 mm DIN rail mounting	Yes
• wall mounting	No

¹⁾ Wireless approval in the USA

Technical specifications (continued)

Article number	6GK5761-1FC00-0AA0 6GK5761-1FC00-0AB0 ¹⁾
Product type designation	SCALANCE W761-1 RJ45
Wireless frequencies	
Operating frequency	
• for WLAN in 2.4 GHz frequency band	2.41 ... 2.48 GHz
• for WLAN in 5 GHz frequency band	4.9 ... 5.8 GHz
Product properties, functions, components general	
Product function Access Point Mode	Yes
Product function Client Mode	Yes
Number of SSIDs	1
Product function	
• iPCF Access Point	No
• iPCF client	No
• iPCF-MC Access Point	No
• iPCF-MC client	No
Product functions management, configuration	
Number of manageable IP addresses in client	4
Product function	
• CLI	Yes
• web-based management	Yes
• MIB support	Yes
• TRAPs via email	Yes
• Configuration with STEP 7	Yes
• configuration with STEP 7 in the TIA Portal	Yes
• operation with IWLAN controller	No
• operation with Enterasys WLAN controller	No
• forced roaming on IP down with IWLAN	Yes
• forced roaming on link down with IWLAN	Yes
• WDS	Yes
Protocol is supported	
• Address Resolution Protocol (ARP)	Yes
• ICMP	Yes
• Telnet	Yes
• HTTP	Yes
• HTTPS	Yes
• TFTP	Yes
• DCP	Yes
• LLDP	Yes
Identification & maintenance function	
• I&MO - device-specific information	Yes
• I&M1 – higher-level designation/ location designation	Yes

Article number	6GK5761-1FC00-0AA0 6GK5761-1FC00-0AB0 ¹⁾
Product type designation	SCALANCE W761-1 RJ45
Product functions Diagnosis	
Product function	
• PROFINET IO diagnosis	No
• Link Check	No
• connection monitoring IP-Alive	No
• localization via Aeroscout	No
• SysLog	Yes
Protocol is supported	
• SNMP v1	Yes
• SNMP v2	Yes
• SNMP v3	Yes
Product functions VLAN	
Product function	
• function VLAN with IWLAN	Yes
Product functions DHCP	
Product function	
• DHCP client	Yes
• in Client Mode DHCP server via LAN	Yes
• DHCP Option 82	Yes
Product functions Redundancy	
Protocol is supported	
• STP/RSTP	Yes
• MSTP	Yes
• RSTP	Yes
Product functions Security	
Product function	
• ACL - MAC-based	Yes
• Management security, ACL-IP based	Yes
• IEEE 802.1x (radius)	Yes
• NAT/NAPT	No
• access protection according to IEEE802.11i	Yes
• WPA/WPA2	Yes
• TKIP/AES	Yes
Protocol is supported	
• SSH	Yes
• RADIUS	Yes
Product functions Time	
Protocol is supported	
• NTP	Yes
• SNTP	Yes
• SIMATIC Time	Yes

¹⁾ Wireless approval in the USA

I/O systems

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

I/O modules > Communication > SCALANCE W761 RJ45 for the control cabinet

Technical specifications (continued)

Article number	6GK5761-1FC00-0AA0 6GK5761-1FC00-0AB0 ¹⁾
Product type designation	SCALANCE W761-1 RJ45
Standards, specifications, approvals	
Standard	
• for FM	FM 3611: Class I, Division 2, Groups A,B,C,D, T4 / Class 1, Zone 2, Group IIC, T4
• for hazardous zone	EN 60079-15:2005, EN 60079-0:2006, II 3 G Ex nA II T4 KEMA 07 ATEX 0145X
• for safety from CSA and UL	UL 60950-1 CSA C22.2 No. 60950-1
Certificate of suitability	
• EC declaration of conformity	Yes
• CE marking	Yes
• C-Tick	Yes
• CCC	No
• E1 approval	No
• Railway application in accordance with EN 50155	No
• NEMA TS2	No
• IEC 61375	No
• IEC 61850-3	No
• NEMA4X	No
• Power-over-Ethernet according IEEE802.3at for type 1 and IEEE802.3af	No
• Power-over-Ethernet according to IEEE802.3at for type 2	No

Article number	6GK5761-1FC00-0AA0 6GK5761-1FC00-0AB0 ¹⁾
Product type designation	SCALANCE W761-1 RJ45
Standard for wireless communication	
• IEEE 802.11a	Yes
• IEEE 802.11b	Yes
• IEEE 802.11e	Yes
• IEEE 802.11g	Yes
• IEEE 802.11h	Yes
• IEEE 802.11i	Yes
• IEEE 802.11n	Yes
Wireless approval	You will find the current list of countries at: www.siemens.com/wireless-approvals
Marine classification association	
• American Bureau of Shipping Europe Ltd. (ABS)	No
• Bureau Veritas (BV)	No
• DNV GL	No
• Lloyds Register of Shipping (LRS)	No
• Nippon Kaiji Kyokai (NK)	No
• Polski Rejestr Statkow (PRS)	No
• Royal Institution of Naval Architects (RINA)	No
Accessories	
accessories	24 V DC screw terminal included in scope of delivery

¹⁾ Wireless approval in the USA

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Ordering data

Article No.

SCALANCE W761 Access Points

IWLAN Access Point with built-in wireless interface; wireless networks IEEE 802.11a/b/g/n at 2.4/5 GHz up to 150 Mbps; WPA2/AES; IP20 degree of protection (0 °C to +55 °C); scope of delivery: Mounting hardware, 3-pin screw terminal for 24 V DC; manual on CD-ROM; German/English

SCALANCE W761-1 RJ45

IWLAN Access Point with one built-in wireless interface

- National approvals for operation outside the USA
- National approvals for operation within the USA ²⁾

6GK5761-1FC00-0AA0

6GK5761-1FC00-0AB0

Article No.

Accessories

IE FC RJ45 Plug 180 2 x 2

RJ45 plug connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; with a 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface

- 1 pack = 1 unit
- 1 pack = 10 units
- 1 pack = 50 units

6GK1901-1BB10-2AA0

6GK1901-1BB10-2AB0

6GK1901-1BB10-2AE0

IE FC Standard Cable GP 2 x 2

4-core, shielded TP installation cable for connection to IE FC outlet RJ45 plug / IE FC RJ45 plug; PROFINET-compliant; with UL approval; sold by the meter; max. quantity 1000 m, minimum order quantity 20 m

6XV1840-2AH10

IE FC Stripping Tool

Preadjusted stripping tool for fast stripping of the Industrial Ethernet FC cables

6GK1901-1GA00

Antennas and miscellaneous IWLAN accessories

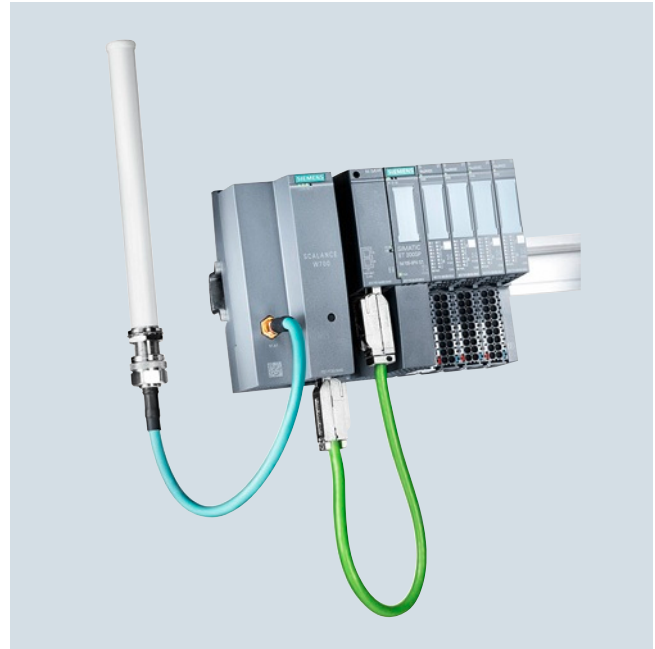
See Catalog IK PI or Industry Mall

²⁾ Please note national approvals under <http://www.siemens.com/wireless-approvals>

Overview



- Low-cost Client Module, suitable for applications where the device is to be mounted in the control cabinet
- Equipped with iFeatures



ET 200SP station with SCALANCE W722 RJ45

Technical specifications

Article number	6GK5722-1FC00-0AA0 6GK5722-1FC00-0AB0 ¹⁾
Product type designation	SCALANCE W722-1 RJ45
Transmission rate	
• Transfer rate with WLAN maximum	150 Mbit/s
• Transfer rate for Industrial Ethernet	10 Mbit/s, 100 Mbit/s, 10 Mbit/s, 100 Mbit/s
Interfaces	
Number of electrical connections	
• for network components or terminal equipment	1
• for power supply	1
• for redundant voltage supply	0
Type of electrical connection	
• for network components or terminal equipment	RJ45 socket
• for power supply	3-pole screw terminal
design of the removable storage	
• C-PLUG	No
• KEY-PLUG	No
Interfaces wireless	
Number of radio cards permanently installed	1
Number of electrical connections for external antenna(s)	1
Type of electrical connection for external antenna(s)	R-SMA (socket)
Product feature external antenna can be mounted directly on device	Yes

Article number	6GK5722-1FC00-0AA0 6GK5722-1FC00-0AB0 ¹⁾
Product type designation	SCALANCE W722-1 RJ45
Supply voltage, current consumption, power loss	
Type of voltage of the supply voltage	DC
Supply voltage 1	
• from terminal block	19.2 V
Supply voltage 2	
• from terminal block	28.8 V
Consumed current	
• at DC at 24 V typical	0.15 A
Power loss [W]	
• at DC at 24 V typical	3.6 W
Permitted ambient conditions	
Ambient temperature	
• during operation	0 ... 55 °C
• during storage	-40 ... +85 °C
• during transport	-40 ... +85 °C
Relative humidity at 25 °C without condensation during operation maximum	95 %
Ambient condition for operation	When used under hazardous conditions (Zone 2), the SCALANCE W761-1 RJ45 or W72x-1 RJ45 product must be installed in an enclosure. To comply with EN 50021, this enclosure must meet the requirements of at least IP 54 in compliance with EN 60529.
Protection class IP	IP20

¹⁾ Wireless approval in the USA

I/O systems

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

I/O modules > Communication > SCALANCE W722 RJ45 for the control cabinet

Technical specifications (continued)

Article number	6GK5722-1FC00-0AA0 6GK5722-1FC00-0AB0 ¹⁾
Product type designation	SCALANCE W722-1 RJ45
Design, dimensions and weight	
Width	50 mm
Height	114 mm
Depth	74 mm
Width of the enclosure without antenna	50 mm
Height of the enclosure without antenna	114 mm
Depth of the enclosure without antenna	74 mm
Net weight	0.13 kg
Mounting type	
• S7-300 rail mounting	No
• S7-1500 rail mounting	No
• 35 mm DIN rail mounting	Yes
• wall mounting	No
Wireless frequencies	
Operating frequency	
• for WLAN in 2.4 GHz frequency band	2.41 ... 2.48 GHz
• for WLAN in 5 GHz frequency band	4.9 ... 5.8 GHz
Product properties, functions, components general	
Product function Access Point Mode	No
Product function Client Mode	Yes
Product function	
• iPCF client	Yes
• iPCF-MC Access Point	No
• iPCF-MC client	Yes
Number of iPCF-capable radio modules	1
Product functions management, configuration	
Number of manageable IP addresses in client	4
Product function	
• CLI	Yes
• web-based management	Yes
• MIB support	Yes
• TRAPs via email	Yes
• Configuration with STEP 7	Yes
• configuration with STEP 7 in the TIA Portal	Yes
• WDS	No
Protocol is supported	
• Address Resolution Protocol (ARP)	Yes
• ICMP	Yes
• Telnet	Yes
• HTTP	Yes
• HTTPS	Yes
• TFTP	Yes
• DCP	Yes
• LLDP	No
Identification & maintenance function	
• I&MO - device-specific information	Yes
• I&M1 – higher-level designation/location designation	Yes

Article number	6GK5722-1FC00-0AA0 6GK5722-1FC00-0AB0 ¹⁾
Product type designation	SCALANCE W722-1 RJ45
Product functions Diagnosis	
Product function	
• PROFINET IO diagnosis	Yes
• Link Check	No
• connection monitoring IP-Alive	No
• SysLog	Yes
Protocol is supported	
• SNMP v1	Yes
• SNMP v2	Yes
• SNMP v3	Yes
Product functions VLAN	
Product function	
• function VLAN with IWLAN	No
Product functions DHCP	
Product function	
• DHCP client	Yes
• in Client Mode DHCP server via LAN	Yes
• DHCP Option 82	Yes
Product functions Redundancy	
Protocol is supported	
• STP/RSTP	Yes
• MSTP	Yes
• RSTP	Yes
Product functions Security	
Product function	
• ACL - MAC-based	Yes
• Management security, ACL-IP based	Yes
• IEEE 802.1x (radius)	Yes
• NAT/NAPT	Yes
• access protection according to IEEE802.11i	Yes
• WPA/WPA2	Yes
• TKIP/AES	Yes
Protocol is supported	
• SSH	Yes
• RADIUS	Yes
Product functions Time	
Protocol is supported	
• NTP	Yes
• SNTP	Yes
• SIMATIC Time	Yes

¹⁾ Wireless approval in the USA

Technical specifications (continued)

Article number	6GK5722-1FC00-0AA0 6GK5722-1FC00-0AB0 ¹⁾
Product type designation	SCALANCE W722-1 RJ45
Standards, specifications, approvals	
Standard	
• for FM	FM 3611: Class I, Division 2, Groups A,B,C,D, T4 / Class 1, Zone 2, Group IIC, T4
• for hazardous zone	EN 60079-15:2005, EN 60079-0:2006, II 3 G Ex nA II T4 KEMA 07 ATEX 0145X
• for safety from CSA and UL	UL 60950-1 CSA C22.2 No. 60950-1
Certificate of suitability	
• EC declaration of conformity	Yes
• CE marking	Yes
• C-Tick	Yes
• CCC	No
• E1 approval	No
• Railway application in accordance with EN 50155	No
• NEMA TS2	No
• IEC 61375	No
• IEC 61850-3	No
• NEMA4X	No
• Power-over-Ethernet according IEEE802.3at for type 1 and IEEE802.3af	No
• Power-over-Ethernet according to IEEE802.3at for type 2	No

Article number	6GK5722-1FC00-0AA0 6GK5722-1FC00-0AB0 ¹⁾
Product type designation	SCALANCE W722-1 RJ45
Standard for wireless communication	
• IEEE 802.11a	Yes
• IEEE 802.11b	Yes
• IEEE 802.11e	Yes
• IEEE 802.11g	Yes
• IEEE 802.11h	Yes
• IEEE 802.11i	Yes
• IEEE 802.11n	Yes
Wireless approval	You will find the current list of countries at: www.siemens.com/wireless-approvals
Marine classification association	
• American Bureau of Shipping Europe Ltd. (ABS)	No
• Bureau Veritas (BV)	No
• DNV GL	No
• Lloyds Register of Shipping (LRS)	No
• Nippon Kaiji Kyokai (NK)	No
• Polski Rejestr Statkow (PRS)	No
• Royal Institution of Naval Architects (RINA)	No
Accessories	
accessories	24 V DC screw terminal included in scope of delivery

¹⁾ Wireless approval in the USA

Ordering data

Article No.

Article No.

SCALANCE W722 Client Modules

IWLAN Ethernet Client Modules with iFeatures support and built-in wireless interface; wireless networks IEEE 802.11a/b/g/n at 2.4/5 GHz up to 150 Mbps; WPA2/AES; IP20 degree of protection (0 °C to +55 °C); scope of delivery: Mounting hardware, 3-pin screw terminal for 24 V DC; manual on CD-ROM; German/English

SCALANCE W722-1 RJ45

For administration of the wireless connection with iFeatures from a connected device with Industrial Ethernet connection

- National approvals for operation outside the USA
- National approvals for operation within the USA ²⁾

6GK5722-1FC00-0AA0**6GK5722-1FC00-0AB0****Accessories****IE FC RJ45 Plug 180 2 x 2**

RJ45 plug connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; with a 180° cable outlet; for network components and CPs/CPU's with Industrial Ethernet interface

- 1 pack = 1 unit
- 1 pack = 10 units
- 1 pack = 50 units

6GK1901-1BB10-2AA0**6GK1901-1BB10-2AB0****6GK1901-1BB10-2AE0****IE FC Standard Cable GP 2 x 2****6XV1840-2AH10**

4-core, shielded TP installation cable for connection to IE FC outlet RJ45 plug / IE FC RJ45 plug; PROFINET-compliant; with UL approval; Sold by the meter max. quantity 1000 m minimum order quantity 20 m

IE FC Stripping Tool**6GK1901-1GA00**

Preadjusted stripping tool for fast stripping of the Industrial Ethernet FC cables

Antennas and miscellaneous IWLAN accessories

See Catalog IK PI or Industry Mall

²⁾ Please note national approvals under <http://www.siemens.com/wireless-approvals>

I/O systems

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

I/O modules > Communication > SCALANCE W721 RJ45 for the control cabinet

Overview



- Low-cost Client Module, suitable for applications where the device is to be mounted in the control cabinet

Technical specifications

Article number	6GK5721-1FC00-0AA0 6GK5721-1FC00-0AB0 ¹⁾
Product type designation	SCALANCE W721-1 RJ45
Transmission rate	
• Transfer rate with WLAN maximum	150 Mbit/s
• Transfer rate for Industrial Ethernet	10 Mbit/s, 100 Mbit/s, 10 Mbit/s, 100 Mbit/s
Interfaces	
Number of electrical connections	1
• for network components or terminal equipment	1
• for power supply	0
Type of electrical connection	RJ45 socket
• for network components or terminal equipment	3-pole screw terminal
• for power supply	
design of the removable storage	No
• C-PLUG	No
• KEY-PLUG	No
Interfaces wireless	
Number of radio cards permanently installed	1
Number of electrical connections for external antenna(s)	1
Type of electrical connection for external antenna(s)	R-SMA (socket)
Product feature external antenna can be mounted directly on device	Yes
Supply voltage, current consumption, power loss	
Type of voltage of the supply voltage	DC
Supply voltage 1	
• from terminal block	19.2 V
Supply voltage 2	
• from terminal block	28.8 V
Consumed current	
• at DC at 24 V typical	0.15 A
Power loss [W]	
• at DC at 24 V typical	3.6 W

Article number	6GK5721-1FC00-0AA0 6GK5721-1FC00-0AB0 ¹⁾
Product type designation	SCALANCE W721-1 RJ45
Permitted ambient conditions	
Ambient temperature	
• during operation	0 ... 55 °C
• during storage	-40 ... +85 °C
• during transport	-40 ... +85 °C
Relative humidity at 25 °C without condensation during operation maximum	95 %
Ambient condition for operation	When used under hazardous conditions (Zone 2), the SCALANCE W761-1 RJ45 or W72x-1 RJ45 product must be installed in an enclosure. To comply with EN 50021, this enclosure must meet the requirements of at least IP 54 in compliance with EN 60529.
Protection class IP	IP20
Design, dimensions and weight	
Width	50 mm
Height	114 mm
Depth	74 mm
Width of the enclosure without antenna	50 mm
Height of the enclosure without antenna	114 mm
Depth of the enclosure without antenna	74 mm
Net weight	0.13 kg
Mounting type	
• S7-300 rail mounting	No
• S7-1500 rail mounting	No
• 35 mm DIN rail mounting	Yes
• wall mounting	No

¹⁾ Wireless approval in the USA

Technical specifications (continued)

Article number	6GK5721-1FC00-0AA0 6GK5721-1FC00-0AB0 ¹⁾
Product type designation	SCALANCE W721-1 RJ45
Wireless frequencies	
Operating frequency	
• for WLAN in 2.4 GHz frequency band	2.41 ... 2.48 GHz
• for WLAN in 5 GHz frequency band	4.9 ... 5.8 GHz
Product properties, functions, components general	
Product function Access Point Mode	No
Product function Client Mode	Yes
Product function	
• iPCF client	No
• iPCF-MC client	No
Product functions management, configuration	
Number of manageable IP addresses in client	4
Product function	
• CLI	Yes
• web-based management	Yes
• MIB support	Yes
• TRAPs via email	Yes
• Configuration with STEP 7	Yes
• configuration with STEP 7 in the TIA Portal	Yes
• WDS	No
Protocol is supported	
• Address Resolution Protocol (ARP)	Yes
• ICMP	Yes
• Telnet	Yes
• HTTP	Yes
• HTTPS	Yes
• TFTP	Yes
• DCP	Yes
• LLDP	No
Identification & maintenance function	
• I&MO - device-specific information	Yes
• I&M1 – higher-level designation/location designation	Yes
Product functions Diagnosis	
Product function	
• PROFINET IO diagnosis	No
• Link Check	No
• connection monitoring IP-Alive	No
• SysLog	Yes
Protocol is supported	
• SNMP v1	Yes
• SNMP v2	Yes
• SNMP v3	Yes
Product functions VLAN	
Product function	
• function VLAN with IWLAN	No

Article number	6GK5721-1FC00-0AA0 6GK5721-1FC00-0AB0 ¹⁾
Product type designation	SCALANCE W721-1 RJ45
Product functions DHCP	
Product function	
• DHCP client	Yes
• in Client Mode DHCP server via LAN	Yes
• DHCP Option 82	Yes
Product functions Redundancy	
Protocol is supported	
• STP/RSTP	Yes
• MSTP	Yes
• RSTP	Yes
Product functions Security	
Product function	
• ACL - MAC-based	Yes
• Management security, ACL-IP based	Yes
• IEEE 802.1x (radius)	Yes
• NAT/NAPT	No
• access protection according to IEEE802.11i	Yes
• WPA/WPA2	Yes
• TKIP/AES	Yes
Protocol is supported	
• SSH	Yes
• RADIUS	Yes
Product functions Time	
Protocol is supported	
• NTP	Yes
• SNTP	Yes
• SIMATIC Time	Yes
Standards, specifications, approvals	
Standard	
• for FM	FM 3611: Class I, Division 2, Groups A,B,C,D, T4 / Class 1, Zone 2, Group IIC, T4
• for hazardous zone	EN 60079-15:2005, EN 60079-0:2006, II 3 G Ex nA II T4 KEMA 07 ATEX 0145X
• for safety from CSA and UL	UL 60950-1 CSA C22.2 No. 60950-1
Certificate of suitability	
• EC declaration of conformity	Yes
• CE marking	Yes
• C-Tick	Yes
• CCC	No
• E1 approval	No
• Railway application in accordance with EN 50155	No
• NEMA TS2	No
• IEC 61375	No
• IEC 61850-3	No
• NEMA4X	No
• Power-over-Ethernet according to IEEE802.3at for type 1 and IEEE802.3af	No
• Power-over-Ethernet according to IEEE802.3at for type 2	No

¹⁾ Wireless approval in the USA

I/O systems

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

I/O modules > Communication > SCALANCE W721 RJ45 for the control cabinet

Technical specifications (continued)

Article number	6GK5721-1FC00-0AA0 6GK5721-1FC00-0AB0 ¹⁾
Product type designation	SCALANCE W721-1 RJ45
Standard for wireless communication	
• IEEE 802.11a	Yes
• IEEE 802.11b	Yes
• IEEE 802.11e	Yes
• IEEE 802.11g	Yes
• IEEE 802.11h	Yes
• IEEE 802.11i	Yes
• IEEE 802.11n	Yes
Wireless approval	You will find the current list of countries at: www.siemens.com/wireless-approvals

Article number	6GK5721-1FC00-0AA0 6GK5721-1FC00-0AB0 ¹⁾
Product type designation	SCALANCE W721-1 RJ45
Marine classification association	
• American Bureau of Shipping Europe Ltd. (ABS)	No
• Bureau Veritas (BV)	No
• DNV GL	No
• Lloyds Register of Shipping (LRS)	No
• Nippon Kaiji Kyokai (NK)	No
• Polski Rejestr Statkow (PRS)	No
• Royal Institution of Naval Architects (RINA)	No
Accessories	
accessories	24 V DC screw terminal included in scope of delivery

¹⁾ Wireless approval in the USA

Ordering data

Article No.

SCALANCE W721 Client Modules

IWLAN Ethernet Client Modules with built-in wireless interface; wireless networks
IEEE 802.11a/b/g/h/n at 2.4/5 GHz up to 150 Mbps; WPA2/AES;
IP20 degree of protection (0 °C to +55 °C);
scope of delivery:
Mounting hardware,
3-pin screw terminal for 24 V DC;
manual on CD-ROM;
German/English

SCALANCE W721-1 RJ45

For administration of the wireless connection from a connected device with Industrial Ethernet connection

- National approvals for operation outside the USA
- National approvals for operation within the USA ²⁾

6GK5721-1FC00-0AA0
6GK5721-1FC00-0AB0

Article No.

Accessories

IE FC RJ45 Plug 180 2 x 2

RJ45 plug connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; with a 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface

- 1 pack = 1 unit
- 1 pack = 10 units
- 1 pack = 50 units

6GK1901-1BB10-2AA0
6GK1901-1BB10-2AB0
6GK1901-1BB10-2AE0

IE FC Standard Cable GP 2 x 2

4-core, shielded TP installation cable for connection to IE FC outlet RJ45 plug / IE FC RJ45 plug;
PROFINET-compliant; with UL approval; sold by the meter; max. quantity 1000 m, minimum order quantity 20 m

6XV1840-2AH10

IE FC Stripping Tool

Preadjusted stripping tool for fast stripping of the Industrial Ethernet FC cables

6GK1901-1GA00

Antennas and miscellaneous IWLAN accessories

See Catalog IK PI or Industry Mall

²⁾ Please note national approvals under <http://www.siemens.com/wireless-approvals>

Overview



- PROFIBUS DP master/slave with electrical interface for connecting the ET 200SP CPUs to PROFIBUS at up to 12 Mbps
- Expands the ET 200SP CPUs 1510SP-1 PN / 1512SP-1 PN by one PROFIBUS connection
- For communication with lower-level PROFIBUS devices at bandwidths of 9.6 Kbps to 12 Mbps
- Communication services:
 - PROFIBUS DP
 - PG/OP communication
 - S7 communication:

This makes it possible to establish communication between the ET 200SP CPU and other devices, for example those from the SIMATIC S7-300/400/1500 range.
- Time synchronization
- Simple programming and configuration over PROFIBUS
- Cross-network PG communication using S7 routing
- Data set routing

Note

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

Technical specifications

Article number	6AG1545-5DA00-2AB0
Based on	6ES7545-5DA00-0AB0 SIPLUS ET 200SP CM DP
Ambient conditions	
Ambient temperature during operation	
• horizontal installation, min.	-40 °C; = Tmin; Startup @ -25 °C
• horizontal installation, max.	60 °C; = Tmax
• vertical installation, min.	-40 °C; = Tmin; Startup @ -25 °C
• vertical installation, max.	50 °C; = Tmax
Extended ambient conditions	
• relative to ambient temperature-atmospheric pressure-installation altitude	Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m)
Relative humidity	
- With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation/frost (no commissioning under condensation conditions)
Resistance	
- against biologically active substances / conformity with EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!
- against chemically active substances / conformity with EN 60721-3-3	Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!
- against mechanically active substances / conformity with EN 60721-3-3	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!

Ordering data

Article No.

SIPLUS CM DP for ET 200SP CPU (Extended temperature range and exposure to media) PROFIBUS DP master/slave with electrical interface for connecting the ET 200SP CPUs to PROFIBUS at up to 12 Mbps	6AG1545-5DA00-2AB0
Accessories	see SIMATIC CM DP, page 9/93

I/O systems

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

Fail-safe I/O modules > Digital F input modules

Overview



Digital fail-safe input module:
F-DI 8x24 V DC High Feature for BU type A0, color code CC01

Other properties:

- 8-channel digital fail-safe input module for the ET 200SP
- For fail-safe reading of sensor information (1 or 2 channels)
- Provides integral discrepancy evaluation for 2-out-of-2 signals
- 8 internal sensor supplies (incl. test function) onboard
- Certified up to SIL 3 (IEC 61508), PL e (ISO 13849)
- Can be plugged onto type A0 BaseUnits (BU) with automatic coding
- LED display for error, operation, supply voltage and status
- Clear labeling on front of module
 - Plain text identification of the module type and function class
 - 2D matrix code (order and serial number)
 - Connection diagram
 - Color coding of the DI module type: white
 - Hardware and firmware version
 - Color code (CC) for module-specific color coding of the potentials at the terminals of the BU
 - Complete Article No.
- Optional labeling accessories
 - Labeling strips
 - Reference identification label
- Optional module-specific color identification of the terminals according to the color code (CC)
- Optional system-integrated shield connection
- The modules support PROFIsafe in both PROFIBUS and PROFINET configurations. They can be used with all fail-safe SIMATIC S7 CPUs

Technical specifications

Article number	6ES7136-6BA00-0CA0 ET 200SP, EL-MOD., F-DI 8X24VDC HF
General information	
Product type designation	F-DI 8x24VDC HF
Product function	
• I&M data	Yes; I&M0 to I&M3
Engineering with	
• STEP 7 TIA Portal configurable/ integrated as of version	V12
• STEP 7 configurable/integrated as of version	V5.5 SP3 / -
Supply voltage	
Type of supply voltage	24 V DC
Rated value (DC)	24 V
Reverse polarity protection	Yes
Encoder supply	
Number of outputs	8
Short-circuit protection	Yes; Electronic (response threshold 0.7 A to 1.8 A)
Output current	
• up to 60 °C, max.	0.3 A
24 V encoder supply	
• 24 V	Yes; min. L+ (-1.5 V)
• Short-circuit protection	Yes
• Output current, max.	800 mA; Total current of all encoders

Article number	6ES7136-6BA00-0CA0 ET 200SP, EL-MOD., F-DI 8X24VDC HF
Digital inputs	
Number of digital inputs	8
Source/sink input	Yes; P-reading
Input characteristic curve in accordance with IEC 61131, type 1	Yes
Input voltage	
• Type of input voltage	DC
• Rated value (DC)	24 V
• for signal "0"	-30 to +5V
• for signal "1"	+15 to +30V
Input current	
• for signal "1", typ.	3.7 mA
Input delay (for rated value of input voltage) for standard inputs	
- parameterizable	Yes
for counter/technological functions	
- parameterizable	No
Cable length	
• shielded, max.	1 000 m
• unshielded, max.	500 m

Technical specifications (continued)

Article number	6ES7136-6BA00-0CA0 ET 200SP, EL-MOD., F-DI 8X24VDC HF
Interrupts/diagnostics/ status information	
Diagnostics function	Yes, "Alarms/diagnostic messages" section in the manual
Alarms	
• Diagnostic alarm	Yes
• Hardware interrupt	No
Diagnostics indication LED	
• RUN LED	Yes; Green LED
• ERROR LED	Yes; Red LED
• Monitoring of the supply voltage (PWR-LED)	Yes; green PWR LED
• Channel status display	Yes; Green LED
• for channel diagnostics	Yes; Red LED
• for module diagnostics	Yes; green/red DIAG LED
Potential separation	
Potential separation channels	
• between the channels and backplane bus	Yes
Isolation	
Isolation tested with	707 V DC (type test)

Article number	6ES7136-6BA00-0CA0 ET 200SP, EL-MOD., F-DI 8X24VDC HF
Standards, approvals, certificates	
Suitable for safety functions	Yes
Highest safety class achievable in safety mode	
• Performance level according to ISO 13849-1	PL _e
• SIL acc. to IEC 61508	SIL 3
Probability of failure (for service life of 20 years and repair time of 100 hours)	
- Low demand mode: PFDavg in accordance with SIL3	< 2.00E-05 1/h
- High demand/continuous mode: PFH in accordance with SIL3	< 1.00E-09 1/h
Ambient conditions	
Ambient temperature during operation	
• horizontal installation, min.	0 °C
• horizontal installation, max.	60 °C
• vertical installation, min.	0 °C
• vertical installation, max.	50 °C
Dimensions	
Width	15 mm
Weights	
Weight, approx.	49 g

Ordering data

Article No.

Digital F input modules

F-DI 8x24 V DC High Feature,
BU type A0, color code CC01**6ES7136-6BA00-0CA0**

Usable BaseUnits

BU15-P16+A0+2D

BU type A0; BaseUnit (light) with
16 process terminals to the module;
for starting a new load group
(max. 10 A)

- 1 unit
- 10 units

6ES7193-6BP00-0DA0
6ES7193-6BP00-2DA0

BU15-P16+A0+2B

BU type A0; BaseUnit (dark) with
16 process terminals to the module;
for continuing the load group

- 1 unit
- 10 units

6ES7193-6BP00-0BA0
6ES7193-6BP00-2BA0

BU15-P16+A10+2D

BU type A0; BaseUnit (light) with
16 process terminals (1...16) to the
module and an additional 10 inter-
nally jumpered AUX terminals
(1 A to 10 A); for starting a new
load group (max. 10 A)

- 1 unit
- 10 units

6ES7193-6BP20-0DA0
6ES7193-6BP20-2DA0

Article No.

BU15-P16+A10+2B

BU type A0; BaseUnit (dark) with
16 process terminals (1...16) to the
module and an additional 10 inter-
nally jumpered AUX terminals
(1 A to 10 A); for continuing the
load group

- 1 unit
- 10 units

6ES7193-6BP20-0BA0
6ES7193-6BP20-2BA0

Accessories

S7 Distributed Safety
programming tool V5.4

Task:
Engineering tool for configuring
fail-safe user programs for
SIMATIC S7-300F, S7-400F,
WinAC RTX F, ET 200S, ET 200M,
ET 200iSP, ET 200pro, ET 200eco

Requirement:
STEP 7 V5.3 SP3 and higher

Floating license for 1 user

Floating license for 1 user,
license key download without
software or documentation¹⁾;
email address required for delivery**6ES7833-1FC02-0YA5****6ES7833-1FC02-0YH5**

I/O systems

SIMATIC ET 200 systems for the control cabinet

SIMATIC ET 200SP

Fail-safe I/O modules > Digital F input modules

Ordering data

Article No.

STEP 7 Safety Advanced V14 SP1

Task:

Engineering tool for configuring and programming fail-safe user programs for SIMATIC S7-1200 FC, S7-1500F, S7-1500F Software Controller, S7-300F, S7-400F, WinAC RTX F, ET 200SP F Controller and the fail-safe ET 200SP, ET 200S, ET 200M, ET 200iSP, ET 200pro and ET 200eco I/O

Requirement:

STEP 7 Professional V14 SP1

Floating license for 1 user, software and documentation on DVD; license key on USB flash drive

Floating license for 1 user, software, documentation and license key for download¹⁾; email address required for delivery

6ES7833-1FA14-0YA5

6ES7833-1FA14-0YH5

Reference identification label

6ES7193-6LF30-0AW0

10 sheets of 16 labels

Labeling strips

500 labeling strips on roll, light gray, for inscription with thermal transfer roll printer

6ES7193-6LR10-0AA0

500 labeling strips on roll, yellow, for inscription with thermal transfer roll printer

6ES7193-6LR10-0AG0

1000 labeling strips DIN A4, light gray, card, for inscription with laser printer

6ES7193-6LA10-0AA0

1000 labeling strips DIN A4, yellow, card, for inscription with laser printer

6ES7193-6LA10-0AG0

Article No.

BU cover

for covering empty slots (gaps); 5 units

- 15 mm wide
- 20 mm wide

6ES7133-6CV15-1AM0

6ES7133-6CV20-1AM0

Shield connection

5 shield supports and 5 shield terminals

6ES7193-6SC00-1AM0

Color-coding plates

- Color code CC01, module-specific, for 16 push-in terminals; for BaseUnit type A0, A1; 10 units
- Color code CC71, for 10 AUX terminals 1 A to 10 A, for BU type A0, yellow/green, with push-in terminals; 10 units
- Color code CC72, for 10 AUX terminals 1 A to 10 A, for BU type A0, red, with push-in terminals; 10 units
- Color code CC73, for 10 AUX terminals 1 A to 10 A, for BU type A0, blue, with push-in terminals; 10 units

6ES7193-6CP01-2MA0

6ES7193-6CP71-2AA0

6ES7193-6CP72-2AA0

6ES7193-6CP73-2AA0

E-coding element type F

5 units, spare part

6ES7193-6EF00-1AA0

¹⁾ For up-to-date information and download availability, see: <http://www.siemens.com/tia-online-software-delivery>

Overview



Digital fail-safe output module:
F-DQ 4x24 V DC High Feature, BU type A0, color code CC01

Other properties:

- 4-channel digital fail-safe output module for the ET 200SP
- Fail-safe 2-channel activation (sink/source output) by actuators
- Actuators can be controlled up to 2 A
- Certified up to SIL 3 (IEC 61508), PL e (ISO 13849)

- Can be plugged onto type A0 BaseUnits (BU) with automatic coding
- LED display for error, operation, supply voltage and status
- Clear labeling on front of module
 - Plain text identification of the module type and function class
 - 2D matrix code (order and serial number)
 - Connection diagram
 - Color coding of the DI module type: white
 - Hardware and firmware version
 - Color code (CC) for module-specific color coding of the potentials at the terminals of the BU
 - Complete Article No.
- Optional labeling accessories
 - Labeling strips
 - Reference identification label
- Optional module-specific color identification of the terminals according to the color code (CC)
- Optional system-integrated shield connection
- The modules support PROFI-safe, both in PROFIBUS, and in PROFINET configurations
- They can be used with all fail-safe SIMATIC S7 CPUs

Technical specifications

Article number	6ES7136-6DB00-0CA0 ET 200SP, EL-MOD., F-DQ 4XDC 24V/2A
General information	
Product type designation	F-DQ 4x 24 V DC/2 A PM HF
Product function	
• I&M data	Yes; I&M0 to I&M3
Engineering with	
• STEP 7 TIA Portal configurable/ integrated as of version	V12
• STEP 7 configurable/integrated as of version	V5.5 SP3 / -
• PROFINET as of GSD version/ GSD revision	V2.31
Supply voltage	
Type of supply voltage	24 V DC
Rated value (DC)	24 V
Reverse polarity protection	Yes
Digital outputs	
Number of digital outputs	4
Digital outputs, parameterizable	Yes
Short-circuit protection	Yes
Open-circuit detection	Yes
Overload protection	Yes
Limitation of inductive shutdown voltage to	typ. 2*47V

Article number	6ES7136-6DB00-0CA0 ET 200SP, EL-MOD., F-DQ 4XDC 24V/2A
Switching capacity of the outputs	
• with resistive load, max.	2 A
• on lamp load, max.	10 W
Load resistance range	
• lower limit	12 Ω
• upper limit	2 000 Ω
Output voltage	
• Type of output voltage	DC
• for signal "1", min.	24 V; L+ (-0.5 V)
Output current	
• for signal "1" rated value	2 A
• for signal "0" residual current, max.	0.5 mA
Switching frequency	
• with resistive load, max.	30 Hz; Symmetrical
• with inductive load, max.	0.1 Hz; according to IEC 60947-5-1, DC-13, symmetrical
• on lamp load, max.	10 Hz; Symmetrical
Total current of the outputs	
• Current per channel, max.	2 A; Note derating data in the manual
• Current per module, max.	6 A; Note derating data in the manual
Cable length	
• shielded, max.	1 000 m
• unshielded, max.	500 m

I/O systems

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

Fail-safe I/O modules > Digital F output modules

Technical specifications (continued)

Article number	6ES7136-6DB00-0CA0 ET 200SP, EL-MOD., F-DQ 4XDC 24V/2A
Interrupts/diagnostics/ status information	
Diagnostics function	Yes, "Alarms/diagnostic messages" section in the manual
Substitute values connectable	No
Alarms	
• Diagnostic alarm	Yes
Diagnostics indication LED	
• RUN LED	Yes; Green LED
• ERROR LED	Yes; Red LED
• Monitoring of the supply voltage (PWR-LED)	Yes; green PWR LED
• Channel status display	Yes; Green LED
• for channel diagnostics	Yes; Red LED
• for module diagnostics	Yes; green/red DIAG LED
Potential separation	
Potential separation channels	
• between the channels and backplane bus	Yes
Isolation	
Isolation tested with	707 V DC (type test)

Article number	6ES7136-6DB00-0CA0 ET 200SP, EL-MOD., F-DQ 4XDC 24V/2A
Standards, approvals, certificates	
Suitable for safety functions	Yes
Highest safety class achievable in safety mode	
• Performance level according to ISO 13849-1	PL _e
• SIL acc. to IEC 61508	SIL 3
Probability of failure (for service life of 20 years and repair time of 100 hours)	
- Low demand mode: PFDavg in accordance with SIL3	< 2.00E-05 1/h
- High demand/continuous mode: PFH in accordance with SIL3	< 1.00E-09 1/h
Ambient conditions	
Ambient temperature during operation	
• horizontal installation, min.	0 °C
• horizontal installation, max.	60 °C
• vertical installation, min.	0 °C
• vertical installation, max.	50 °C
Dimensions	
Width	15 mm
Weights	
Weight, approx.	57 g

Ordering data

Article No.

Digital F output modules	
F-DQ 4x24 V DC High Feature, BU type A0, color code CC01	6ES7136-6DB00-0CA0
Usable BaseUnits	
BU15-P16+A0+2D	
BU type A0; BaseUnit (light) with 16 process terminals to the module; for starting a new load group (max. 10 A)	
• 1 unit	6ES7193-6BP00-0DA0
• 10 units	6ES7193-6BP00-2DA0
BU15-P16+A0+2B	
BU type A0; BaseUnit (dark) with 16 process terminals to the module; for continuing the load group	
• 1 unit	6ES7193-6BP00-0BA0
• 10 units	6ES7193-6BP00-2BA0
BU15-P16+A10+2D	
BU type A0; BaseUnit (light) with 16 process terminals (1...16) to the module and an additional 10 inter- nally jumpered AUX terminals (1 A to 10 A); for starting a new load group (max. 10 A)	
• 1 unit	6ES7193-6BP20-0DA0
• 10 units	6ES7193-6BP20-2DA0
BU15-P16+A10+2B	
BU type A0; BaseUnit (dark) with 16 process terminals (1...16) to the module and an additional 10 inter- nally jumpered AUX terminals (1 A to 10 A); for continuing the load group	
• 1 unit	6ES7193-6BP20-0BA0
• 10 units	6ES7193-6BP20-2BA0

Article No.

BU20-P12+A4+0B	6ES7193-6BP20-0BB0
BU type B0; BaseUnit (dark) with 12 process terminals (1...12) to the module and an additional 4 inter- nally jumpered AUX terminals (1 A to 4 A); for continuing the load group	
Accessories	
S7 Distributed Safety programming tool V5.4	
Task: Engineering tool for configuring fail-safe user programs for SIMATIC S7-300F, S7-400F, WinAC RTX F, ET 200S, ET 200M, ET 200iSP, ET 200pro, ET 200eco	
Requirement: STEP 7 V5.3 SP3 and higher	
Floating license for 1 user	6ES7833-1FC02-0YA5
Floating license for 1 user, license key download without software or documentation ¹⁾ ; email address required for delivery	6ES7833-1FC02-0YH5

Ordering data	Article No.	Article No.
STEP 7 Safety Advanced V14 SP1 Task: Engineering tool for configuring and programming fail-safe user programs for SIMATIC S7-1200 FC, S7-1500F, S7-1500F Software Controller, S7-300F, S7-400F, WinAC RTX F, ET 200SP F Controller and the fail-safe ET 200SP, ET 200S, ET 200M, ET 200iSP, ET 200pro and ET 200eco I/O Requirement: STEP 7 Professional V14 SP1 Floating license for 1 user, software and documentation on DVD; license key on USB flash drive Floating license for 1 user, software, documentation and license key for download ¹⁾ ; email address required for delivery	6ES7833-1FA14-0YA5 6ES7833-1FA14-0YH5	BU cover for covering empty slots (gaps); 5 units • 15 mm wide • 20 mm wide 6ES7133-6CV15-1AM0 6ES7133-6CV20-1AM0
Reference identification label 10 sheets of 16 labels	6ES7193-6LF30-0AW0	Shield connection 5 shield supports and 5 shield terminals 6ES7193-6SC00-1AM0
Labeling strips 500 labeling strips on roll, light gray, for inscription with thermal transfer roll printer 500 labeling strips on roll, yellow, for inscription with thermal transfer roll printer 1000 labeling strips DIN A4, light gray, card, for inscription with laser printer 1000 labeling strips DIN A4, yellow, card, for inscription with laser printer	6ES7193-6LR10-0AA0 6ES7193-6LR10-0AG0 6ES7193-6LA10-0AA0 6ES7193-6LA10-0AG0	Color-coding plates • Color code CC02, module-specific, for 16 push-in terminals; for BaseUnit type A0, A1; 10 units 6ES7193-6CP02-2MA0 • Color code CC71, for 10 AUX terminals 1 A to 10 A, for BU type A0, yellow/green, with push-in terminals; 10 units 6ES7193-6CP71-2AA0 • Color code CC72, for 10 AUX terminals 1 A to 10 A, for BU type A0, red, with push-in terminals; 10 units 6ES7193-6CP72-2AA0 • Color code CC73, for 10 AUX terminals 1 A to 10 A, for BU type A0, blue, with push-in terminals; 10 units 6ES7193-6CP73-2AA0
		E-coding element type F 5 units, spare part 6ES7193-6EF00-1AA0

¹⁾ For up-to-date information and download availability, see:
<http://www.siemens.com/tia-online-software-delivery>

I/O systems

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

Fail-safe I/O modules > Digital F output module relay

Overview

The digital F electronic module relay 1 F-RQ 24 V DC/ 24...230 V AC/5 A has the following characteristics:

- 1 relay output (2 NO contacts)
- Total output current 5 A
- Rated load voltage 24 V DC and 24...230 V AC
- The control circuit of the two safety relays must be routed from the outside to the respective terminals

The attainable safety integrity level is SIL 3 (IEC 61508) when the control of the F-RQ module is implemented via a fail-safe output (e.g. ET 200SP 4F-DQ 24 V DC/2 A PROFIsafe).

Technical specifications

Article number	6ES7136-6RA00-0BF0 ET 200SP, F-RQ 1X24VDC/ 24...230VAC/5A ST
General information	
Product type designation	F-RQ 1x24VDC/24 ... 230VAC/5A
Product function	
• I&M data	Yes; I&M0 to I&M3
Engineering with	
• STEP 7 TIA Portal configurable/ integrated as of version	V13
• STEP 7 configurable/integrated as of version	V5.5 SP4 and higher
Supply voltage	
Type of supply voltage	24 V DC
Rated value (DC)	24 V; Coil voltage
Digital outputs	
Number of digital outputs	1
Limitation of inductive shutdown voltage to	No
Controlling a digital input	Yes
Switching capacity of the outputs	
• with resistive load, max.	5 A
• on lamp load, max.	25 W
Switching frequency	
• with resistive load, max.	2 Hz
• with inductive load, max.	0.1 Hz; See data in manual
• with inductive load (acc. to IEC 60947-5-1, DC13), max.	0.1 Hz
• with inductive load (acc. to IEC 60947-5-1, AC15), max.	2 Hz
Total current of the outputs (per module)	
horizontal installation	
- up to 40 °C, max.	5 A; Note derating data in the manual
- up to 50 °C, max.	4 A; Note derating data in the manual
- up to 60 °C, max.	3 A; Note derating data in the manual
vertical installation	
- up to 50 °C, max.	3 A; Note derating data in the manual
Relay outputs	
• Number of relay outputs	1; 2 NO contacts
• Rated supply voltage of relay coil L+ (DC)	24 V
• Current consumption of relays (coil current of all relays), max.	70 mA
• external protection for relay outputs	yes; 6 A, see data in manual
• Relay approved acc. to UL 508	Yes; Pilot Duty B300, R300

Article number	6ES7136-6RA00-0BF0 ET 200SP, F-RQ 1X24VDC/ 24...230VAC/5A ST
Switching capacity of contacts	
- with inductive load, max.	see additional description in the manual
- with resistive load, max.	see additional description in the manual
- Thermal continuous current, max.	5 A
- Switching current, min.	1 mA
- Switching current after exceeding 300 mA, min.	10 mA
- Switching current after exceeding 300 mA, max.	5 A
- Rated switching voltage (DC)	24 V
- Rated switching voltage (AC)	230 V
Cable length	
• shielded, max.	500 m; for load contacts
• unshielded, max.	300 m; for load contacts
• Control cable (input), max.	10 m
Interrupts/diagnostics/ status information	
Diagnostics function	yes, firmware update
Diagnostics indication LED	
• RUN LED	Yes; green/red DIAG LED
• Channel status display	Yes; Green LED
Potential separation	
Potential separation channels	
• between the channels and backplane bus	Yes
Isolation	
Isolation tested with	2 545 V DC/2 s (routine test)
Overvoltage category	III
tested with	
• between channels and backplane bus/supply voltage	DC 2545 V 2 s (routine test), impulse voltage test DC 7200 V / 5 positive and 5 negative pulses (type test)
• between backplane bus and supply voltage	707 V DC (type test)
Standards, approvals, certificates	
Suitable for safety functions	Yes
Highest safety class achievable in safety mode	
• Performance level according to ISO 13849-1	PLe
• Category according to ISO 13849-1	4
• SiL acc. to IEC 61508	SIL 3

Technical specifications (continued)

Article number	6ES7136-6RA00-0BF0 ET 200SP, F-RQ 1X24VDC/ 24..230VAC/5A ST
Probability of failure (for service life of 20 years and repair time of 100 hours)	- Low demand mode: PFDavg in accordance with SIL2 < 1.00E-04, function test 1x per year - Low demand mode: PFDavg in accordance with SIL3 < 1.00E-05, function test 1x per month - High demand/continuous mode: PFH in accordance with SIL2 < 1.00E-08 1/h, function test 1x per year - High demand/continuous mode: PFH in accordance with SIL3 < 6.00E-09 1/h, function test 1x per month

Article number	6ES7136-6RA00-0BF0 ET 200SP, F-RQ 1X24VDC/ 24..230VAC/5A ST
Dimensions	
Width	20 mm
Weights	
Weight, approx.	56 g

Ordering data

Digital F output module relay 1 F-RQ BU type F0, relay output (2 NO contacts), total output current 5 A, load voltages 24 V DC and 24...230 V AC; can be used up to SIL3/Cat.4/PLe if controlled via F-DQ	6ES7136-6RA00-0BF0
Usable BaseUnits BU20-P8+A4+0B BU type F0; BaseUnit (dark) with 8 process terminals to the module and an additional 4 internally jumpered AUX terminals (1 A to 4 A); for continuing the load group	6ES7193-6BP20-0BF0
Accessories	
S7 Distributed Safety programming tool V5.4 Task: Engineering tool for configuring fail-safe user programs for SIMATIC S7-300F, S7-400F, WinAC RTX F, ET 200S, ET 200M, ET 200iSP, ET 200pro, ET 200eco Requirement: STEP 7 V5.3 SP3 and higher Floating license for 1 user Floating license for 1 user, license key download without software or documentation¹⁾; email address required for delivery	6ES7833-1FC02-0YA5 6ES7833-1FC02-0YH5

	Article No.
STEP 7 Safety Advanced V14 SP1	
Task: Engineering tool for configuring and programming fail-safe user programs for SIMATIC S7-1200 FC, S7-1500F, S7-1500F Software Controller, S7-300F, S7-400F, WinAC RTX F, ET 200SP F Controller and the fail-safe ET 200SP, ET 200S, ET 200M, ET 200iSP, ET 200pro and ET 200eco I/O Requirement: STEP 7 Professional V14 SP1	
Floating license for 1 user, software and documentation on DVD; license key on USB flash drive	6ES7833-1FA14-0YA5
Floating license for 1 user, software, documentation and license key for download ¹⁾ ; email address required for delivery	6ES7833-1FA14-0YH5
Reference identification label	6ES7193-6LF30-0AW0
10 sheets of 16 labels	
Labeling strips	
500 labeling strips on roll, light gray	6ES7193-6LR10-0AA0
500 labeling strips on roll, yellow	6ES7193-6LR10-0AG0
1000 labeling strips DIN A4, light gray	6ES7193-6LA10-0AA0
1000 labeling strips DIN A4, yellow	6ES7193-6LA10-0AG0
BU cover	6ES7133-6CV15-1AM0
for covering empty slots (gaps); 5 units	
• 20 mm wide	
Shield connection	6ES7193-6SC00-1AM0
5 shield supports and 5 shield terminals	
Color-coded labels	
• Color code CC42, module-specific; for BaseUnit type F0; 10 units	6ES7193-6CP42-2MB0

1) For up-to-date information and download availability see:
<http://www.siemens.com/tia-online-software-delivery>

I/O systems

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

Fail-safe I/O modules > Fail-safe special modules

Overview



Digital fail-safe power module:
F-PM-E PPM 24 V DC/8 A for BU type C0, color code CC52

Other properties:

- Certified up to SIL 3 (IEC 61508), PL e (ISO 13849)
- Safety-related shutdown of output modules within the potential group of the F-PM-E
- Two fail-safe digital inputs, for reading of sensor information (1 or 2 channels)
- One fail-safe digital output onboard (ppm switching, up to 2 A, up to SIL 3/PL e)

- Fail-safe digital output and potential supply pp or pm switching can be parameterized
- Parameterizable onboard evaluation of the fail-safe inputs for control of the fail-safe digital outputs and of the potential group
- Digital standard output modules can be shut down up to PL d (ISO 13849) and SIL 2 (IEC 61508) (up to 8 A)
- Can be plugged onto type C0 BaseUnits (BU) with automatic coding
- LED display for error, operation, supply voltage and status
- Clear labeling on front of module
 - Plain text identification of the module type and function class
 - 2D matrix code (order and serial number)
 - Connection diagram
 - Color coding of the DI module type: white
 - Hardware and firmware version
 - Color code (CC) for module-specific color coding of the potentials at the terminals of the BU
 - Complete Article No.
- Optional labeling accessories
 - Labeling strips
 - Reference identification label
- Optional module-specific color identification of the terminals according to the color code (CC)
- Optional system-integrated shield connection
- The modules support PROFI-safe in both PROFIBUS and PROFINET configurations. They can be used with all fail-safe SIMATIC S7 CPUs

Technical specifications

Article number	6ES7136-6PA00-0BC0 ET 200SP, POWERMOD. F-PM-E PPM, DC24V
General information	
Product type designation	F-PM-E PPM 24VDC
Product function	
• I&M data	Yes; I&M0 to I&M3
Engineering with	
• STEP 7 TIA Portal configurable/ integrated as of version	V12
• STEP 7 configurable/integrated as of version	V5.5 SP3 / -
• PROFIBUS as of GSD version/ GSD revision	V2.3
• PROFINET as of GSD version/ GSD revision	V2.31
Supply voltage	
Type of supply voltage	24 V DC
Rated value (DC)	24 V
Reverse polarity protection	Yes
Output voltage	
Type of output voltage	DC
Encoder supply	
Number of outputs	2
Short-circuit protection	Yes; Electronic (response threshold 0.7 A to 2.1 A)
Output current	
• up to 60 °C, max.	0.3 A
24 V encoder supply	
• 24 V	Yes; min. L+ (-1.5 V)
• Short-circuit protection	Yes
• Output current, max.	600 mA; Total current of all encoders

Article number	6ES7136-6PA00-0BC0 ET 200SP, POWERMOD. F-PM-E PPM, DC24V
Digital inputs	
Number of digital inputs	2
Source/sink input	Yes; P-reading
Input characteristic curve in accordance with IEC 61131, type 1	Yes
Input voltage	
• Type of input voltage	DC
• Rated value (DC)	24 V
• for signal "0"	-30 to +5V
• for signal "1"	+15 to +30V
Input current	
• for signal "1", typ.	3.7 mA
Input delay (for rated value of input voltage) for standard inputs	
- parameterizable	Yes
for counter/technological functions	
- parameterizable	No
Cable length	
• shielded, max.	1 000 m
• unshielded, max.	500 m
Digital outputs	
Number of digital outputs	1
Digital outputs, parameterizable	Yes
Short-circuit protection	Yes
Open-circuit detection	Yes
Overload protection	Yes
Limitation of inductive shutdown voltage to	max. 1.5 V

Technical specifications (continued)

Article number	6ES7136-6PA00-0BC0 ET 200SP, POWERMOD. F-PM-E PPM, DC24V
Switching capacity of the outputs	
• with resistive load, max.	8 A
• on lamp load, max.	100 W
Load resistance range	
• lower limit	3 Ω
• upper limit	2 000 Ω
Output voltage	
• for signal "1", min.	24 V; L+ (-0.5 V)
Output current	
• for signal "1" rated value	8 A
• for signal "0" residual current, max.	1.5 mA; PP-switching: max. 1.5 mA; PM-switching: max. 1 mA
Switching frequency	
• with resistive load, max.	10 Hz; Symmetrical
• with inductive load, max.	0.1 Hz; according to IEC 60947-5-1, DC-13, symmetrical
• on lamp load, max.	4 Hz; Symmetrical
Total current of the outputs	
• Current per channel, max.	8 A; Note derating data in the manual
• Current per module, max.	8 A; Note derating data in the manual
Cable length	
• shielded, max.	1 000 m
• unshielded, max.	500 m
Interrupts/diagnostics/ status information	
Diagnostics function	Yes, "Alarms/diagnostic messages" section in the manual
Substitute values connectable	No
Alarms	
• Diagnostic alarm	Yes
• Hardware interrupt	No

Article number	6ES7136-6PA00-0BC0 ET 200SP, POWERMOD. F-PM-E PPM, DC24V
Diagnostics indication LED	
• RUN LED	Yes; Green LED
• ERROR LED	Yes; Red LED
• Monitoring of the supply voltage (PWR-LED)	Yes; green PWR LED
• Channel status display	Yes; Green LED
• for channel diagnostics	Yes; Red LED
• for module diagnostics	Yes; green/red DIAG LED
Potential separation	
Potential separation channels	
• between the channels and backplane bus	Yes
Isolation	
Isolation tested with	707 V DC (type test)
Standards, approvals, certificates	
Suitable for safety functions	Yes
Highest safety class achievable in safety mode	
• Performance level according to ISO 13849-1	PLe
• SIL acc. to IEC 61508	SIL 3
Probability of failure (for service life of 20 years and repair time of 100 hours)	
- Low demand mode: PFDavg in accordance with SIL3	< 2.00E-05 1/h
- High demand/continuous mode: PFH in accordance with SIL3	< 1.00E-09 1/h
Ambient conditions	
Ambient temperature during operation	
• horizontal installation, min.	0 °C
• horizontal installation, max.	60 °C
• vertical installation, min.	0 °C
• vertical installation, max.	50 °C
Dimensions	
Width	20 mm
Height	72 mm
Depth	55 mm
Weights	
Weight, approx.	70 g

Ordering data

Digital F power module F-PM-E 24 V DC/8 A PPM Standard	6ES7136-6PA00-0BC0
BU type C0, color code CC52. 2 inputs, 1 output, SIL3/Cat.4/PLe	
Type C0 BaseUnits	
BU20-P6+A2+4D	6ES7193-6BP20-0DC0
BU type C0; BaseUnit (light) with 6 push-in terminals (1...6) to the module and an additional 2 AUX terminals; new load group	
Accessories	
Reference identification label	6ES7193-6LF30-0AW0
10 sheets of 16 labels	
Labeling strips	6ES7193-6LA10-0AG0
1000 labeling strips DIN A4, yellow, card, for inscription with laser printer	

Article No.

BU cover	
for covering empty slots (gaps); 5 units	
• 20 mm wide	6ES7133-6CV20-1AM0
Shield connection	6ES7193-6SC00-1AM0
5 shield supports and 5 shield terminals	
Color-coding plates	6ES7193-6CP52-2MC0
• Color code CC52, module-specific, for 8 push-in terminals; 10 units	
E-coding element type F	6ES7193-6EF00-1AA0
5 units, spare part	

I/O systems

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

Fail-safe I/O modules > SIPLUS digital F input modules

Overview



Digital fail-safe input module:
F-DI 8x24 V DC High Feature for BU type A0, color code CC01

Other properties:

- 8-channel digital fail-safe input module for the ET 200SP
- For fail-safe reading of sensor information (1 or 2 channels)
- Provides integral discrepancy evaluation for 2-out-of-2 signals
- 8 internal sensor supplies (incl. test function) onboard
- Certified up to SIL 3 (IEC 61508), PL e (ISO 13849)

- Can be plugged onto type A0 BaseUnits (BU) with automatic coding
- LED display for error, operation, supply voltage and status
- Clear labeling on front of module
 - Plain text identification of the module type and function class
 - 2D matrix code (order and serial number)
 - Connection diagram
 - Color coding of the DI module type: white
 - Hardware and firmware version
 - Color code (CC) for module-specific color coding of the potentials at the terminals of the BU
 - Complete Article No.
- Optional labeling accessories
 - Labeling strips
 - Reference identification label
- Optional module-specific color identification of the terminals according to the color code (CC)
- Optional system-integrated shield connection
- The modules support PROFIsafe in both PROFIBUS and PROFINET configurations. They can be used with all fail-safe SIMATIC S7 CPUs

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

Technical specifications

Article number	6AG1136-6BA00-2CA0
Based on	6ES7136-6BA00-0CA0 SIPLUS ET 200SP F-DI 4/8x24VDC HF
Ambient conditions	
Ambient temperature during operation	
• horizontal installation, min.	-25 °C
• horizontal installation, max.	60 °C
• vertical installation, min.	-25 °C
• vertical installation, max.	50 °C
Extended ambient conditions	
• relative to ambient temperature-atmospheric pressure-installation altitude	Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m)
Relative humidity	
- With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation/frost (no commissioning under condensation conditions)

Article number	6AG1136-6BA00-2CA0
Based on	6ES7136-6BA00-0CA0 SIPLUS ET 200SP F-DI 4/8x24VDC HF
Resistance	
- against biologically active substances / conformity with EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!
- against chemically active substances / conformity with EN 60721-3-3	Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!
- against mechanically active substances / conformity with EN 60721-3-3	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!

Ordering data	Article No.		Article No.
SIPLUS digital fail-safe input modules (Extended temperature range and exposure to media) F-DI 8x24 V DC High Feature, BU type A0, color code CC01	6AG1136-6BA00-2CA0		
Usable BaseUnits			
BU15-P16+A0+2D (Extended temperature range and exposure to media) BU type A0; BaseUnit (light) with 16 process terminals to the module; for starting a new load group (max. 10 A)	6AG1193-6BP00-7DA0	BU15-P16+A10+2D (Extended temperature range and exposure to media) BU type A0; BaseUnit (light) with 16 process terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1 A to 10 A); for starting a new load group (max. 10 A)	6AG1193-6BP20-7DA0
BU15-P16+A0+2B (Extended temperature range and exposure to media) BU type A0; BaseUnit (dark) with 16 process terminals to the module; for continuing the load group	6AG1193-6BP00-7BA0	BU15-P16+A10+2B (Extended temperature range and exposure to media) BU type A0; BaseUnit (dark) with 16 process terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1 A to 10 A); for continuing the load group	6AG1193-6BP20-7BA0
		Accessories	See SIMATIC ET 200SP, digital fail-safe input modules, page 9/115

I/O systems

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

Fail-safe I/O modules > SIPLUS digital F output modules

Overview



Digital fail-safe output module:
F-DQ 4x24VDC High Feature, BU type A0, color code CC01

Other properties:

- 4-channel digital fail-safe output module for the ET 200SP
- Fail-safe 2-channel activation (sink/source output) by actuators
- Actuators can be controlled up to 2 A
- Certified up to SIL 3 (IEC 61508), PL e (ISO 13849)

- Can be plugged onto type A0 BaseUnits (BU) with automatic coding
- LED display for error, operation, supply voltage and status
- Clear labeling on front of module
 - Plain text identification of the module type and function class
 - 2D matrix code (order and serial number)
 - Connection diagram
 - Color coding of the DI module type: white
 - Hardware and firmware version
 - Color code (CC) for module-specific color coding of the potentials at the terminals of the BU
 - Complete Article No.
- Optional labeling accessories
 - Labeling strips
 - Reference identification label
- Optional module-specific color identification of the terminals according to the color code (CC)
- Optional system-integrated shield connection
- The modules support PROFI-safe in both PROFIBUS and PROFINET configurations
- They can be used with all fail-safe SIMATIC S7 CPUs

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

Technical specifications

Article number	6AG1136-6DB00-2CA0
Based on	6ES7136-6DB00-0CA0 SIPLUS ET 200SP F-DQ 4x24VDC/2A PM HF
Ambient conditions	
Ambient temperature during operation	
• horizontal installation, min.	-25 °C
• horizontal installation, max.	60 °C
• vertical installation, min.	-25 °C
• vertical installation, max.	50 °C
Extended ambient conditions	
• relative to ambient temperature-atmospheric pressure-installation altitude	Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m)
Relative humidity	
- With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation/frost (no commissioning under condensation conditions)

Article number	6AG1136-6DB00-2CA0
Based on	6ES7136-6DB00-0CA0 SIPLUS ET 200SP F-DQ 4x24VDC/2A PM HF
Resistance	
- against biologically active substances / conformity with EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!
- against chemically active substances / conformity with EN 60721-3-3	Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!
- against mechanically active substances / conformity with EN 60721-3-3	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!

Ordering data	Article No.		Article No.
SIPLUS digital fail-safe output modules (Extended temperature range and exposure to media) F-DQ 4x24VDC High Feature, BU type A0, color code CC01	6AG1136-6DB00-2CA0		
Usable BaseUnits			
BU15-P16+A0+2D (Extended temperature range and exposure to media) BU type A0; BaseUnit (light) with 16 process terminals to the module; for starting a new load group (max. 10 A)	6AG1193-6BP00-7DA0		
BU15-P16+A0+2B (Extended temperature range and exposure to media) BU type A0; BaseUnit (dark) with 16 process terminals to the module; for continuing the load group	6AG1193-6BP00-7BA0		
BU15-P16+A10+2D (Extended temperature range and exposure to media) BU type A0; BaseUnit (light) with 16 process terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1 A to 10 A); for starting a new load group (max. 10 A)	6AG1193-6BP20-7DA0		
		BU15-P16+A10+2B (Extended temperature range and exposure to media) BU type A0; BaseUnit (dark) with 16 process terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1 A to 10 A); for continuing the load group	6AG1193-6BP20-7BA0
		BU20-P12+A4+0B (Extended temperature range and exposure to media) BU type B0; BaseUnit (dark) with 12 process terminals (1...12) to the module and an additional 4 internally jumpered AUX terminals (1 A to 4 A); for continuing the load group; 1 unit	6AG1193-6BP20-7BB0
		Accessories See SIMATIC ET 200SP, digital F output modules, page 9/118	

IO systems

SIMATIC ET 200 systems for the control cabinet

SIMATIC ET 200SP

Fail-safe I/O modules > SIPLUS fail-safe special modules

Overview



Digital fail-safe power module:
F-PM-E PPM 24VDC/8A for BU type C0,
color code CC52

Other properties:

- Certified up to SIL 3 (IEC 61508), PL e (ISO 13849)
- Safety-related shutdown of output modules within the potential group of the F-PM-E
- Two fail-safe digital inputs, for reading of sensor information (1 or 2 channels)
- One fail-safe digital output onboard (ppm switching, up to 2 A, up to SIL 3/PL e)
- Fail-safe digital output and potential supply pp or pm switching can be configured
- Configurable onboard evaluation of the fail-safe inputs for control of the fail-safe digital outputs and of the potential group
- Digital standard output modules can be shut down up to PL d (ISO 13849) and SIL 2 (IEC 61508) (up to 8 A)
- Can be plugged onto type C0 BaseUnits (BU) with automatic coding
- LED display for error, operation, supply voltage and status
- Clear labeling on front of module
 - Plain text identification of the module type and function class
 - 2D matrix code (order and serial number)
 - Connection diagram
 - Color coding of the DI module type: white
 - Hardware and firmware version
 - Color code (CC) for module-specific color coding of the potentials at the terminals of the BU
 - Complete Article No.
- Optional labeling accessories
 - Labeling strips
 - Reference identification label
- Optional module-specific color identification of the terminals according to the color code (CC)
- Optional system-integrated shield connection
- The modules support PROFIsafe in both PROFIBUS and PROFINET configurations
- They can be used with all fail-safe SIMATIC S7 CPUs

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

Technische Daten

Article number	6AG1136-6PA00-2BC0
Based on	6ES7136-6PA00-0BC0 SIPLUS ET 200SP F-PM-E 24VDC/8A PPM
Ambient conditions	
Ambient temperature during operation	
• horizontal installation, min.	-25 °C
• horizontal installation, max.	60 °C
• vertical installation, min.	-25 °C
• vertical installation, max.	50 °C
Extended ambient conditions	
• relative to ambient temperature-atmospheric pressure-installation altitude	Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m)
Relative humidity	
- With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation/frost (no commissioning under condensation conditions)
Resistance	
- against biologically active substances / conformity with EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!
- against chemically active substances / conformity with EN 60721-3-3	Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!
- against mechanically active substances / conformity with EN 60721-3-3	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!

Ordering data

Article No.

SIPLUS digital F power module F-PM-E 24 V DC/8 A PPM Standard

(Extended temperature range and exposure to media)

BU type C0, color code CC52.
2 inputs, 1 output, SIL3/Cat.4/PLc**Type C0 BaseUnits****BU20-P6+A2+4D**

(Extended temperature range and exposure to media)

BU type C0; BaseUnit (light) with 6 push-in terminals (1...6) to the module and an additional 2 AUX terminals; new load group

Accessories**6AG1136-6PA00-2BC0****6AG1193-6BP20-7DC0**

See SIMATIC ET 200SP, fail-safe special modules, page 9/123

I/O systems

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

Fail-safe I/O modules > F-CM AS-i Safety ST for SIMATIC ET 200SP

Overview



The F-CM AS-i Safety ST fail-safe communication module supplements an AS-Interface network without additional wiring to produce a safety-related AS-i network.

Important features:

- Fail-safe communication module for the ET 200SP
 - 31 fail-safe input channels in the process image
 - 16 fail-safe output channels in the process image
 - Certified up to SIL 3 (IEC 61508/EN 62061), PL e (EN ISO 13849-1)
 - Parameterization conforms with other fail-safe I/O modules of the ET 200SP
- The communication module supports PROFINET and PROFIBUS configurations. It can be used with fail-safe SIMATIC S7-300F/S7-416F CPUs and S7-1500F CPUs and also the fail-safe versions of the ET 200SP station with ET 200SP F-CPU 1510SP F / 1512SP F (firmware V1.8 or higher) or 1515SP PC F
- For reading up to 31 fail-safe AS-i input slaves
 - Two sensor inputs/signals for each fail-safe AS-i input slave
 - Adjustable evaluation of sensor signals: 2-channel or 2 x 1-channel
 - Integrated discrepancy evaluation in the case of 2-channel signals
 - Integrated AND operation in the case of 2 x 1-channel signals
 - Input delay can be parameterized
 - Start-up test can be set
 - Sequence monitoring can be activated
- For control of up to 16 fail-safe AS-i output circuit groups
 - The output circuit groups are controlled independently of one another
 - One output circuit group can act on one or more actuators (e.g. to switch drives simultaneously)
 - An actuator (e.g. a contactor) is interfaced via an AS-i safety output module (e.g. SlimLine S45F safety module, Article No. 3RK1405-1SE15-0AA2; [see Catalog IC 10, Chapter 2 "Industrial Communication" → "ASIsafe" → "Fail-safe AS-Interface modules"](#)).
 - Simple fault acknowledgment via the process image
- Simple module replacement thanks to automatic importing of the safety parameters from the coding element
- Comprehensive diagnostic options
- Can be plugged onto type C1 or type C0 BaseUnits (BU)
- Informative automatic alarm indications (firmware V1.0.1 or higher)

- Supply via AS-Interface voltage
- Eight LED indicators for diagnostics, operating state, fault indication and supply voltage
- Informative front-side module inscription
 - Plain text marking of the module type and function class
 - 2D matrix code (Article No. and serial number)
 - Connection diagram
 - Color coding of the CM module type: light gray
 - Hardware and firmware version
 - Complete Article No.
- Optional labeling accessories
 - Labeling strips
 - Reference identification label

Design

The fail-safe F-CM AS-i Safety ST module has an ET 200SP module enclosure with a width of 20 mm.

One AS-i master according to the AS-i Specification V3.0, as well as fail-safe AS-i input slaves and/or AS-i safety output modules are needed for operation. The CM AS-i Master ST communication module (Article no. 3RK7137-6SA00-0BC1) is recommended as the AS-i master for the ET 200SP, [see beginning from page 9/89](#).

Simple combination of the CM AS-i Master ST and F-CM AS-i Safety ST modules in one ET 200SP station results in a powerful, safety-oriented router between PROFINET (or PROFIBUS) and AS-Interface, which can be expanded further in a modular fashion.



Combination of an ET 200SP interface module, CM AS-i Master ST and F-CM AS-i Safety ST

With the digital and analog I/O modules of the ET 200SP, additional local inputs and outputs can be realized so as to ensure that the modular AS-i router complies precisely with customer requirements. Expansion variants for almost every application are possible thanks to the selection of standard and fail-safe I/O modules.

Besides the single AS-i master, double, triple or generally multiple masters can be realized with or without fail-safe functionality.

Overview (continued)Supported BaseUnits

With the combination of the CM AS-i Master ST and F-CM AS-i Safety ST modules, the CM module is plugged onto a light type C0 BaseUnit and, directly to the right of it, the F-CM module is plugged onto a dark type C1 BaseUnit. The AS-i cable is connected only on the light BaseUnit of the CM module.

Notes on safety

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 only represent one component of such a concept.

For more information on the topic of Industrial Security, see <http://www.siemens.com/industrialsecurity>.

Configuration

The following software is required for configuration of the F-CM AS-i Safety ST module:

- STEP 7 (classic), V5.5 SP3 HF4 or higher with HSP 2093¹⁾ and Distributed Safety V5.4 SP5 or F-Configuration Pack SP11

or

- STEP 7 (TIA Portal) V13 and higher with HSP 0070²⁾ and Safety Advanced V13.
For connection to S7-1500F you require STEP 7 V13 SP1. When configuring with STEP 7 V13 SP1, the latest version of HSP 0070 V2.0 (or higher) is an essential prerequisite. STEP 7 Safety V13 SP1 Update 4 and the new version of HSP 0070 V3.0 (or higher) is needed for configuration of the F-CM AS-i Safety ST module in an ET 200SP station with ET 200SP F-CPU 1510SP F/1512SP F (firmware V1.8 or higher) or 1515SP PC F.

Configuration and programming are done entirely in the STEP 7 user interface. No additional configuration software is needed for commissioning.

Data management – together with all other configuration data of the SIMATIC – is realized completely in the S7 project.

The input and output channels are assigned to the process image automatically and manual linking via configuration function blocks is not necessary.

If the F-CM AS-i Safety ST module is replaced, all necessary settings are automatically imported into the new module.

The F-CM AS-i Safety ST module occupies 16 input bytes and 8 output bytes in the I/O data of the ET 200SP station.

For diagnostics during ongoing operation, diagnostics blocks with clearly arranged visualization on the SIMATIC HMI panel are available or can be downloaded free of charge via a web browser, see <https://support.industry.siemens.com/cs/ww/en/view/109479103>.

¹⁾ HSP 2093; see <https://support.industry.siemens.com/cs/ww/en/view/23183356>.

²⁾ HSP 0070; see <https://support.industry.siemens.com/cs/ww/en/view/72341852>.

Ordering data**Article No.****F-CM AS-i Safety ST communication module****3RK7136-6SC00-0BC1**

- Fail-safe module for SIMATIC ET 200SP, can be plugged onto BaseUnit type C1 (alternatively type C0)
- Operation requires an AS-i master, e.g. CM AS-i Master ST
- Can be used up to SIL 3 (IEC 62061/IEC 61508), PL e (EN ISO 13849-1)
- Coding element type H (included in scope of supply)
- Dimensions (W x H x D / mm): 20 x 73 x 58

Accessories**BaseUnit BU20-P6+A2+4B****6ES7193-6BP20-0BC1**

- BaseUnit (dark), BU type C1
- Suitable for the F-CM AS-i Safety ST fail-safe module
- Continuation of an AS-i network, connection with the AS-i voltage of the left-hand module

Coding element type H (spare part)**6ES7193-6EH00-1AA0**

- For the ET 200SP modules F-CM AS-i Safety ST, CM 4xIO-Link
- Packing unit 5 items

More accessories

See CM AS-i Master ST communication modules

More information

For the Manual "F-CM AS-i Safety ST for SIMATIC ET 200SP", see <https://support.industry.siemens.com/cs/ww/en/view/90265988>.

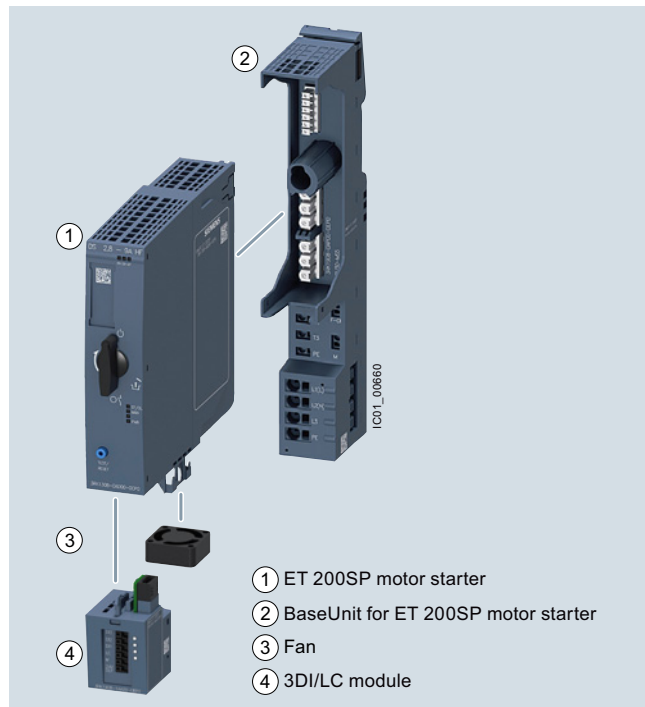
Released combinations of the AS-i modules for ET 200SP, see <https://support.industry.siemens.com/cs/ww/en/view/103624653>.

I/O systems

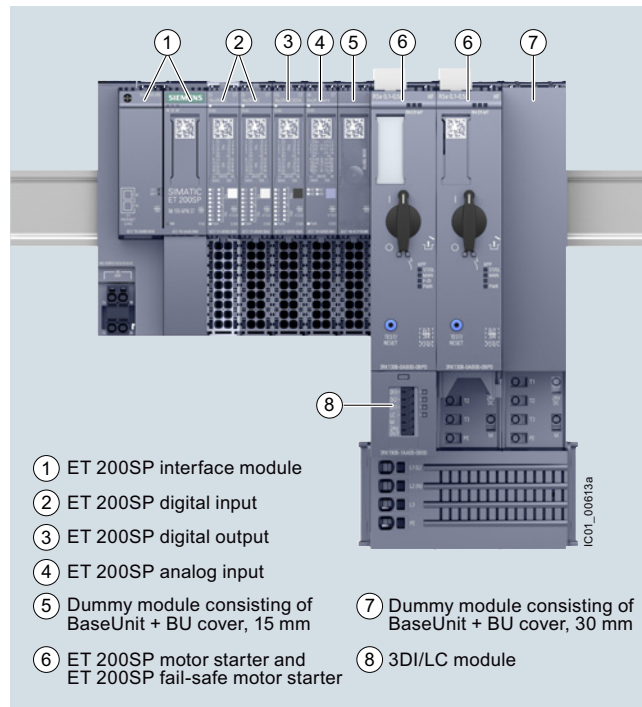
SIMATIC ET 200 systems for the control cabinet
SIMATIC ET 200SP

I/O modules > ET 200SP motor starters

Overview



Motor starter, BaseUnit and 3DI/LC control module



3RK1308 motor starter in the ET 200SP I/O system

More information

Home page see <http://www.siemens.com/ET200SP-motorstarter>

Further components in the ET 200SP distributed I/O system see [Industry Mall, https://mall.industry.siemens.com/mall/en/de/Catalog/Products/10144488?tree=CatalogTree](https://mall.industry.siemens.com/mall/en/de/Catalog/Products/10144488?tree=CatalogTree)

ET 200SP motor starters

ET 200SP is a scalable, highly flexible and modular I/O system with IP20 degree of protection.

As I/O modules, the ET 200SP motor starters are an integral part of this I/O system. They are switching and protection devices for single and three-phase loads and are available as direct-on-line or reversing starters.

Basic functionality

All versions of the ET 200SP motor starters have the following functionality:

- Fully pre-wired motor starters for switching and protecting any AC loads up to 5.5 kW from 48 V AC to 500 V AC
- Disconnection possible via fail-safe motor starters up to SIL 3 and PL e Cat. 4
- With self-assembling 32 A power bus, i.e. the load voltage is only fed in once for a group of motor starters
- All control supply voltages connected only once, i.e. when modules are added they are automatically connected to the next module
- Hot swapping is permissible
- Digital inputs can be used optionally via a 3DI/LC module
- Control of the motor starter from the control system and extensive diagnostics status via the cyclic process image
- Diagnostics capability for active monitoring of the switching and protection functions
- The signal states in the process image of the motor starter provide information about protective devices (short circuit or overload), the switching states of the motor starter, and system faults.

Designing interference-free motor starters

For interference-free operation of the ET 200SP station in accordance with the IEC 60947-4-2 standard, use a dummy module before the first motor starter. The dummy module consists of the 6ES7193-6BP00-0BA0 or 6ES7193-6BP00-0DA0 BaseUnit and the 6ES7133-6CV15-1AM0 BU cover 15 mm.

The 15 mm BU cover protects the plug contacts of the BaseUnit against dirt.

Both can be ordered as accessories, see also page 9/141.

Overview (continued)

Article No. scheme

Product versions		Article number	
Motor starters		3RK1308 - 0 □ □ 0 0 - 0 C P 0	
Product function	Direct-on-line starters	A	for motor standard output 0.12 ... 5.5 kW ¹⁾
	Reversing starters	B	for motor standard output 0.12 ... 5.5 kW ¹⁾
	Fail-safe direct-on-line starters	C	for motor standard output 0.12 ... 5.5 kW ¹⁾
	Fail-safe reversing starters	D	for motor standard output 0.12 ... 5.5 kW ¹⁾
Current range	0.3 ... 1 A	B	
	0.9 ... 3 A	C	
	2.8 ... 9 A	D	
	4 ... 12 A	E	
Example		3RK1308 - 0 A D 0 0 - 0 C P 0	

¹⁾ For standard motors: Single- or three-phase asynchronous motors, single-phase AC motors, single-phase asynchronous motors, at 400 V AC and 500 V AC; the actual startup characteristics of the motor as well as its rated data are important factors here.

Note:

The Article No. scheme shows an overview of product versions for better understanding of the logic behind the article numbers.

For your orders, please use the article numbers quoted in the selection and ordering data.

BaseUnits for motor starters

BaseUnits are components for accommodating the ET 200SP I/O modules. The self-assembling voltage buses integrated into the BaseUnits reduce wiring outlay to the single infeed (both of auxiliary and load voltage).

All modules following on the right are automatically supplied upon plugging the BaseUnits together, if BaseUnits are inserted

with routing. The rugged design and keyed connection technology enables use in harsh industrial conditions.

The BaseUnits are available with various infeeds for the motor starters.

Article No. scheme

Product versions		Article number	
BaseUnit		3RK1908 - 0 A P 0 0 - 0 □ P 0	
BaseUnit infeed	24 V and 500 V DC	A	
	24 V DC	B	
	500 V AC	C	
	without infeed	D	
	500 V AC	E	with F-DI for fail-safe motor starters
	without infeed	F	with F-DI for fail-safe motor starters
Example		3RK1908 - 0 A P 0 0 - 0 A P 0	

Note:

The Article No. scheme shows an overview of product versions for better understanding of the logic behind the article numbers.

For your orders, please use the article numbers quoted in the selection and ordering data.

3DI/LC control module

This is a digital input module with three inputs for local motor starter functions such as "manual local control", "implementation of fast inputs" or "end position disconnection".

For a list of all the functions permitted by the 3DI/LC module, see Manual "ET 200SP motor starters", "Function overview" section
<https://support.industry.siemens.com/cs/ww/en/view/109479973>

The module is plugged onto the front of the motor starter from which it is supplied with a 24 V DC operating voltage.

I/O systems

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

I/O modules > ET 200SP motor starters

Benefits

Product advantages

The ET 200SP motor starters offer a number of benefits:

- Fully integrated into the ET 200SP I/O system (including TIA Selection Tool and TIA Portal)
- High degree of flexibility when it comes to safety applications via SIMATIC F-CPU or SIRIUS 3SK safety relays up to SIL 3 and PL e Cat. 4.
- Simple, integrated current value transmission
- Extensive parameterization by means of TIA Portal
- Increase of plant availability through fast replacement of units (easy mounting and plug-in technology)
- Longer service life and reduced heat losses thanks to hybrid technology
- Less space required in the control cabinet (20 to 80%) as a result of greater functional density (direct-on-line and reversing starters in same width)
- Extensive diagnostics and information for preventive maintenance
- Parameterizable inputs via 3DI/LC control module
- Less wiring and testing required as a result of integrating several functions into a single device
- Lower overheads for stock keeping and configuration as a result of the wide setting range of the electronic overload release (up to 1:3)
- Lower technology-reduced inherent power loss as speed-controlled drive systems, also enabling lower cooling requirements (and enabling a more compact design)

The ET 200SP motor starters can be used with highly energy-efficient IE3/IE4 motors.

For more information on IE3/IE4 ready see [Catalog IC 10, Preface](#) or <https://www.siemens.com/ie3ready>

Standards and approvals

- IEC/EN 60947-4-2
- UL 60947-4-2
- CSA
- ATEX
- IEC 61508-1: SIL 3
- ISO 13849: PL e
- CCC approval for China

Application

The ET 200SP motor starters are suitable for the following applications:

- Switching and monitoring of
 - 3-phase motors with overload and short-circuit protection (e.g. 400 V asynchronous motors for secondary drives in conveyor systems)
 - 1-phase motors with overload and short-circuit protection (e.g. 250 V motors for pump applications)
 - Resistive loads by means of current value and diagnosis via the maintenance function (e.g. for heaters)
- Plant monitoring and energy management in conveyor systems:

By means of phase asymmetry and zero current detection, for example, it is possible to monitor drive belts and blocking
- Track switching and lifting table control in conveyor systems

Track switches can be implemented by means of the quick stop function and lifting table controls by means of the "immediate end position disconnection" function without any laborious programming
- Safe isolation of drive from main power supply:

The isolating functions in accordance with IEC 60947-1 offer protection against inadvertent activation during plant maintenance

Technical specifications

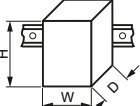
More information

Industry Mall, see www.siemens.com/product?3RK1308

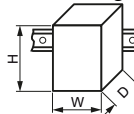
Manual, see <https://support.industry.siemens.com/cs/ww/en/view/109479973>

FAQs, see <https://support.industry.siemens.com/cs/de/en/ps/21800/faq>

ET 200SP motor starters

Article number		3RK1308-0AB00-0CP0	3RK1308-0AC00-0CP0	3RK1308-0AD00-0CP0	3RK1308-0AE00-0CP0
		3RK1308-0BB00-0CP0	3RK1308-0BC00-0CP0	3RK1308-0BD00-0CP0	3RK1308-0BE00-0CP0
Product designation		Motor starters			
General technical data					
Width x Height x Depth	mm	30 × 142 × 150			
					
Design of the switching contact		Hybrid			
Type of the motor protection		solid-state			
Installation altitude at height above sea level maximum	m	4 000			
Mounting position		Vertical, horizontal, flat (observe derating)			
Mounting type		pluggable in BaseUnit			
Ambient temperature					
• during operation	°C	-25 ... +60			
• during transport	°C	-40 ... +70			
• during storage	°C	-40 ... +70			

Article number		3RK1308-0AB00-0CP0 3RK1308-0BB00-0CP0	3RK1308-0AC00-0CP0 3RK1308-0BC00-0CP0	3RK1308-0AD00-0CP0 3RK1308-0BD00-0CP0	3RK1308-0AE00-0CP0 3RK1308-0BE00-0CP0
Relative humidity during operation	%	10 ... 95			
Vibration resistance		15 mm to 6 Hz; 2g to 500 Hz			
Shock resistance		6 g / 11 ms			
Protection class IP		IP20			
Type of assignment		1			
Electrical data					
Supply voltage at DC rated value	V	24			
Operating power at AC-53a at 400 V rated value	kW	0.25	1.1	4	5.5
Operating frequency rated value	Hz	50 ... 60			
Maximum short-circuit current breaking capacity (<i>I</i> _{cu}) • at 400 V rated value • at 500 V rated value	kA kA	55 55			
Adjustable pick-up value current of the current-dependent overload release	A	0.3 ... 1	0.9 ... 3	2.8 ... 9	4 ... 12
Current-carrying capacity at startup maximum	A	10	30	90	100
maximum permissible voltage for safe isolation between main and auxiliary circuit	V	500			
Insulation voltage rated value	V	500			
Trip class		CLASS 5 and 10 adjustable			

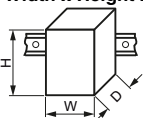
Article number		3RK1308-0CB00-0CP0 3RK1308-0DB00-0CP0	3RK1308-0CC00-0CP0 3RK1308-0DC00-0CP0	3RK1308-0CD00-0CP0 3RK1308-0DD00-0CP0	3RK1308-0CE00-0CP0 3RK1308-0DE00-0CP0
Product designation		Fail-safe motor starter			
General technical data					
Width x Height x Depth	mm	30 × 142 × 150			
					
Design of the switching contact		Hybrid			
Type of the motor protection		Solid-state			
Installation altitude at height above sea level maximum	m	2 000			
Mounting position		Vertical, horizontal, flat (observe derating)			
Mounting type		Pluggable in BaseUnit			
Ambient temperature • during operation • during transport • during storage	°C °C °C	-25 ... +60 -40 ... +70 -40 ... +70			
Relative humidity during operation	%	10 ... 95			
Vibration resistance		15 mm bis 6 Hz; 2 g bis 500 Hz			
Shock resistance		6 g / 11 ms			
Protection class IP		IP20			
Type of assignment		1			
Electrical data					
Supply voltage at DC rated value	V	24			
Operating power at AC-53a at 400 V rated value	kW	0.25	1.1	4	5.5
Operating frequency rated value	Hz	50 ... 60			
Maximum short-circuit current breaking capacity (<i>I</i> _{cu}) • at 400 V rated value • at 500 V rated value	kA kA	55 55			
Adjustable pick-up value current of the current-dependent overload release	A	0.3 ... 1	0.9 ... 3	2.8 ... 9	4 ... 12
Current-carrying capacity at startup maximum	A	10	30	90	100
maximum permissible voltage for safe isolation between main and auxiliary circuit	V	500			
Insulation voltage rated value	V	500			
Trip class		CLASS 5 and 10 adjustable			

I/O systems

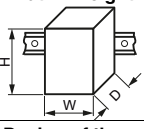
SIMATIC ET 200 systems for the control cabinet

SIMATIC ET 200SP

I/O modules > ET 200SP motor starters**BaseUnits for motor starters**

Article number		3RK1908-0AP00-0AP0	3RK1908-0AP00-0BP0	3RK1908-0AP00-0CP0	3RK1908-0AP00-0DP0	3RK1908-0AP00-0EP0	3RK1908-0AP00-0FP0
Product designation		BaseUnit					
General technical data							
Width x Height x Depth	mm	30 × 215 × 75					
							
Ambient temperature							
• during operation	°C	-25 ... +60					
• during transport	°C	-40 ... +70					
• during storage	°C	-40 ... +70					
Protection class IP		IP20					
Protection against electrical shock		finger-safe					
Connections/Terminals							
Type of connectable conductor cross-sections							
• at the inputs for supply voltage							
- solid		1x0.5 ... 2.5 mm ²	--				
- finely stranded with core end processing		1x0.5 ... 2.5 mm ²	--				
- finely stranded without core end processing		1x0.5 ... 2.5 mm ²	--				
- at AWG conductors solid		1x20 ... 12	--				
• for supply							
- solid		1x1 ... 6 mm ²	--	1x1 ... 6 mm ²	--	1x1 ... 6 mm ²	--
- finely stranded with core end processing		1x1 ... 6 mm ²	--	1x1 ... 6 mm ²	--	1x1 ... 6 mm ²	--
- finely stranded without core end processing		1x1 ... 6 mm ²	--	1x1 ... 6 mm ²	--	1x1 ... 6 mm ²	--
- at AWG conductors solid		1x18 ... 10	--	1x18 ... 10	--	1x18 ... 10	--
• for load-side outgoing feeder							
- solid		1x0.5 ... 2.5 mm ²					
- finely stranded with core end processing		1x0.5 ... 2.5 mm ²					
- finely stranded without core end processing		1x0.5 ... 2.5 mm ²					
- at AWG conductors solid		1x20 ... 12					
Type of electrical connection for auxiliary and control current circuit		PUSH-IN connection (spring-loaded connection)					
Miscellaneous							
Shape of the screwdriver tip		Slot					
Size of the screwdriver tip		Standard screwdriver 0.6 mm x 3.5 mm					

3DI/LC control module

Article number		3RK1908-1AA00-0BP0
Product designation		3DI/LC control module
General technical data		
Width x Height x Depth	mm	30 × 54.5 × 42.3
		
Design of the product		Accessories
Number of digital inputs		4
Installation altitude at height above sea level maximum	m	2 000
Mounting position		vertical, horizontal, flat
Mounting type		Can be plugged onto motor starters
Ambient temperature		
• during operation	°C	-25 ... +60
• during transport	°C	-40 ... +70
• during storage	°C	-40 ... +70
Connections/Terminals		
Connectable conductor cross-section for auxiliary contacts		
• single or multi-stranded	mm ²	0.2 ... 1.5
• finely stranded with core end processing	mm ²	0.25 ... 1.5
• finely stranded without core end processing	mm ²	0.2 ... 1.5
AWG number as coded connectable conductor cross section for auxiliary contacts		24 ... 16
Type of electrical connection for auxiliary and control current circuit		PUSH-IN connection (spring-loaded connection)
Electrical data		
Type of voltage of the control supply voltage		DC
Control supply voltage at DC rated value	V	20.4 ... 28.8
Miscellaneous		
Shape of the screwdriver tip		Slot
Size of the screwdriver tip		Standard screwdriver 0.6 mm x 3.5 mm

I/O systems

SIMATIC ET 200 systems for the control cabinet

SIMATIC ET 200SP

I/O modules > ET 200SP motor starters

IE3/IE4 ready**Selection and ordering data**

	Adjustable current response value of the inverse-time delayed overload release	Current-carrying capacity at startup maximum		Article No.
	A	A		
Motor starters				
Direct-online starter				
	0.3 ... 1	10	NEW	3RK1308-0AB00-0CP0 3RK1308-0AC00-0CP0 3RK1308-0AD00-0CP0 3RK1308-0AE00-0CP0
	0.9 ... 3	30		
	2.8 ... 9	90		
	4 ... 12	100		
3RK1308-0AB00-0CP0				
Reversing starter				
	0.3 ... 1	10	NEW	3RK1308-0BB00-0CP0 3RK1308-0BC00-0CP0 3RK1308-0BD00-0CP0 3RK1308-0BE00-0CP0
	0.9 ... 3	30		
	2.8 ... 9	90		
	4 ... 12	100		
3RK1308-0BB00-0CP0				
Fail-safe direct-online starter				
	0.3 ... 1	10	NEW NEW NEW NEW	3RK1308-0CB00-0CP0 3RK1308-0CC00-0CP0 3RK1308-0CD00-0CP0 3RK1308-0CE00-0CP0
	0.9 ... 3	30		
	2.8 ... 9	90		
	4 ... 12	100		
3RK1308-0CE00-0CP0				
Fail-safe reversing starter				
	0.3 ... 1	10	NEW NEW NEW NEW	3RK1308-0DB00-0CP0 3RK1308-0DC00-0CP0 3RK1308-0DD00-0CP0 3RK1308-0DE00-0CP0
	0.9 ... 3	30		
	2.8 ... 9	90		
	4 ... 12	100		
3RK1308-0DE00-0CP0				

Design of the product	Operating voltage of AC supply	Supply voltage of DC supply	Spring-loaded connection (push-in)
	V	V	Article No.

BaseUnit¹⁾

3RK1908-0AP00-0AP0

For AC/DC feed in	500	24	3RK1908-0AP00-0AP0
For AC feed in	--	24	3RK1908-0AP00-0BP0
For DC feed in	500	--	3RK1908-0AP00-0CP0
Without feed in	--	--	3RK1908-0AP00-0DP0
For AC infeed, F-DI	500	--	3RK1908-0AP00-0EP0
Without infeed, F-DI	--	--	3RK1908-0AP00-0FP0

NEW

NEW

¹⁾ The voltage is looped-through from BaseUnits with infeed to subsequent BaseUnits.

Control supply voltage at DC rated value	Product function	Spring-loaded connection (push-in)
	on-site operation digital inputs parameterizable	Article No.
V		

3DI/LC control module

3RK1908-1AA00-0BP0

20.4 ... 28.8	Yes	Yes	3RK1908-1AA00-0BP0
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Product designation	Article No.
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Accessories

3RK1908-1CA00-0BP0

BaseUnit cover	3RK1908-1CA00-0BP0
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3RK1908-1DA00-2BP0

Infeed bus cover	3RK1908-1DA00-2BP0
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3RK1908-1EA00-1BP0

Mechanical bracket	3RK1908-1EA00-1BP0
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3RW4928-8VB00

Fan	3RW4928-8VB00
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I/O systems

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

BaseUnits

Overview



With the BaseUnits, the ET 200SP offers a rugged and service-friendly design with permanent wiring:

- No tools needed for one-handed wiring using push-in terminals
- Actuation of the spring NC contacts with a standard screwdriver, with a blade width up to 3.5 mm
- Outstanding access due to arrangement of measuring tap, spring NC contacts and cable entry in columns, while at the same time reducing the space required by 64%
- Fault-proof color coding of the spring NC contacts for better orientation in the terminal panel

- Replacement of I/O modules during operation without affecting the wiring
- Operation with module gaps (gaps without I/O module)
- Automatic coding of the I/O modules prevents destruction of the electronics if a module is accidentally inserted in the wrong slot during replacement
- High EMC interference immunity:
 - self-assembling shielded backplane bus
 - multi-layer conductor plate with shield levels for interference-free signal transmission from the terminal to the I/O module
 - system-integrated, space-saving shield connection for quick installation
- Self-assembling potential groups without external wiring or jumpers
- Replaceable terminal box
- Side-by-side latching of the BUs for high mechanical and EMC loads
- Optional module-specific color identification of the terminals according to the color code (CC)
- Optional equipment marking using slide-in equipment labeling plates

An ET 200SP station can be expanded via one BU-Send BaseUnit with a BA-Send BusAdapter plugged onto it with up to 16 modules from the ET 200AL series of I/O devices with IP67 protection.

Technical specifications

Article number	6ES7193-6BP20-0DA0 BASEUNIT TYPE A0, BU15-P16+A10+2D	6ES7193-6BP00-0DA0 BASEUNIT TYPE A0, BU15-P16+A0+2D	6ES7193-6BP20-0BA0 BASEUNIT TYPE A0, BU15-P16+A10+2B	6ES7193-6BP00-0BA0 BASEUNIT TYPE A0, BU15-P16+A0+2B
General information				
Product type designation	ET 200SP, BaseUnit BU type A0, BU15-P16+A10+2D, PU 1	BU Type A0, BU15-P16+A0+2D, PU 1	ET 200SP, BaseUnit BU type A0, BU15-P16+A10+2B, PU 1	BU Type A0, BU15-P16+A0+2B, PU 1
Dimensions				
Width	15 mm	15 mm	15 mm	15 mm
Height	141 mm	117 mm	141 mm	117 mm
Depth	35 mm	35 mm	35 mm	35 mm
Weights				
Weight, approx.	50 g	40 g	50 g	40 g

Article number	6ES7193-6BP20-0BB0 BASEUNIT TYP B0, BU20-P12+A4+0B	6ES7193-6BP20-0BB1 BASEUNIT TYPE B1, BU20-P12+A0+4B	6ES7193-6BP20-0DC0 BASEUNIT TYP C0, BU20-P6+A2+4D	6ES7193-6BP00-0BD0 BASEUNIT TYPE D0, BU20-P12+A0+0B	6ES7193-6BP20-0BF0 BASEUNIT TYPE F0, BU20-P8+A4+0B
General information					
Product type designation	ET 200SP, BaseUnit BU-Type B0, PU 1	ET 200SP, BaseUnit BU type B1, BU20-P12+A0+4B, PU 1	ET 200SP, BaseUnit type C0, BU20-P6+A2+4D, PU 1	ET 200SP, BaseUnit BU type D0, PU 1	ET 200SP, BaseUnit BU type F0, BU20-P8+A4+0B, PU 1
Dimensions					
Width	20 mm	20 mm	20 mm	20 mm	20 mm
Height	117 mm	117 mm	117 mm	117 mm	117 mm
Depth	35 mm	35 mm	35 mm	35 mm	35 mm
Weights					
Weight, approx.	48 g	48 g	47 g	47 g	48 g

Technical specifications (continued)

Article number	6ES7193-6BP40-0DA1 BASEUNIT TYPE A1, BU15-P16+A0+12D/T	6ES7193-6BP00-0DA1 BASEUNIT TYPE A1, BU15-P16+A0+2D/T	6ES7193-6BP40-0BA1 BASEUNIT TYPE A1, BU15-P16+A0+12B/T	6ES7193-6BP00-0BA1 BASEUNIT TYPE A1, BU15-P16+A0+2B/T
General information				
Product type designation	ET 200SP, BaseUnit BU type A1, BU15-P16+A0+12D/T, PU 1	ET 200SP, BaseUnit BU type A1, BU15-P16+A0+2D/T, PU 1	ET 200SP, BaseUnit BU type A1, BU15-P16+A0+12B/T, PU 1	BU type A1, BU15-P16+A0+2B/T, PU 1
Dimensions				
Width	15 mm	15 mm	15 mm	15 mm
Height	141 mm	117 mm	141 mm	117 mm
Depth	35 mm	35 mm	35 mm	35 mm
Weights				
Weight, approx.	50 g	40 g	50 g	40 g

Article number	6ES7193-6BN00-0NE0 ET 200SP, BASEUNIT BU-SEND
General information	
Product type designation	BaseUnit BU-Send
Dimensions	
Width	20 mm
Height	117 mm
Depth	35 mm
Weights	
Weight, approx.	30 g

Ordering data**Article No.****Article No.****Type A0 BaseUnits****BU15-P16+A10+2D**

BU type A0; BaseUnit (light) with 16 process terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1 A to 10 A); for starting a new load group (max. 10 A)

- 1 unit
- 10 units

6ES7193-6BP20-0DA0
6ES7193-6BP20-2DA0

BU15-P16+A0+2D

BU type A0; BaseUnit (light) with 16 process terminals to the module; for starting a new load group (max. 10 A)

- 1 unit
- 10 units

6ES7193-6BP00-0DA0
6ES7193-6BP00-2DA0

BU15-P16+A10+2B

BU type A0; BaseUnit (dark) with 16 process terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1 A to 10 A); for continuing the load group

- 1 unit
- 10 units

6ES7193-6BP20-0BA0
6ES7193-6BP20-2BA0

BU15-P16+A0+2B

BU type A0; BaseUnit (dark) with 16 process terminals to the module; for continuing the load group

- 1 unit
- 10 units

6ES7193-6BP00-0BA0
6ES7193-6BP00-2BA0

Type B0 BaseUnits**BU20-P12+A4+0B**

BU type B0; BaseUnit (dark) with 12 process terminals (1...12) to the module and an additional 4 internally jumpered AUX terminals (1 A to 4 A); for continuing the load group; 1 unit

- 1 unit
- 10 units

6ES7193-6BP20-0BB0
6ES7193-6BP20-2BB0

Type B1 BaseUnits**BU20-P12+A0+4B**

BU type B1; BaseUnit (dark) with 12 process terminals to the module; for continuing the load group; 1 unit

6ES7193-6BP20-0BB1

Type C0 BaseUnits**BU20-P6+A2+4D**

BU type C0; BaseUnit (light) with 6 push-in terminals (1...6) to the module and an additional 2 AUX terminals; new load group

6ES7193-6BP20-0DC0

Type D0 BaseUnits**BU20-P12+A0+0B**

BU type D0; BaseUnit (dark) with 12 push-in terminals, without AUX terminals, bridged to the left

6ES7193-6BP00-0BD0

I/O systems

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

BaseUnits

Ordering data	Article No.		Article No.
Type A1 BaseUnits (with temperature detection)		Accessories	
BU15-P16+A0+12D/T BU type A1; BaseUnit (light) with 16 process terminals (1...16) to the module and an additional 2x5 internally jumpered additional terminals (1 B to 5 B and 1 C to 5 C); for starting a new load group (max. 10 A)	6ES7193-6BP40-0DA1	Equipment labeling plate 10 sheets of 16 labels	6ES7193-6LF30-0AW0
BU15-P16+A0+2D/T BU type A1; BaseUnit (light) with 16 process terminals to the module; for starting a new load group (max. 10 A)	6ES7193-6BP00-0DA1	BU cover for covering empty slots (gaps); 5 units • 15 mm wide • 20 mm wide	6ES7133-6CV15-1AM0 6ES7133-6CV20-1AM0
BU15-P16+A0+12B/T BU type A1; BaseUnit (dark) with 16 process terminals (1...16) to the module and an additional 2x5 internally jumpered additional terminals (1 B to 5 B and 1 C to 5 C); for continuing the load group	6ES7193-6BP40-0BA1	Shield connection 5 shield supports and 5 shield terminals	6ES7193-6SC00-1AM0
BU15-P16+A0+2B/T BU type A1; BaseUnit (dark) with 16 process terminals to the module; for continuing the load group	6ES7193-6BP00-0BA1	Color-coded labels • Color code CC01, module-specific, for 16 push-in terminals; for BaseUnit type A0, A1; 10 units • Color code CC02, module-specific, for 16 push-in terminals; for BaseUnit type A0, A1; 10 units • Color code CC03, module-specific, for 16 push-in terminals; for BaseUnit type A0, A1; 10 units • Color code CC04, module-specific, for 16 push-in terminals; for BaseUnit type A0, A1; 10 units • Color code CC71, for 10 AUX terminals 1 A to 10 A, for BU type A0, yellow/green, with push-in terminals; 10 units • Color code CC72, for 10 AUX terminals 1 A to 10 A, for BU type A0, red, with push-in terminals; 10 units • Color code CC73, for 10 AUX terminals 1 A to 10 A, for BU type A0, blue, with push-in terminals; 10 units • Color code CC74, for 2x5 additional terminals, 5 x red, 5 x blue, for BU type A1, with push-in terminals; 10 units • Color code CC81, for 4 AUX terminals 1 A to 4 A, yellow/green, for BaseUnit type B0; 10 units • Color code CC82, for 4 AUX terminals 1 A to 4 A, red, for BaseUnit type B0; 10 units • Color code CC83, for 4 AUX terminals 1 A to 4 A, blue, for BaseUnit type B0; 10 units • Color code CC41, module-specific, for 12 push-in terminals; for BaseUnit type B1; 10 units • Color code CC84, for 2 AUX terminals 1 A to 2 A, yellow/green, for BaseUnit type C0; 10 units • Color code CC85, for 2 AUX terminals 1 A to 2 A, red, for BaseUnit type C0; 10 units • Color code CC86, for 2 AUX terminals 1 A to 2 A, blue, for BaseUnit type C0; 10 units	6ES7193-6CP01-2MA0 6ES7193-6CP02-2MA0 6ES7193-6CP03-2MA0 6ES7193-6CP04-2MA0 6ES7193-6CP71-2AA0 6ES7193-6CP72-2AA0 6ES7193-6CP73-2AA0 6ES7193-6CP74-2AA0 6ES7193-6CP81-2AB0 6ES7193-6CP82-2AB0 6ES7193-6CP83-2AB0 6ES7193-6CP41-2MB0 6ES7193-6CP84-2AC0 6ES7193-6CP85-2AC0 6ES7193-6CP86-2AC0
Type F0 BaseUnits			
BU20-P8+A4+0B BU type F0; BaseUnit (dark) with 8 process terminals to the module and an additional 4 internally jumpered AUX terminals (1 A to 4 A); for continuing the load group	6ES7193-6BP20-0BF0		
Station expansion with IP67 I/O system ET 200AL			
BaseUnit BU-Send	6ES7193-6BN00-0NE0		
ET 200SP BA-Send 1 x FC BusAdapter	6ES7193-6AS00-0AA0		

Overview



With the BaseUnits, the ET 200SP offers a rugged and service-friendly design with permanent wiring:

- No tools needed for one-handed wiring using push-in terminals
- Outstanding access due to arrangement of measuring tap, spring NC contacts and cable entry in columns, while at the same time reducing the space required by 64%
- Fault-proof color coding of the spring NC contacts for better orientation in the terminal panel
- Replacement of I/O modules during operation without affecting the wiring

- Operation with module gaps (missing I/O module)
- Automatic coding of the I/O modules prevents destruction of the electronics if a module is accidentally inserted in the wrong slot during replacement
- High immunity to electromagnetic interference due to
 - self-assembling shielded backplane bus
 - multi-layer conductor plate with shield levels for interference-free signal transmission from the terminal to the I/O module
 - system-integrated, space-saving shield connection for quick installation
- Self-assembling potential groups without external wiring or jumpers
- Replaceable terminal box
- Side-by-side latching of the BUs for high mechanical load capacity
- Optional module-specific color identification of the terminals according to the color code (CC)
- Actuation of the spring NC contacts with a standard screwdriver, with a blade width up to 3.5 mm

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

Technical specifications

Article number	6AG1193-6BP00-7BA0 6ES7193-6BP00-0BA0	6AG1193-6BP00-7DA0 6ES7193-6BP00-0DA0	6AG1193-6BP20-7BA0 6ES7193-6BP20-0BA0	6AG1193-6BP20-7DA0 6ES7193-6BP20-0DA0
Based on	SIPLUS ET 200SP BU15-P16+A0+2B	SIPLUS ET 200SP BU15-P16+A0+2D	SIPLUS ET 200SP BU15-P16+A10+2B	SIPLUS ET 200SP BU15-P16+A10+2D
Extended ambient conditions				
• relative to ambient temperature-atmospheric pressure-installation altitude	Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m)	Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m)	Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m)	Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m)
Relative humidity				
- With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation/frost (no commissioning under condensation conditions)	100 %; RH incl. condensation/frost (no commissioning under condensation conditions)	100 %; RH incl. condensation/frost (no commissioning under condensation conditions)	100 %; RH incl. condensation/frost (no commissioning under condensation conditions)

I/O systems

SIMATIC ET 200 systems for the control cabinet

SIMATIC ET 200SP

SIPLUS BaseUnits

Technical specifications (continued)

Article number	6AG1193-6BP00-7BA0	6AG1193-6BP00-7DA0	6AG1193-6BP20-7BA0	6AG1193-6BP20-7DA0
Based on	6ES7193-6BP00-0BA0	6ES7193-6BP00-0DA0	6ES7193-6BP20-0BA0	6ES7193-6BP20-0DA0
	SIPLUS ET 200SP BU15-P16+A0+2B	SIPLUS ET 200SP BU15-P16+A0+2D	SIPLUS ET 200SP BU15-P16+A10+2B	SIPLUS ET 200SP BU15-P16+A10+2D
Resistance				
- against biologically active substances / conformity with EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!
- against chemically active substances / conformity with EN 60721-3-3	Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!
- against mechanically active substances / conformity with EN 60721-3-3	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!
Article number	6AG1193-6BP00-7BA1	6AG1193-6BP00-7DA1	6AG1193-6BP40-7BA1	6AG1193-6BP40-7DA1
Based on	6ES7193-6BP00-0BA1	6ES7193-6BP00-0DA1	6ES7193-6BP40-0BA1	6ES7193-6BP40-0DA1
	SIPLUS ET 200SP BU15-P16+A0+2B/T	SIPLUS ET 200SP BU15-P16+A0+2D/T	SIPLUS ET 200SP BU15-P16+A0+12B/T	SIPLUS ET 200SP BU15-P16+A0+12D/T
Extended ambient conditions				
• relative to ambient temperature-atmospheric pressure-installation altitude	Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m)	Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m)	Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m)	Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m)
Relative humidity				
- With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation/frost (no commissioning under condensation conditions)	100 %; RH incl. condensation/frost (no commissioning under condensation conditions)	100 %; RH incl. condensation/frost (no commissioning under condensation conditions)	100 %; RH incl. condensation/frost (no commissioning under condensation conditions)
Resistance				
- against biologically active substances / conformity with EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!
- against chemically active substances / conformity with EN 60721-3-3	Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!
- against mechanically active substances / conformity with EN 60721-3-3	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!

Technical specifications (continued)

Article number	6AG1193-6BP20-7BB0	6AG1193-6BP20-7BB1	6AG1193-6BP20-7DC0	6AG1193-6BP00-7BD0
Based on	6ES7193-6BP20-0BB0 SIPLUS ET 200SP BU20-P12+A4+0B	6ES7193-6BP20-0BB1 SIPLUS ET 200SP BU20-P12+A0+4B TYP B1	6ES7193-6BP20-0DC0 SIPLUS ET 200SP BU20-P6+A2+4D	6ES7193-6BP00-0BD0 SIPLUS ET 200SP BU20-P12+A0+0B
Ambient conditions				
Ambient temperature during operation				
• horizontal installation, min.	-40 °C; = Tmin	-40 °C; = Tmin; Startup @ -25 °C	-25 °C; = Tmin	-40 °C; = Tmin
• horizontal installation, max.	70 °C; = Tmax	70 °C; = Tmax	60 °C; = Tmax	70 °C; = Tmax
• vertical installation, min.	-40 °C		-25 °C	-40 °C
• vertical installation, max.	50 °C		50 °C	50 °C
Extended ambient conditions				
• relative to ambient temperature-atmospheric pressure-installation altitude	Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m)	Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m)	Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m)	Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m)
Relative humidity				
- With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation/frost (no commissioning under condensation conditions)	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation	100 %; RH incl. condensation/frost (no commissioning under condensation conditions)	100 %; RH incl. condensation/frost (no commissioning under condensation conditions)
Resistance				
- against biologically active substances / conformity with EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!
- against chemically active substances / conformity with EN 60721-3-3	Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!
- against mechanically active substances / conformity with EN 60721-3-3	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!

I/O systems

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SIMATIC ET 200SP

SIPLUS BaseUnits

Ordering data	Article No.		Article No.
SIPLUS BaseUnits type A0		BU15-P16+A0+12D/T	6AG1193-6BP40-7DA1
BU15-P16+A0+2D (Extended temperature range and exposure to media) BU type A0; BaseUnit (light) with 16 process terminals to the module; for starting a new load group (max. 10 A)	6AG1193-6BP00-7DA0	(Extended temperature range and exposure to media) BU type A1; BaseUnit (light) with 16 process terminals (1...16) to the module and an additional 2x5 internally jumpered AUX terminals (1 B to 5 B and 1 C to 5 C); for starting a new load group (max. 10 A)	
BU15-P16+A0+2B (Extended temperature range and exposure to media) BU type A0; BaseUnit (dark) with 16 process terminals to the module; for continuing the load group	6AG1193-6BP00-7BA0	BU15-P16+A0+12B/T (Extended temperature range and exposure to media) BU type A1; BaseUnit (dark) with 16 process terminals (1...16) to the module and an additional 2x5 internally jumpered AUX terminals (1 B to 5 B and 1 C to 5 C); for continuing the load group	6AG1193-6BP40-7BA1
BU15-P16+A10+2D (Extended temperature range and exposure to media) BU type A0; BaseUnit (light) with 16 process terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1A to 10A); for starting a new load group (max. 10 A)	6AG1193-6BP20-7DA0	SIPLUS BaseUnits type B0	
BU15-P16+A10+2B (Extended temperature range and exposure to media) BU type A0; BaseUnit (dark) with 16 process terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1A to 10A); for continuing the load group	6AG1193-6BP20-7BA0	BU20-P12+A4+0B (Extended temperature range and exposure to media) BU type B0; BaseUnit (dark) with 12 process terminals (1...12) to the module and an additional 4 internally jumpered AUX terminals (1 A to 4 A); for continuing the load group; 1 unit	6AG1193-6BP20-7BB0
SIPLUS BaseUnits type A1 (with temperature detection)		SIPLUS BaseUnits type B1	
BU15-P16+A0+2D/T (Extended temperature range and exposure to media) BU type A1; BaseUnit (light) with 16 process terminals to the module; for starting a new load group (max. 10 A)	6AG1193-6BP00-7DA1	BU20-P12+A0+4B (Extended temperature range and exposure to media) BU type B1; BaseUnit (dark) with 12 process terminals to the module; for continuing the load group; 1 unit	6AG1193-6BP20-7BB1
BU15-P16+A0+2B/T (Extended temperature range and exposure to media) BU type A1; BaseUnit (dark) with 16 process terminals to the module; for continuing the load group	6AG1193-6BP00-7BA1	SIPLUS BaseUnits type C0	
		BU20-P6+A2+4D (Extended temperature range and exposure to media) BU type C0; BaseUnit (light) with 6 push-in terminals (1...6) to the module and an additional 2 AUX terminals; new load group	6AG1193-6BP20-7DC0
		SIPLUS BaseUnits type D0	
		BU20-P12+A0+0B (Extended temperature range and exposure to media) BU type D0; BaseUnit (dark) with 12 push-in terminals, without AUX terminals, bridged to the left	6AG1193-6BP00-7BD0
		Accessories	See SIMATIC ET 200SP BaseUnits, page 9/142

Overview

SIMATIC BA 2xFC BusAdapter for direct laying of the PROFINET cable via FastConnect connection



ET 200SP BA-Send BusAdapter for expansion of an ET 200SP station with ET 200AL modules



SIMATIC BA LC/RJ45 BusAdapter for use as a system-integrated media converter from copper (RJ45) to glass fiber (LC)

For the SIMATIC ET 200SP, two types of BusAdapter (BA) are available for selection:

- ET 200SP BA-Send BusAdapter
for expansion of an ET 200SP station with up to 16 modules from the ET 200AL I/O series with IP67 protection via an ET connection
- SIMATIC BusAdapter
for the free selection of the connection system (pluggable or direct connection) and physical PROFINET connection (copper, POF, HCS or glass fiber) to devices with a SIMATIC BusAdapter interface.
One further advantage of the SIMATIC BusAdapter: only the adapter needs to be replaced for subsequent conversion to the rugged FastConnect technology or a fiber-optic connection, or to repair defective RJ45 sockets

I/O systems

SIMATIC ET 200 systems for the control cabinet

SIMATIC ET 200SP

BusAdapters

Technical specifications

Article number	6ES7193-6AR00-0AA0 ET 200SP, BA 2XRJ45 BUSADAPTER	6ES7193-6AF00-0AA0 ET 200SP, BA 2XFC BUSADAPTER	6ES7193-6AP00-0AA0 ET 200SP, BA 2XSCRJ BUSADAPTER	6ES7193-6AP20-0AA0 ET 200SP, BA SCRJ/RJ45 BUSADAPTER
General information				
Product type designation	SIMATIC BusAdapter BA 2x RJ45	SIMATIC BusAdapter BA 2x FC	SIMATIC BusAdapter BA 2x SCRJ	SIMATIC BusAdapter BA SCRJ / RJ45
Interfaces				
Number of PROFINET interfaces	1	1	1; 2 ports (switch) SCRJ FO	1; 2 ports (SCRJ + RJ45)
PROFINET IO				
• RJ 45	Yes; 2 x		No	Yes; 1x
• FC (FastConnect)	No	Yes; 2 x	No	No
• Number of SCRJ ports	0		2	1
• Number of LC ports	0		0	0
Cable length				
- PCF			100 m	100 m
- Plastic FOC (POF)			50 m	50 m
- PCF-GI			250 m	250 m
- Cu conductors	100 m	100 m		100 m
Dimensions				
Width	20 mm	20 mm	20 mm	20 mm
Height	69.5 mm	69.5 mm	69.5 mm	
Depth	59 mm	59 mm	59 mm	
Weights				
Weight, approx.	46 g	53 g	50 g	50 g

Article number	6ES7193-6AP40-0AA0 ET 200SP, BA 2XSCRJ/FC BUSADAPTER	6ES7193-6AG00-0AA0 SIMATIC BA 2XLC BUSADAPTER	6ES7193-6AG20-0AA0 SIMATIC BA LC/RJ45 BUSADAPTER	6ES7193-6AG40-0AA0 SIMATIC BA 2XLC/FC BUSADAPTER
General information				
Product type designation	SIMATIC BusAdapter BA SCRJ / FC	SIMATIC BusAdapter BA 2x LC	SIMATIC BusAdapter BA LC / RJ45	SIMATIC BusAdapter BA LC / FC
Interfaces				
Number of PROFINET interfaces	1; 2 ports (SCRJ + FC)	1; 2 ports (switch) LC Multimode Glass Fibre	1; 2 ports (switch) LC / RJ45	1
PROFINET IO				
• RJ 45	No	No	Yes; 1x	No
• FC (FastConnect)	Yes; 1x	No	No	Yes; 1x
• Number of SCRJ ports	1	0	0	0
• Number of LC ports	0	2	1	1
Cable length				
- PCF	100 m			
- Plastic FOC (POF)	50 m			
- PCF-GI	250 m			
- Cu conductors	100 m		100 m	100 m
- Multimode graded-index fiber 50/125 µm		3 km	3 km	3 km
- Multimode graded-index fiber 62.5/125 µm		3 km	3 km	3 km
Ambient conditions				
Ambient temperature during operation				
• min.		0 °C	0 °C	0 °C
• max.		60 °C	60 °C	60 °C
Dimensions				
Width	20 mm	20 mm	20 mm	20 mm
Height	69.5 mm	69.5 mm	69.5 mm	69.5 mm
Depth	59 mm	59 mm	59 mm	59 mm
Weights				
Weight, approx.	50 g	40 g	32 g	50 g

Technical specifications (continued)

Article number	6ES7193-6AS00-0AA0 ET 200SP, BA-SEND BA1XFC BUSADAPTER
General information	
Product type designation	BusAdapter BA-Send 1x FC
Interfaces	
PROFINET IO	
Cable length	
- Cu conductors	15 m; from IM firmware V3.3: between BA-send and the first ET-CONNECTION bus node and between all other bus nodes
ET-Connection	
• Number of interfaces ET connection	1
• FC (FastConnect)	Yes
Ambient conditions	
Ambient temperature during operation	
• min.	0 °C
• max.	60 °C
Dimensions	
Width	20 mm
Weights	
Weight, approx.	44 g

Ordering data**Article No.**

BA 2xRJ45 BusAdapter For IM 155-6PN ST, HF	6ES7193-6AR00-0AA0
BA 2xFC BusAdapter For IM 155-6PN ST, HF; for increased resistance to vibration and EMC loads	6ES7193-6AF00-0AA0
BA 2xSCRJ BusAdapter For IM 155-6PN HF; fiber-optic connection for POF or PCF cables up to 250 m, with monitoring of damping	6ES7193-6AP00-0AA0
BA SCRJ/RJ45 BusAdapter For IM 155-6PN HF; with media converter FOC-Cu; 1 x SCRJ FO connection, 1 x RJ45 connection	6ES7193-6AP20-0AA0
BA SCRJ/FC BusAdapter For IM 155-6PN HF; with media converter FOC-Cu; 1 x SCRJ FO connection, 1 x FastConnect connection	6ES7193-6AP40-0AA0
BA 2XLC BusAdapter For IM 155-6PN HF; 2 glass FO connections	6ES7193-6AG00-0AA0
BA LC/RJ45 BusAdapter For IM 155-6PN HF; with media converter glass FO - copper; 1 x LC connection, 1 x RJ45 connection	6ES7193-6AG20-0AA0
BA LC/FC BusAdapter For IM 155-6PN HF; with media converter glass FO - copper; 1 x LC connection, 1 x FastConnect connection	6ES7193-6AG40-0AA0
Station expansion with IP67 I/O system ET 200AL	
ET 200SP BA-Send 1 x FC BusAdapter	6ES7193-6AS00-0AA0
BaseUnit BU-Send	6ES7193-6BN00-0NE0
Accessories	
Equipment labeling plate 10 sheets of 16 labels, for printing with thermal transfer card printer or plotter	6ES7193-6LF30-0AW0

I/O systems

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SIPLUS BusAdapters

Overview



ET 200SP BusAdapter (RJ45)



BA 2xFC BusAdapter

Some interface modules of the SIPLUS ET 200SP have a universal PROFINET interface for BusAdapters. With the appropriate BusAdapter, the type of connection can be adapted to the requirements of the respective application:

- For standard applications with a moderate mechanical and EMC load, the BA 2xRJ45 BusAdapter is used. It offers two sockets for standard RJ45 plugs.
- For machines and systems in which higher mechanical and/or EMC loads act on the devices, the BA 2xFC BusAdapter is recommended. In this case, the bus cables are connected directly by means of FastConnect terminals – similar to the PROFIBUS connector, proven in millions of applications. The technology is extremely quick to assemble and achieves 5 times better vibration resistance and also 5 times greater resistance to electromagnetic interference, when compared to RJ45 plug connectors.
- BusAdapters with connections for fiber-optic cables can be used to cover high potential differences between two stations and/or high EMC loads.

Another advantage of the BusAdapters: In order to repair defective RJ45 sockets or for subsequent conversion to the rugged FastConnect technology or a fiber-optic connection, only the adapter needs to be replaced.

The following interface modules offer a PROFINET connection via BusAdapter:

- SIPLUS IM 155-6PN Standard
- SIPLUS IM 155-6PN High Feature

Note

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

Technical specifications

Article number	6AG1193-6AR00-7AA0	6AG1193-6AF00-7AA0	6AG1193-6AP00-2AA0
Based on	6ES7193-6AR00-0AA0	6ES7193-6AF00-0AA0	6ES7193-6AP00-0AA0
	SIPLUS ET 200SP BA 2xRJ45	SIPLUS ET 200SP BA 2XFC PN	SIPLUS ET 200SP BA 2XSCRJ PN
Ambient conditions			
Ambient temperature during operation			
• min.	-40 °C; = Tmin; Startup @ -25 °C	-40 °C; = Tmin; Startup @ -25 °C	-40 °C; = Tmin; Startup @ -25 °C
• max.	70 °C; = Tmax	70 °C; = Tmax	60 °C; = Tmax
Extended ambient conditions			
• relative to ambient temperature-atmospheric pressure-installation altitude	Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m)	Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m)	Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m)
Relative humidity			
- With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation/frost (no commissioning under condensation conditions)	100 %; RH incl. condensation/frost (no commissioning under condensation conditions)	100 %; RH incl. condensation/frost (no commissioning under condensation conditions)
Resistance			
- against biologically active substances / conformity with EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!
- against chemically active substances / conformity with EN 60721-3-3	Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!
- against mechanically active substances / conformity with EN 60721-3-3	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!

Ordering data

	Article No.		Article No.
SIPLUS BA 2xRJ45 BusAdapter (Extended temperature range and exposure to media) for IM 155-6PN ST, HF	6AG1193-6AR00-7AA0	SIPLUS BA 2xSCRJ BusAdapter (Extended temperature range and exposure to media) for IM 155-6PN HF; fiber-optic connection for POF or PCF cables up to 250 m, with monitoring of damping	6AG1193-6AP00-2AA0
SIPLUS BA 2xFC BusAdapter (Extended temperature range and exposure to media) for IM 155-6PN ST, HF; for increased resistance to vibration and EMC loads	6AG1193-6AF00-7AA0	Reference identification label 10 sheets of 16 labels, for printing with thermal transfer card printer or plotter	6ES7193-6LF30-0AW0

I/O systems

SIMATIC ET 200 systems for the control cabinet
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Accessories

Overview Labeling strips

The head-end stations and I/O modules can optionally be equipped with labeling strips (13 x 31 mm) for system-specific marking. The labeling strips can be inscribed mechanically. Labeling strips are available in two versions in the colors light gray and yellow:

- 500 strips on the roll, for printing on thermal transfer printers. Core diameter 40 mm, external diameter 70 mm, width 62 mm
- 10 DIN A4 sheets with 100 strips each, 180 g/sm card, perforated, for printing using a laser printer direct from TIA Portal or via print templates

Overview Reference identification labels



Optionally, one equipment labeling plate each can be plugged onto head-end stations, BusAdapters, BaseUnits, and I/O modules. Equipment labeling plates are supplied in packs of 10 sheets with 16 labels each. The labels can be printed with thermal transfer card printers or plotters, or stickers can be attached to them. Advantages compared to labels that are attached directly:

- The inscription on the front is not covered
- Simple label replacement when replacing a module
- No parallax errors when marking the BaseUnits on the mounting plate

The size of the labels is 14.8 x 10.5 mm (W x H)

Overview BU cover

The ET 200SP system can be operated with any number of slot gaps (BU slot without inserted I/O module). Applications for this include:

- Partial commissioning
- Prewired but unequipped options

To protect against damage, such slot gaps must be covered by a BU cover.

Within the BU cover, an equipment labeling plate for identification of the I/O module planned for this slot can be stored.

Versions:

- For BaseUnits with a width of 15 mm (pack containing 5 BU covers)
- For BaseUnits with a width of 20 mm (pack containing 5 BU covers)

Overview Shield connection

The shield connection permits the low-cost connection of cable shields. Compared to external shield supports, the system offers the following advantages:

- Quick installation without tools by plugging the shield connection element onto the BaseUnit
- Automatic low-impedance connection to the functional ground (DIN rail)
- Optimized EMC properties by separating the signal lines from the voltage supply lines
- Short unshielded cable lengths
- Requires little space

Overview Color-coded labels

The I/O modules that are plugged onto the BaseUnits determine the potentials connected at the process terminals. The +/- potentials can optionally be identified using module-specific color-coded labels. The potentials of the AUX and add-on terminals can also be marked using color-coded labels. Advantages of the color-coded labels:

- Quick installation (one label for marking 16 terminals)
- Printed terminal numbers
- Avoidance of wiring errors
- Simple detection of potentials during servicing

Overview Server module

The server module is included in the scope of delivery of all head-end stations (interface module, CPU, Open Controller). It concludes the setup of an ET 200SP station.

Overview e-coding elements

The operation of selected modules requires an electronic coding element that is always included in the scope of delivery of the I/O module. Apart from the mechanical coding function, this contains a re-writable memory for the redundant storage of module-specific configuration data (e.g. F target address for fail-safe modules or parameter data in the case of the IO-Link master). In this way, this data is automatically backed up during a module replacement. This saves the user from having to set addresses manually or back up data when replacing modules.

At present, there are two types of electronic coding element:

- e-coding element (Type H), which can be used in the I/O modules:
 - CM IO-Link master
 - F-CM AS-i Safety
- e-coding element (Type F), which can be used in the I/O modules:
 - F-DI 8x24VDC HF
 - F-DQ 4x24VDC/2A PM HF
 - F-PM-E 24VDC/8A PPM ST

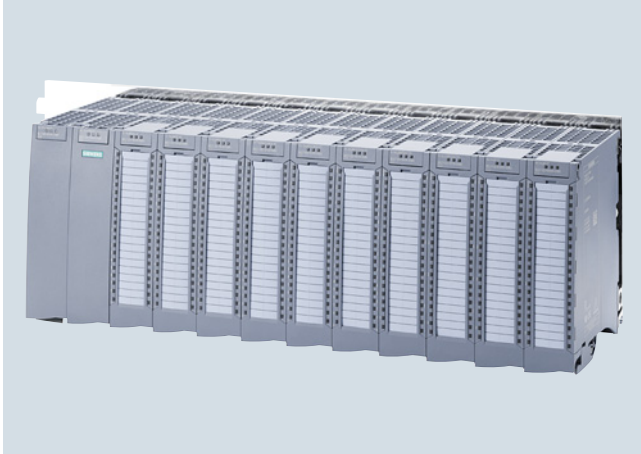
Ordering data	Article No.		Article No.
Labeling strips			
500 labeling strips on roll, light gray, for inscription with thermal transfer roll printer	6ES7193-6LR10-0AA0	Color code CC42, for 12 process terminals, BU type F0, gray (terminals 1 to 8), red (terminals 9 to 10), blue (terminals 11 to 12)	6ES7193-6CP42-2MB0
500 labeling strips on roll, yellow, for inscription with thermal transfer roll printer	6ES7193-6LR10-0AG0	Color code CC51, for 6 process terminals, for BU type C0, C1, gray (terminals 1 to 4), red (terminal 5), blue (terminal 6)	6ES7193-6CP51-2MC0
1000 labeling strips DIN A4, light gray, card, for inscription with laser printer	6ES7193-6LA10-0AA0	Color code CC51, for 6 process terminals, for BU type C0, gray (terminals 1, 2 and 5), red (terminals 3 and 4), blue (terminal 6)	6ES7193-6CP52-2MC0
1000 labeling strips DIN A4, yellow, card, for inscription with laser printer	6ES7193-6LA10-0AG0		
Equipment labeling plate	6ES7193-6LF30-0AW0		
10 sheets of 16 labels			
BU cover		Color-coded labels for additional terminals	
For covering empty slots (gaps); 5 units		(pack containing 10 labels)	
• 15 mm wide	6ES7133-6CV15-1AM0	Color code CC71, for 10 AUX terminals, BU type A0, yellow/green (terminals 1 A to 10 A)	6ES7193-6CP71-2AA0
• 20 mm wide	6ES7133-6CV20-1AM0	Color code CC72, for 10 AUX terminals, BU type A0, red (terminals 1 A to 10 A)	6ES7193-6CP72-2AA0
Shield connection	6ES7193-6SC00-1AM0	Color code CC73, for 10 AUX terminals, BU type A0, blue (terminals 1 A to 10 A)	6ES7193-6CP73-2AA0
5 shield supports and 5 shield terminals each for plugging onto BaseUnits with automatic low-impedance connection to functional ground		Color code CC74, for 2x5 additional terminals, BU type A1, red (terminals 1B to 5B), blue (terminals 1C to 5C)	6ES7193-6CP74-2AA0
Module-specific color-coded labels		Color code CC81, for 4 AUX terminals, BU type B0, yellow/green (terminals 1 A to 4 A)	6ES7193-6CP81-2AB0
(pack containing 10 labels)		Color code CC82, for 4 AUX terminals, BU type B0, red (terminals 1 A to 4 A)	6ES7193-6CP82-2AB0
Color code CC00, for 16 process terminals, for BU type A0, A1, gray (terminals 1 to 8), red (terminals 9 to 16)	6ES7193-6CP00-2MA0	Color code CC83, for 4 AUX terminals, BU type B0, blue (terminals 1 A to 4 A)	6ES7193-6CP83-2AB0
Color code CC01, for 16 process terminals, for BU type A0, A1, gray (terminals 1 to 8), red (terminals 9 to 16)	6ES7193-6CP01-2MA0	Color code CC84, for 2 AUX terminals, BU type C0, C1, yellow/green (1 A to 2 A)	6ES7193-6CP84-2AC0
Color code CC02, for 16 process terminals, for BU type A0, A1, gray (terminals 1 to 8), blue (terminals 9 to 16)	6ES7193-6CP02-2MA0	Color code CC85, for 2 AUX terminals, BU type C0, C1, red (1 A to 2 A)	6ES7193-6CP85-2AC0
Color code CC03, for 16 process terminals, for BU type A0, A1, gray (terminals 1 to 8), red (terminals 9 to 12), gray (terminals 13 to 16)	6ES7193-6CP03-2MA0	Color code CC86, for 2 AUX terminals, BU type C0, C1, blue (1 A to 2 A)	6ES7193-6CP86-2AC0
Color code CC04, for 16 process terminals, BU type A0, A1, gray (terminals 1 to 8), red (terminals 9 to 12), blue (terminals 13 to 16)	6ES7193-6CP04-2MA0	Server module	6ES7193-6PA00-0AA0
Color code CC05, for 16 process terminals, for BU type A0, A1, gray (terminals 1 to 12), red (terminals 13 to 14), blue (terminals 15 to 16)	6ES7193-6CP05-2MA0	Spare parts	
Color code CC41, for 16 process terminals; for BU type B1, gray (terminals 1 to 4), red (terminals 5 to 8), blue (terminals 9 to 12)	6ES7193-6CP41-2MB0	e-coding element	
		Type H; pack containing 5 e-coding elements	6ES7193-6EH00-1AA0
		Type F; pack containing 5 e-coding elements	6ES7193-6EF00-1AA0

I/O systems

SIMATIC ET 200 systems for the control cabinet

SIMATIC ET 200MP

Overview



The SIMATIC ET 200MP is a modular and scalable I/O system with IP20 degree of protection for universal use, and offers the same system advantages as the S7-1500. The SIMATIC ET 200MP permits extremely short bus cycles and very fast response times, even with large quantity structures.

SIMATIC ET 200MP consists of the following components:

- Interface module for connecting S7-1500 I/O modules to PROFINET; up to 30 modules can be connected to one interface module
- Interface module for connecting S7-1500 I/O modules to PROFIBUS; up to 12 modules can be connected to one interface module

The SIMATIC ET 200MP distributed I/O system is particularly easy to install, wire, and commission.

Highlights:

- Modular I/O system with IP20 protection for PROFINET or alternatively for PROFIBUS
- Compact dimensions
- High degree of user-friendliness due to the following design features:
 - Uniform 40-pin front connector simplifies ordering, logistics, and warehousing
 - Uniform pin assignment per module type simplifies wiring and helps avoid errors
 - Integrated potential bridges simplify wiring and allow flexible subsequent modification
 - The cable storage space grows along with the requirements and allows a uniform appearance even with insulated conductors with a large cross-section and/or thick insulation
 - The pre-wiring position for the front connector allows convenient wiring both when commissioning and making changes during operation

- The top hat rail integrated in the S7-1500 DIN rail allows snapping-on of many standard components such as additional terminals, miniature circuit breakers or small relays
- The 1:1 allocation of channel status and diagnostics LED, terminal and inscription allows fast location and elimination of errors. Assistance is provided by the wiring diagram printed on the inside of the front panels
- The integrated shielding concept for analog and technology modules allows reliable and rugged operation, in particular with high-speed applications. Installation does not require any tools
- Particularly space-saving and simple design with slim 25 mm modules; the maximum possible station configuration with power supply (PS), interface module (IM) and 30 I/O modules can be accommodated on a 830-mm-wide S7-1500 DIN rail
- Comprehensive product portfolio comprising digital and analog input or output modules, technology modules, and communication modules for point-to-point communication; further modules, e.g. F modules, will be available soon
- Extensive system functions
 - Integrated system diagnostics when operated with an S7-1500 and the TIA portal
 - Increased communication availability by using Media Redundancy Protocol (MRP) on the PROFINET; in addition, the IM 155-5 PN HF High Feature interface module can be operated on an S7-400H. Configuration is carried out with STEP 7 V5.5 SP3 and a GSDML file. The IM 155-5 PN HF also supports operation on an S7-400H CPU (system redundancy)
 - Consistent use of identification and maintenance data IM0 to IM3 for fast electronic and unambiguous identification of individual modules (Article No., serial number, etc.)
 - Uniform firmware update for the interface module and all I/O modules for subsequent expansion of functions (investment security)
 - Bus cycle time $\geq 250 \mu\text{s}$ and coupling to the isochronous task permit implementation of applications with high performance requirements with PROFINET
 - Up to 30 I/O modules (PROFINET) or 12 I/O modules (PROFIBUS) within a station save on interface modules and installation time
 - MMC not required with PROFINET; automatic address assignment via LLDP or manually via TIA portal or PST tool
 - Shared device on up to two (IM 155-5 PN BA and IM 155-5 PN ST) or four (IM 155-5 PN HF) IO controllers
 - Module shared input / module shared output as system function for all S7-1500 I/O modules

Overview

- Interface modules for linking the ET 200MP to PROFINET
- These handle data exchange with the PROFINET IO controller in the PLC
- Integrated 2-port switch for line topology

IM 155-5 PN BA

- Max. 30 I/O modules
- Shortest bus cycle time 1 ms
- Media redundancy (MRP)
- Shared device on up to 2 IO controllers
- Omission of SIMATIC Memory Card (SMC); IM replacement without PG using LLDP

IM 155-5 PN ST, IM 155-5 PN HF

- Interface modules for linking the ET 200MP to PROFINET
- These handle data exchange with the PROFINET IO controller in the PLC
- Integrated 2-port switch for line topology
- Max. 30 I/O modules
- Shortest bus cycle 250 µs
- Linking to the isochronous task of the CPU
- Prioritized fast startup (FSU) with max. 12 I/O modules
- Media Redundancy Protocol (MRP)
- Shared device on up to two I/O controllers (when configuring using GSD file; depends on the respective configuration tool)
- Omission of SIMATIC Memory Card (SMC); IM replacement without PG using LLDP
- Operation of F modules and PROFIsafe

Starting from FW version V2.0.0, the IM155-5 PN ST interface module supports the following new functions:

- Submodule-granular shared device with up to two I/O controllers
- Configuration control (option handling)
- Module shared input and module shared output (MSI/MSO), i.e. the inputs or outputs of a module can be made available simultaneously to up to two I/O controllers

The IM155-5 PN HF interface module has the following additional functions:

- Shared device on up to 4 IO controllers
- Module-internal shared input and output (MSI/MSO) on up to four IO controllers
- Operation on a highly available SIMATIC S7-400H
- Support for the MRPD function (media redundancy with planned duplication)

I/O systems

SIMATIC ET 200 systems for the control cabinet

SIMATIC ET 200MP

Interface modules > IM 155-5 PN**Overview** (continued)

	IM 155-5 PN BA	IM 155-5 PN ST	IM 155-5 PN HF
Article No.	6ES7155-5AA00-0AA0	6ES7155-5AA00-0AB0	6ES7155-5AA00-0AC0
Specifications			
I/O modules	All except PROFIsafe	All	All
Max. number I/O modules / IM	12	30	30
Max. number of bytes / slot	64 inputs 64 outputs	256 inputs 256 outputs	256 inputs 256 outputs
Max. number bytes / station	64 inputs 64 outputs	512 inputs 512 outputs	512 inputs 512 outputs
Update time	1 ms	250 µs	250 µs
Configuration			
GSDML	Yes	Yes	Yes
STEP 7	GSDML	GSDML	GSDML
TIA Portal	Yes	Yes	Yes
PCS 7	No	No	No
General functions			
Reset to factory settings	TIA Portal	TIA Portal	TIA Portal
Device replacement: without PG	LLDP	LLDP	LLDP
Configuration management (option handling)	No	Yes	Yes
I&M data	IM 0 ... 3	IM 0 ... 3	IM 0 ... 3
Isochronous mode	No	Yes	Yes
PROFIsafe	No	Yes	Yes
PROFINET functions			
RT	Yes	Yes	Yes
IRT	No	Yes	Yes
MRP	Yes	Yes	Yes
MRPD	No	No	No
S2 redundancy	No	No	Yes
Fast Startup	No	Yes	Yes
Shared device	Yes; up to 2 ctrl.	Yes; up to 2 ctrl.	Yes; up to 4 ctrl.
MSI / MSO	Yes	Yes	Yes
Submodules	Yes	Yes	Yes

Technical specifications

Article number	6ES7155-5AA00-0AA0 ET 200MP, IM 155-5 PN BA	6ES7155-5AA00-0AB0 ET 200MP, IM 155-5 PN ST	6ES7155-5AA00-0AC0 ET 200MP, IM 155-5 PN HF
General information			
Product type designation	IM 155-5 PN BA	IM 155-5 PN ST	IM 155-5 PN HF
Product function			
• I&M data	Yes; I&M0 to I&M3	Yes; I&M0 to I&M3	Yes; I&M0 to I&M3
Engineering with			
• STEP 7 TIA Portal configurable/ integrated as of version	V14 with HSP 0187	V13 / V13	V13 / V13
• STEP 7 configurable/integrated as of version	V5.5 SP3 / -	V5.5 SP3 / -	V5.5 SP3 / -
• PROFINET as of GSD version/ GSD revision	V2.3 / -	V2.3 / -	V2.3 / -
Supply voltage			
Type of supply voltage	DC	DC	DC
Rated value (DC)	24 V	24 V	24 V
Reverse polarity protection	Yes	Yes	Yes
Short-circuit protection	Yes	Yes	Yes
Mains buffering			
• Mains/voltage failure stored energy time	5 ms	5 ms	5 ms
Hardware configuration			
Integrated power supply	Yes	Yes	Yes
Rack			
• Modules per rack, max.	12; I/O modules	30; I/O modules	30; I/O modules
Submodules			
• Number of submodules per station, max.	108; 9 submodules / I/O modules		
Interfaces			
Number of PROFINET interfaces	1; 2 ports (switch) RJ45	1	1
1. Interface			
Interface types			
• Number of ports	2	2	2
• integrated switch	Yes	Yes	Yes
• RJ 45 (Ethernet)	Yes	Yes	Yes
• BusAdapter (PROFINET)	No		
Functionality			
• PROFINET IO Device	Yes	Yes	Yes
• Media redundancy	Yes	Yes; PROFINET MRP	Yes; PROFINET MRP
Interface types			
RJ 45 (Ethernet)			
• Transmission procedure	PROFINET with 100 Mbit/s full duplex (100BASE-TX)	PROFINET with 100 Mbit/s full duplex (100BASE-TX)	PROFINET with 100 Mbit/s full duplex (100BASE-TX)
• 100 Mbps	Yes	Yes	Yes
• Autonegotiation	Yes	Yes	Yes
• Autocrossing	Yes	Yes	Yes
PROFINET IO Device			
Services			
- Isochronous mode	No	Yes	Yes
- Open IE communication	Yes		
- IRT	No	Yes	Yes
- MRP	Yes	Yes	Yes
- MRPD	No	No	No
- PROFINET system redundancy	No	No	Yes
- PROFIenergy	No	No	No
- Prioritized startup	No	Yes	Yes
- Shared device	Yes	Yes	Yes
- Number of IO Controllers with shared device, max.	2	2	4

I/O systems

SIMATIC ET 200 systems for the control cabinet

SIMATIC ET 200MP

Interface modules > IM 155-5 PN**Technical specifications (continued)**

Article number	6ES7155-5AA00-0AA0 ET 200MP, IM 155-5 PN BA	6ES7155-5AA00-0AB0 ET 200MP, IM 155-5 PN ST	6ES7155-5AA00-0AC0 ET 200MP, IM 155-5 PN HF
Open IE communication			
• TCP/IP	Yes	Yes	Yes
• SNMP	Yes	Yes	Yes
• LLDP	Yes	Yes	Yes
Isochronous mode			
Isochronous operation (application synchronized up to terminal)	No	Yes	Yes
Equidistance	No	Yes	Yes
shortest clock pulse		250 µs	250 µs
max. cycle		4 ms	4 ms
Interrupts/diagnostics/ status information			
Status indicator	Yes	Yes	Yes
Alarms	Yes	Yes	Yes
Diagnostic functions	Yes	Yes	Yes
Diagnostics indication LED			
• RUN LED	Yes; Green LED	Yes; Green LED	Yes; Green LED
• ERROR LED	Yes; Red LED	Yes; Red LED	Yes; Red LED
• MAINT LED	Yes; yellow LED	Yes; yellow LED	Yes; yellow LED
• Connection display LINK TX/RX	Yes; 2x green-yellow LEDs	Yes; yellow LED	Yes; yellow LED
Isolation			
Isolation tested with	707 V DC (type test)	707 V DC (type test)	707 V DC (type test)
Standards, approvals, certificates			
Network loading class	2		
Ambient conditions			
Ambient temperature during operation			
• horizontal installation, min.	0 °C	0 °C	0 °C
• horizontal installation, max.	60 °C	60 °C	60 °C
• vertical installation, min.	0 °C	0 °C	0 °C
• vertical installation, max.	40 °C	40 °C	40 °C
Dimensions			
Width	35 mm	35 mm	35 mm
Height	147 mm	147 mm	147 mm
Depth	129 mm	129 mm	129 mm
Weights			
Weight, approx.	236 g	310 g	350 g

Ordering data	Article No.	Article No.
IM 155-5 PN interface module IP 20 degree of protection, module width 35 mm, installation on S7-1500 DIN rail IM 155-5 PN BA, Basic version IM 155-5 PN ST, Standard version IM 155-5 PN HF, High Feature version with additional functions	6ES7155-5AA00-0AA0 6ES7155-5AA00-0AB0 6ES7155-5AA00-0AC0	
Accessories		
Front flap for IM 155-5 PN (spare part), 5 units	6ES7528-0AA70-7AA0	
SIMATIC S7-1500 DIN rail Fixed lengths, with grounding elements • 160 mm • 245 mm • 482 mm • 530 mm • 830 mm For cutting to length by customer, without drill holes; grounding elements must be ordered separately • 2000 mm	6ES7590-1AB60-0AA0 6ES7590-1AC40-0AA0 6ES7590-1AE80-0AA0 6ES7590-1AF30-0AA0 6ES7590-1AJ30-0AA0	
PE connection element for DIN rail 2000 mm 20 units	6ES7590-5AA00-0AA0	
Power supply For supplying the backplane bus of the S7-1500 24 V DC input voltage, power 25 W 24/48/60 V DC input voltage, power 60 W 24/48/60 V DC input voltage, power 60 W, buffering functionality 120/230 V AC input voltage, power 60 W	6ES7505-0KA00-0AB0 6ES7505-0RA00-0AB0 6ES7505-0RB00-0AB0 6ES7507-0RA00-0AB0	
Power connector With coding element for power supply module; spare part, 10 units	6ES7590-8AA00-0AA0	
Load power supply 24 V DC/3 A 24 V DC/8 A	6EP1332-4BA00 6EP1333-4BA00	
Power supply connector Spare part; for connecting the 24 V DC supply voltage • with push-in terminals	6ES7193-4JB00-0AA0	
		IE FC RJ45 plugs RJ45 plug connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables
		IE FC RJ45 Plug 180 180° cable outlet 1 unit 10 units 50 units
		IE FC TP Standard Cable GP 2x2 4-core, shielded TP installation cable for connection to IE FC outlet RJ45/ IE FC RJ45 plug; PROFINET-compatible; with UL approval; Sold by the meter, max. length 1000 m; minimum order quantity 20 m
		IE FC TP Trailing Cable 2 x 2 (Type C) 4-core, shielded TP installation cable for connection to IE FC outlet RJ45/ IE FC RJ45 plug 180/90 for trailing cable use; PROFINET-compatible; with UL approval; Sold by the meter, max. length 1000 m; minimum order quantity 20 m
		IE FC TP Marine Cable 2 x 2 (Type B) 4-core, shielded TP installation cable for connection to IE FC outlet RJ45/ IE FC RJ45 Plug 180/90 marine certified; Sold by the meter, max. length 1000 m; minimum order quantity 20 m
		IE FC Stripping Tool Preadjusted stripping tool for fast stripping of Industrial Ethernet FC cables

I/O systems

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

Interface modules > IM 155-5 DP

Overview



- Interface module for linking the ET 200MP to PROFIBUS
- Handles data exchange with the PROFIBUS master in the PLC
- Max. 12 I/O modules
- Automatic detection of baud rate 9.6 kBd ... 12 MBd
- PROFIBUS addresses 1 ... 125; adjustable using DIP switches
- Identification and maintenance data IM0 ... IM3

Technical specifications

Article number	6ES7155-5BA00-0AB0 ET 200MP, IM155-5 DP ST
General information	
Product type designation	IM 155-5 DP ST
Product function	
• I&M data	Yes; I&M0 to I&M3
Engineering with	
• STEP 7 TIA Portal configurable/ integrated as of version	V13 / V13
• STEP 7 configurable/integrated as of version	V5.5 SP3 / -
• PROFIBUS as of GSD version/ GSD revision	V1.0 / V5.1
Supply voltage	
Type of supply voltage	DC
Rated value (DC)	24 V
Reverse polarity protection	Yes
Short-circuit protection	Yes
Mains buffering	
• Mains/voltage failure stored energy time	5 ms
Hardware configuration	
Integrated power supply	Yes
Rack	
• Modules per rack, max.	12; I/O modules
Interfaces	
Number of PROFIBUS interfaces	1
1. Interface	
Interface types	
• RS 485	Yes
Functionality	
• PROFIBUS DP slave	Yes
RS 485	
• Transmission rate, max.	12 Mbit/s

Article number	6ES7155-5BA00-0AB0 ET 200MP, IM155-5 DP ST
PROFIBUS	
Services	
- SYNC capability	Yes
- FREEZE capability	Yes
- DPV1	Yes
Isochronous mode	
Isochronous operation (application synchronized up to terminal)	No
Interrupts/diagnostics/ status information	
Status indicator	Yes
Alarms	Yes
Diagnostic functions	Yes
Diagnostics indication LED	
• RUN LED	Yes; Green LED
• ERROR LED	Yes; Red LED
• MAINT LED	Yes; yellow LED
• Connection display DP	Yes; Green LED
Isolation	
Isolation tested with	707 V DC (type test)
Ambient conditions	
Ambient temperature during operation	
• horizontal installation, min.	0 °C
• horizontal installation, max.	60 °C
• vertical installation, min.	0 °C
• vertical installation, max.	40 °C
Dimensions	
Width	35 mm
Height	147 mm
Depth	129 mm
Weights	
Weight, approx.	360 g

Ordering data	Article No.		Article No.
IM 155-5 DP ST interface module IP 20 degree of protection, module width 35 mm, installation on S7-1500 DIN rail	6ES7155-5BA00-0AB0	FC robust cable Bus cable with PUR sheath for use under conditions of extreme mechanical stress or aggressive chemicals, 2-core, shielded, sold by the meter, max. delivery unit 1,000 m, minimum order quantity 20 m	6XV1830-0JH10
Accessories		FC flexible cable PROFIBUS bus cable, flexible, with special design for quick mounting, 2-core, shielded, sold by the meter, max. delivery unit 1000 m, minimum order quantity 20 m	6XV1831-2K
Front flap for IM 155-5 PN (spare part), 5 units	6ES7528-0AA70-7AA0	FC trailing cable PROFIBUS trailing cable, at least 3 million bending cycles, min. bending radius approx. 120 mm, 2-core, shielded, sold by the meter, max. delivery unit 1000 m, minimum order quantity 20 m	6XV1830-3EH10
SIMATIC S7-1500 DIN rail Fixed lengths, with grounding elements • 160 mm • 245 mm • 482 mm • 530 mm • 830 mm For cutting to length by customer, without drill holes; grounding ele- ments must be ordered separately • 2000 mm	6ES7590-1AB60-0AA0 6ES7590-1AC40-0AA0 6ES7590-1AE80-0AA0 6ES7590-1AF30-0AA0 6ES7590-1AJ30-0AA0 6ES7590-1BC00-0AA0	FC bus cable PROFIBUS Food bus cable with PE sheath for use in the food and beverages industry, 2-core, shielded, sold by the meter, max. delivery unit 1,000 m, minimum order quantity 20 m	6XV1830-0GH10
PE connection element for DIN rail 2000 mm 20 units	6ES7590-5AA00-0AA0	FC underground cable PROFIBUS underground cable, 2-core, shielded, sold by the meter, max. delivery unit 1,000 m, minimum order quantity 20 m	6XV1830-3FH10
Load power supply 24 V DC/3 A 24 V DC/8 A	6EP1332-4BA00 6EP1333-4BA00	FC FRNC cable PROFIBUS bus cable, flame-retardant and halogen-free, with copolymer sheath FRNC, sold by the meter, max. delivery unit 1000 m, minimum order quantity 20 m	6XV1830-0LH10
Power supply connector Spare part; for connecting the 24 V DC supply voltage • with push-in terminals	6ES7193-4JB00-0AA0	FC trailing cable PROFIBUS trailing cable, at least 3 million bending cycles, min. bending radius approx. 120 mm, 2-core, shielded, sold by the meter, max. delivery unit 1000 m, minimum order quantity 20 m	6XV1831-2L
PROFIBUS connector • Connector for PROFIBUS, up to 12 Mbps, 90° cable outlet, insulation displacement system, without PG socket • Connector for PROFIBUS, up to 12 Mbps, 90° cable outlet, insulation displacement system, with PG socket	6ES7972-0BA70-0XA0 6ES7972-0BB70-0XA0	IE FC Stripping Tool Preadjusted stripping tool for fast stripping of Industrial Ethernet FC cables	6GK1901-1GA00
PROFIBUS Stripping Tool Stripping tool for fast stripping of the PROFIBUS	6GK1905-6AA00		
PROFIBUS FastConnect bus cable • Standard type with special design for quick mounting, 2-core, shielded, sold by the meter, max. delivery unit 1000 m, minimum order quantity 20 m • 20 m • 50 m • 100 m • 200 m • 500 m • 1000 m	6XV1830-0EH10 6XV1830-0EN20 6XV1830-0EN50 6XV1830-0ET10 6XV1830-0ET20 6XV1830-0ET50 6XV1830-0EU10		

I/O systems

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

Interface modules > SIPLUS IM 155-5 PN

Overview



- Interface module for linking the ET 200MP to PROFINET
- Handles data exchange with the PROFINET IO controller in the PLC
- Integrated 2-port switch for line topology
- Max. 30 I/O modules
- Shortest bus cycle 250 µs
- Linking to the isochronous task of the CPU
- Prioritized fast startup (FSU) with 500 ms (max. 12 I/O modules)
- Media Redundancy Protocol (MRP)
- Shared device on up to two I/O controllers (when configuring using GSD file; depends on the respective configuration tool)
- Omission of SIMATIC Memory Card (SMC); IM replacement without PG using LLDP

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

Technical specifications

Article number	6AG1155-5AA00-7AB0
Based on	6ES7155-5AA00-0AB0 SIPLUS ET 200MP IM 155-5 PN ST
Extended ambient conditions	
• relative to ambient temperature-atmospheric pressure-installation altitude	Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m)
Relative humidity	
- With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation/frost (no commissioning under condensation conditions)
Resistance	
- against biologically active substances / conformity with EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!
- against chemically active substances / conformity with EN 60721-3-3	Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!
- against mechanically active substances / conformity with EN 60721-3-3	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!

Ordering data

SIPLUS IM 155-5 PN interface module	Article No. 6AG1155-5AA00-7AB0
(Extended temperature range and exposure to media)	
IP 20 degree of protection, module width 35 mm, installation on S7-1500 rail	
Accessories	See SIMATIC ET 200MP, IM 155-5 PN interface module, page 9/159

Overview

I/O modules constitute the interface of the SIMATIC ET 200MP to the process:

- Digital and analog modules provide exactly the inputs/outputs required for each task
- Technology modules for SIMATIC S7-1500 and ET 200MP
 - With integrated functions for high-speed counting and position detection
 - With integrated inputs and outputs for tasks at the process level and short response times
- Communication modules for SIMATIC S7-1500 and ET 200MP
 - For data exchange using point-to-point coupling
 - For connecting to PROFIBUS
 - For connecting to Industrial Ethernet
- Connection system for user-friendly, low-overhead wiring of the S7-1500 and ET 200MP modules

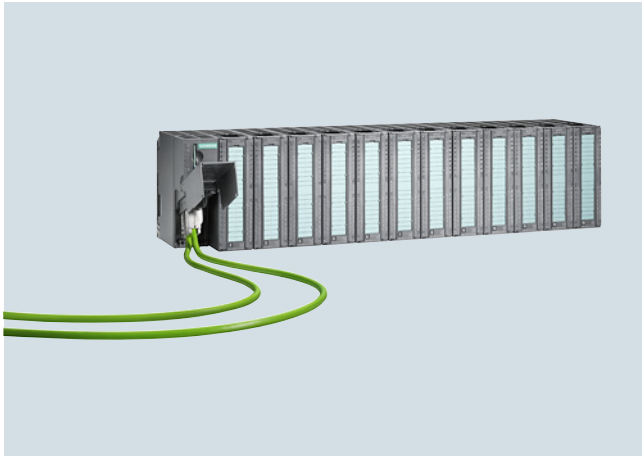
For further information, see SIMATIC S7-1500, chapter 4.

I/O systems

SIMATIC ET 200 systems for the control cabinet

SIMATIC ET 200M

Overview



- Modular I/O system with IP20 degree of protection, particularly suitable for user-specific and complex automation tasks
- Consists of a PROFIBUS DP or PROFINET interface module IM 153, up to 8 or 12 I/O modules of the S7-300 automation system (structure with bus connection or with active bus modules), and a power supply if applicable
- Can be expanded with S7-300 automation system signal, communication and function modules
- Applicable Ex analog input or output modules with HART optimize the ET 200M for use in process engineering
- Can be used in redundant systems (S7-400H, S7-400F/FH)
- Modules can be replaced during operation (hot swapping) with the bus modules active
- Transmission rates up to 12 Mbps
- Ex approval to Cat. 3 for Zone 2 acc. to ATEX100a
- Fail-safe digital inputs/outputs as well as analog inputs for safety-oriented signal processing in accordance with PROFIsafe
- Supports modules with expanded user data, e.g. HART modules with HART minor variables

Technical specifications

General technical data ET 200M	
Cables and connections	Screw and spring-loaded connections in permanent wiring
Degree of protection	IP20
Ambient temperature on vertical wall (preferred mounting position)	
• with horizontal assembly	0 to +60 °C
• with other assembly	0 to +40 °C
Relative humidity	5 to 95% (RH stress level 2 according to IEC 1131-2)
Atmospheric pressure	795 to 1080 hPa
Mechanical stress	
• Vibrations	IEC 68, parts 2 – 6: 10 - 57 Hz (const.amplitude 0.075 mm) 57 - 150 Hz (constant acceleration 1 g)
• Shock	IEC 68, parts 2 – 27 half-sine, 15 g, 11 ms

Overview



The ET 200M system with various interface modules is available for the distributed use of S7-300 I/O modules. Depending on the application purpose, the best suited IM in terms of costs and functions can be selected:

IM153-1 Standard

The IM153-1 is one reasonably priced variant that is excellently suited for most applications in the manufacturing environment. It permits the use of up to 8 S7-300 I/O modules.

IM153-2 High Feature

For higher requirements in manufacturing technology, such as the use of F technology or the highest performance in conjunction with clock synchronization, the IM153-2 High Feature is available. This IM is also designed for use with the PCS 7 in the field of process-oriented applications. This IM can be redundantly used and supports typical functions as they are required in the control field. These include, for example, clock synchronization or time stamping with an accuracy of up to 1 ms.

Technical specifications

Article number	6ES7153-1AA03-0XB0 ET 200M, INTERFACE MODULE IM153-1	6ES7153-2BA10-0XB0 ET 200M, INTERFACE IM153-2 HF	6ES7153-2BA70-0XB0 ET 200M, INTERFACE IM153-2 HF OUTDOOR
General information			
Product type designation	IM 153-1 DP ST	IM 153-2 DP HF	
Supply voltage			
Rated value (DC)	24 V	24 V	
• 24 V DC	Yes	Yes	Yes
permissible range (ripple included), lower limit (DC)	20.4 V	20.4 V	20.4 V
permissible range (ripple included), upper limit (DC)	28.8 V	28.8 V	28.8 V
external protection for power supply lines (recommendation)	not necessary	2.5 A	2.5 A
Mains buffering			
• Mains/voltage failure stored energy time	5 ms	5 ms	5 ms
Input current			
Current consumption, max.	350 mA; at 24 V DC	650 mA; with 24 V DC supply	650 mA
Inrush current, typ.	2.5 A	3 A	3 A
I ² t	0.1 A ² ·s	0.1 A ² ·s	0.1 A ² ·s
Output voltage			
Rated value (DC)	5 V		
Output current			
for backplane bus (5 V DC), max.	1 A	1.5 A	1.5 A
Power loss			
Power loss, typ.	3 W	5.5 W	5.5 W
Address area			
Addressing volume			
• Inputs	128 byte	244 byte	244 byte
• Outputs	128 byte	244 byte	244 byte
Hardware configuration			
Number of modules per DP slave interface, max.	8	12	12

I/O systems

SIMATIC ET 200 systems for the control cabinet

SIMATIC ET 200M

Interface modules > IM 153-1/153-2

Technical specifications (continued)

Article number	6ES7153-1AA03-0XB0 ET 200M, INTERFACE MODULE IM153-1	6ES7153-2BA10-0XB0 ET 200M, INTERFACE IM153-2 HF	6ES7153-2BA70-0XB0 ET 200M, INTERFACE IM153-2 HF OUTDOOR
Time stamping			
Accuracy		1 ms; 1ms at up to 8 modules; 10ms at up to 12 modules	1 ms; 1ms at up to 8 modules; 10ms at up to 12 modules
Number of message buffers		15	15
Messages per message buffer		20	20
Number of stampable digital inputs, max.		128; Max. 128 signals/station; max. 32 signals/slot	128; Max. 128 signals/station; max. 32 signals/slot
Time format		RFC 1119	RFC 1119
Time resolution		0.466 ns	0.466 ns
Time interval for transmitting the message buffer if a message is present		1 000 ms	1 000 ms
Time stamp on signal change		rising / falling edge as signal entering or exiting	rising / falling edge as signal entering or exiting
Interfaces			
Interface physics, RS 485	Yes	Yes	Yes
Interface physics, FOC	No	No	No
PROFIBUS DP			
• Node addresses	1 to 125 permitted	1 to 125 permitted	1 to 125 permitted
• automatic detection of transmission rate	Yes	Yes	Yes
• Output current, max.	90 mA	70 mA	70 mA
• Transmission rate, max.	12 Mbit/s	12 Mbit/s	12 Mbit/s
• Transmission procedure	RS 485	RS 485	RS 485
• SYNC capability	Yes	Yes	Yes
• FREEZE capability	Yes	Yes	Yes
• Direct data exchange (slave-to-slave communication)	Yes; Sender	Yes; as publisher with all IO, as subscriber with F-IO only	Yes; as publisher with all IO, as subscriber with F-IO only
• Connector type	9-pin sub D socket	9-pin sub D	9-pin sub D
1. Interface			
DP slave			
• GSD file	(for DPV1) SIEM801D.GSD; SI01801D.GSG	SI05801E.GSG	SI05801E.GSG
• automatic baud rate search	Yes	Yes	Yes
Protocols			
Bus protocol/transmission protocol	PROFIBUS DP to EN 50170	PROFIBUS DP to EN 50170	PROFIBUS DP to EN 50170
Isolation			
Isolation tested with	Isolation voltage 500 V	Isolation voltage 500 V	Isolation voltage 500 V
Degree and class of protection			
Degree of protection acc. to EN 60529			
• IP20	Yes	Yes	Yes
Ambient conditions			
Ambient temperature during operation			
• min.	0 °C	0 °C	
• max.	60 °C	60 °C	
Air pressure acc. to IEC 60068-2-13			
• Installation altitude above sea level, max.	3 000 m	3 000 m	3 000 m
Configuration			
Configuration software			
• STEP 7	STEP 7 / COM PROFIBUS / non-Siemens tools via GSD file	Yes; STEP 7 / COM PROFIBUS / non-Siemens tools via GSD file	Yes; STEP 7 / COM PROFIBUS / non-Siemens tools via GSD file
Dimensions			
Width	40 mm	40 mm	40 mm
Height	125 mm	125 mm	125 mm
Depth	117 mm	117 mm	117 mm
Weights			
Weight, approx.	360 g	360 g	360 g

Technical specifications (continued)

Article number	6ES7195-7HD10-0XA0 ET 200M, BUS UNIT F. 2 IM 153-2 RED.		
Accessories			
belongs to product	ET 200M		
Dimensions			
Width	97 mm		
Height	92 mm		
Depth	30 mm		
Weights			
Weight, approx.	133 g		
Article number	6ES7195-7HA00-0XA0 ET 200M, BUS UNIT F. PS AND IM 153	6ES7195-7HB00-0XA0 ET 200M, BUS UNIT F. 2 40MM I/O MODULES	6ES7195-7HC00-0XA0 ET 200M, BUS UNIT F. 1 80MM I/O MODULE
Accessories			
belongs to product	ET 200M	ET 200M	ET 200M
Dimensions			
Width	97 mm	97 mm; 80 mm when installed	97 mm; 80 mm when installed
Height	92 mm	92 mm	92 mm
Depth	30 mm	30 mm	30 mm
Weights			
Weight, approx.	111 g	140 g	127 g

Ordering data**Article No.****Article No.****IM 153-1 interface module**

Slave interface for connecting an ET 200M to PROFIBUS DP

- Standard temperature range

6ES7153-1AA03-0XB0**IM 153-2 interface module**

Slave interface for connecting an ET 200M to PROFIBUS DP; also for use in redundant systems

- High Feature
- High Feature with extended temperature range

6ES7153-2BA10-0XB0
6ES7153-2BA70-0XB0**Active IM 153/IM 153 bus module**

For two IM 153-2 High Feature modules for designing redundant systems

6ES7195-7HD10-0XA0**Bus module for ET 200M**

- For accommodating a power supply and an IM 153 module for the hot-swapping function during RUN, incl. bus module cover
- For accommodating two 40-mm-wide I/O modules for the hot-swapping function
- For accommodating one 80-mm-wide I/O module for the hot-swapping function

6ES7195-7HA00-0XA0**6ES7195-7HB00-0XA0****6ES7195-7HC00-0XA0****ET 200M redundancy bundle**

Comprising two IM 153-2 High Feature modules and one IM 153/IM 153 bus module

6ES7153-2AR04-0XA0**Accessories****SIMATIC DP DIN rail for ET 200M**

Accommodates up to 5 bus modules; for hot-swapping function

- Length: 483 mm (19")
- Length: 530 mm
- Length: 620 mm
- Length: 2000 mm

6ES7195-1GA00-0XA0
6ES7195-1GF30-0XA0
6ES7195-1GG30-0XA0
6ES7195-1GC00-0XA0**SIMATIC S7-300 DIN rail**

- Length: 160 mm
- Length: 480 mm (19")
- Length: 530 mm
- Length: 830 mm
- Length: 2000 mm

6ES7390-1AB60-0AA0
6ES7390-1AE80-0AA0
6ES7390-1AF30-0AA0
6ES7390-1AJ30-0AA0
6ES7390-1BC00-0AA0**PROFIBUS bus connector**

90° outgoing cable, terminating resistor with disconnecting function, up to 12 Mbps, FastConnect

Without PG interface

- 1 unit
- 100 units

6ES7972-0BA52-0XA0
6ES7972-0BA52-0XB0

With PG interface

- 1 unit
- 100 units

6ES7972-0BB52-0XA0
6ES7972-0BB52-0XB0**S7 Manual Collection**

Electronic manuals on DVD, multi-language:
S7-200, TD 200, S7-300, M7-300, C7, S7-400, M7-400, STEP 7, Engineering Tools, Runtime Software, SIMATIC DP (Distributed I/O), SIMATIC HMI (Human Machine Interface), SIMATIC NET (Industrial Communication)

6ES7998-8XC01-8YE0**S7 Manual Collection update service for 1 year**

Scope of delivery:
Current DVD "S7 Manual Collection" and the three subsequent updates

6ES7998-8XC01-8YE2

I/O systems

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

Interface modules > IM 153-4 PN

Overview



- For connecting ET 200M to PROFINET IO (via copper line, RJ45) as an IO device
- 2 versions:
 - IM 153-4 PN Standard
 - IM 153-4 PN High Feature: supports, in contrast to the STANDARD version, the operation of PROFI-safe F and HART modules. The operation of an S7-400H (system redundancy) is likewise possible
- Integrated 2-port switch
- 12 modules per station
- Usable I/O capacity: 192 bytes each
- Active bus backplane to hot-swap modules available as an option
- Baud rate 10 Mbps / 100 Mbps (autonegotiation / full duplex)
- I&M functions according to PNO Guideline Order No. 3.502, Version V1.1

Note:

Micro Memory Card with at least 64 KB required if not all the stations in the network support LLDP (Link Layer Discovery Protocol; proximity detection).

Technical specifications

Article number	6ES7153-4AA01-0XB0 IM153-4 PN IO FOR 12 MODULES S7-300	6ES7153-4BA00-0XB0 IM153-4 PN IO HF FOR 12 MODULES S7-300
General information		
Product type designation	IM 153-4 PN ST	IM 153-4 PN HF
Supply voltage		
Rated value (DC)	24 V	24 V
• 24 V DC	Yes	Yes
permissible range (ripple included), lower limit (DC)	20.4 V	18.5 V
permissible range (ripple included), upper limit (DC)	28.8 V	30.2 V
external protection for power supply lines (recommendation)	In a construction with grounded reference potential, a fuse is necessary for redundant interface modules (Recommendation: 2.5 A)	In a construction with grounded reference potential, a fuse is necessary for redundant interface modules (Recommendation: 2.5 A)
Mains buffering		
• Mains/voltage failure stored energy time	5 ms	5 ms
Input current		
Current consumption, max.	600 mA; with 24 V DC supply	600 mA; with 24 V DC supply
Inrush current, typ.	4 A	4 A
I^2t	0.09 A ² s	0.09 A ² s
Output voltage		
Rated value (DC)	5 V	5 V
Output current		
for backplane bus (5 V DC), max.	1.5 A	1.5 A
Power loss		
Power loss, typ.	6 W	6 W
Address area		
Addressing volume		
• Inputs	192 byte	672 byte; Extended HART user data
• Outputs	192 byte	192 byte
Hardware configuration		
Number of modules per DP slave interface, max.	12	12

Technical specifications (continued)

Article number	6ES7153-4AA01-0XB0 IM153-4 PN IO FOR 12 MODULES S7-300	6ES7153-4BA00-0XB0 IM153-4 PN IO HF FOR 12 MODULES S7-300
Protocols		
Bus protocol/transmission protocol	PROFINET IO	PROFINET IO
Interrupts/diagnostics/ status information		
Diagnostics indication LED		
• Connection to network LINK (green)	Yes	Yes
• Transmit/receive RX/TX (yellow)	Yes	Yes
Isolation		
Isolation tested with	500 V DC	Between PROFINET and 24 V supply: 1 500 V AC, between functional grounding and 24 V supply: 500 V DC
Degree and class of protection		
Degree of protection acc. to EN 60529		
• IP20	Yes	Yes
Ambient conditions		
Ambient temperature during operation		
• min.	0 °C	0 °C
• max.	60 °C	60 °C
Air pressure acc. to IEC 60068-2-13		
• Installation altitude above sea level, max.	2 000 m	2 000 m
Dimensions		
Width	40 mm	40 mm
Height	125 mm	125 mm
Depth	118 mm	118 mm
Weights		
Weight, approx.	215 g	215 g

I/O systems

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

Interface modules > IM 153-4 PN

Ordering data	Article No.		Article No.
IM 153-4 PN interface module I/O device to connect an ET 200M to PROFINET Standard High Feature	 6ES7153-4AA01-0XB0 6ES7153-4BA00-0XB0		
Accessories			
Bus modules for ET 200M • For accommodating a power supply and an IM 153 module for the hot-swapping function during RUN, incl. bus module cover • For accommodating two 40-mm-wide I/O modules for the hot-swapping function • For accommodating one 80-mm-wide I/O module for the hot-swapping function	 6ES7195-7HA00-0XA0 6ES7195-7HB00-0XA0 6ES7195-7HC00-0XA0		
SIMATIC Micro Memory Card 64 KB ¹⁾	6ES7953-8LF31-0AA0		
SIMATIC DP DIN rail for ET 200M Accommodates bus modules; for hot-swapping function • Length: 483 mm (19") • Length: 530 mm • Length: 620 mm • Length: 2000 mm	 6ES7195-1GA00-0XA0 6ES7195-1GF30-0XA0 6ES7195-1GG30-0XA0 6ES7195-1GC00-0XA0		
SIMATIC S7-300 DIN rail Length: 160 mm Length: 480 mm (19") Length: 530 mm Length: 830 mm Length: 2000 mm	 6ES7390-1AB60-0AA0 6ES7390-1AE80-0AA0 6ES7390-1AF30-0AA0 6ES7390-1AJ30-0AA0 6ES7390-1BC00-0AA0		
Power supply connector For connection of the 24 V DC power supply; spare part, 1 pack containing 10 units Spring-loaded connections Screw terminal connections	 6ES7193-4JB00-0AA0 6ES7193-4JB50-0AA0		
		S7 Manual Collection Electronic manuals on DVD, multi-language: S7-200, TD 200, S7-300, M7-300, C7, S7-400, M7-400, STEP 7, Engineering Tools, Runtime Software, SIMATIC DP (Distributed I/O), SIMATIC HMI (Human Machine Interface), SIMATIC NET (Industrial Communication)	6ES7998-8XC01-8YE0
		S7 Manual Collection update service for 1 year Scope of delivery: Current DVD "S7 Manual Collection" and the three subsequent updates	6ES7998-8XC01-8YE2
		Industrial Ethernet FC RJ45 Plug 180 RJ45 plug connector for Industrial Ethernet with a rugged metal housing and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; with 180° cable outlet 1 unit 10 units 50 units	 6GK1901-1BB10-2AA0 6GK1901-1BB10-2AB0 6GK1901-1BB10-2AE0
		Industrial Ethernet FastConnect installation cables • FastConnect standard cable • FastConnect trailing cable • FastConnect marine cable	 6XV1840-2AH10 6XV1840-3AH10 6XV1840-4AH10
		Industrial Ethernet FastConnect Stripping tool	 6GK1901-1GA00

¹⁾ To operate the IM153-4, an MMC is required with at least 64 KB memory. Cards with higher memory capacity may also be used.

Overview



Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

For technical documentation on SIPLUS, see:

<http://www.siemens.com/siplus-extreme>

Technical specifications

Article number	6AG1153-1AA03-2XB0	6AG1153-2BA10-2XY0	6AG1153-2BA10-7XB0
Based on	6ES7153-1AA03-0XB0	6ES7153-2BA10-0XB0	6ES7153-2BA10-0XB0
	SIPLUS IM153-1	SIPLUS ET 200M IM153-2 EN50155	SIPLUS ET 200M IM153-2 HF
Ambient conditions			
Ambient temperature during operation			
• min.	-40 °C; = Tmin	-25 °C; = Tmin	-40 °C; = Tmin; Startup @ -25 °C
• max.	70 °C; = Tmax; 60 °C @ UL/cUL, ATEX and FM use	60 °C; = Tmax; the rated temperature range of -25 ... +55 °C (T1) applies for the use on railway vehicles according to EN50155	70 °C; = Tmax
Ambient temperature during storage/transportation			
• min.	-40 °C	-40 °C	-40 °C
• max.	70 °C	70 °C	70 °C
Extended ambient conditions			
• relative to ambient temperature-atmospheric pressure-installation altitude	Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m)	Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m)	Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m)
• At cold restart, min.	-25 °C	-25 °C	-25 °C
Relative humidity			
- With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation/frost (no commissioning under condensation conditions)	100 %; RH incl. condensation/frost (no commissioning under condensation conditions)	100 %; RH incl. condensation/frost (no commissioning under condensation conditions)
Resistance			
- against biologically active substances / conformity with EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!
- against chemically active substances / conformity with EN 60721-3-3	Yes; Class 3C4 incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!
- against mechanically active substances / conformity with EN 60721-3-3	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!

I/O systems

SIMATIC ET 200 systems for the control cabinet

SIMATIC ET 200M

Interface modules > SIPLUS ET 200M IM 153-1/153-2

Technical specifications (continued)

Article number	6AG1195-7HA00-2XA0	6AG1195-7HB00-7XA0	6AG1195-7HC00-2XA0	6AG1195-7HD10-2XA0
Based on	6ES7195-7HA00-0XA0	6ES7195-7HB00-0XA0	6ES7195-7HC00-0XA0	6ES7195-7HD10-0XA0
	SIPLUS ET 200M DP Busmodul	SIPLUS DP Busmodul ET 200M 2X40	SIPLUS ET 200M Busmodul	SIPLUS ET 200M DP Busmodul
Ambient conditions				
Ambient temperature during operation				
• min.	-40 °C; = Tmin	-40 °C; = Tmin	-40 °C; = Tmin	-40 °C; = Tmin
• max.	70 °C; = Tmax; 60 °C @ UL/cUL, ATEX and FM use	70 °C; = Tmax; 60 °C @ UL/cUL, ATEX and FM use	70 °C; = Tmax; 60 °C @ UL/cUL, ATEX and FM use	70 °C; = Tmax; 60 °C @ UL/cUL, ATEX and FM use
Ambient temperature during storage/transportation				
• min.		-40 °C	-40 °C	-40 °C
• max.		70 °C	70 °C	70 °C
Extended ambient conditions				
• relative to ambient temperature-atmospheric pressure-installation altitude	Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m)	Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m)	Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m)	Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m)
Relative humidity				
- With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation/frost (no commissioning under condensation conditions)	100 %; RH incl. condensation/frost (no commissioning under condensation conditions)	100 %; RH incl. condensation/frost (no commissioning under condensation conditions)	100 %; RH incl. condensation/frost (no commissioning under condensation conditions)
Resistance				
- against biologically active substances / conformity with EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!
- against chemically active substances / conformity with EN 60721-3-3	Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!
- against mechanically active substances / conformity with EN 60721-3-3	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!

Ordering data	Article No.		Article No.
SIPLUS ET 200M IM 153-1 Slave interface for connecting an ET 200M to PROFIBUS DP for a maximum of 8 S7-300 modules Extended temperature range and exposure to media	6AG1153-1AA03-2XB0	Bus module for SIPLUS ET 200M Bus module for accommodating a power supply and an IM 153 module for the hot-swapping function during RUN, incl. bus module cover Extended temperature range and exposure to media	6AG1195-7HA00-2XA0
SIPLUS ET 200M IM 153-2 High Feature Slave interface for connecting an ET 200M to PROFIBUS DP for a maximum of 12 S7-300 modules; also for use in redundant systems - Extended temperature range and exposure to media - Conforms to EN 50155	6AG1153-2BA10-7XB0 6AG1153-2BA10-2XY0	 Bus module for accommodating two 40-mm-wide I/O modules for the hot-swapping function - Extended temperature range and exposure to media Bus module for accommodating one 80-mm-wide I/O module for the hot-swapping function - Extended temperature range and exposure to media Bus module for accommodating two IM 153 modules for the hot-swapping function; for setting up redundant systems - Extended temperature range and exposure to media	 6AG1195-7HB00-7XA0 6AG1195-7HC00-2XA0 6AG1195-7HD10-2XA0
		RS 485 bus connector with 90° cable outlet Max. transfer rate 12 Mbps Extended temperature range and exposure to media - without PG interface - with PG interface	6AG1972-0BA12-2XA0 6AG1972-0BB12-2XA0
		Additional accessories	see SIMATIC ET 200M IM 153-1/153-2, page 9/167

I/O systems

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

Interface modules > SIPLUS ET 200M IM 153-4 PN IO

Overview



- For connection of ET 200M as an IO device to PROFINET IO (copper, RJ45)
- 2 versions:
 - IM 153-4 PN STANDARD
 - IM 153-4 PN HIGH FEATURE: compared to the STANDARD version, also allows operation of PROFIsafe F and HART modules
- Integrated 2-port switch
- 12 modules per station
- Usable I/O quantity structure: 192 bytes each
- Active backplane bus for hot swapping of modules optionally available
- Baud rate 10 Mbps / 100 Mbps (Autonegotiation/Full Duplex)
- I&M functions according to PNO-Guideline Order-No. 3.502, Version V1.1

Notes:

Micro Memory Card with min. 64 KB required if not all participants in the network support LLDP (Link Layer Discovery Protocol; proximity detection).

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

Technical documentation on SIPLUS can be found here:
<http://www.siemens.com/siplus-extreme>

Technical specifications

Article number	6AG1153-4AA01-7XB0
Based on	6ES7153-4AA01-0XB0 SIPLUS ET 200M IM 153-4 PN IO
Ambient conditions	
Ambient temperature during operation	
• min.	-25 °C; = Tmin
• max.	70 °C; = Tmax; 60 °C @ UL/cUL, ATEX and FM use
Ambient temperature during storage/transportation	
• min.	-40 °C
• max.	70 °C
Extended ambient conditions	
• relative to ambient temperature-atmospheric pressure-installation altitude	Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m)
Relative humidity	
- With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation/frost (no commissioning under condensation conditions)
Resistance	
- against biologically active substances / conformity with EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!
- against chemically active substances / conformity with EN 60721-3-3	Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!
- against mechanically active substances / conformity with EN 60721-3-3	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!

Ordering data

Article No.

SIPLUS ET 200M IM 153-4 PN	
Slave interface for connecting an ET 200M to PROFINET for a maximum of 12 S7-300 modules	
• Extended temperature range and exposure to media	6AG1153-4AA01-7XB0
Accessories	
IE FC RJ45 Plug 180	6AG1901-1BB10-7AA0
180° cable outlet; 1 unit	
Additional accessories	See SIMATIC ET 200M IM 153-4 PN interface module, page 9/170

Overview Digital modules

- Digital inputs and outputs
- For flexible adaptation of the controller to the respective task
- For connecting digital sensors and actuators

For further information, see SIMATIC S7-300, chapter 5.

Overview Analog modules

- Analog inputs and outputs
- For solving even complex tasks with analog process signals
- For connecting analog actuators and sensors without additional measuring amplifiers

For further information, see SIMATIC S7-300, chapter 5.

I/O systems

SIMATIC ET 200 systems for the control cabinet

SIMATIC ET 200M

I/O modules > Analog modules with HART > Analog input module with HART

Overview



- Can only be plugged onto ET 200M with IM 153-2 and IM 153-2 FO
- 8 AI HART
- Redundancy switching
- Firmware update
- HART minor variables

Technical specifications

Article number	6ES7331-7TF01-0AB0 SM331, 8AI, 0/4-20mA HART
Supply voltage	
Load voltage L+	
• Rated value (DC)	24 V
• Reverse polarity protection	Yes
Input current	
from load voltage L+ (without load), max.	20 mA
from backplane bus 5 V DC, max.	120 mA
Output voltage	
Power supply to the transmitters	
• present	Yes
• Rated value (DC)	24 V
• short-circuit proof	Yes
Power loss	
Power loss, typ.	1.5 W
Analog inputs	
Number of analog inputs	8
permissible input current for current input (destruction limit), max.	40 mA
Input ranges	
• Current	Yes
Input ranges (rated values), currents	
• 0 to 20 mA	Yes
• Input resistance (0 to 20 mA)	140 Ω
• Input resistance (-20 mA to +20 mA)	140 Ω
• Input resistance (4 mA to 20 mA)	140 Ω
Cable length	
• shielded, max.	800 m

Article number	6ES7331-7TF01-0AB0 SM331, 8AI, 0/4-20mA HART
Analog value generation for the inputs	
Measurement principle	Sigma Delta
Integration and conversion time/resolution per channel	
• Resolution with overrange (bit including sign), max.	16 bit
• Integration time, parameterizable	Yes
• Integration time (ms)	20 ms at 50 Hz; 16.6 ms at 60 Hz; 100 ms at 100 Hz
• Basic conversion time, including integration time (ms)	55 ms @ 60 Hz, 65 ms @ 50 Hz, 305 ms @ 100 Hz
• Interference voltage suppression for interference frequency f1 in Hz	10 / 50 / 60 Hz
Encoder	
Connection of signal encoders	
• for current measurement as 2-wire transducer	Yes
• for current measurement as 4-wire transducer	Yes
Errors/accuracies	
Linearity error (relative to input range), (+/-)	0.01 %
Temperature error (relative to input range), (+/-)	0.001 %/K
Crosstalk between the inputs, min.	70 dB
Repeat accuracy in steady state at 25 °C (relative to input range), (+/-)	0.1 %
Operational error limit in overall temperature range	
• Current, relative to input range, (+/-)	0.15 %
Basic error limit (operational limit at 25 °C)	
• Current, relative to input range, (+/-)	0.1 %
Interference voltage suppression for f = n x (f1 +/- 1 %), f1 = interference frequency	
• Series mode interference (peak value of interference < rated value of input range), min.	40 dB
• Common mode interference, min.	100 dB

Technical specifications (continued)

Article number	6ES7331-7TF01-0AB0 SM331, 8AI, 0/4-20MA HART
Isochronous mode	
Isochronous operation (application synchronized up to terminal)	No
Interrupts/diagnostics/status information	
Diagnostic functions	Yes
Alarms	
• Diagnostic alarm	Yes
• Limit value alarm	Yes
Diagnostic messages	
• Diagnostic information readable	Yes
Diagnostics indication LED	
• Group error SF (red)	Yes
• Channel fault indicator F (red)	Yes

Article number	6ES7331-7TF01-0AB0 SM331, 8AI, 0/4-20MA HART
Potential separation	
Potential separation analog inputs	
• between the channels	No
• between the channels and backplane bus	Yes
Isolation	
Isolation tested with	500 V DC
Connection method	
required front connector	20-pin
Dimensions	
Width	40 mm
Height	125 mm
Depth	117 mm
Weights	
Weight, approx.	205 g

Ordering data

Article No.

SM 331 HART analog input module 8 inputs, 0/4 – 20 mA, HART for ET 200M with IM 153-2 interface module	6ES7331-7TF01-0AB0
Accessories	
Front connectors	
• 20-pin, with screw terminals	
- 1 unit	6ES7392-1AJ00-0AA0
- 100 units	6ES7392-1AJ00-1AB0
• 20-pin, with spring-loaded terminals	
- 1 unit	6ES7392-1BJ00-0AA0
- 100 units	6ES7392-1BJ00-1AB0
LK 393 cable guide	6ES7393-4AA00-0AA0
Mandatory for operation in hazardous areas	
SIMATIC DP DIN rail for ET 200M	
For mounting of up to 5 bus modules for	
• Length: 483 mm (19")	6ES7195-1GA00-0XA0
• Length: 530 mm	6ES7195-1GF30-0XA0
SIMATIC S7-300 DIN rail	
• Length: 160 mm	6ES7390-1AB60-0AA0
• Length: 480 mm (19")	6ES7390-1AE80-0AA0
• Length: 530 mm	6ES7390-1AF30-0AA0
• Length: 830 mm	6ES7390-1AJ30-0AA0
• Length: 2000 mm	6ES7390-1BC00-0AA0

Article No.

Label cover (10 units, spare part) for signal modules (not 32-channel modules), function modules and CPU 312 IFM	6ES7392-2XY00-0AA0
Labeling strips (10 units, spare part) for signal modules (not 32-channel modules), function modules and CPU 312 IFM	6ES7392-2XX00-0AA0
Labeling sheets for machine printing For modules with 20-pin front connector, DIN A4, for printing with laser printer; 10 units	
petrol	6ES7392-2AX00-0AA0
light beige	6ES7392-2BX00-0AA0
yellow	6ES7392-2CX00-0AA0
red	6ES7392-2DX00-0AA0

I/O systems

SIMATIC ET 200 systems for the control cabinet

SIMATIC ET 200M

I/O modules > Analog modules with HART > Analog output module with HART

Overview



- For plugging into ET 200M exclusively with IM 153-2 and IM 153-2 FO
- 8 AO HART
- Redundancy switching
- Firmware update
- HART minor variables

Technical specifications

Article number	6ES7332-8TF01-0AB0 SM332, 8AO, 0/4 - 20MA HART
Supply voltage	
Load voltage L+	
• Rated value (DC)	24 V
• Reverse polarity protection	Yes
Input current	
from load voltage L+ (without load), max.	350 mA
from backplane bus 5 V DC, max.	110 mA
Power loss	
Power loss, typ.	6 W
Analog outputs	
Number of analog outputs	8
Current output, no-load voltage, max.	24 V
Output ranges, current	
• 0 to 20 mA	Yes
• -20 mA to +20 mA	No
• 4 mA to 20 mA	Yes
Connection of actuators	
• for current output two-wire connection	Yes
Load impedance (in rated range of output)	
• with current outputs, max.	750 Ω
• with current outputs, inductive load, max.	10 mH
Destruction limits against externally applied voltages and currents	
• Voltages at the outputs towards MANA	+60/-0.5 V
Cable length	
• shielded, max.	800 m

Article number	6ES7332-8TF01-0AB0 SM332, 8AO, 0/4 - 20MA HART
Analog value generation for the outputs	
Integration and conversion time/ resolution per channel	
• Resolution with overrange (bit including sign), max.	16 bit
Settling time	
• for resistive load	0.1 ms
• for inductive load	0.5 ms
Errors/accuracies	
Output ripple (relative to output range, bandwidth 0 to 50 kHz), (+/-)	0.02 %
Linearity error (relative to output range), (+/-)	0.01 %
Temperature error (relative to output range), (+/-)	0.002 %/K
Crosstalk between the outputs, min.	70 dB
Repeat accuracy in steady state at 25 °C (relative to output range), (+/-)	0.05 %
Operational error limit in overall temperature range	
• Current, relative to output range, (+/-)	0.2 %
Basic error limit (operational limit at 25 °C)	
• Current, relative to output range, (+/-)	0.1 %
Isochronous mode	
Isochronous operation (application synchronized up to terminal)	No

Technical specifications (continued)

Article number	6ES7332-8TF01-0AB0 SM332, 8AO, 0/4 - 20MA HART
Interrupts/diagnostics/ status information	
Diagnostic functions	Yes
Substitute values connectable	Yes
Alarms	
• Diagnostic alarm	Yes
Diagnostic messages	
• Diagnostic information readable	Yes
Diagnostics indication LED	
• Group error SF (red)	Yes
Potential separation	
Potential separation analog outputs	
• between the channels	No
• between the channels and backplane bus	Yes
• Between the channels and load voltage L+	Yes

Article number	6ES7332-8TF01-0AB0 SM332, 8AO, 0/4 - 20MA HART
Isolation	
Isolation tested with	500 V DC
Connection method	
required front connector	20-pin
Dimensions	
Width	40 mm
Height	125 mm
Depth	117 mm
Weights	
Weight, approx.	220 g

Ordering data

Article No.

SM 332 HART analog output module HART analog output, 8 outputs, 0/4 – 20 mA, HART for ET 200M with IM 153-2	6ES7332-8TF01-0AB0
Accessories	
Front connector (1 unit) 20-pin, with screw contacts	6ES7392-1AJ00-0AA0
LK 393 cable guide Mandatory for operation in hazardous areas	6ES7393-4AA00-0AA0
SIMATIC DP DIN rail for ET 200M For mounting of up to 5 bus modules for • Length: 483 mm • Length: 530 mm	6ES7195-1GA00-0XA0 6ES7195-1GF30-0XA0
SIMATIC S7-300 DIN rail • Length: 160 mm • Length: 480 mm (19") • Length: 530 mm • Length: 830 mm • Length: 2000 mm	6ES7390-1AB60-0AA0 6ES7390-1AE80-0AA0 6ES7390-1AF30-0AA0 6ES7390-1AJ30-0AA0 6ES7390-1BC00-0AA0
Label cover (10 units, spare part) for signal modules (not 32-channel modules), function modules and CPU 312 IFM	6ES7392-2XY00-0AA0

Article No.

Labeling strips (10 units, spare part) for signal modules (not 32-channel modules), function modules and CPU 312 IFM	6ES7392-2XX00-0AA0
S7 Manual Collection Electronic manuals on DVD, multi-language: S7-200, TD 200, S7-300, M7-300, C7, S7-400, M7-400, STEP 7, Engineering Tools, Runtime Software, SIMATIC DP (Distributed I/O), SIMATIC HMI (Human Machine Interface), SIMATIC NET (Industrial Communication)	6ES7998-8XC01-8YE0
S7 Manual Collection update service for 1 year Scope of delivery: Current DVD "S7 Manual Collection" and the three subsequent updates	6ES7998-8XC01-8YE2
Labeling sheets for machine printing for modules with 20-pin front connector, DIN A4, for printing with laser printer; 10 units petrol light beige yellow red	6ES7392-2AX00-0AA0 6ES7392-2BX00-0AA0 6ES7392-2CX00-0AA0 6ES7392-2DX00-0AA0

I/O systems

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

I/O modules > Analog modules with HART > Ex analog input module with HART

Overview



- For connecting HART devices in hazardous areas
- Can only be plugged onto ET 200M
- 2 AI HART, Ex
- 2 inputs in 2 channel groups (single-channel isolation)
- Measurement type and range can be selected for each channel
- Diagnostics and diagnostic alarm parameterizable

Technical specifications

Article number	6ES7331-7TB10-0AB0 SIMATIC DP, HART ANALOG INPUT M
Supply voltage	
Load voltage L+	
• Rated value (DC)	24 V
• Reverse polarity protection	Yes
Input current	
from load voltage L+ (without load), max.	180 mA
from backplane bus 5 V DC, max.	100 mA
Output voltage	
Power supply to the transmitters	
• present	Yes
• Rated value (DC)	15 V; at 22 mA
• short-circuit proof	Yes; approx. 30 mA
• No-load voltage (DC)	29.6 V
Power loss	
Power loss, typ.	4.5 W
Analog inputs	
Number of analog inputs	2
permissible input current for current input (destruction limit), max.	40 mA
Input ranges	
• Current	Yes
Input ranges (rated values), currents	
• 0 to 20 mA	Yes
• Input resistance (0 to 20 mA)	50 Ω
• 4 mA to 20 mA	Yes
• Input resistance (4 mA to 20 mA)	50 Ω
Cable length	
• shielded, max.	400 m
Analog value generation for the inputs	
Measurement principle	Sigma Delta
Integration and conversion time/resolution per channel	
• Resolution with overrange (bit including sign), max.	16 bit; 10 bit to 15 bit + sign
• Integration time, parameterizable	Yes
• Integration time (ms)	2.5 / 16.67 / 20 / 100 ms
• Basic conversion time, including integration time (ms)	2.5 / 16.67 / 20 / 100 (1 channel enabled); 7.5 / 50 / 60 / 300 (2 channels enabled)
• Interference voltage suppression for interference frequency f1 in Hz	10 / 50 / 60 / 400 Hz

Article number	6ES7331-7TB10-0AB0 SIMATIC DP, HART ANALOG INPUT M
Encoder	
Connection of signal encoders	
• for current measurement as 2-wire transducer	Yes
• for current measurement as 4-wire transducer	Yes
Errors/accuracies	
Linearity error (relative to input range), (+/-)	0.01 %
Temperature error (relative to input range), (+/-)	0.01 %/K
Crosstalk between the inputs, min.	130 dB
Repeat accuracy in steady state at 25 °C (relative to input range), (+/-)	0.05 %
Operational error limit in overall temperature range	
• Current, relative to input range, (+/-)	0.45 %; From 0/4 to 20 mA
Basic error limit (operational limit at 25 °C)	
• Current, relative to input range, (+/-)	0.1 %; From 0/4 to 20 mA
Interference voltage suppression for $f = n \times (f1 \pm 1 \%)$, f1 = interference frequency	
• Series mode interference (peak value of interference < rated value of input range), min.	60 dB
• Common mode interference, min.	130 dB
Interrupts/diagnostics/status information	
Diagnostic functions	Yes; Parameterizable
Alarms	
• Diagnostic alarm	Yes; Parameterizable
• Limit value alarm	Yes; Parameterizable, channels 0 and 1
Diagnostic messages	
• Diagnostic information readable	Yes; possible
• Overrange	Yes; Red LED, signal
• Wire-break in signal transmitter cable	Yes; Red LED, signal
• Short-circuit of the signal encoder cable	Yes; Red LED, signal
• HART communication active	Yes; green LED (H)
Diagnostics indication LED	
• Group error SF (red)	Yes
• Channel fault indicator F (red)	Yes

Technical specifications (continued)

Article number	6ES7331-7TB10-0AB0 SIMATIC DP, HART ANALOG INPUT M
Ex(i) characteristics	
Module for Ex(i) protection	Yes
Maximum values of input circuits (per channel)	
• Co (permissible external capacity), max.	62 nF
• Io (short-circuit current), max.	96.1 mA
• Lo (permissible external inductivity), max.	3 mH
• Po (power of load), max.	511 mW
• Uo (output no-load voltage), max.	26 V
• Um (fault voltage), max.	250 V; DC
• Ta (permissible ambient temperature), max.	60 °C
Potential separation	
Potential separation analog inputs	
• between the channels	Yes
• between the channels and backplane bus	Yes
Permissible potential difference	
between the inputs (UCM)	60 V DC/30 V AC permitted potential difference (Viso) of signals from hazardous areas
Isolation	
tested with	
• Channels against backplane bus and load voltage L+	2500 V DC
• Channels among one another	2500 V DC
• Load voltage L+ against backplane bus	500 V DC

Article number	6ES7331-7TB10-0AB0 SIMATIC DP, HART ANALOG INPUT M
Standards, approvals, certificates	
CE mark	Yes
UL approval	Yes
FM approval	Yes
RCM (formerly C-TICK)	Yes
KC approval	Yes
EAC (formerly Gost-R)	Yes
Use in hazardous areas	
• Type of protection acc. to FM	Class I, Division 2, Group A, B, C, D T4; Class I, Zone 2, Group IIC T4
• Type of protection acc. to KEMA	II 3 G (2) GD Ex nA [ib Gb] [ib IIIC Db] IIC T4 Gc
• Test number KEMA	DEKRA 14 ATEX 0052X
Ambient conditions	
Ambient temperature during operation	
• min.	0 °C
• max.	60 °C
Connection method	
required front connector	1x 20-pin
Dimensions	
Width	40 mm
Height	125 mm
Depth	120 mm
Weights	
Weight, approx.	260 g

Ordering data

Article No.

SM 331 HART analog input module 2 inputs, 0/4 – 20 mA, HART for ET 200M with IM 153-2 interface module For HART protocol V5.0 and higher	6ES7331-7TB10-0AB0
Accessories	
Front connector¹⁾	
20-pin, with screw contacts	
• 1 unit	6ES7392-1AJ00-0AA0
• 100 units	6ES7392-1AJ00-1AB0
LK 393 cable guide Mandatory for operation in hazardous areas	6ES7393-4AA00-0AA0
SIMATIC DP DIN rail for ET 200M	
For mounting of up to 5 bus modules for	
• Length: 483 mm	6ES7195-1GA00-0XA0
• Length: 530 mm	6ES7195-1GF30-0XA0
SIMATIC S7-300 DIN rail	
• Length: 160 mm	6ES7390-1AB60-0AA0
• Length: 480 mm (19")	6ES7390-1AE80-0AA0
• Length: 530 mm	6ES7390-1AF30-0AA0
• Length: 830 mm	6ES7390-1AJ30-0AA0
• Length: 2000 mm	6ES7390-1BC00-0AA0

Article No.

Label cover (10 units, spare part) for signal modules (not 32-channel modules), function modules and CPU 312 IFM	6ES7392-2XY00-0AA0
Labeling strips (10 units, spare part) for signal modules (not 32-channel modules), function modules and CPU 312 IFM	6ES7392-2XX00-0AA0
Labeling sheets for machine printing	
for modules with 20-pin front connector, DIN A4, for printing with laser printer; 10 units	
petrol	6ES7392-2AX00-0AA0
light beige	6ES7392-2BX00-0AA0
yellow	6ES7392-2CX00-0AA0
red	6ES7392-2DX00-0AA0

¹⁾ A connector with spring-loaded terminals cannot be used if the cable guide is used.

I/O systems

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

I/O modules > Analog modules with HART > Ex analog output module with HART

Overview



- For using HART devices in hazardous areas
- Can only be plugged onto ET 200M
- 2 AO HART, Ex
- 2 current outputs in 2 channel groups (single-channel isolation)
- Output type and range can be selected for each channel
- Diagnostics and diagnostic alarm parameterizable
- Read-back capability of the analog outputs

Technical specifications

Article number	6ES7332-5TB10-0AB0 SIMATIC DP, HART ANALOG OUTPUT
Supply voltage	
Load voltage L+	
• Rated value (DC)	24 V
• Reverse polarity protection	Yes
Input current	
from load voltage L+ (without load), max.	150 mA
from backplane bus 5 V DC, max.	100 mA
Power loss	
Power loss, typ.	3.5 W
Analog outputs	
Number of analog outputs	2
Current output, no-load voltage, max.	19 V
Cycle time (all channels) max.	5 ms
Output ranges, current	
• 0 to 20 mA	Yes
• -20 mA to +20 mA	No
• 4 mA to 20 mA	Yes
Connection of actuators	
• for current output two-wire connection	Yes
Load impedance (in rated range of output)	
• with current outputs, max.	650 Ω
• with current outputs, inductive load, max.	7.5 mH
Destruction limits against externally applied voltages and currents	
• Voltages at the outputs towards MANA	max. 17 V / -0.5 V
• Current, max.	60 mA / -1 A
Cable length	
• shielded, max.	400 m
Analog value generation for the outputs	
Integration and conversion time/resolution per channel	
• Resolution with overrange (bit including sign), max.	12 bit; + sign
• Conversion time (per channel)	40 ms

Article number	6ES7332-5TB10-0AB0 SIMATIC DP, HART ANALOG OUTPUT
Settling time	
• for resistive load	2.5 ms
• for capacitive load	4 ms
• for inductive load	2.5 ms
Errors/accuracies	
Output ripple (relative to output range, bandwidth 0 to 50 kHz), (+/-)	0.02 %
Linearity error (relative to output range), (+/-)	0.03 %
Temperature error (relative to output range), (+/-)	0.01 %/K
Crosstalk between the outputs, min.	130 dB
Repeat accuracy in steady state at 25 °C (relative to output range), (+/-)	0.005 %
Operational error limit in overall temperature range	
• Current, relative to output range, (+/-)	0.55 %
Basic error limit t (operational limit at 25 °C)	
• Current, relative to output range, (+/-)	0.15 %
Interrupts/diagnostics/status information	
Diagnostic functions	Yes; Parameterizable
Substitute values connectable	Yes; Parameterizable
Alarms	
• Diagnostic alarm	Yes; Parameterizable
Diagnostic messages	
• Diagnostic information readable	Yes; possible
• Overrange	Yes
• Wire-break	Yes; as of output value > 0.5 mA
• HART communication active	Yes; green LED (H)
Diagnostics indication LED	
• Group error SF (red)	Yes; Red LED
• Channel fault indicator F (red)	Yes; per channel
Ex(i) characteristics	
Module for Ex(i) protection	Yes

Technical specifications (continued)

Article number	6ES7332-5TB10-0AB0 SIMATIC DP, HART ANALOG OUTPUT
Maximum values of output circuits (per channel)	
• Co (permissible external capacity), max.	230 nF
• Io (short-circuit current), max.	66 mA
• Lo (permissible external inductivity), max.	7.5 mH
• Po (power of load), max.	506 mW
• Uo (output no-load voltage), max.	19 V
• Um (fault voltage), max.	60 V; DC
• Ta (permissible ambient temperature), max.	60 °C
Potential separation	
Potential separation analog outputs	
• between the channels	Yes
• between the channels and backplane bus	Yes
• Between the channels and load voltage L+	Yes
Permissible potential difference between the outputs (UCM)	60 V DC/30 V AC permitted potential difference (Viso) of signals from hazardous areas

Article number	6ES7332-5TB10-0AB0 SIMATIC DP, HART ANALOG OUTPUT
Isolation	
tested with	
• Channels against backplane bus and load voltage L+	2500 V DC
• Channels among one another	2500 V DC
• Load voltage L+ against backplane bus	500 V DC
Standards, approvals, certificates	
FM approval	Yes
Use in hazardous areas	
• Type of protection acc. to FM	Class I, Division 2, Group A, B, C, D T4; Class I, Zone 2, Group IIC T4
• Type of protection acc. to KEMA	II 3 G (2) GD Ex nA [ib Gb] [ib IIC Db] IIC T4 Gc
• Test number KEMA	DEKRA 14 ATEX 0053X
Connection method	
required front connector	20-pin
Dimensions	
Width	40 mm
Height	125 mm
Depth	120 mm
Weights	
Weight, approx.	290 g

Ordering data

Article No.

SM 332 HART analog output module HART analog output, 8 outputs, 0/4 – 20 mA, HART for ET 200M with IM 153-2 For HART protocol V5.0 and higher	6ES7332-5TB10-0AB0
Accessories	
Front connectors 20-pin, with screw contacts • 1 unit • 100 units	6ES7392-1AJ00-0AA0 6ES7392-1AJ00-1AB0
LK 393 cable guide Mandatory for operation in hazardous areas	6ES7393-4AA00-0AA0
SIMATIC DP DIN rail for ET 200M For mounting of up to 5 bus modules for • Length: 483 mm (19") • Length: 530 mm	6ES7195-1GA00-0XA0 6ES7195-1GF30-0XA0
SIMATIC S7-300 DIN rail • Length: 160 mm • Length: 480 mm (19") • Length: 530 mm • Length: 830 mm • Length: 2000 mm	6ES7390-1AB60-0AA0 6ES7390-1AE80-0AA0 6ES7390-1AF30-0AA0 6ES7390-1AJ30-0AA0 6ES7390-1BC00-0AA0
Label cover (10 units, spare part) for signal modules (not 32-channel modules), function modules and CPU 312 IFM	6ES7392-2XY00-0AA0

Article No.

Labeling strips (10 units, spare part) for signal modules (not 32-channel modules), function modules and CPU 312 IFM Software for machine labeling of modules directly from the STEP 7 project	6ES7392-2XX00-0AA0
Labeling sheets for machine printing for modules with 20-pin front connector, DIN A4, for printing with laser printer; 10 units	
petrol	6ES7392-2AX00-0AA0
light beige	6ES7392-2BX00-0AA0
yellow	6ES7392-2CX00-0AA0
red	6ES7392-2DX00-0AA0
S7 Manual Collection Electronic manuals on DVD, multi-language: S7-200, TD 200, S7-300, M7-300, C7, S7-400, M7-400, STEP 7, Engineering Tools, Runtime Software, SIMATIC DP (Distributed I/O), SIMATIC HMI (Human Machine Interface), SIMATIC NET (Industrial Communication)	6ES7998-8XC01-8YE0
S7 Manual Collection update service for 1 year Scope of delivery: Current DVD "S7 Manual Collection" and the three subsequent updates	6ES7998-8XC01-8YE2

I/O systems

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

I/O modules > Analog modules with HART > SIPLUS S7-300 analog input module with HART

Overview



- Can only be plugged onto ET 200M with IM 153-2 and IM 153-2 FO
- 8 AI HART
- Redundant connection
- Firmware update
- HART secondary variables

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

For technical documentation on SIPLUS, see:

<http://www.siemens.com/siplus-extreme>

Technical specifications

Article number	6AG1331-7TF01-7AB0
Based on	6ES7331-7TF01-0AB0 SIPLUS SM331 AI 8 x 0/4...20mA HART
Ambient conditions	
Ambient temperature during operation	
• min.	-25 °C; = Tmin
• max.	70 °C; = Tmax; 60 °C @ UL/cUL use
Ambient temperature during storage/transportation	
• min.	-40 °C
• max.	70 °C
Extended ambient conditions	
• relative to ambient temperature-atmospheric pressure-installation altitude	Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m)
Relative humidity	
- With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation/frost (no commissioning under condensation conditions)
Resistance	
- against biologically active substances / conformity with EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!
- against chemically active substances / conformity with EN 60721-3-3	Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!
- against mechanically active substances / conformity with EN 60721-3-3	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!

Ordering data

Article No.

SIPLUS SM 331 analog input module with HART

8 inputs, 0/4 – 20 mA,
HART for ET 200M with
IM 153-2 interface module

Extended temperature range and
exposure to media

6AG1331-7TF01-7AB0

Accessories

See SIMATIC ET 200M
analog input module with
HART, page 9/177

Overview



- Can only be plugged onto ET 200M with IM 153-2 and IM 153-2 FO
- 8 AO HART
- Redundant connection
- Firmware update
- HART secondary variables

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

For technical documentation on SIPLUS, see:

<http://www.siemens.com/siplus-extreme>

Technical specifications

Article number	6AG1332-8TF01-2AB0
Based on	6ES7332-8TF01-0AB0 SIPLUS SM332 8AO HART
Ambient conditions	
Ambient temperature during operation	
• min.	-25 °C; = Tmin
• max.	60 °C; = Tmax
Ambient temperature during storage/transportation	
• min.	-40 °C
• max.	70 °C
Extended ambient conditions	
• relative to ambient temperature-atmospheric pressure-installation altitude	Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m)
Relative humidity	
- With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation/frost (no commissioning under condensation conditions)
Resistance	
- against biologically active substances / conformity with EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!
- against chemically active substances / conformity with EN 60721-3-3	Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!
- against mechanically active substances / conformity with EN 60721-3-3	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!

Ordering data

Article No.

SIPLUS SM 332 analog output module with HART	
8 outputs, 0/4...20 mA HART, for ET 200M with IM 153-2 interface module	
Extended temperature range and exposure to media	6AG1332-8TF01-2AB0
Accessories	See SIMATIC SM 332 analog output modules with HART, page 9/179

I/O systems

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

I/O modules > Analog modules with HART > SIPLUS S7-300 Ex analog input module with HART

Overview



- For connecting HART devices in hazardous areas
- Can only be plugged onto ET 200M
- 2 AI HART, Ex
- 2 inputs in 2 channel groups (single-channel isolation)
- Measurement type and range can be selected for each channel
- Programmable diagnostics and diagnostic interrupt

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

For technical documentation on SIPLUS, see:

<http://www.siemens.com/siplus-extreme>

Technical specifications

Article number	6AG1331-7TB00-7AB0
Based on	6ES7331-7TB00-0AB0 SIPLUS S7-300 SM331 2AE HART
Ambient conditions	
Ambient temperature during operation	
• min.	-25 °C; = Tmin
• max.	70 °C; = Tmax; 60 °C @ UL/cUL, ATEX and FM use
Ambient temperature during storage/transportation	
• min.	-40 °C
• max.	70 °C
Extended ambient conditions	
• relative to ambient temperature-atmospheric pressure-installation altitude	Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m)
Relative humidity	
- With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation/frost (no commissioning under condensation conditions)
Resistance	
- against biologically active substances / conformity with EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!
- against chemically active substances / conformity with EN 60721-3-3	Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!
- against mechanically active substances / conformity with EN 60721-3-3	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!

Ordering data

Article No.

SIPLUS SM 331 Ex analog input module with HART

2 inputs, 0/4 ... 20 mA,
HART for ET 200M with
IM 153-2 interface module

Extended temperature range
and exposure to media

6AG1331-7TB00-7AB0

Accessories

See SIMATIC ET 200M
Ex analog input module
with HART, page 9/181

Overview

The fail-safe CPUs of SIMATIC S7 and the fail-safe signal modules of SIMATIC ET 200S, ET 200pro, ET 200eco and ET 200M have been specially developed for distributed safety-related applications in production engineering. Thanks to the discreetly modular structure of the fail-safe I/Os, safety technology is only applied where actually required. The new system replaces conventional electromechanical components, such as:

- Freely programmable, safe linking of sensors to actuators
- Selective safe shutdown of actuators
- Mixed configuration of fail-safe modules and standard modules in a station
- Single-bus concept;
fail-safe signals and standard signals are transferred over a single bus medium (PROFIBUS DP, PROFINET)

Totally Integrated Automation (TIA)

Safety technology (Safety Integrated) is a component of Totally Integrated Automation which provides total integration of safety automation and standard automation (SIMATIC S7).

Where standard automation (classical PLC) and safety automation (electromechanics) are still separate today, these two worlds are growing together into a uniform, integrated overall system.

Siemens can therefore present itself as a complete supplier for automation technology in which safety engineering is part of standard automation and system-wide integration exists.

For further information, see SIMATIC S7-300, chapter 5.

I/O systems

SIMATIC ET 200 systems for the control cabinet

SIMATIC ET 200M

I/O modules > Function modules

Overview



Function modules unburden the CPU of work-intensive tasks such as counting, positioning and controlling

Module spectrum

- Counter modules
- Positioning modules for rapid traverse and creep speed drives
- Positioning modules for stepper motors
- Positioning and continuous path modules
- SSI position detection modules
- Electronic cam controllers
- High-speed Boolean processor
- Control modules

Function modules	
Counting	FM 350-1 counter module
	FM 350-2 counter module
Positioning	
• of rapid traverse and creep speed drives	FM 351 positioning module
• of stepper motors	FM 353 positioning module
Position and path control	FM 357-2 path and position control module ¹⁾
SSI position detection	SM 338 POS input modules
Electronic cam control	FM 352 electronic cam controller
High speed logic operation	FM 352-5 high-speed Boolean processor
Controlling	FM 355 controller module
	FM 355-2 temperature controller module
Weighing and proportioning electronics	SIWAREX

¹⁾ Not for ET 200M

Overview (continued)**Applicability with ET 200M distributed I/O device**

Almost all function modules can be used in the ET 200M distributed I/O device. In doing so, the following details must be observed:

		For plugging in behind IM 153-1 (6ES7 153-1AA03-0XB0)		For plugging in behind IM 153-2 (6ES7 153-2BA02-0XB0)		For plugging in behind IM 153-2 FO (6ES7 153-2BB00-0XB0)		For plugging in behind IM 153-4 PN (6ES7 153-4AA00-0XB0)
		configurable with						
Module	Article No.	STEP 7 ¹⁾	GSD ²⁾	STEP 7 ¹⁾	GSD ²⁾	STEP 7 ¹⁾	GSD ²⁾	STEP 7 ¹⁾
FM 350-1 counter module	6ES7 350-1AH03-0AE0	☐	--	☐	--	☐	--	☐
FM 350-2 counter module	6ES7 350-2AH01-0AE0	☐	--	☐	--	☐	--	☐
FM 351 positioning module	6ES7 351-1AH01-0AE0	☐	--	☐	--	☐	--	☐
FM 352 cam controller	6ES7 352-1AH02-0AE0	☐	--	☐	--	☐	--	☐
FM 352-5 high-speed Boolean processor	6ES7 352-5AH00-0AE0	☐ ³⁾	☐	☐ ³⁾	☐	☐ ³⁾	☐	☐
FM 352-5 high-speed Boolean processor	6ES7 352-5AH10-0AE0	☐ ³⁾	☐	☐ ³⁾	☐	☐ ³⁾	☐	☐
FM 353 positioning module	6ES7 353-1AH01-0AE0	--	--	☐	--	☐	--	--
FM 355 C controller module	6ES7 355-0VH10-0AE0	--	--	☐	--	☐	--	☐
FM 355 S controller module	6ES7 355-1VH10-0AE0	--	--	☐	--	☐	--	☐
FM 355-2 C temperature controller module	6ES7 355-2CH00-0AE0	☐	--	☐	--	☐	--	☐
FM 355-2 S temperature controller module	6ES7 355-2SH00-0AE0	☐	--	☐	--	☐	--	☐
SM 338 POS input module	6ES7 338-4BC01-0AB0	☐	☐	☐	☐	☐	☐	☐

☐: configurable

--: not configurable

¹⁾ Configuration using the meta-knowledge integrated into STEP 7 (in Hardware Catalog under PROFIBUS DP > ET 200M > IM 153-1 / IM 153-2 or PROFINET IO > I/O > ET 200M > IM153-4 PN).

²⁾ Configuration using GSD file (after installation of the GSD file configurable from the Hardware Catalog under PROFIBUS DP > Additional field devices > I/O > ET 200M). During configuration on the CP 342-5 as DP master, S5 (IM 308C) as DP master or external masters, the GSD file must be configured.

³⁾ Visible and configurable only with the corresponding configuration package in STEP 7.

Note:

Position measurement systems and prefabricated connecting cables for counter and positioning function are offered under SIMODRIVE Sensor and Motion Connect 500.

<http://www.siemens.com/simatic-technology>

For further information, see SIMATIC S7-300, chapter 5.

I/O systems

SIMATIC ET 200 systems for the control cabinet

SIMATIC ET 200M

I/O modules > Communication

Overview Special modules



Special modules provide the user with diagnostic and commissioning functions.

For further information, see SIMATIC S7-300, chapter 5.

Overview Communication



- Communication boards for data exchange using point-to-point coupling
- Communication board for the connection of identification systems

For further information, see SIMATIC S7-300, chapter 5.

Overview

- Load current supplies for S7-300/ET 200M
- For converting the line voltage to the required operating voltage (24 V DC)
- Output current 2 A, 5 A or 10 A

For further information, see SIMATIC S7-300, chapter 5.

I/O systems

SIMATIC ET 200 systems for the control cabinet

SIMATIC ET 200iSP

Overview



The ET 200iSP is a modular, intrinsically safe I/O system with IP30 degree of protection which can be operated in gas and dust atmospheres at ambient temperatures from -20 to +70 °C. It is optimized for use with SIMATIC PCS 7 and SIMATIC S7, but can also be integrated in other systems such as SIMATIC S5 per GSD file.

In accordance with ATEX directive 94/9/EC, the ET 200iSP remote I/O stations can be installed directly in the Ex zones 1, 2, 21 or 22 as well as in non-hazardous areas. The intrinsically safe sensors, actuators and HART field devices can also be located in zone 0 or 20 if necessary.

The modular design of the ET 200iSP makes it possible to optimally adapt the remote I/O stations to the respective automation task through individual configuration and flexible expansion. To increase plant availability, the pressure-encapsulated power supply and the intrinsically safe PROFIBUS DP connection (RS 485-IS) of the stations can also be of redundant design.

The modern architecture with hardwiring and automatic slot coding supports pre-wiring without the electronics modules, simple and reliable hot swapping of individual modules without a fire certificate as well as configuration in run (CiR).

In addition to analog and digital I/O modules for the automation of the technological functions of the process (Basic Process Control), the range of electronics modules also includes safety-related F-I/O modules for implementing safety applications. The various types of electronics module can be arranged mixed within a station. Comprehensive diagnostic options facilitate commissioning and troubleshooting.

Technical specifications

ET 200iSP – general		
Degree of protection	IP30	
Ambient temperature		
• Horizontal mounting position	-20 ... +70 °C	
• Other mounting positions	-20 ... +50 °C	
Loading of media	According to ISA-S71.04 severity level G1; G2; G3 (except for NH3, only level G2 in this case)	
EMC	Electromagnetic compatibility according to NE21	
Vibration resistance	0.5 g continuously, 1 g periodically	
Approvals, standards		
• ATEX	II 2 G (1) GD I M2	Ex de [ia/ib] IIC T4 Ex de [ia/ib] I
• IECEX	Zone 1	Ex de [ia/ib] IIC T4
• INMETRO	Zone 1	BR-Ex de [ia/ib] IIC T4
• cFMus	Class I, II, III	NI Division 2, Groups A, B, C, D, E, F, G T4 AIS Division 1, Groups A, B, C, D, E, F, G
• cULus	Class I Class I, II, III	Zone 1, AEx de [ia/ib] IIC T4 Division 2, Groups A, B, C, D, E, F, G T4 providing int. safe circuits for Division 1, Groups A, B, C, D, E, F, G
• NEPSI	Class I Ex de ib[ia] IIC T4 Ex de [ia/ib] IIC T4	Zone 1, AEx de [ia/ib] IIC T4
• PROFIBUS	EN 50170, Volume 2	
• IEC	IEC 61131, Part 2	
• CE	According to 94/9/EC (previously ATEX 100a), 2004/108/EC and 2006/95/EC	
• KCC	Korea Certification	
• Marine approval	Classification companies	
	• ABS (American Bureau of Shipping)	
	• BV (Bureau Veritas)	
	• DNV (Det Norske Veritas)	
	• GL (Germanischer Lloyd)	
	• LRS (Lloyds Register of Shipping)	
	• Class NK (Nippon Kaiji Kyokai)	

Overview



An ET 200iSP power supply unit consists of a TM-PS terminal module (A or B) and a PS power supply module which is plugged onto this. Terminal modules and power supply modules can be ordered separately.

The power supply modules are suitable for both individual operation (standard) and redundant operation. Depending on the operating mode, they must be combined with the terminal modules as follows:

- Standard: 1 x PS on TM-PS-A
- Redundancy: 1 x PS on TM-PS-A (left) plus 1 x PS on TM-PS-B (right)

Power supply modules are available for supplies of 24 V DC and 120/230 V AC.

The operating state of the power supply modules is indicated by two LEDs on the IM 152 interface module (one for each module).

Technical specifications

Article number	6ES7138-7EA01-0AA0	6ES7138-7EC00-0AA0
	ET 200iSP, POWER SUPPLY MODULE	ET 200iSP, POWER SUPPLY MOD. 120/230 V AC
Supply voltage		
Rated value (DC)	24 V	
Rated value (AC)		230 V; 120/230V AC
Reverse polarity protection	Yes	
Line frequency		
• permissible range, lower limit		47 Hz
• permissible range, upper limit		63 Hz
Input current		
from supply voltage L+, max.	4 A	
from supply voltage L1, max.		1.04 A; at rated voltage 230 VAC:0.45A at rated voltage 120 VAC:0.75A
Power loss		
Power loss, typ.	20 W	5 W; 5 W + 1.2 x total power loss of the electronics modules
Power loss, max.		21.3 W
Interrupts/diagnostics/status information		
Status indicator	Yes	Yes
Alarms	No	No
Diagnostic messages		
• Diagnostic information readable	Yes; via IM 152	Yes; via IM 152
Diagnostics indication LED		
• Group error SF (red)	No	No
Ex(i) characteristics		
Maximum values of input circuits (per channel)		
• Um (fault voltage), max.	250 V; DC	264 V; AC/DC
Potential separation		
primary/secondary	Yes	Yes
between supply voltage and electronics	Yes	No

I/O systems

SIMATIC ET 200 systems for the control cabinet

SIMATIC ET 200iSP

Power supply unit

Technical specifications (continued)

Article number	6ES7138-7EA01-0AA0 ET 200iSP, POWER SUPPLY MODULE	6ES7138-7EC00-0AA0 ET 200iSP, POWER SUPPLY MOD. 120/230 V AC
Standards, approvals, certificates		
CE mark	Yes	Yes
Use in hazardous areas		
• Type of protection acc. to EN 50020 (CENELEC)	Ex de [ib]IIC T4	Ex de [ib]IIC T4
• Type of protection acc. to KEMA	04 ATEX 2263	09 ATEX 0156
Dimensions		
Width	60 mm	60 mm
Height	190 mm	190 mm
Depth	136.5 mm	136.5 mm
Weights		
Weight, approx.	2 700 g	2 700 g

Article number	6ES7193-7DA20-0AA0 ET 200iSP, TERM.-MOD. TM-PS-A UC	6ES7193-7DB20-0AA0 ET 200iSP, TERM.-MOD. TM-PS-B UC
Standards, approvals, certificates		
CE mark	Yes	Yes
Use in hazardous areas		
• Type of protection acc. to EN 50020 (CENELEC)	see ET200iSP system	see ET200iSP system
• Test number KEMA	04 ATEX 2242	04 ATEX 2242
Dimensions		
Width	60 mm	60 mm
Height	190 mm	190 mm
Depth	52 mm	52 mm
Weights		
Weight, approx.	230 g	230 g

9

Ordering data	Article No.		Article No.
PS 24 V DC power supply module for ET 200iSP	6ES7138-7EA01-0AA0	TM-PS-A UC terminal module For standard operation	6ES7193-7DA20-0AA0
PS 120/230 V AC power supply module for ET 200iSP	6ES7138-7EC00-0AA0	TM-PS-B UC terminal module Additional terminal module for redundant operation	6ES7193-7DB20-0AA0

Overview



The IM 152 interface module connects the ET 200iSP to the PROFIBUS DP with intrinsically safe RS 485-iS transmission technology with transmission rates up to 1.5 Mbps. A redundant connection is also possible. In this case the ET 200iSP is connected via two interface modules to two redundant PROFIBUS DP segments of a fault-tolerant automation system.

The IM 152 is plugged onto a special terminal module (to be ordered separately). The following terminal modules are available:

- TM-IM/IM terminal module for two interface modules (for redundant PROFIBUS DP connection)
- TM-IM/EM60 terminal module for one interface module and one watchdog, reserve or electronics module (except 2 DO relay)
 - with blue screw-type or spring-loaded terminals for hazardous environments
 - with black screw-type terminals for non-hazardous environments

Tasks of the IM 152 interface module

- Connection of ET 200iSP to the intrinsically safe PROFIBUS DP
- Autonomous communication with the host automation system
- Preparation of data for the fitted electronics modules
- Saving of parameters of the electronics modules
- Time stamping of digital process signals with an accuracy of 20 ms

The maximum address space of the interface module is 244 bytes for inputs and 244 bytes for outputs.

Technical specifications

Article number	6ES7152-1AA00-0AB0 ET 200iSP, IM152-1 INTERFACE MODULE
Input current	
from supply voltage L+, max.	30 mA
Power loss	
Power loss, typ.	0.5 W
Time stamping	
Description	for each digital input, digital input module, total ET 200iS
Accuracy	20 ms
Number of stampable digital inputs, max.	64; for accuracy class 20 ms
Time format	RFC 1119 Internet (ISP)
Time resolution	1 ms
Time interval for transmitting the message buffer if a message is present	1 000 ms
Time stamp on signal change	rising / falling edge as signal entering or exiting
Interfaces	
Interface physics, RS 485	Yes; intrinsically safe
PROFIBUS DP	
• Transmission rate, max.	1.5 Mbit/s; 9,6 / 19,2 / 45,45 / 93,75 / 187,5 / 500 kbit/s
• SYNC capability	Yes
• FREEZE capability	Yes
• Direct data exchange (slave-to-slave communication)	Yes; Slave to slave as publisher
Protocols	
PROFIBUS DP	Yes
Protocols (Ethernet)	
• TCP/IP	No

Article number	6ES7152-1AA00-0AB0 ET 200iSP, IM152-1 INTERFACE MODULE
Isochronous mode	
Isochronous operation (application synchronized up to terminal)	No
Interrupts/diagnostics/status information	
Alarms	Yes
Diagnostic functions	Yes
Alarms	
• acyclic function, interrupts	Yes
• acyclic function, parameters	Yes
Diagnostics indication LED	
• Bus fault BF (red)	Yes
• Group error SF (red)	Yes
• Monitoring 24 V voltage supply ON (green)	Yes
Potential separation	
between supply voltage and electronics	Yes
Standards, approvals, certificates	
CE mark	Yes
Use in hazardous areas	
• Type of protection acc. to EN 50020 (CENELEC)	II2 G Ex ib IIC T4 and I M2 Ex ib I
• Type of protection acc. to KEMA	04 ATEX 1243
Dimensions	
Width	30 mm
Height	129 mm
Depth	136.5 mm
Weights	
Weight, approx.	245 g

I/O systems

SIMATIC ET 200 systems for the control cabinet

SIMATIC ET 200iSP

Interface module

Technical specifications (continued)

Article number	6ES7193-7AA00-0AA0 ET 200iSP, TERM.-MOD. TM-IM/EM60S, SCREW	6ES7193-7AA10-0AA0 ET 200iSP, TERM.-MOD. TM-IM/EM60C, SPRING	6ES7193-7AA20-0AA0 ET 200iSP, TERM.-MOD. TM-IM/EM60S	6ES7193-7AB00-0AA0 ET 200iSP, TERM.-MOD. TM-IM/IM F. TWO IM
Standards, approvals, certificates				
CE mark	Yes	Yes	Yes	Yes
Use in hazardous areas				
• Type of protection acc. to EN 50020 (CENELEC)	see ET200iSP system	see ET200iSP system	No	see ET200iSP system
• Test number KEMA	04 ATEX 2242	04 ATEX 2242		04 ATEX 2242
Dimensions				
Width	60 mm	60 mm	60 mm	60 mm
Height	190 mm	190 mm	190 mm	190 mm
Depth	52 mm	52 mm	52 mm	52 mm
Weights				
Weight, approx.	235 g	235 g	235 g	195 g

Ordering data

ET 200iSP interface module IM 152-1	6ES7152-1AA00-0AB0
ET 200iSP terminal module TM-IM/EM60 For an IM 152 and a watchdog, reserve or electronics module (except 2 DO relay), including terminating module	
• For hazardous environments	
- TM-IM/EM60S (blue screw-type terminals)	6ES7193-7AA00-0AA0
- TM-IM/EM60C (blue spring-loaded terminals)	6ES7193-7AA10-0AA0
• For non-hazardous environments	
- TM-IM/EM60S (black screw-type terminals)	6ES7193-7AA20-0AA0
ET 200iSP terminal module TM-IM/IM For two IM 152 modules (redundant operation), including terminating module	6ES7193-7AB00-0AA0
Accessories	
PROFIBUS connector with selectable terminating resistor For connection of IM 152 to PROFIBUS DP with RS 485-iS transmission technology	6ES7972-0DA60-0XA0
RS 485-iS coupler Isolating transformer for connection of PROFIBUS DP segments with RS 485 and RS 485-iS transmission technologies	6ES7972-0AC80-0XA0

Article No.

Labeling sheet DIN A4, perforated, each consisting of 10 sheets of 30 strips each for electronics modules and 20 strips each for IM 152	
• petrol • yellow	6ES7193-7BH00-0AA0 6ES7193-7BB00-0AA0
Labels, inscribed For slot numbering, label size H × W (in mm): 5 × 7	
• 204 labels, for slots 1 to 20 • 204 labels, for slots 1 to 40 • 136 labels, inscription in plain text	8WA8361-0AB 8WA8361-0AC 8WA8348-0XA
Labels, blank 136 labels for slot numbering, label size H × W (in mm): 5 × 7	8WA8348-2AY
S7-300 DIN rails	
• 585 mm long, suitable for assembly of ET 200iSP in a 650 mm-wide wall box	6ES7390-1AF85-0AA0
• 885 mm long, suitable for assembly of ET 200iSP in a 950 mm-wide wall box	6ES7390-1AJ85-0AA0

Overview

**Digital input modules**

- 8-channel digital input module DI NAMUR EEx i, for evaluation of NAMUR sensors, connected and non-connected contacts, as well as for use as counter or frequency meter
Parameterizable connections:
 - NAMUR sensor on/off
 - NAMUR changeover contact
 - Single contact connected (mechanical NO contact)
 - Changeover contact connected (mechanical changeover contact)
 - Single contact non-connected (mechanical NO contact with single contact)
 - Changeover contact non-connected (mechanical changeover contact)
 - Counting function: optional use of 2 channels for recording counter pulses or for frequency measurement
 - Short-circuit and wire break monitoring

Digital output modules

- 4-channel digital output modules DO EEx i, 23.1 V DC/20 mA, 17.4 V DC/27 mA, 17.4 V DC/40 mA or 25.5 V DC/22 mA, with external actuator switch-off via High or Low signal (H/L switch-off)
 - Load-free switching of outputs via external intrinsically safe signal
 - Power boosting through parallel connection of two outputs for one actuator with 4 DO 17.4 V DC/27 mA or 4 DO 17.4 V DC/40 mA
 - Short-circuit and wire break monitoring
- 2-channel digital output module DO Relay EEx e, e.g. for switching solenoid valves, DC contactors or signaling lamps
 - Can be plugged onto TM-RM/RM terminal module
 - Output current up to 2 A with 60 V UC for each of the two relay outputs
 - Installation up to Ex zone 1
 - Intrinsically-safe and non-intrinsically safe signals can be mixed in a station

Extra functionsActuator shutdown function of the 4 DO EEx i modules

The 4 DO EEx i modules are equipped with a shutdown function. This permits implementation of an external switch-off independent of the automation system (controller).

As soon as the intrinsically safe switch-off signal (High or Low) is present at the actuator switch-off input of the electronics module, its outputs are deactivated.

You can also combine several DO modules into a switch-off group. The intrinsically safe power supply for the switch-off device is either via the watchdog module or a separate intrinsically safe source.

Technical specifications

Article number	6ES7131-7RF00-0AB0 ET 200iSP, EL-MOD., 8DI, NAMUR
Digital inputs	
Number of digital inputs	8
Number of NAMUR inputs	8
Input voltage	
• Type of input voltage	DC
Input delay (for rated value of input voltage) for standard inputs	
- at "0" to "1", min.	2.8 ms
- at "0" to "1", max.	3.5 ms
- at "1" to "0", min.	2.8 ms
- at "1" to "0", max.	3.5 ms
Cable length	
• shielded, max.	500 m
Encoder	
Number of connectable encoders, max.	8
Connectable encoders	
• NAMUR encoder	Yes
NAMUR encoder	
• Input current for signal "0", max.	1.2 mA
• Input current for signal "1", min.	2.1 mA

Article number	6ES7131-7RF00-0AB0 ET 200iSP, EL-MOD., 8DI, NAMUR
Interrupts/diagnostics/status information	
Diagnostic functions	Yes
Alarms	
• Diagnostic alarm	Yes; Parameterizable
• Hardware interrupt	No
Diagnostic messages	
• Diagnostic information readable	Yes
• Short-circuit	Yes; R load < 150 ohms with NAMUR sensor/sensor and NAMUR changeover contact/sensor to DIN 19234
Diagnostics indication LED	
• Group error SF (red)	Yes
• Status indicator digital input (green)	Yes
Integrated Functions	
Frequency measurement	Yes; (Gate time) 50 ms; 200 ms; 1 s
Number of frequency meters	2
Counter	
Number of counter inputs	2; normal and periodic count function
Input frequency, max.	5 kHz; with a cable length of 20 m: 5 kHz; with a cable length of 100 m: 1 kHz; with a cable length of 200 m: 500 Hz

I/O systems

SIMATIC ET 200 systems for the control cabinet

SIMATIC ET 200iSP

Digital electronics modules

Technical specifications (continued)

Article number	6ES7131-7RF00-0AB0 ET 200iSP, EL-MOD., 8DI, NAMUR		Article number	6ES7131-7RF00-0AB0 ET 200iSP, EL-MOD., 8DI, NAMUR	
Potential separation			Dimensions		
Potential separation digital inputs			Width	30 mm	
• between the channels	No		Height	129 mm	
• between the channels and backplane bus	Yes		Depth	136.5 mm	
Permissible potential difference			Weights		
between different circuits	60 V DC/30 V AC		Weight, approx.	255 g	
Standards, approvals, certificates					
CE mark	Yes				
Use in hazardous areas					
• Type of protection acc. to EN 50020 (CENELEC)	II 2 G (1) GD Ex ib[ia] IIC T4 and I M2 Ex ib[ia] I				
• Type of protection acc. to KEMA	04 ATEX 1248				

Article number	6ES7132-7RD01-0AB0 ET 200iSP, EL-MOD., 4DO, DC 23,1V, 20MA	6ES7132-7RD11-0AB0 ET 200iSP, EL-MOD., 4DO, DC 17,4V, 27MA	6ES7132-7RD22-0AB0 ET 200iSP, EL-MOD., 4DO, DC 17.4V, 40MA
Input current			
from load voltage L+ (without load), max.	340 mA; with actuator supply	300 mA	400 mA
from backplane bus 3.3 V DC, max.	10 mA	10 mA	
Power loss			
Power loss, typ.	2.5 W	2.1 W	2.8 W
Address area			
Address space per module			
• without packing	2 byte	2 byte	2 byte
Digital outputs			
Number of digital outputs	4; additionally 1 intrinsically-safe input for H shutdown	4; additionally 1 intrinsically-safe input for H shutdown	4; additionally 1 intrinsically-safe input for H shutdown
Short-circuit protection	Yes	Yes	Yes
No-load voltage U _{ao} (DC)	23.1 V	17.4 V	17.4 V
Internal resistor R _i	275 Ω	150 Ω	167 Ω
Trend key points E			
• Voltage U _e (DC)	17.6 V	13.3 V	10.7 V
• Current I _e	20 mA	27 mA	40 mA; 80 mA when outputs connected in parallel
Output current			
• for signal "1" rated value	0.02 A	0.027 A	0.04 A
Output delay with resistive load			
• "0" to "1", max.	2 ms	2 ms	2 ms
• "1" to "0", max.	1.5 ms	1.5 ms	1.5 ms
Parallel switching of two outputs			
• for uprating	No; for Ex reasons not possible; nor for predecessor	Yes	Yes
Switching frequency			
• with resistive load, max.	100 Hz	100 Hz	100 Hz
• with inductive load, max.	2 Hz	2 Hz	2 Hz
Cable length			
• shielded, max.	500 m	500 m	500 m
• unshielded, max.	500 m	500 m	500 m

Technical specifications (continued)

Article number	6ES7132-7RD01-0AB0 ET 200iSP, EL-MOD., 4DO, DC 23,1V, 20MA	6ES7132-7RD11-0AB0 ET 200iSP, EL-MOD., 4DO, DC 17,4V, 27MA	6ES7132-7RD22-0AB0 ET 200iSP, EL-MOD., 4DO, DC 17.4V, 40MA
Interrupts/diagnostics/ status information			
Status indicator	Yes	Yes	Yes
Alarms		No	
Diagnostic functions	Yes	Yes	
Alarms			
• Diagnostic alarm	Yes; Parameterizable	Yes; Parameterizable	Yes; Parameterizable
Diagnostic messages			
• Diagnostic information readable	Yes	Yes	Yes
• Wire-break	Yes; R > 10 kohms, I < 100 µA	Yes	Yes; R > 10 kohms, I < 100 µA
• Short-circuit	Yes; R < 800 ohms (one output), R < 40 ohms (outputs connected in parallel)	Yes	Yes; R < 80 Ohm (one output), R < 40 Ohm (outputs connected in parallel)
Diagnostics indication LED			
• Group error SF (red)	Yes	Yes	Yes
• Status indicator digital output (green)	Yes	Yes	Yes; Per channel
Parameter			
Remark		14 byte	
Diagnostics wire break	Yes	Yes	Yes
Diagnostics short-circuit	Yes	Yes	Yes
Response to CPU/master STOP	Substitute a value/keep last value	Substitute a value/keep last value	Substitute a value/keep last value
Ex(i) characteristics			
Maximum values of output circuits (per channel)			
• Co (permissible external capacity), max.			241 nF; For IIC, 1507 nF for IIB
• Io (short-circuit current), max.			118 mA
• Lo (permissible external inductivity), max.			1.7 mH; For IIC, 10.4 mH for IIB
• Po (power of load), max.			572 mW
• Uo (output no-load voltage), max.			19.4 V
• Ta (permissible ambient temperature), max.	70 °C	70 °C	
Potential separation			
Potential separation digital outputs			
• between the channels	No	No	No
• between the channels and backplane bus	Yes	Yes	Yes
• Between the channels and load voltage L+	Yes	Yes	Yes
Permissible potential difference			
between different circuits			60 V DC/30 V AC
Standards, approvals, certificates			
CE mark			Yes
Highest safety class achievable in safety mode			
• SIL acc. to IEC 61508	No		No
Use in hazardous areas			
• Type of protection acc. to EN 50020 (CENELEC)	II2 G (1) GD Ex ib[ia] IIC T4 and I M2 Ex ib[ia] I	II2 G (1) GD Ex ib[ia] IIC T4 and I M2 Ex ib[ia] I	II2 G (1) GD Ex ib[ia] IIC T4 and I M2 Ex ib[ia] I
• Type of protection acc. to KEMA	04 ATEX 1249	04 ATEX 1249	04 ATEX 1249
Dimensions			
Width	30 mm	30 mm	30 mm
Height	129 mm	129 mm	129 mm
Depth	136.5 mm	136.5 mm	136.5 mm
Weights			
Weight, approx.	255 g	255 g	255 g

I/O systems

SIMATIC ET 200 systems for the control cabinet

SIMATIC ET 200iSP

Digital electronics modules

Technical specifications (continued)

Article number	6ES7132-7GD00-0AB0 ET 200iSP, EL-MOD., 4DO, DC 23,1V, 20MA	6ES7132-7GD10-0AB0 ET 200iSP, EL-MOD., 4DO, DC 17,4V, 27MA	6ES7132-7GD21-0AB0 ET 200iSP, EL-MOD., 4DO, DC 17,4V, 40MA	6ES7132-7GD30-0AB0 ET 200iSP, EL-MOD., 4DO, DC 25.5V, 22MA
Input current				
from load voltage L+ (without load), max.	340 mA; with actuator supply	300 mA; with actuator supply	400 mA	400 mA
from backplane bus 3.3 V DC, max.	10 mA	10 mA		
Power loss				
Power loss, typ.	2.5 W	2.1 W	2.8 W	2.8 W
Address area				
Address space per module				
• without packing	2 byte	2 byte	2 byte	2 byte
Digital outputs				
Number of digital outputs	4; additionally 1 intrinsically-safe input for L shutdown	4; additionally 1 intrinsically-safe input for L shutdown	4; additionally 1 intrinsically-safe input for L shutdown	4; additionally 1 intrinsically-safe input for L shutdown
Short-circuit protection	Yes	Yes	Yes	Yes
No-load voltage U _{ao} (DC)	23.1 V	17.4 V	17.4 V	25.5 V
Internal resistor R _i	275 Ω	150 Ω	167 Ω	260 Ω
Trend key points E				
• Voltage U _e (DC)	17.6 V	13.3 V	10.7 V	19.8 V
• Current I _e	20 mA	27 mA; 54 mA when outputs connected in parallel	40 mA	22 mA
Output current				
• for signal "1" rated value	0.02 A	0.027 A	0.04 A	0.022 A
Output delay with resistive load				
• "0" to "1", max.	2 ms	2 ms	2 ms	2 ms
• "1" to "0", max.	1.5 ms	1.5 ms	1.5 ms	1.5 ms
Parallel switching of two outputs				
• for uprating	No; for Ex reasons not possible; nor for predecessor	Yes	Yes	No
Switching frequency				
• with resistive load, max.	100 Hz	100 Hz	100 Hz	100 Hz
• with inductive load, max.	2 Hz	2 Hz	2 Hz	2 Hz
Cable length				
• shielded, max.	500 m	500 m	500 m	500 m
• unshielded, max.	500 m	500 m	500 m	500 m
Interrupts/diagnostics/status information				
Status indicator	Yes	Yes	Yes	Yes
Diagnostic functions	Yes	Yes	Yes	Yes
Alarms				
• Diagnostic alarm	Yes; Parameterizable	Yes; Parameterizable	Yes; Parameterizable	Yes; Parameterizable
Diagnostic messages				
• Diagnostic information readable	Yes	Yes	Yes	Yes
• Wire-break	Yes; R > 10 kohms, I < 100 μA	Yes; R > 10 kohms, I < 100 μA	Yes; R > 10 kohms, I < 100 μA	Yes; R > 10 kohms, I < 100 μA
• Short-circuit	Yes; R < 80 Ohm (one output), R < 40 Ohm (outputs connected in parallel)	Yes; R < 80 ohms (one output), R < 40 ohms (outputs connected in parallel)	Yes; R < 80 Ohm (one output), R < 40 Ohm (outputs connected in parallel)	Yes; R < 80 ohms
Diagnostics indication LED				
• Group error SF (red)	Yes	Yes	Yes	Yes
• Status indicator digital output (green)	Yes	Yes	Yes; Per channel	Yes; Per channel

Technical specifications (continued)

Article number	6ES7132-7GD00-0AB0 ET 200iSP, EL-MOD., 4DO, DC 23,1V, 20MA	6ES7132-7GD10-0AB0 ET 200iSP, EL-MOD., 4DO, DC 17,4V, 27MA	6ES7132-7GD21-0AB0 ET 200iSP, EL-MOD., 4DO, DC 17,4V, 40MA	6ES7132-7GD30-0AB0 ET 200iSP, EL-MOD., 4DO, DC 25.5V, 22MA
Parameter				
Remark	14 byte	14 byte		
Diagnostics wire break	Yes	Yes	Yes	Yes
Diagnostics short-circuit	Yes	Yes	Yes	Yes
Response to CPU/master STOP	Substitute a value/keep last value	Substitute a value/keep last value	Substitute a value/keep last value	Substitute a value/keep last value
Ex(i) characteristics				
Maximum values of output circuits (per channel)				
• Co (permissible external capacity), max.			241 nF; For IIC, 1507 nF for IIB	81 nF; For IIC, 651 nF for IIB
• Io (short-circuit current), max.			118 mA	110 mA
• Lo (permissible external inductivity), max.			1.7 mH; For IIC, 10.4 mH for IIB	1.7 mH; For IIC, 11.5 mH for IIB
• Po (power of load), max.			572 mW	764 mW
• Uo (output no-load voltage), max.			19.4 V	27.9 V
• Ta (permissible ambient temperature), max.	70 °C	70 °C		
Potential separation				
Potential separation digital outputs				
• between the channels	No	No	No	No
• between the channels and backplane bus	Yes	Yes	Yes	Yes
• Between the channels and load voltage L+	Yes	Yes	Yes	Yes
Permissible potential difference between different circuits			60 V DC/30 V AC	60 V DC/30 V AC
Standards, approvals, certificates				
CE mark	Yes	Yes	Yes	Yes
Highest safety class achievable in safety mode				
• SIL acc. to IEC 61508	No	No	No	No
Use in hazardous areas				
• Type of protection acc. to EN 50020 (CENELEC)	II 2 G (1) GD Ex ib[ia] IIC T4 and I M2 Ex ib[ia] I	II 2 G (1) GD Ex ib[ia] IIC T4 and I M2 Ex ib[ia] I	II 2 G (1) GD and I M2 Ex ib[ia][iaD] IIC T4; Ex ib [ia] I	II 2 G (1) GD and I M2 Ex ib[ia][iaD] IIC T4; Ex ib [ia] I
• Type of protection acc. to KEMA	04 ATEX 1249	04 ATEX 1249	04 ATEX 1249	04 ATEX 1249
Dimensions				
Width	30 mm	30 mm	30 mm	30 mm
Height	129 mm	129 mm	129 mm	129 mm
Depth	136.5 mm	136.5 mm	136.5 mm	136.5 mm
Weights				
Weight, approx.	255 g	255 g	255 g	255 g

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SIMATIC ET 200iSP

Digital electronics modules

Technical specifications (continued)

Article number	6ES7132-7HB00-0AB0 ET 200iSP, RELAY-MOD., 2DO, UC60V, 2A
Input current	
from load voltage L+ (without load), max.	120 mA
Power loss	
Power loss, typ.	1.1 W
Digital outputs	
Number of digital outputs	2
Short-circuit protection	No
Output current	
• for signal "1" rated value	2 A
Output delay with resistive load	
• "0" to "1", max.	8 ms
• "1" to "0", max.	3 ms
Parallel switching of two outputs	
• for uprating	No
• for redundant control of a load	No
Switching frequency	
• with resistive load, max.	0.5 Hz; See data in manual
• with inductive load, max.	0.2 Hz; See data in manual
Relay outputs	
Switching capacity of contacts	
- with resistive load, up to 60 °C, max.	2 A; See data in manual
- Thermal continuous current, max.	2 A; See data in manual
Cable length	
• shielded, max.	500 m
• unshielded, max.	500 m
Interrupts/diagnostics /status information	
Status indicator	Yes
Alarms	No
Substitute values connectable	Yes
Alarms	
• Diagnostic alarm	Yes
• Hardware interrupt	No

Article number	6ES7132-7HB00-0AB0 ET 200iSP, RELAY-MOD., 2DO, UC60V, 2A
Diagnostic messages	
• Diagnostic information readable	Yes
• Wire-break	No; Cannot be determined in contact power circuit
• Short-circuit	No; Cannot be determined in contact power circuit
Diagnostics indication LED	
• Group error SF (red)	Yes
• Status indicator digital output (green)	Yes; Per channel
Ex(i) characteristics	
Maximum values of output circuits (per channel)	
• U _o (output no-load voltage), max.	60 V
• U _m (fault voltage), max.	250 V
• T _a (permissible ambient temperature), max.	70 °C
Potential separation	
Potential separation digital outputs	
• between the channels	Yes
• between the channels and backplane bus	Yes
• Between the channels and load voltage L+	Yes; Channels and power bus
Standards, approvals, certificates	
CE mark	Yes
Highest safety class achievable in safety mode	
• SIL acc. to IEC 61508	No
Use in hazardous areas	
• Type of protection acc. to EN 50020 (CENELEC)	II 2 G and I M2 Ex eibmb IIC T4; Ex eibmb I
• Type of protection acc. to KEMA	07 ATEX 0180
Dimensions	
Width	30 mm
Height	129 mm
Depth	136.5 mm
Weights	
Weight, approx.	255 g

Article number	6ES7193-7CA00-0AA0 ET 200iSP, TERM.-MOD. TM-EM/EM60S F. EM	6ES7193-7CA10-0AA0 ET 200iSP, TERM.-MOD. TM-EM/EM60C F. EM	6ES7193-7CA20-0AA0 ET 200iSP, TERM.-MOD. TM-EM/EM60S F. EM	6ES7193-7CB00-0AA0 ET 200iSP, TERM.-MOD. TM-RM/RM
Standards, approvals, certificates				
CE mark	Yes	Yes	Yes	Yes
Use in hazardous areas				
• Type of protection acc. to EN 50020 (CENELEC)	see ET200iSP system	see ET200iSP system	No	see ET200iSP system
• Test number KEMA	04 ATEX 2242	04 ATEX 2242		07 ATEX 0205
Dimensions				
Width	60 mm	60 mm	60 mm	60 mm
Height	190 mm	190 mm	190 mm	190 mm
Depth	52 mm	52 mm	52 mm	52 mm
Weights				
Weight, approx.	275 g	275 g	235 g	340 g

Technical specifications (continued)

Article number	6ES7138-7AA00-0AA0 ET 200iSP, RESERVE MODULE
Digital inputs	
Number of digital inputs	0
Standards, approvals, certificates	
CE mark	Yes
Use in hazardous areas	
• Type of protection acc. to EN 50020 (CENELEC)	II2 G EEx ib IIC T4
• Test number KEMA	04 ATEX 1251

Article number	6ES7138-7AA00-0AA0 ET 200iSP, RESERVE MODULE
Dimensions	
Width	30 mm
Height	129 mm
Depth	136.5 mm
Weights	
Weight, approx.	180 g

Ordering data

Article No.	Article No.
Digital input modules	
Digital input modules EEx i	
8 DI NAMUR For evaluation of NAMUR sensors, connected/non-connected contacts, as well as for recording counter pulses or measuring frequencies • 8 × NAMUR (NAMUR sensor on/off, NAMUR changeover contact) or connected/non-connected inputs (single/changeover contact) • 2 channels optionally usable as counters (max. 5 kHz) or frequency meters (1 Hz ... 5 kHz) • Time tagging 20 ms, rising or falling edge • Wire break monitoring • Short-circuit monitoring • Sensor power supply monitoring • Flutter monitoring	6ES7131-7RF00-0AB0
Digital output modules	
Digital output modules EEx i with H-switch-off (external actuator switch-off via H-signal); for switching of solenoid valves, DC relays, signal lamps, actuators	
4 DO DC 23.1 V/20 mA • 4 channels with 20 mA each • Short-circuit monitoring • Wire break monitoring • Configurable connection of substitute value in the event of CPU failure • Load-free switching of outputs via external intrinsically safe signal	6ES7132-7RD01-0AB0
4 DO DC 17.4 V/27 mA • 4 channels with 27 mA each or • 2 outputs connected in parallel with 54 mA each • Short-circuit monitoring • Wire break monitoring • Configurable connection of substitute value in the event of CPU failure • Load-free switching of outputs via external intrinsically safe signal	6ES7132-7RD11-0AB0
4 DO DC 17.4 V/40 mA • 4 channels with 40 mA each or • 2 outputs connected in parallel with 80 mA each • Short-circuit monitoring • Wire break monitoring • Configurable connection of substitute value in the event of CPU failure • Load-free switching of outputs via external intrinsically safe signal	6ES7132-7RD22-0AB0
Digital output modules EEx i with L-switch-off (external actuator switch-off via L-signal); for switching of solenoid valves, DC relays, signal lamps, actuators	
4 DO DC 23.1 V/20 mA • 4 channels with 20 mA each • Short-circuit monitoring • Wire break monitoring • Configurable connection of substitute value in the event of CPU failure • Load-free switching of outputs via external intrinsically safe signal	6ES7132-7GD00-0AB0
4 DO DC 17.4 V/27 mA • 4 channels with 27 mA each or • 2 outputs connected in parallel with 54 mA each • Short-circuit monitoring • Wire break monitoring • Configurable connection of substitute value in the event of CPU failure • Load-free switching of outputs via external intrinsically safe signal	6ES7132-7GD10-0AB0
4 DO DC 17.4 V/40 mA • 4 channels with 40 mA each or • 2 outputs connected in parallel with 80 mA each • Short-circuit monitoring • Wire break monitoring • Configurable connection of substitute value in the event of CPU failure • Load-free switching of outputs via external intrinsically safe signal	6ES7132-7GD21-0AB0

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Digital electronics modules

Ordering data	Article No.		Article No.
Digital input modules (continued)		Accessories	
4 DO DC 25.5 V/22 mA¹⁾ 4 channels with 22 mA each - Short-circuit monitoring - Wire break monitoring - Configurable connection of substitute value in the event of CPU failure - Load-free switching of outputs via external intrinsically safe signal	6ES7132-7GD30-0AB0	Reserve module For any electronics module	6ES7138-7AA00-0AA0
Digital output modules EEx e For switching of solenoid valves, DC contactors or indicator lights		Labeling sheet DIN A4, perforated, each consisting of 10 sheets of 30 strips each for electronics modules and 20 strips each for IM 151 - petrol - yellow	6ES7193-7BH00-0AA0 6ES7193-7BB00-0AA0
2 DO Relay, 60 V UC, 2 A - Can be plugged onto TM-RM/RM terminal module - Output current up to 2 A with 60 V UC for each of the two relay outputs - Installation up to Ex zone 1 - Configurable connection of substitute value in the event of CPU failure	6ES7132-7HB00-0AB0	Labels, inscribed for slot numbering, label size H × W (in mm): 5 × 7 204 labels, for slots 1 to 20 204 labels, for slots 1 to 40	8WA8361-0AB 8WA8361-0AC
Terminal modules		Labels, blank 136 labels for slot numbering, label size H × W (in mm): 5 × 7	8WA8348-2AY
ET 200iSP terminal module TM-EM/EM60 For two modules (reserve module, watchdog module and all electronics modules except 2 DO Relay can be plugged in) - For hazardous environments - TM-EM/EM60S (blue screw-type terminals) - TM-EM/EM60C (blue spring-loaded terminals) - For non-hazardous environments - TM-EM/EM60S (black screw-type terminals)	6ES7193-7CA00-0AA0 6ES7193-7CA10-0AA0 6ES7193-7CA20-0AA0	S7-300 rails 585 mm long, suitable for assembly of ET 200iSP in a 650 mm-wide wall box 885 mm long, suitable for assembly of ET 200iSP in a 950 mm-wide wall box	6ES7390-1AF85-0AA0 6ES7390-1AJ85-0AA0
ET 200iSP terminal module TM-RM/RM 60 For two modules (electronics module 2 DO Relay and reserve module can be plugged in) TM-RM/RM60S (screw-type terminals)	6ES7193-7CB00-0AA0		

¹⁾ Can be used with SIMATIC PCS 7 V7.1+SP2 or higher

Overview**Analog input modules**

- 4-channel analog input module AI 2 WIRE HART EEx i for current measurement in the range 4 to 20 mA, suitable for connection of two-wire transmitters (with/without HART functionality)
 - Resolution 12 bit + sign
 - Max. load of transmitter 750 Ω
 - Short-circuit and wire break monitoring
- 4-channel analog input module AI 4 WIRE HART EEx i for current measurement in the range 0/4 to 20 mA, suitable for connection of 4-wire transmitters (with/without HART functionality)
 - Resolution 12 bit + sign
 - Max. load of transmitter 750 Ω
 - Wire break monitoring
- 4-channel analog input module AI RTD EEx i for resistance measurement and for temperature measurement per Pt100/Ni100 resistance thermometer
 - Resolution 15 bit + sign
 - 2, 3 or 4-wire connection possible
 - Resistance measurements 600 Ω absolute and 1 000 Ω absolute
 - Wire break monitoring
- 4-channel analog input module AI TC EEx i for thermoelectric EMF measurements and for temperature measurement per thermocouple, type B, E, N, J, K, L, S, R, T, U
 - Resolution 15 bit + sign
 - Internal temperature compensation possible using TC sensor module (included in scope of delivery of module)
 - External temperature compensation by means of a temperature value acquired at an analog module of the same ET 200iSP station
 - Wire break monitoring

Analog output modules

- 4-channel analog output module AO I HART EEx i for output of current signals in the range 0/4 to 20 mA to field devices (with/without HART functionality)
 - Resolution 14 bit
 - Parameterizable substitute value in case of CPU failure
 - Short-circuit and wire break monitoring

Extra functionsTemperature compensation

A TC sensor module for internal temperature compensation is provided with the 4 AI TC module, and is fitted on the corresponding terminals of the associated terminal module.

External temperature compensation is possible via a Pt100 on a 4 AI RTD module.

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Analog electronics modules

Technical specifications

Article number	6ES7134-7SD00-0AB0 ET 200iSP, EL-MOD., 4 AI TC	6ES7134-7SD51-0AB0 ET 200iSP, EL-MOD., 4 AI RTD, PT100/Ni100	6ES7134-7TD00-0AB0 ET 200iSP, EL-MOD., 4 AI, HART, 2-WIRE	6ES7134-7TD50-0AB0 ET 200iSP, EL-MOD., 4 AI, HART, 4-WIRE
Input current				
from supply voltage L+, max.	30 mA	22 mA	320 mA	30 mA
Output voltage				
Power supply to the transmitters				
• short-circuit proof			Yes	
• Supply current, max.			23 mA; per channel	
Power loss				
Power loss, typ.	0.4 W	0.4 W	2.7 W	0.4 W
Analog inputs				
Number of analog inputs	4	4	4	4
permissible input current for current input (destruction limit), max.			90 mA	50 mA
Cycle time (all channels) max.	320 ms; 66 ms basic conversion time x 4 channels with interference frequency suppression 60 Hz, 80 ms basic conversion time x 4 channels with interference frequency suppression 50 Hz	320 ms; 66 ms basic conversion time x 4 channels with interference frequency suppression 60 Hz, 80 ms basic conversion time x 4 channels with interference frequency suppression 50 Hz	120 ms; 30 ms basic conversion time x 4 channels with 60 Hz, 50 Hz interference frequency suppression	120 ms; 30 ms basic conversion time x 4 channels with 60 Hz, 50 Hz interference frequency suppression
Technical unit for temperature measurement adjustable	Yes	Yes	Yes	Yes
Input ranges				
• Voltage	Yes	No	No	No
• Current	No	No	Yes	Yes
• Thermocouple	Yes	No	No	No
• Resistance thermometer	No	Yes	No	No
• Resistance	No	Yes	No	No
Input ranges (rated values), voltages				
• -80 mV to +80 mV	Yes			
• Input resistance (-80 mV to +80 mV)	1 000 kΩ			
Input ranges (rated values), currents				
• 4 mA to 20 mA			Yes	Yes
• Input resistance (4 mA to 20 mA)				295 Ω
Input ranges (rated values), thermocouples				
• Type B	Yes			
• Input resistance (Type B)	1 000 kΩ			
• Type C	Yes			
• Input resistance (Type C)	1 000 kΩ			
• Type E	Yes			
• Input resistance (Type E)	1 000 kΩ			
• Type J	Yes			
• Input resistance (type J)	1 000 kΩ			
• Type K	Yes			
• Input resistance (Type K)	1 000 kΩ			
• Type L	Yes			
• Input resistance (Type L)	1 000 kΩ			
• Type N	Yes			
• Input resistance (Type N)	1 000 kΩ			
• Type R	Yes			
• Input resistance (Type R)	1 000 kΩ			
• Type S	Yes			
• Input resistance (Type S)	1 000 kΩ			
• Type T	Yes			
• Input resistance (Type T)	1 000 kΩ			
• Type U	Yes			
• Input resistance (Type U)	1 000 kΩ			

Technical specifications (continued)

Article number	6ES7134-7SD00-0AB0 ET 200iSP, EL-MOD., 4 AI TC	6ES7134-7SD51-0AB0 ET 200iSP, EL-MOD., 4 AI RTD, PT100/Ni100	6ES7134-7TD00-0AB0 ET 200iSP, EL-MOD., 4 AI, HART, 2-WIRE	6ES7134-7TD50-0AB0 ET 200iSP, EL-MOD., 4 AI, HART, 4-WIRE
Input ranges (rated values), resistance thermometer				
- Ni 100 - Input resistance (Ni 100) - Pt 100 - Input resistance (Pt 100)		Yes 2 000 k Ω Yes 2 000 k Ω		
Input ranges (rated values), resistors				
0 to 600 ohms - Input resistance (0 to 600 ohms)		Yes; Also 1000 ohms 1 000 k Ω		
Thermocouple (TC)				
Temperature compensation				
- internal temperature compensation - external temperature compensation with compensations socket	Yes; via supplied TC sensor module Yes; via temperature value, acquired by an analog module of the same ET 200iSP station			
Characteristic linearization				
- parameterizable - for thermocouples - for resistance thermometer	Yes Yes	Yes Yes		
Cable length				
shielded, max.	50 m	500 m	500 m	500 m
Analog value generation for the inputs				
Measurement principle	integrating (Sigma-Delta)	integrating (Sigma-Delta)	integrating (Sigma-Delta)	integrating (Sigma-Delta)
Integration and conversion time/ resolution per channel				
- Resolution with overrange (bit including sign), max. - Integration time, parameterizable - Basic conversion time, including integration time (ms) - additional conversion time for wire-break monitoring - Interference voltage suppression for interference frequency f1 in Hz	16 bit Yes 80 ms at 50 Hz; 66 ms at 60 Hz 5 ms 50 / 60 Hz	16 bit Yes 80 ms at 50 Hz; 66 ms at 60 Hz 5 ms 50 / 60 Hz	13 bit No 50 / 60 Hz	12 bit; + sign Yes 30 ms 50 / 60 Hz
Smoothing of measured values				
- parameterizable - Step: None - Step: low - Step: Medium - Step: High	Yes; in 4 stages Yes; 1 x cycle time Yes; 4 x cycle time Yes; 32 x cycle time Yes; 64 x cycle time	Yes; in 4 stages Yes; 1 x cycle time Yes; 4 x cycle time Yes; 32 x cycle time Yes; 64 x cycle time	Yes; in 4 stages Yes; 1 x cycle time Yes; 4 x cycle time Yes; 32 x cycle time Yes; 64 x cycle time	Yes; in 4 stages Yes; 1 x cycle time Yes; 4 x cycle time Yes; 32 x cycle time Yes; 64 x cycle time
Encoder				
Connection of signal encoders				
- for current measurement as 2-wire transducer - Burden of 2-wire transmitter, max. - for current measurement as 4-wire transducer - for resistance measurement with two-wire connection - for resistance measurement with three-wire connection - for resistance measurement with four-wire connection			Yes 750 Ω	Yes

I/O systems

SIMATIC ET 200 systems for the control cabinet

SIMATIC ET 200iSP

Analog electronics modules

Technical specifications (continued)

Article number	6ES7134-7SD00-0AB0 ET 200iSP, EL-MOD., 4 AI TC	6ES7134-7SD51-0AB0 ET 200iSP, EL-MOD., 4 AI RTD, PT100/NI100	6ES7134-7TD00-0AB0 ET 200iSP, EL-MOD., 4 AI, HART, 2-WIRE	6ES7134-7TD50-0AB0 ET 200iSP, EL-MOD., 4 AI, HART, 4-WIRE
Errors/accuracies				
Linearity error (relative to input range), (+/-)	0.015 %	0.015 %	0.015 %	0.015 %
Temperature error (relative to input range), (+/-)	0.02 %/K	0.02 %/K	0.005 %/K	0.005 %/K
Crosstalk between the inputs, min.	-50 dB	-50 dB	-50 dB	-50 dB
Repeat accuracy in steady state at 25 °C (relative to input range), (+/-)	0.01 %	0.01 %	0.01 %	0.01 %
Operational error limit in overall temperature range				
• Voltage, relative to input range, (+/-)	0.15 %			
• Current, relative to input range, (+/-)			0.15 %	0.15 %
• Resistance thermometer, relative to input range, (+/-)		0.15 %; Applies to resistances standard ± 0.8 K, climatic ± 0.3 K		
Basic error limit (operational limit at 25 °C)				
• Voltage, relative to input range, (+/-)	0.1 %			
• Current, relative to input range, (+/-)			0.1 %	0.1 %
• Resistance thermometer, relative to input range, (+/-)		0.1 %; Applies to resistances standard ± 0.5 K, climatic ± 0.2 K		
Interference voltage suppression for $f = n \times (f_1 \pm 1 \%)$, f_1 = interference frequency				
• Series mode interference (peak value of interference < rated value of input range), min.	70 dB	70 dB	70 dB	70 dB
• Common mode interference, min.	90 dB	90 dB		
Interrupts/diagnostics/status information				
Alarms				
• Diagnostic alarm	Yes; Parameterizable	Yes	Yes; Parameterizable	Yes; Parameterizable
• Limit value alarm	Yes; Parameterizable	Yes	Yes; Parameterizable	Yes; Parameterizable
Diagnostic messages				
• Diagnostic information readable	Yes	Yes	Yes	Yes
• Wire-break		Yes	Yes	Yes
• Short-circuit		Yes	Yes	
• Group error		Yes		
Diagnostics indication LED				
• Group error SF (red)	Yes	Yes	Yes	Yes
Potential separation				
Potential separation analog inputs				
• between the channels	Yes	No	No	No
• between the channels and backplane bus	Yes	Yes	Yes	Yes
• Between the channels and load voltage L+		Yes; Channels and power bus		

Technical specifications (continued)

Article number	6ES7134-7SD00-0AB0 ET 200iSP, EL-MOD., 4 AI TC	6ES7134-7SD51-0AB0 ET 200iSP, EL-MOD., 4 AI RTD, PT100/NI100	6ES7134-7TD00-0AB0 ET 200iSP, EL-MOD., 4 AI, HART, 2-WIRE	6ES7134-7TD50-0AB0 ET 200iSP, EL-MOD., 4 AI, HART, 4-WIRE
Standards, approvals, certificates				
CE mark	Yes	Yes	Yes	Yes
Highest safety class achievable in safety mode				
• Performance level according to ISO 13849-1	none	none	none	none
• SIL acc. to IEC 61508	No	No	No	No
Use in hazardous areas				
• Type of protection acc. to EN 50020 (CENELEC)	II2 G (1) GD Ex ib[ia] IIC T4 and I M2 Ex ib[ia] I	II2 G (1) GD Ex ib[ia] IIC T4 and I M2 Ex ib[ia] I	II2 G (1) GD Ex ib[ia] IIC T4 and I M2 Ex ib[ia] I	II2 G (1) GD Ex ib[ia] IIC T4 and I M2 Ex ib[ia] I
• Type of protection acc. to KEMA	04 ATEX 1246	04 ATEX 1247	04 ATEX 1244	04 ATEX 1245
Dimensions				
Width	30 mm	30 mm	30 mm	30 mm
Height	129 mm	129 mm	129 mm	129 mm
Depth	136.5 mm	136.5 mm	136.5 mm	136.5 mm
Weights				
Weight, approx.	230 g	230 g	230 g	230 g

Article number	6ES7135-7TD00-0AB0 ET 200iSP, EL-MOD., 4 AO, 4-20MA, HART
Input current	
from load voltage L+ (without load), max.	330 mA
Power loss	
Power loss, typ.	2.7 W
Analog outputs	
Number of analog outputs	4
Cycle time (all channels) max.	3.6 ms
Output ranges, current	
• 0 to 20 mA	Yes
• 4 mA to 20 mA	Yes
Connection of actuators	
• for current output two-wire connection	Yes
Load impedance (in rated range of output)	
• with current outputs, max.	750 Ω
Cable length	
• shielded, max.	500 m
Analog value generation for the outputs	
Integration and conversion time/resolution per channel	
• Resolution with overrange (bit including sign), max.	14 bit
Settling time	
• for resistive load	4 ms
• for capacitive load	40 ms
• for inductive load	40 ms
Errors/accuracies	
Linearity error (relative to output range), (+/-)	0.015 %
Temperature error (relative to output range), (+/-)	0.005 %/K
Crosstalk between the outputs, min.	-50 dB
Repeat accuracy in steady state at 25 °C (relative to output range), (+/-)	0.01 %
Operational error limit in overall temperature range	
• Current, relative to output range, (+/-)	0.15 %

Article number	6ES7135-7TD00-0AB0 ET 200iSP, EL-MOD., 4 AO, 4-20MA, HART
Basic error limit (operational limit at 25 °C)	
• Current, relative to output range, (+/-)	0.1 %
Interrupts/diagnostics/status information	
Substitute values connectable	Yes
Alarms	
• Diagnostic alarm	Yes
Diagnostic messages	
• Diagnostic information readable	Yes
• Wire-break	Yes
• Short-circuit	Yes
Diagnostics indication LED	
• Group error SF (red)	Yes
Potential separation	
Potential separation analog outputs	
• between the channels	No
• between the channels and backplane bus	Yes
Standards, approvals, certificates	
CE mark	Yes
Use in hazardous areas	
• Type of protection acc. to EN 50020 (CENELEC)	II2 G (1) GD Ex ib[ia] IIC T4 and I M2 Ex ib[ia] I
• Type of protection acc. to KEMA	04 ATEX 1250
Dimensions	
Width	30 mm
Height	129 mm
Depth	136.5 mm
Weights	
Weight, approx.	265 g

I/O systems

SIMATIC ET 200 systems for the control cabinet

SIMATIC ET 200iSP

Analog electronics modules

Technical specifications (continued)

Article number	6ES7193-7CA00-0AA0 ET 200iSP, TERM.-MOD. TM-EM/EM60S F. EM	6ES7193-7CA10-0AA0 ET 200iSP, TERM.-MOD. TM-EM/EM60C F. EM	6ES7193-7CA20-0AA0 ET 200iSP, TERM.-MOD. TM-EM/EM60S F. EM	6ES7193-7CB00-0AA0 ET 200iSP, TERM.-MOD. TM-RM/RM
Standards, approvals, certificates				
CE mark	Yes	Yes	Yes	Yes
Use in hazardous areas				
• Type of protection acc. to EN 50020 (CENELEC)	see ET200iSP system	see ET200iSP system	No	see ET200iSP system
• Test number KEMA	04 ATEX 2242	04 ATEX 2242		07 ATEX 0205
Dimensions				
Width	60 mm	60 mm	60 mm	60 mm
Height	190 mm	190 mm	190 mm	190 mm
Depth	52 mm	52 mm	52 mm	52 mm
Weights				
Weight, approx.	275 g	275 g	235 g	340 g

Article number	6ES7138-7AA00-0AA0 ET 200iSP, RESERVE MODULE
Digital inputs	
Number of digital inputs	0
Standards, approvals, certificates	
CE mark	Yes
Use in hazardous areas	
• Type of protection acc. to EN 50020 (CENELEC)	II 2 G EEx ib IIC T4
• Test number KEMA	04 ATEX 1251

Article number	6ES7138-7AA00-0AA0 ET 200iSP, RESERVE MODULE
Dimensions	
Width	30 mm
Height	129 mm
Depth	136.5 mm
Weights	
Weight, approx.	180 g

Ordering data

Article No.

Analog input modules

Analog input modules EEx i

4 AI | 2 WIRE HART

- For measuring currents with 2-wire transmitters with/without HART functionality
- 4 × 4 ... 20 mA, HART, 2-wire transmitter
 - Transmitter load: max. 750 Ω
 - Resolution 12 bit + sign
 - Short-circuit monitoring
 - Wire break monitoring

6ES7134-7TD00-0AB0

4 AI | 4 WIRE HART

- For measuring currents with 4-wire transmitters with/without HART functionality
- 4 × 0/4 ... 20 mA, HART, 4-wire transmitter
 - Transmitter load: max. 750 Ω
 - Resolution 12 bit + sign
 - Wire break monitoring

6ES7134-7TD50-0AB0

4 AI RTD

- For measuring resistances as well as for temperature measurements with resistance thermometers
- 4 × RTD, resistance thermometer Pt100/Ni100
 - 2, 3, 4-wire
 - Resolution 15 bit + sign
 - Short-circuit monitoring
 - Wire break monitoring

6ES7134-7SD51-0AB0

Article No.

4 AI TC

For measuring thermal e.m.f. as well as for temperature measurements with thermocouples

- 4 × TC (thermocouples)
- Type B [PtRh-PtRh]
- Type N [NiCrSi-NiSi]
- Type E [NiCr-CuNi]
- Type R [PtRh-Pt]
- Type S [PtPh-Pt]
- Type J [Fe-CuNi]
- Type L [Fe-CuNi]
- Type T [Cu-CuNi]
- Type K [NiCr-Ni]
- Type U [Cu-CuNi]
- Resolution 15 bit + sign
- Internal compensation of cold junction temperature possible using TC sensor module (included in scope of delivery of module)
- External temperature compensation via Pt100, connected to RTD module of same ET 200iSP station
- Wire break monitoring

6ES7134-7SD00-0AB0

Ordering data	Article No.		Article No.
Analog output modules		Accessories	
Analog output modules EEx i		Reserve module For any electronics module	6ES7138-7AA00-0AA0
4 AO I HART For output of currents to field devices with/without HART functionality • 4 × 0/4 ... 20 mA, HART (max. load 750 Ω) • Resolution 14-bit • Short-circuit monitoring • Wire break monitoring • Parameterizable substitute value in case of CPU failure	6ES7135-7TD00-0AB0	Labeling sheet DIN A4, perforated, each consisting of 10 sheets of 30 strips each for electronics modules and 20 strips each for IM 151 • petrol • yellow	6ES7193-7BH00-0AA0 6ES7193-7BB00-0AA0
Terminal modules		Labels, inscribed for slot numbering, label size H × W (in mm): 5 × 7 • 204 labels, for slots 1 to 20 • 204 labels, for slots 1 to 40	8WA8361-0AB 8WA8361-0AC
ET 200iSP terminal module TM-EM/EM60 For two modules (reserve module, watchdog module and all electronics modules except 2 DO Relay can be plugged in) • For hazardous environments - TM-EM/EM60S (blue screw-type terminals) - TM-EM/EM60C (blue spring-loaded terminals) • For non-hazardous environments - TM-EM/EM60S (black screw-type terminals)	6ES7193-7CA00-0AA0 6ES7193-7CA10-0AA0 6ES7193-7CA20-0AA0	Labels, blank 136 labels for slot numbering, label size H × W (in mm): 5 × 7	8WA8348-2AY
		S7-300 DIN rails • 585 mm long, suitable for assembly of ET 200iSP in a 650 mm-wide wall box • 885 mm long, suitable for assembly of ET 200iSP in a 950 mm-wide wall box	6ES7390-1AF85-0AA0 6ES7390-1AJ85-0AA0

I/O systems

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

Safety-related electronics modules

Overview



The electronics modules of the SIMATIC ET 200iSP distributed I/O system equipped with safety functions can be used together with the safety-related automation systems (controllers) for the implementation of safety applications. The input modules record the process signals, evaluate them, and prepare them for additional processing by the automation system. The output modules convert the safety-related signals output by the automation systems so that they are suitable for controlling the connected actuators.

F digital input modules

- 8 F-DI Ex NAMUR
Safety-related digital input module for evaluating the signals from IEC 60947-5-6/NAMUR sensors and connected/non-connected mechanical contacts in hazardous and non-hazardous areas
 - SIL 3/Cat. 3/PL e with 8 inputs (1-channel/1oo1 evaluation) or 4 inputs (2-channel/1oo2 evaluation)
 - 8 short-circuit-proof sensor supplies (8 V DC) for 1 channel each
 - Inputs and sensor supplies electrically isolated from power bus and backplane bus
 - Diagnostics evaluation (deactivated for non-connected mechanical contacts)
 - Internal diagnostics buffer
 - Programmable diagnostics interrupt
 - Supports time stamping
 - Channel-selective passivation
 - Firmware update using HW Config possible
 - Exclusively for safety mode
 - LED displays for safety mode, group errors and channel status/fault

F digital output modules

- 4 F-DO Ex DC 17.4 V/40 mA
Safety-related digital output module for controlling actuators in hazardous and non-hazardous areas, e.g. solenoid valves, DC current relays or indicator lamps
 - SIL 3/Cat. 3/PL e with 4 outputs, P/P-switching
 - Electrical isolation from power bus and backplane bus
 - Rated load voltage 17.4 V DC
 - Max. output current 40 mA
 - Performance enhancement through parallel connection of two digital outputs for one actuator
 - Short-circuit, overload and wire-break monitoring
 - Configurable diagnostics
 - Internal diagnostics buffer
 - Programmable diagnostics interrupt
 - Channel-selective passivation
 - Firmware update using HW Config possible
 - Exclusively for safety mode
 - LED displays for safety mode, group errors and channel status/fault

F analog input modules

- 4 F-AI Ex HART (0 ... 20 mA or 4 ... 20 mA)
Safety-related digital input module for evaluating the signals from current sensors in hazardous and non-hazardous areas, e.g. 2-wire transmitters and HART field devices
 - SIL 3/Cat. 3/PL e with 4 inputs of one module (1-channel/1oo1 evaluation) or 4 inputs of two modules (2-channel/1oo2 evaluation)
 - Measuring ranges: 0 ... 20 mA or 4 ... 20 mA
 - Resolution 15 bit + sign
 - HART communication in measuring range 4 ... 20 mA
 - 4 short-circuit-proof sensor supplies (min. 12 V DC; max. 26 V DC) for 1 channel each
 - Inputs and sensor supplies electrically isolated from backplane bus
 - Configurable diagnostics
 - Programmable diagnostics interrupt
 - Internal diagnostics buffer
 - Firmware update using HW Config possible
 - Exclusively for safety mode
 - LED displays for safety mode, group errors, channel faults and HART status per channel

Technical specifications

Article number	6ES7138-7FN00-0AB0 ET 200iSP, 8F-DI NAMUR EX, FAIL-SAFE
Input current	
from supply voltage L+, max.	150 mA; int. Powerbus
Encoder supply	
Number of outputs	8
Type of output voltage	8 V DC
Power loss	
Power loss, typ.	1.4 W
Address area	
Occupied address area	
• Inputs	6 byte
• Outputs	4 byte
Digital inputs	
Number of digital inputs	8
Number of NAMUR inputs	8
Input voltage	
• Type of input voltage	DC
Input current	
• for signal "1", typ.	9.5 mA
Input delay (for rated value of input voltage) for standard inputs	
- at "0" to "1", min.	0.7 ms
- at "0" to "1", max.	16 ms; Parameterizable
- at "1" to "0", min.	0.7 ms
- at "1" to "0", max.	16 ms; Parameterizable
Cable length	
• shielded, max.	500 m
• unshielded, max.	200 m
Encoder	
Number of connectable encoders, max.	8
Connectable encoders	
• NAMUR encoder	Yes
NAMUR encoder	
• Input current for signal "0", max.	1.2 mA
• Input current for signal "1", min.	2.1 mA
Interrupts/diagnostics/ status information	
Status indicator	Yes
Diagnostic functions	Yes
Alarms	
• Diagnostic alarm	Yes; Parameterizable
• Hardware interrupt	No
Diagnostic messages	
• Diagnostic information readable	Yes
• Wire-break	Yes; NAMUR encoders or single contact with 10 kOhm parallel resistor
• Short-circuit	Yes; R load < 150 ohms with NAMUR sensor/sensor and NAMUR changeover contact/sensor to DIN 19234
Diagnostics indication LED	
• Group error SF (red)	Yes

Article number	6ES7138-7FN00-0AB0 ET 200iSP, 8F-DI NAMUR EX, FAIL-SAFE
Parameter	
Diagnostics wire break	channel by channel
Diagnostics short-circuit	channel by channel
Potential separation	
Potential separation digital inputs	
• between the channels	No
• between the channels and backplane bus	Yes
Permissible potential difference	
between different circuits	60 V DC/30 V AC
Isolation	
Isolation tested with	350 V AC/1 min between the shield and backplane bus connection 350 V AC/1 min between the shield and I/O 2830 V AC/1 min between backplane bus connection and I/O
Standards, approvals, certificates	
CE mark	Yes
Highest safety class achievable in safety mode	
• Performance level according to ISO 13849-1	PLe
• SIL acc. to IEC 61508	SIL 3
Use in hazardous areas	
• Type of protection acc. to EN 50020 (CENELEC)	II 2 G (1) GD Ex ib[ia Ga][ia IIIC Da] IIC T4 GB and I M2 Ex ib[ia Ma] I Mb
• Type of protection acc. to KEMA	10 ATEX 0056
Dimensions	
Width	30 mm
Height	129 mm
Depth	136.5 mm
Weights	
Weight, approx.	288 g

I/O systems

SIMATIC ET 200 systems for the control cabinet

SIMATIC ET 200iSP

Safety-related electronics modules

Technical specifications (continued)

Article number	6ES7138-7FD00-0AB0 ET 200iSP, 4F-DO 40MA EX, FAIL-SAFE
Input current	
from load voltage L+ (without load), max.	510 mA; int. Powerbus
Power loss	
Power loss, typ.	5.3 W; max.
Digital outputs	
Number of digital outputs	4
Short-circuit protection	Yes
• Response threshold, typ.	Depending on the "short-circuit level" parameter
Controlling a digital input	No
No-load voltage U _{ao} (DC)	17.4 V
Internal resistor R _i	167 Ω
Load resistance range	
• lower limit	270 Ω
• upper limit	18 kΩ
Trend key points E	
• Voltage U _e (DC)	10.7 V
• Current I _e	40 mA
Output voltage	
• for signal "1", min.	max. 17.4 V
Output current	
• for signal "0" residual current, max.	10 μA
Parallel switching of two outputs	
• for uprating	Yes
• for redundant control of a load	No
Switching frequency	
• with resistive load, max.	30 Hz
• with inductive load, max.	2 Hz
Cable length	
• shielded, max.	500 m
• unshielded, max.	500 m
Interrupts/diagnostics/ status information	
Status indicator	Yes
Substitute values connectable	Yes
Alarms	
• Diagnostic alarm	Yes; Parameterizable
Diagnostic messages	
• Diagnostic information readable	Yes
• Wire-break	Yes
• Short-circuit	Yes
Diagnostics indication LED	
• Group error SF (red)	Yes
• Status indicator digital output (green)	Yes

Article number	6ES7138-7FD00-0AB0 ET 200iSP, 4F-DO 40MA EX, FAIL-SAFE
Parameter	
Diagnostics wire break	Yes
Diagnostics short-circuit	Yes
Potential separation	
Potential separation digital outputs	
• between the channels	No
• between the channels and backplane bus	Yes
• Between the channels and load voltage L+	Yes
Permissible potential difference	
between different circuits	60 V DC/30 V AC
Standards, approvals, certificates	
CE mark	Yes
Highest safety class achievable in safety mode	
• Performance level according to ISO 13849-1	PL _e
• SIL acc. to IEC 61508	SIL 3
Use in hazardous areas	
• Type of protection acc. to EN 50020 (CENELEC)	II 2 G (1) GD Ex ib[ia Ga][ia IIC Da] IIC T4 GB and I M2 Ex ib[ia Ma] I Mb
• Type of protection acc. to KEMA	10 ATEX 0057
Dimensions	
Width	30 mm
Height	129 mm
Depth	136.5 mm
Weights	
Weight, approx.	285 g

Technical specifications (continued)

Article number	6ES7138-7FA00-0AB0 ET 200iSP, 4F-AI HART EX, FAIL-SAFE
Input current	
from supply voltage L+, max.	490 mA; int. Powerbus
Output voltage	
Power supply to the transmitters	
• short-circuit proof	Yes
• Supply current, max.	25 mA; Plus 4 mA per channel
Power loss	
Power loss, max.	5.4 W
Address area	
Address space per module	
• Address space per module, max.	16 byte; 12 bytes in the I area / 4 bytes in the O area
Analog inputs	
Number of analog inputs	4
Cycle time (all channels) max.	See data in manual
Input ranges	
• Voltage	No
• Current	Yes
• Thermocouple	No
• Resistance thermometer	No
• Resistance	No
Input ranges (rated values), currents	
• 0 to 20 mA	Yes
• 4 mA to 20 mA	Yes
Cable length	
• shielded, max.	500 m
Analog value generation for the inputs	
Measurement principle	integrating (Sigma-Delta)
Integration and conversion time/ resolution per channel	
• Resolution with overrange (bit including sign), max.	16 bit
• Integration time, parameterizable	Yes
• Interference voltage suppression for interference frequency f1 in Hz	50 / 60 Hz
Smoothering of measured values	
• parameterizable	Yes; in 4 stages
• Step: None	Yes; 1 x cycle time
• Step: low	Yes; 4 x cycle time
• Step: Medium	Yes; 16 x cycle time
• Step: High	Yes; 64 x cycle time
Encoder	
Connection of signal encoders	
• for current measurement as 2-wire transducer	Yes
- Burden of 2-wire transmitter, max.	750 Ω
Errors/accuracies	
Linearity error (relative to input range), (+/-)	0.015 %
Temperature error (relative to input range), (+/-)	0.005 %/K
Crosstalk between the inputs, min.	-50 dB
Repeat accuracy in steady state at 25 °C (relative to input range), (+/-)	0.015 %

Article number	6ES7138-7FA00-0AB0 ET 200iSP, 4F-AI HART EX, FAIL-SAFE
Operational error limit in overall temperature range	
• Current, relative to input range, (+/-)	0.35 %
Basic error limit (operational limit at 25 °C)	
• Current, relative to input range, (+/-)	0.1 %
Interference voltage suppression for f = n x (f1 +/- 1 %), f1 = interference frequency	
• Series mode interference (peak value of interference < rated value of input range), min.	40 dB
• Common mode interference, min.	50 dB
Interrupts/diagnostics/ status information	
Alarms	
• Diagnostic alarm	Yes; Parameterizable
Diagnostic messages	
• Diagnostic information readable	Yes
• Wire-break	Yes
• Short-circuit	Yes
Diagnostics indication LED	
• Group error SF (red)	Yes
Potential separation	
Potential separation analog inputs	
• between the channels	No
• between the channels and backplane bus	Yes
• Between the channels and load voltage L+	Yes; Power bus
Permissible potential difference	
between different circuits	60 V DC/30 V AC
Standards, approvals, certificates	
CE mark	Yes
Highest safety class achievable in safety mode	
• Performance level according to ISO 13849-1	PLe
• SIL acc. to IEC 61508	SIL 3
Use in hazardous areas	
• Type of protection acc. to EN 50020 (CENELEC)	II 2 G (1) GD Ex ib[ia Ga][ia IIC Da] IIC T4 GB and I M2 Ex ib[ia Ma] I Mb
• Type of protection acc. to KEMA	10 ATEX 0058
Dimensions	
Width	30 mm
Height	129 mm
Depth	136.5 mm
Weights	
Weight, approx.	299 g

I/O systems

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

Safety-related electronics modules

Technical specifications (continued)

Article number	6ES7138-7AA00-0AA0 ET 200iSP, RESERVE MODULE
Digital inputs	
Number of digital inputs	0
Standards, approvals, certificates	
CE mark	Yes
Use in hazardous areas	
• Type of protection acc. to EN 50020 (CENELEC)	II2 G EEx ib IIC T4
• Test number KEMA	04 ATEX 1251

Article number	6ES7138-7AA00-0AA0 ET 200iSP, RESERVE MODULE
Dimensions	
Width	30 mm
Height	129 mm
Depth	136.5 mm
Weights	
Weight, approx.	180 g

Ordering data

Article No.

Safety-related electronics modules	
<u>F digital input modules</u>	
8 F-DI Ex NAMUR For evaluating the signals from IEC 60947-5-6/NAMUR sensors and connected/non-connected mechanical contacts in hazardous and non-hazardous areas • SIL3/Cat.3/PLe with 8 inputs (1-channel/1oo1 evaluation) or 4 inputs (2-channel/1oo2 evaluation)	6ES7138-7FN00-0AB0
<u>F digital output modules</u>	
4 F-DO Ex 17.4 V DC/40 mA For controlling actuators in hazardous and non-hazardous areas, e.g. solenoid valves, DC current relays or indicator lamps • SIL 3/Cat. 3/PLe with 4 outputs, P/P-switching	6ES7138-7FD00-0AB0
<u>F analog input modules</u>	
4 F-AI Ex HART (0 ... 20 mA or 4 ... 20 mA) For evaluating the signals from current sensors in hazardous and non-hazardous areas, e.g. 2-wire transmitters and HART field devices • SIL 3/Cat. 3/PLe with 4 inputs of one module (1-channel/1oo1 evaluation) or 4 inputs of two modules (2-channel/1oo2 evaluation) • Resolution 15 bit + sign • HART communication in measuring range 4 ... 20 mA	6ES7138-7FA00-0AB0

Article No.

Terminal modules	
ET 200iSP terminal module TM-EM/EM60 For two modules (reserve module, watchdog module and all electronics modules except 2 DO Relay can be plugged in) • For hazardous environments - TM-EM/EM60S (blue screw-type terminals) - TM-EM/EM60C (blue spring-loaded terminals) • For non-hazardous environments - TM-EM/EM60S (black screw-type terminals)	6ES7193-7CA00-0AA0 6ES7193-7CA10-0AA0 6ES7193-7CA20-0AA0
Accessories	
Reserve module For any electronics module	6ES7138-7AA00-0AA0
Labeling sheet DIN A4, perforated, each consisting of 10 sheets of 30 strips each for electronics modules and 20 strips each for IM 151 • petrol • yellow	6ES7193-7BH00-0AA0 6ES7193-7BB00-0AA0
Labels, inscribed for slot numbering, label size H x W (in mm): 5 x 7 • 204 labels, for slots 1 to 20 • 204 labels, for slots 1 to 40	8WA8361-0AB 8WA8361-0AC
Labels, blank 136 labels for slot numbering, label size H x W (in mm): 5 x 7	8WA8348-2AY
S7-300 DIN rails • 585 mm long, suitable for assembly of ET 200iSP in a 650 mm-wide wall box • 885 mm long, suitable for assembly of ET 200iSP in a 950 mm-wide wall box	6ES7390-1AF85-0AA0 6ES7390-1AJ85-0AA0

Overview



The watchdog module has two fundamental functions:

- Monitoring of the ET 200iSP remote I/O station for hardware failures (hardware lifebeat); external, applicative failure monitoring is also possible via an I/O address area of the module
- Intrinsically-safe power supply for external actuator switch-off

The watchdog module must be plugged onto a terminal module (order separately). The following terminal modules are suitable for this:

- TM-IM/EM60 terminal modules for one interface module and one watchdog, reserve or electronics module (for versions, Interface module section)
- TM-EM/EM60 terminal modules with two slots for watchdog module, reserve module or electronics modules (except 2 DO relay):
 - with blue screw-type or spring-loaded terminals for hazardous environments
 - with black screw-type terminals for non-hazardous environments

The first slot directly next to the interface module is provided for the watchdog module.

Technical specifications

Article number	6ES7138-7BB00-0AB0 ET 200iSP, WATCHDOG MOD.
Digital inputs	
Number of digital inputs	0
Dimensions	
Width	30 mm
Height	129 mm
Depth	136.5 mm

Ordering data

Article No.

Watchdog module For failure monitoring and for the intrinsically safe power supply of an external actuator switch-off	6ES7138-7BB00-0AB0
Terminal modules	
ET 200iSP terminal module TM-EM/EM60 For two modules (reserve module, watchdog module and all electronics modules except 2 DO Relay can be plugged in)	
• For hazardous environments	
- TM-EM/EM60S (blue screw-type terminals)	6ES7193-7CA00-0AA0
- TM-EM/EM60C (blue spring-loaded terminals)	6ES7193-7CA10-0AA0
• For non-hazardous environments	
- TM-EM/EM60S (black screw-type terminals)	6ES7193-7CA20-0AA0
Accessories	
Labeling sheet DIN A4, perforated, each consisting of 10 sheets of 30 strips each for electronics modules and 20 strips each for IM 151	
• petrol	6ES7193-7BH00-0AA0
• yellow	6ES7193-7BB00-0AA0
Labels, inscribed for slot numbering, label size H x W (in mm): 5 x 7	
• 204 labels, for slots 1 to 20	8WA8361-0AB
• 204 labels, for slots 1 to 40	8WA8361-0AC
Labels, blank 136 labels for slot numbering, label size H x W (in mm): 5 x 7	8WA8348-2AY

I/O systems

SIMATIC ET 200 systems for the control cabinet

SIMATIC ET 200iSP

RS 485-iS coupler

Overview



Tasks of the RS 485-iS coupler

- Conversion of the electrical PROFIBUS DP RS 485 transmission technology into the intrinsically safe RS 485-iS transmission technology with a transmission rate of 1.5 Mbps
- Required to connect intrinsically safe PROFIBUS DP stations, e.g. ET 200iSP or devices from other vendors with Ex i DP connection
- Acts as a safety barrier
- Additional use as a repeater in the hazardous area
- Passive bus station (no configuration necessary)
- Certified according to ATEX 100a

Technical specifications

Technical data RS 485-iS coupler

Dimensions and weight

Dimensions W x H x D (mm)	80 x 125 x 130
Weight	Approx. 500 g

Technical data - General

Degree of protection	IP20
Ambient temperature	- 20 °C to + 60 °C

Standards and approvals

• PROFIBUS • EU directive • CENELEC • UL and CSA	IEC 61784-1:2002 Ed1 CP 3/1 94/9/EG (ATEX 100a) II 3 (2) G EEx nA[ib] IIC T4 Class I, Division2, Group A, B, C, D T4 Class I Zone 2, Group IIC T4 AIS Class I, Division 1, Group A, B, C, D [Aexib] IIC, Class I, Zone1, 2, Group IIC Class I, Division2, Group A, B, C, D T4 Class I Zone 2, Group IIC T4 AIS Class I, Division 1, Group A, B, C, D [Aexib] IIC, Class I, Zone1, 2, Group IIC IEC61131-2, Part 2 Conforming with 89/336/EWG Conforming with 73/23/EWG Classification companies • ABS (American Bureau of Shipping) • BV (Bureau Veritas) • DNV (Det Norske Veritas) • GL (Germanischer Lloyd) • LRD (Lloyds Register of Shipping) • Class NK (Nippon Kaiji Kyokai)
• FM	
• IEC • CE	
• Ship-building certification	

Module-Specific Specifications

Transfer rate on PROFIBUS DP, PROFIBUS RS 485-iS	9.6; 19.2; 45.45; 93.75; 187.5; 500 Kbps 1.5 Mbps
Bus-Protocol	PROFIBUS DP

Technical specifications (continued)

Technical data RS 485-iS coupler		
Voltages, Currents, Potentials		
Nominal supply voltage for RS 485-iS coupler	24 V DC (20.4 to 28.8 V)	
• Polarity reversal protection	Yes	
• Voltage drop bypass	Min. 5 ms	
Potential isolation for 24 V power supply		
• to PROFIBUS DP	Yes	
- tested with	500 V DC	
• to PROFIBUS RS 485-IS	Yes	
- tested with	AC 500 V	
Current consumption RS 485-iS coupler (24 V DC), max.	150 mA	
Power loss of the module, typically	3 Watts	
Status, alarms, diagnostics		
Status display	no	
Alarms	None	
Diagnostic functions	Yes	
• Bus monitoring PROFIBUS DP (primary)	Yellow LED "DP1"	
• Bus monitoring PROFIBUS RS 485-IS (secondary)	Yellow LED "DP2"	
• Monitoring 24 V power supply	Green LED "ON"	
Technical safety notice		
V _{DC}	±4.2 V	
I _{SC}	±93 mA	
P ₀	0.1 Watts	
V _{max}	±4.2 V	
L _I	0	
C _i	0	
U _m	AC 250 V	
T _a	−25 ... +60 °C	
RS 485-IS segment		
permitted cable length on a single line	RS 485–IS	DP Ex i
• 9.6 to 187.5 Kbps	1,000 m	200 m
• 500 Kbps	400 m	200 m
• 1.5 Mbps	200 m	200 m
Number of PROFIBUS DP nodes that can be connected, max.	31	16
PROFIBUS RS 485-IS bus termination switch	integrated, can be added	

Ordering data

Article No.

Article No.

RS 485-iS coupler

Isolating transformer for connection of PROFIBUS DP segments with RS 485 and RS 485-iS transmission technologies

6ES7972-0AC80-0XA0

Accessories

PROFIBUS connector with selectable terminating resistor

For connection of IM 152 to PROFIBUS DP with RS 485-iS transmission technology

6ES7972-0DA60-0XA0

S7-300 rails

Lengths:

- 160 mm
- 482 mm
- 530 mm
- 830 mm
- 2 000 mm

6ES7390-1AB60-0AA0
6ES7390-1AE80-0AA0
6ES7390-1AF30-0AA0
6ES7390-1AJ30-0AA0
6ES7390-1BC00-0AA0

PROFIBUS FastConnect bus cable

Standard type with special design for fast mounting, 2-core, shielded, cut-to-length; max. delivery unit 1 000 m, minimum order quantity 20 m

6XV1830-0EH10

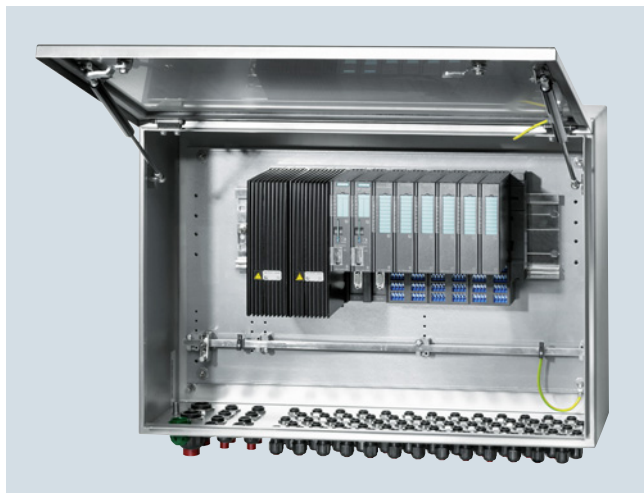
I/O systems

SIMATIC ET 200 systems for the control cabinet

SIMATIC ET 200iSP

Stainless steel wall enclosure

Design



ET 200iSP modules can also be installed in stainless steel wall enclosures designed to meet more exacting protection requirements. The enclosures are available in various sizes. They comply with IP65 degree of protection and can be used in Ex zones 1 and 21.

Delivery is possible as an empty enclosure (6DL2804-0....) or including components (6DL2804-1.... or 6DL2804-2....), depending on the order. Please send your requests to:

Siemens AG
PD PA AE SO
(please insert project name here)
Östl. Rheinbrückenstr. 50
76187 Karlsruhe, Germany

Email: cabinets.industry@siemens.com

Ordering data

Article No.

Stainless steel enclosure IP65, protection class Ex e, suitable for Ex zones 1 and 21

Empty enclosure without installation of modules, for use in gas area (zones 1 and 2), IP65

Enclosure with hinged cover 650 x 450 x 230

For the installation of max. 15 ET 200iSP modules, for use in gas area, for temperature range -20 ... +70 °C, with equipotential bonding rail and cable inlets:

- 2 x M32 for infeed, 4 x M20 for bus cables, 39 x M16 (3 rows) for signal lines and 2 rows of blanking plugs, all cable inlets of black plastic
- 2 x M32 for infeed, 4 x M20 for bus cables, 39 x M16 (3 rows) for signal lines and 2 rows of blanking plugs, all cable inlets of metal, for extended temperature range -40 to +70 °C
- 2 x M32 for infeed, 4 x M20 for bus cables, 39 x M16 (3 rows) for signal lines and 2 rows of blanking plugs, cable inlets M20 and M16 of blue plastic, M32 of black plastic
- 2 x M32 for infeed, 4 x M20 for bus cables, 36 x M20 (3 rows) for signal lines and 2 rows of blanking plugs, cable inlets M20 of blue plastic, M32 of black plastic
- 2 x M32 for infeed, 4 x M20 for bus cables, 65 x M16 (5 rows) for signal lines, all cable inlets of black plastic
- 2 x M32 for infeed, 4 x M20 for bus cables, 65 x M16 (5 rows) for signal lines, all cable inlets of metal, for extended temperature range -40 ... +70 °C
- 2 x M32 for infeed, 4 x M20 for bus cables, 65 x M16 (5 rows) for signal lines, cable inlets M20 and M16 of blue plastic, M32 of black plastic
- 2 x M32 for infeed, 4 x M20 for bus cables, 60 x M20 (5 rows) for signal lines, cable inlets M20 of blue plastic, M32 of black plastic

6DL2804-0AD30

6DL2804-0AD31

6DL2804-0AD32

6DL2804-0AD42

6DL2804-0AD50

6DL2804-0AD51

6DL2804-0AD52

6DL2804-0AD62

Ordering data	Article No.		Article No.
Enclosure with hinged cover 950 × 450 × 230 For the installation of max. 25 ET 200iSP modules, for use in gas area, for temperature range -20 ... +70 °C, with equipotential bonding rail and cable inlets: • 2 × M32 for infeed, 4 × M20 for bus cables, 66 × M16 (3 rows) for signal lines and 2 rows of blanking plugs, all cable inlets of black plastic • 2 × M32 for infeed, 4 × M20 for bus cables, 66 × M16 (3 rows) for signal lines and 2 rows of blanking plugs, all cable inlets of metal, for extended temperature range -40 to +70 °C • 2 × M32 for infeed, 4 × M20 for bus cables, 66 × M16 (3 rows) for signal lines and 2 rows of blanking plugs, cable inlets M20 and M16 of blue plastic, M32 of black plastic • 2 × M32 for infeed, 4 × M20 for bus cables, 57 × M20 (3 rows) for signal lines and 2 rows of blanking plugs, cable inlets M20 of blue plastic, M32 of black plastic • 2 × M32 for infeed, 4 × M20 for bus cables, 110 × M16 (5 rows) for signal lines, all cable inlets of black plastic • 2 × M32 for infeed, 4 × M20 for bus cables, 110 × M16 (5 rows) for signal lines, all cable inlets of metal, for extended temperature range -40 ... +70 °C • 2 × M32 for infeed, 4 × M20 for bus cables, 110 × M16 (5 rows) for signal lines, cable inlets M20 and M16 of blue plastic, M32 of black plastic • 2 × M32 for infeed, 4 × M20 for bus cables, 90 × M20 (5 rows) for signal lines, cable inlets M20 of blue plastic, M32 of black plastic	6DL2804-0AE30 6DL2804-0AE31 6DL2804-0AE32 6DL2804-0AE42 6DL2804-0AE50 6DL2804-0AE51 6DL2804-0AE52 6DL2804-0AE62	Empty enclosure without installation of modules, for use in dust area (zones 21 and 22), IP65 Enclosure with hinged cover 650 × 450 × 230 For the installation of max. 15 ET 200iSP modules, for use in dust area, for temperature range -20 ... +70 °C, with equipotential bonding rail and cable inlets: • 2 × M32 for infeed, 4 × M20 for bus cables, 39 × M16 (3 rows) for signal lines and 2 rows of blanking plugs, all cable inlets of black plastic • 2 × M32 for infeed, 4 × M20 for bus cables, 39 × M16 (3 rows) for signal lines and 2 rows of blanking plugs, cable inlets M20 and M16 of blue plastic, M32 of black plastic • 2 × M32 for infeed, 4 × M20 for bus cables, 36 × M20 (3 rows) for signal lines and 2 rows of blanking plugs, cable inlets M20 of blue plastic, M32 of black plastic • 2 × M32 for infeed, 4 × M20 for bus cables, 65 × M16 (5 rows) for signal lines, all cable inlets of black plastic • 2 × M32 for infeed, 4 × M20 for bus cables, 65 × M16 (5 rows) for signal lines, cable inlets M20 and M16 of blue plastic, M32 of black plastic • 2 × M32 for infeed, 4 × M20 for bus cables, 60 × M20 (5 rows) for signal lines, cable inlets M20 of blue plastic, M32 of black plastic	6DL2804-0DD30 6DL2804-0DD32 6DL2804-0DD42 6DL2804-0DD50 6DL2804-0DD52 6DL2804-0DD62

I/O systems

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

Stainless steel wall enclosure

Ordering data

Article No.

Enclosure with hinged cover 950 × 450 × 230

For the installation of max.
25 ET 200iSP modules, for use in
dust area, for temperature range
-20 ... +70 °C, with equipotential
bonding rail and cable inlets:

- 2 × M32 for infeed, 4 × M20 for bus cables, 66 × M16 (3 rows) for signal lines and 2 rows of blanking plugs, all cable inlets of black plastic
- 2 × M32 for infeed, 4 × M20 for bus cables, 66 × M16 (3 rows) for signal lines and 2 rows of blanking plugs, cable inlets M20 and M16 of blue plastic, M32 of black plastic
- 2 × M32 for infeed, 4 × M20 for bus cables, 57 × M20 (3 rows) for signal lines and 2 rows of blanking plugs, cable inlets M20 of blue plastic, M32 of black plastic
- 2 × M32 for infeed, 4 × M20 for bus cables, 110 × M16 (5 rows) for signal lines, all cable inlets of black plastic
- 2 × M32 for infeed, 4 × M20 for bus cables, 110 × M16 (5 rows) for signal lines, cable inlets M20 and M16 of blue plastic, M32 of black plastic
- 2 × M32 for infeed, 4 × M20 for bus cables, 95 × M20 (5 rows) for signal lines, cable inlets M20 of blue plastic, M32 of black plastic

6DL2804-0DE30

6DL2804-0DE32

6DL2804-0DE42

6DL2804-0DE50

6DL2804-0DE52

6DL2804-0DE62

Empty enclosure without installation of modules, for use in mining (Cat. M2), IP65

Enclosure with hinged cover 650 × 450 × 230

For the installation of max.
15 ET 200iSP modules, for use in
mining (Cat. M2), for temperature
range -20 to +70 °C, with equipo-
tential bonding rail and cable inlets:

- 6 × M25 for infeed, 6 × M32 (1 row) for signal lines, all cable inlets of metal
- 6 × M25 for infeed, 12 × M32 (2 rows) for signal lines, all cable inlets of metal

6DL2804-0MD16

6DL2804-0MD26

Enclosure with hinged cover 950 × 450 × 230

For the installation of max.
25 ET 200iSP modules, for use in
mining (Cat. M2), for temperature
range -20 to +70 °C, with equipo-
tential bonding rail and cable inlets:

- 6 × M25 for infeed, 9 × M32 (1 row) for signal lines, all cable inlets of metal
- 6 × M25 for infeed, 18 × M32 (2 rows) for signal lines, all cable inlets of metal

6DL2804-0ME16

6DL2804-0ME26

Article No.

Enclosure with installation of ET 200iSP modules, for use in gas area (zones 1 and 2), IP65

Enclosure with hinged cover 650 × 450 × 230

For installation of max.
15 ET 200iSP modules, for use in
gas area, for temperature range
-20 ... +70 °C, with equipotential
bonding rail and cable inlets:

- 2 × M32 for infeed, 4 × M20 for bus cables, 39 × M16 (3 rows) for signal lines and 2 rows of blanking plugs, all cable inlets of black plastic
- 2 × M32 for infeed, 4 × M20 for bus cables, 39 × M16 (3 rows) for signal lines and 2 rows of blanking plugs, all cable inlets of metal, minimum ambient operating temperature -30 °C (heater must be ordered separately)
- 2 × M32 for infeed, 4 × M20 for bus cables, 39 × M16 (3 rows) for signal lines and 2 rows of blanking plugs, cable inlets M20 and M16 of blue plastic, M32 of black plastic
- 2 × M32 for infeed, 4 × M20 for bus cables, 36 × M20 (3 rows) for signal lines and 2 rows of blanking plugs, cable inlets M20 of blue plastic, M32 of black plastic
- 2 × M32 for infeed, 4 × M20 for bus cables, 65 × M16 (5 rows) for signal lines, all cable inlets of black plastic
- 2 × M32 for infeed, 4 × M20 for bus cables, 65 × M16 (5 rows) for signal lines, all cable inlets of metal, minimum ambient operating temperature -30 °C (heater must be ordered separately)
- 2 × M32 for infeed, 4 × M20 for bus cables, 65 × M16 (5 rows) for signal lines, cable inlets M20 and M16 of blue plastic, M32 of black plastic
- 2 × M32 for infeed, 4 × M20 for bus cables, 60 × M20 (5 rows) for signal lines, cable inlets M20 of blue plastic, M32 of black plastic

6DL2804-1AD30

6DL2804-1AD31

6DL2804-1AD32

6DL2804-1AD42

6DL2804-1AD50

6DL2804-1AD51

6DL2804-1AD52

6DL2804-1AD62

Ordering data	Article No.		Article No.
Enclosure with hinged cover 950 × 450 × 230 For the installation of max. 25 ET 200iSP modules, for use in gas area, for temperature range -20 ... +70 °C, with equipotential bonding rail and cable inlets:			Enclosure with installation of ET 200iSP modules, for use in dust area (zones 21 and 22), IP65
• 2 × M32 for infeed, 4 × M20 for bus cables, 66 × M16 (3 rows) for signal lines and 2 rows of blanking plugs, all cable inlets of black plastic	6DL2804-1AE30		Enclosure with hinged cover 650 × 450 × 230 For the installation of max. 15 ET 200iSP modules, for use in dust area, for temperature range -20 ... +70 °C, with equipotential bonding rail and cable inlets:
• 2 × M32 for infeed, 4 × M20 for bus cables, 66 × M16 (3 rows) for signal lines and 2 rows of blanking plugs, all cable inlets of metal, minimum ambient operating temperature -30 °C (heater must be ordered separately)	6DL2804-1AE31		• 2 × M32 for infeed, 4 × M20 for bus cables, 39 × M16 (3 rows) for signal lines and 2 rows of blanking plugs, all cable inlets of black plastic
• 2 × M32 for infeed, 4 × M20 for bus cables, 66 × M16 (3 rows) for signal lines and 2 rows of blanking plugs, cable inlets M20 and M16 of blue plastic, M32 of black plastic	6DL2804-1AE32		• 2 × M32 for infeed, 4 × M20 for bus cables, 39 × M16 (3 rows) for signal lines and 2 rows of blanking plugs, cable inlets M20 and M16 of blue plastic, M32 of black plastic
• 2 × M32 for infeed, 4 × M20 for bus cables, 57 × M20 (3 rows) for signal lines and 2 rows of blanking plugs, all cable inlets of metal, minimum ambient operating temperature -30 °C (heater must be ordered separately)	6DL2804-1AE41		• 2 × M32 for infeed, 4 × M20 for bus cables, 36 × M20 (3 rows) for signal lines and 2 rows of blanking plugs, cable inlets M20 of blue plastic, M32 of black plastic
• 2 × M32 for infeed, 4 × M20 for bus cables, 57 × M20 (3 rows) for signal lines and 2 rows of blanking plugs, cable inlets M20 of blue plastic, M32 of black plastic	6DL2804-1AE42		• 2 × M32 for infeed, 4 × M20 for bus cables, 65 × M16 (5 rows) for signal lines, all cable inlets of black plastic
• 2 × M32 for infeed, 4 × M20 for bus cables, 110 × M16 (5 rows) for signal lines, all cable inlets of black plastic	6DL2804-1AE50		• 2 × M32 for infeed, 4 × M20 for bus cables, 65 × M16 (5 rows) for signal lines, all cable inlets of metal, minimum ambient operating temperature -30 °C (heater must be ordered separately)
• 2 × M32 for infeed, 4 × M20 for bus cables, 110 × M16 (5 rows) for signal lines, all cable inlets of metal, minimum ambient operating temperature -30 °C (heater must be ordered separately)	6DL2804-1AE51		• 2 × M32 for infeed, 4 × M20 for bus cables, 65 × M16 (5 rows) for signal lines, cable inlets M20 and M16 of blue plastic, M32 of black plastic
• 2 × M32 for infeed, 4 × M20 for bus cables, 110 × M16 (5 rows) for signal lines, cable inlets M20 and M16 of blue plastic, M32 of black plastic	6DL2804-1AE52		• 2 × M32 for infeed, 4 × M20 for bus cables, 60 × M20 (5 rows) for signal lines, cable inlets M20 of blue plastic, M32 of black plastic
• 2 × M32 for infeed, 4 × M20 for bus cables, 95 × M20 (5 rows) for signal lines, all cable inlets of metal, minimum ambient operating temperature -30 °C (heater must be ordered separately)	6DL2804-1AE61		
• 2 × M32 for infeed, 4 × M20 for bus cables, 90 × M20 (5 rows) for signal lines, cable inlets M20 of blue plastic, M32 of black plastic	6DL2804-1AE62		

I/O systems

SIMATIC ET 200 systems for the control cabinet

SIMATIC ET 200iSP

Stainless steel wall enclosure

Ordering data

Article No.

Article No.

Enclosure with hinged cover 950 × 450 × 230

For the installation of max.
25 ET 200iSP modules, for use in
dust area, for temperature range
-20 ... +70 °C, with equipotential
bonding rail and cable inlets:

- 2 × M32 for infeed, 4 × M20 for bus cables, 66 × M16 (3 rows) for signal lines and 2 rows of blanking plugs, all cable inlets of black plastic
- 2 × M32 for infeed, 4 × M20 for bus cables, 66 × M16 (3 rows) for signal lines and 2 rows of blanking plugs, cable inlets M20 and M16 of blue plastic, M32 of black plastic
- 2 × M32 for infeed, 4 × M20 for bus cables, 57 × M20 (3 rows) for signal lines and 2 rows of blanking plugs, cable inlets M20 of blue plastic, M32 of black plastic
- 2 × M32 for infeed, 4 × M20 for bus cables, 110 × M16 (5 rows) for signal lines, all cable inlets of black plastic
- 2 × M32 for infeed, 4 × M20 for bus cables, 110 × M16 (5 rows) for signal lines, cable inlets M20 and M16 of blue plastic, M32 of black plastic
- 2 × M32 for infeed, 4 × M20 for bus cables, 95 × M20 (5 rows) for signal lines, cable inlets M20 of blue plastic, M32 of black plastic

6DL2804-1DE30

6DL2804-1DE32

6DL2804-1DE42

6DL2804-1DE50

6DL2804-1DE52

6DL2804-1DE62

Enclosure with installation of ET 200iSP modules, for use in mining (Cat. M2), IP65

Enclosure with hinged cover 650 × 450 × 230

For the installation of max.
15 ET 200iSP modules, for use in
mining (Cat. M2), for temperature
range -20 to +70 °C, with equipo-
tential bonding rail and cable inlets:

- 6 × M25 for infeed, 6 × M32 (1 row) for signal lines, all cable inlets of metal
- 6 × M25 for infeed, 12 × M32 (2 rows) for signal lines, all cable inlets of metal

6DL2804-1MD16

6DL2804-1MD26

Enclosure with hinged cover 950 × 450 × 230

For the installation of max.
25 ET 200iSP modules, for use in
mining (Cat. M2), for temperature
range -20 to +70 °C, with equipo-
tential bonding rail and cable inlets:

- 6 × M25 for infeed, 9 × M32 (1 row) for signal lines, all cable inlets of metal
- 6 × M25 for infeed, 18 × M32 (2 rows) for signal lines, all cable inlets of metal

6DL2804-1ME16

6DL2804-1ME26

Enclosure with installation of ET 200iSP and AirLINE Ex modules, for use in gas area (zones 1 and 2), IP65

Enclosure with hinged cover 650 × 450 × 230

For the installation of max.
15 ET 200iSP modules, for use in
gas area, for temperature range
-20 ... +70 °C, with equipotential
bonding rail and cable inlets:

- 2 × M32 for infeed, 4 × M20 for bus cables, 39 × M16 (3 rows) for signal lines and 2 rows of blanking plugs, all cable inlets of black plastic
- 2 × M32 for infeed, 4 × M20 for bus cables, 65 × M16 (5 rows) for signal lines, all cable inlets of black plastic
- 2 × M32 for infeed, 4 × M20 for bus cables, 60 × M20 (5 rows) for signal lines, cable inlets M20 of blue plastic, M32 of black plastic

6DL2804-2AD30

6DL2804-2AD50

6DL2804-2AD62

Enclosure with hinged cover 950 × 450 × 230

For the installation of max.
25 ET 200iSP modules, for use in
gas area, for temperature range
-20 ... +70 °C, with equipotential
bonding rail and cable inlets:

- 2 × M32 for infeed, 4 × M20 for bus cables, 66 × M16 (3 rows) for signal lines and 2 rows of blanking plugs, all cable inlets of black plastic
- 2 × M32 for infeed, 4 × M20 for bus cables, 110 × M16 (5 rows) for signal lines, all cable inlets of black plastic
- 2 × M32 for infeed, 4 × M20 for bus cables, 95 × M20 (5 rows) for signal lines, cable inlets M20 of blue plastic, M32 of black plastic

6DL2804-2AE30

6DL2804-2AE50

6DL2804-2AE62

Ordering data	Article No.		Article No.
Enclosure with installation of ET 200iSP and AirLINE Ex modules, for use in dust area (zones 21 and 22), IP65¹⁾			
Enclosure with hinged cover 650 × 450 × 230 For the installation of max. 15 ET 200iSP modules, for use in dust area, for temperature range -20 to +70 °C, with equipotential bonding rail and cable inlets: • 2 × M32 for infeed, 4 × M20 for bus cables, 36 × M20 (3 rows) for signal lines and 2 rows of blanking plugs, all cable inlets of black plastic	6DL2804-2DD40	Enclosure with hinged cover 950 × 450 × 230 For installation of max. 25 ET 200iSP modules, for use in dust area, for temperature range -20 ... +70 °C, with equipotential bonding rail and cable inlets: • 2 × M32 for infeed, 4 × M20 for bus cables, 57 × M20 (3 rows) for signal lines and 2 rows of blanking plugs, all cable inlets of black plastic • 2 × M32 for infeed, 4 × M20 for bus cables, 110 × M16 (5 rows) for signal lines, all cable inlets of black plastic	6DL2804-2DE40 6DL2804-2DE50
		Special configurations	For individual configurations that deviate from the standard configurations, we would be happy to prepare an offer tailored to your needs. Please direct your request to cabinets.industry@siemens.com

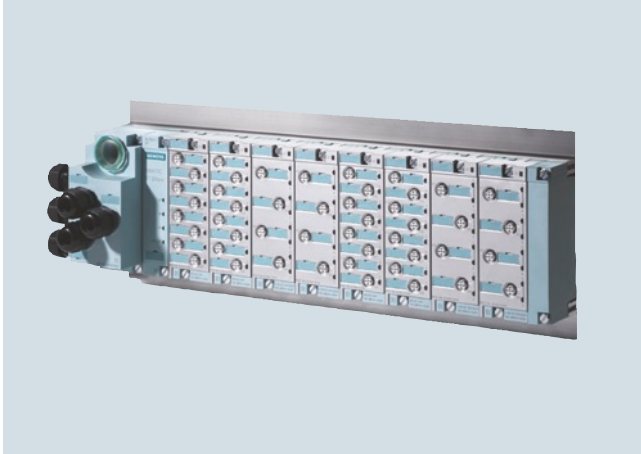
¹⁾ The AirLINE Ex components (see catalog "Add-ons for SIMATIC PCS 7") must be ordered separately.

I/O systems

SIMATIC ET 200 systems without control cabinet

SIMATIC ET 200pro

Overview



- SIMATIC ET 200pro distributed I/O system with IP65/67 degree of protection for cabinet-free use at the machine
- Small, multifunctional complete solution: Digital inputs/outputs, fail-safe modules, motor starters up to 5.5 kW, etc.
- Communication over PROFIBUS or PROFINET
- Mixed arrangement of fail-safe and standard modules in the same station
- Freely selectable connection technique: direct, ECOFAST or M12 7/8"
- Power module for easy implementation of load groups
- Module replacement during operation (hot swapping)
- Easy installation as well as permanent wiring
- Transmission rate for PROFIBUS DP up to 12 Mbps
- Extensive diagnostics: module-specific or channel-specific
- Intelligent motor starters for starting and protection of motors and loads up to 5.5 kW
 - Versions: direct and reversing starters - Standard and High Feature
- Fail-safe motor starters
- Fail-safe modules with safety-related signal processing according to PROFIsafe
- Frequency converters
- RFID communication modules
- Pneumatic interface modules

Technical specifications

General technical specifications	
Electronic modules	• Digital inputs/outputs • Analog inputs • Analog outputs
Connections	M12 and M8 round connector with standard assignment for actuator/sensor
Transmission rate, max.	12 Mbit/s (PROFIBUS DP), 100 Mbit/s (PROFINET IO)
Supply voltage	24 V DC
Current consumption of one ET 200pro (internal and encoder supply, non-switched voltage), up to 55 °C, max.	≤ 5 A
Load current for ET 200pro per incoming supply (IM, PM, switched voltage), up to 55 °C, max.	10 A
For overall configuration with looping through (multiple ET 200pros), up to 55 °C, max.	16 A (with connecting module, directly)
Degree of protection	IP65/66/IP67 for interface, digital and analog modules
Material	Thermoplastic (reinforced with glass fiber)

Environmental conditions	
Temperature	From -25 °C/0 °C to +55 °C
Relative humidity	From 5 to 100%
Air pressure	From 795 to 1080 hPa
Mechanical stress	
• Vibration	Vibration test according to IEC 60068, Part 2-6 (sinusoidal) • Constant acceleration 5 g, occasionally 10 g for interface, digital and analog modules • 2 g motor starters
• Shock	Shock test according to IEC 680068 Part 2-27, half-sine, 30 g, 18 ms duration for interface, digital and analog modules • 15 g, 11 ms duration for motor starters
Approvals	UL, CSA or cULus

Overview



Interface modules for handling communication between the ET 200pro and the higher-level master over PROFIBUS DP.

Technical specifications

Article number	6ES7154-1AA01-0AB0 ET 200PRO, IM 154-1 DP	6ES7154-2AA01-0AB0 ET 200PRO, IM154-2 DP HF
Supply voltage		
Rated value (DC)	24 V	24 V
Reverse polarity protection	Yes; against destruction	Yes; against destruction
Short-circuit protection	Yes; over exchangeable fuses	Yes; over exchangeable fuses
Load voltage 2L+		
• Rated value (DC)	24 V	24 V
• Reverse polarity protection	Yes; against destruction	Yes; against destruction
Input current		
from supply voltage 1L+, max.	200 mA	200 mA
Power loss		
Power loss, typ.	5 W	5 W
Address area		
Addressing volume		
• Inputs	244 byte	244 byte
• Outputs	244 byte	244 byte
Interfaces		
Interfaces/bus type	PROFIBUS DP	PROFIBUS DP
Interface physics, RS 485	Yes	Yes
PROFIBUS DP		
• automatic detection of transmission rate	Yes	Yes
• Transmission rate, min.	9.6 kbit/s	9.6 kbit/s
• Transmission rate, max.	12 Mbit/s	12 Mbit/s
• SYNC capability	Yes	Yes
• FREEZE capability	Yes	Yes
• Direct data exchange (slave-to-slave communication)	Yes	Yes
Interrupts/diagnostics/status information		
Alarms		
• Diagnostic alarm	Yes; Parameterizable	Yes; Parameterizable
• Hardware interrupt	Yes; Parameterizable	Yes; Parameterizable
Diagnostics indication LED		
• Bus fault BF (red)	Yes	Yes
• Group error SF (red)	Yes	Yes
• Monitoring 24 V voltage supply ON (green)	Yes	Yes
• Load voltage monitoring 24 V DC (green)	Yes	Yes

I/O systems

SIMATIC ET 200 systems without control cabinet

SIMATIC ET 200pro

Interface modules > IM 154-1 and IM 154-2**Technical specifications** (continued)

Article number	6ES7154-1AA01-0AB0 ET 200PRO, IM 154-1 DP	6ES7154-2AA01-0AB0 ET 200PRO, IM154-2 DP HF
Parameter		
DPV1 operation	possible	possible
Swapping interrupt	Parameterizable	Parameterizable
Startup if setpoint not equal to actual configuration	Parameterizable	Parameterizable
Potential separation		
between supply voltage and electronics	Yes	Yes
Isolation		
Isolation tested with	707 V DC (type test)	707 V DC (type test)
Degree and class of protection		
Degree of protection acc. to EN 60529		
• IP67	Yes	Yes
Ambient conditions		
Ambient temperature during operation		
• min.	-25 °C	-25 °C
• max.	55 °C	55 °C
Ambient temperature during storage/transportation		
• min.	-40 °C	-40 °C
• max.	70 °C	70 °C
Dimensions		
Width	90 mm	90 mm
Height	130 mm	130 mm
Depth	59.3 mm	59.3 mm
Weights		
Weight, approx.	375 g	375 g

Ordering data	Article No.		Article No.
IM154-1 interface module For ET 200pro; for communication between ET 200pro and higher-level masters over PROFIBUS DP.	6ES7154-1AA01-0AB0		
IM154-2 DP High Feature interface module For ET 200pro; for communication between ET 200pro and higher-level masters over PROFIBUS DP; supports PROFI-safe.	6ES7154-2AA01-0AB0		
Accessories			
CM IM DP ECOFAST connection module For connecting PROFIBUS DP and the 24 V power supply to PROFIBUS interface modules, 2 ECOFAST Cu connections.	6ES7194-4AA00-0AA0	PROFIBUS ECOFAST hybrid cable, non-assembled Trailing-type cable with 2 x Cu 0.64 mm ² and 4 x Cu 1.5 mm ² , in various lengths: 50 m 100 m	6XV1830-7AN50 6XV1830-7AT10
CM IM DP direct connection module For connecting PROFIBUS DP and the 24 V power supply directly to PROFIBUS interface modules, up to six M20 cable glands.	6ES7194-4AC00-0AA0	PROFIBUS ECOFAST hybrid connector 180 ECOFAST Cu, 2 x Cu, 4 x 1.5 mm ² , HANBRID connector • With male insert, 5-pack • With female insert, 5-pack	6GK1905-0CA00 6GK1905-0CB00
CM IM DP M12, 7/8" connection module For connecting PROFIBUS DP and the 24 V power supply to PROFIBUS interface modules, 2 x M12 and 2 x 7/8".	6ES7194-4AD00-0AA0	PROFIBUS ECOFAST hybrid connector angular ECOFAST Cu, 2 x Cu, 4 x 1.5 mm ² , HANBRID connector • With male insert, 5-pack • With female insert, 5-pack	6GK1905-0CC00 6GK1905-0CD00
Accessories for CM IM DP ECOFAST		Accessories for CM IM DP direct	
PROFIBUS ECOFAST hybrid cable, pre-assembled With 2 ECOFAST connectors, trailing-type cable with 2 x Cu 0.64 mm ² and 4 x Cu 1.5 mm ² , in various lengths: 1.5 m 3.0 m 5.0 m 10 m 15 m 20 m	6XV1830-7BH15 6XV1830-7BH30 6XV1830-7BH50 6XV1830-7BN10 6XV1830-7BN15 6XV1830-7BN20	PROFIBUS trailing cable Max. acceleration 4 m/s ² , at least 3 million bending cycles, bending radius at least 60 mm, 2-core shielded, sold by the meter, minimum order quantity 20 m, maximum order quantity 1 000 m.	6XV1830-3EH10
PROFIBUS ECOFAST hybrid cable GP, pre-assembled With 2 ECOFAST connectors, trailing-type cable with 2 x Cu 0.64 mm ² and 4 x Cu 1.5 mm ² , in various lengths: 1.5 m 3.0 m 5.0 m 10 m 15 m 20 m	6XV1860-3PH15 6XV1860-3PH30 6XV1860-3PH50 6XV1860-3PN10 6XV1860-3PN15 6XV1860-3PN20	PROFIBUS FC Food bus cable With PE sheath for use in the food and beverages industry, 2-core, shielded, sold by the meter, minimum order quantity 20 m, maximum order quantity 1 000 m.	6XV1830-0GH10
		PROFIBUS FC Robust bus cable With PUR sheath for use in environments subject to harsh chemicals and extreme mechanical stress, 2-core, shielded, sold by the meter, minimum order quantity 20 m, maximum order quantity 1 000 m.	6XV1830-0JH10
		Power line 5-core, 5 x 1.5 mm ² , trailing type, sold by the meter, minimum order quantity 20 m, maximum order quantity 1 000 m.	6XV1830-8AH10

I/O systems

SIMATIC ET 200 systems without control cabinet

SIMATIC ET 200pro

Interface modules > IM 154-1 and IM 154-2

Ordering data	Article No.		Article No.
Accessories for CM IM DP M12, 7/8"		General accessories	
PROFIBUS M12 connecting cable		ET 200pro rack	
Pre-assembled with two M12 connectors, 5-pin, in various lengths:		- Narrow, for interface, electronics and power modules - 500 mm - 1000 mm - 2000 mm, can be cut to length - Compact, for interface, electronics and power modules - 500 mm - 1000 mm - 2000 mm, can be cut to length - Wide, for interface, electronics, power modules and motor starters - 500 mm - 1000 mm - 2000 mm, can be cut to length - Wide, for I/O modules and motor starters - 500 mm - 1000 mm - 2000 mm	6ES7194-4GA00-0AA0 6ES7194-4GA60-0AA0 6ES7194-4GA20-0AA0 6ES7194-4GC70-0AA0 6ES7194-4GC60-0AA0 6ES7194-4GC20-0AA0 6ES7194-4GB00-0AA0 6ES7194-4GB60-0AA0 6ES7194-4GB20-0AA0 6ES7194-4GD00-0AA0 6ES7194-4GD10-0AA0 6ES7194-4GD20-0AA0
1.5 m	6XV1830-3DH15		
2.0 m	6XV1830-3DH20		
3.0 m	6XV1830-3DH30		
5.0 m	6XV1830-3DH50		
10 m	6XV1830-3DN10		
15 m	6XV1830-3DN15		
7/8" connecting cable to power supply		Spare fuse	
5-core, 5 x 1.5 mm ² , trailing type, pre-assembled with two 7/8" connectors, 5-pin, in various lengths:		12.5 A fast-blow, for interface and power modules, 10 units per pack.	6ES7194-4HB00-0AA0
1.5 m	6XV1822-5BH15		
2.0 m	6XV1822-5BH20		
3.0 m	6XV1822-5BH30		
5.0 m	6XV1822-5BH50		
10 m	6XV1822-5BN10		
15 m	6XV1822-5BN15		
M12 cable connector		PROFIBUS FastConnect bus cable	
For ET 200eco, with axial cable outlet.		Standard type with special design for quick mounting, 2-core, shielded, sold by the meter, max. delivery unit 1 000 m, minimum order quantity 20 m.	6XV1830-0EH10
- With male insert, 5-pack - With female insert, 5-pack	6GK1905-0EA00 6GK1905-0EB00	PROFIBUS Hybrid Standard Cable GP	6XV1860-2R
PROFIBUS M12 bus termination connector	6GK1905-0EC00	Standard PROFIBUS hybrid cable with 2 energy cables (1.5 mm ²) for supplying data and energy for ET 200pro.	
With male insert.		SIMATIC Manual Collection	6ES7998-8XC01-8YE0
7/8" cable connector		Electronic manuals on DVD, multi-language: S7-200, TD 200, S7-300, M7-300, C7, S7-400, M7-400, STEP 7, Engineering Tools, Runtime Software, SIMATIC DP (Distributed I/O), SIMATIC HMI (Human Machine Interface), SIMATIC NET (Industrial Communication).	
For ET 200eco, with axial cable outlet.		SIMATIC Manual Collection update service for 1 year	6ES7998-8XC01-8YE2
- With male insert, 5-pack - With female insert, 5-pack	6GK1905-0FA00 6GK1905-0FB00	Scope of delivery: Current DVD "S7 Manual Collection" and the three subsequent updates.	
M12 sealing cap	3RX9802-0AA00		
For protection of unused M12 connections with ET 200pro.			
Sealing cap 7/8"	6ES7194-3JA00-0AA0		
For protection of unused 7/8" connections with ET 200pro; 10 units per pack.			

Overview



Interface module for processing the communication between ET 200pro and a higher-level controller over PROFINET IO.

Technical specifications

Article number	6ES7154-4AB10-0AB0 ET 200PRO, IM 154-4 PN HF
Supply voltage	
Rated value (DC)	24 V
Reverse polarity protection	Yes; against destruction
Short-circuit protection	Yes; Fuse in lower part is exchangeable, the fuse on the IM-LP is not
Load voltage 2L+	
• Rated value (DC)	24 V
• Reverse polarity protection	Yes; against destruction
Input current	
from supply voltage 1L+, max.	400 mA; Dependent on terminal module, typ. maximum value for FO connection method, full load on RWB and 20.4 V input voltage
Power loss	
Power loss, typ.	6 W; Dependent on terminal module, typ. maximum value for CU connection method, full load on RWB, for FO the value is approx. 0.7 W higher
Memory	
Micro Memory Card	No; Internal memory medium
Address area	
Addressing volume	
• Inputs	256 byte
• Outputs	256 byte
Interfaces	
PROFINET IO	
• automatic detection of transmission rate	Yes
• Transmission rate, max.	100 Mbit/s
• Services	ARP, PING, SNMP
Interrupts/diagnostics/status information	
Alarms	
• Diagnostic alarm	Yes; Parameterizable
• Hardware interrupt	Yes; Parameterizable

Article number	6ES7154-4AB10-0AB0 ET 200PRO, IM 154-4 PN HF
Diagnostics indication LED	
• Bus fault BF (red)	Yes; Additional LEDs (MAINT, P1/2 LINK, P1/2 RX/TX) available
• Group error SF (red)	Yes
• Monitoring 24 V voltage supply ON (green)	Yes
• Load voltage monitoring 24 V DC (green)	Yes
Parameter	
Swapping interrupt	1
Startup if setpoint not equal to actual configuration	1
Hot swapping of modules	1
Potential separation	
between backplane bus and electronics	No
between supply voltage and electronics	Yes
Isolation	
Isolation tested with	707 V DC (type test)
Degree and class of protection	
Degree of protection acc. to EN 60529	
• IP65	Yes
• IP66	Yes
• IP67	Yes
Ambient conditions	
Ambient temperature during operation	
• min.	-25 °C
• max.	55 °C
Ambient temperature during storage/transportation	
• min.	-40 °C
• max.	70 °C
Dimensions	
Width	135 mm
Height	130 mm
Depth	59.3 mm
Weights	
Weight, approx.	490 g

I/O systems

SIMATIC ET 200 systems without control cabinet

SIMATIC ET 200pro

Interface modules > IM 154-4 PN

Ordering data	Article No.	Article No.
IM 154-4 PN High Feature interface module For communication between ET 200pro and higher-level controllers over PROFINET IO; Supports PROFI-safe.	6ES7 154-4AB10-0AB0	
Accessories		
CM IM PN connection module M12, 7/8" For connecting PROFINET PN and 24 V power supply to PROFINET interface modules, 2 x M12 and 2 x 7/8".	6ES7 194-4AJ00-0AA0	
CM IM PN connection module 2xRJ45 For connecting PROFINET PN and 24 V power supply to PROFINET interface modules, 2 x RJ45 and 2 x push-pull power connector.	6ES7 194-4AF00-0AA0	
CM IM PN 2xSCRJ FO connection module For connecting PROFINET PN and 24 V power supply to PROFINET interface modules, 2 x SCRJ FO and 2 x push-pull power connector.	6ES7 194-4AG00-0AA0	
M12 sealing cap For protection of unused M12 connections with ET 200pro.	3RX9 802-0AA00	
IE M12 connecting cables Pre-assembled with two M12 connectors, up to 85 m, in various lengths: 0.3 m 0.5 m 1.0 m 1.5 m 2.0 m 3.0 m 5.0 m 10 m 15 m Other special lengths with 90° or 180° cable outlet.	6XV1 870-8AE30 6XV1 870-8AE50 6XV1 870-8AH10 6XV1 870-8AH15 6XV1 870-8AH20 6XV1 870-8AH30 6XV1 870-8AH50 6XV1 870-8AN10 6XV1 870-8AN15 See http://support.automation.siemens.com/WW/view/en/26999294	
7/8" sealing caps 1 pack = 10 units	6ES7 194-3JA00-0AA0	
		7/8" connecting cable to power supply 5-core, 5 x 1.5 mm ² , trailing type, pre-assembled with two 7/8" connectors, 5-pin, up to 50 m, in various lengths: 1.5 m 2.0 m 3.0 m 5.0 m 10 m 15 m Other special lengths with 90° or 180° cable outlet.
		Power line 5-core, 5 x 1.5 mm ² , trailing type, sold by the meter, minimum order quantity 20 m, maximum order quantity 1 000 m.
		7/8" cable connector For ET 200eco, with axial cable outlet. • With male insert, 5-pack • With female insert, 5-pack
		Industrial Ethernet FastConnect installation cables • IE FC TP Standard Cable GP 2 x 2; Sold by the meter, max. delivery unit 1 000 m; minimum order quantity 20 m. • IE FC TP Trailing Cable 2 x 2; Sold by the meter, max. order quantity 1000 m; minimum order quantity 20 m. • IE FC TP Trailing Cable GP 2 x 2; sold by the meter, max. delivery unit 1000 m; minimum order quantity 20 m. • IE TP Torsion Cable GP 2 x 2; sold by the meter, max. delivery unit 1000 m; minimum order quantity 20 m. • IE FC TP Marine Cable 2 x 2; Sold by the meter, max. order quantity 1000 m; minimum order quantity 20 m.
		6XV1 822-5BH15 6XV1 822-5BH20 6XV1 822-5BH30 6XV1 822-5BH50 6XV1 822-5BN10 6XV1 822-5BN15 See http://support.automation.siemens.com/WW/view/en/26999294
		6XV1 830-8AH10
		6GK1 905-0FA00 6GK1 905-0FB00
		6XV1 840-2AH10 6XV1 840-3AH10 6XV1 870-2D 6XV1 870-2F 6XV1 840-4AH10

Ordering data	Article No.		Article No.
IE RJ45 Plug PRO RJ45 plug in IP65/67-rated design for on-site assembly, plastic housing, insulation/displacement connection system, for SCALANCE X-200 IRT PRO and ET 200pro: 1 pack = 1 unit.	6GK1901-1BB10-6AA0	General accessories ET 200pro rack - Narrow, for interface, electronics and power modules 500 mm 1000 mm 2000 mm, can be cut to length - Compact, for interface, electronics and power modules 500 mm 1000 mm 2000 mm, can be cut to length - Wide, for interface, electronics, power modules and motor starters 500 mm 1000 mm 2000 mm, can be cut to length - Wide, for I/O modules and motor starters 500 mm 1000 mm 2000 mm	6ES7194-4GA00-0AA0 6ES7194-4GA60-0AA0 6ES7194-4GA20-0AA0 6ES7194-4GC70-0AA0 6ES7194-4GC60-0AA0 6ES7194-4GC20-0AA0 6ES7194-4GB00-0AA0 6ES7194-4GB60-0AA0 6ES7194-4GB20-0AA0 6ES7194-4GD00-0AA0 6ES7194-4GD10-0AA0 6ES7194-4GD20-0AA0
IE SC RJ POF Plug PRO SC RJ plug for POF fibers in IP65/67-rated design for on-site assembly, plastic housing, for SCALANCE X-200IRT PRO and ET 200pro 1 pack = 1 unit	6GK1900-0MB00-6AA0		
IE SC RJ PCF Plug PRO SC RJ plug for PCF fibers in IP65/67-rated design for on-site assembly, plastic housing, for SCALANCE X-200IRT PRO 1 pack = 1 unit.	6GK1900-0NB00-6AA0		
Power Plug PRO 5-pole power plug for 2 x 24 V power supply in IP65/67-rated design, for on-site assembly, plastic housing, for SCALANCE X-200IRT and ET 200 pro 1 pack = 1 unit.	6GK1907-0AB10-6AA0	Spare fuse 12.5 A fast-blow, for interface and power modules, 10 units per pack	6ES7194-4HB00-0AA0
IE panel feed-through Control cabinet feedthrough for converting M12 D-coded connection system (IP65) to RJ45 connection system (IP20) • 1 pack = 5 units	6GK1901-0DM20-2AA5	SIMATIC Manual Collection Electronic manuals on DVD, multi-language: S7-200, TD 200, S7-300, M7-300, C7, S7-400, M7-400, STEP 7, Engineering Tools, Runtime Software, SIMATIC DP (Distributed I/O), SIMATIC HMI (Human Machine Interface), SIMATIC NET (Industrial Communication)	6ES7998-8XC01-8YE0
Push-pull cable connector For 1L+/ 2L+, unassembled	6GK1907-0AB10-6AA0	SIMATIC Manual Collection update service for 1 year Scope of delivery: Current DVD "S7 Manual Collection" and the three subsequent updates	6ES7998-8XC01-8YE2
Cover caps for push-pull RJ45 female connectors 5 items per pack	6ES7194-4JD50-0AA0		

I/O systems

SIMATIC ET 200 systems without control cabinet

SIMATIC ET 200pro

I/O modules > Digital expansion modules

Overview



- Expansion modules with digital inputs/outputs for connection of actuators/sensors
- With scalable diagnostics
 - Standard modules with module-specific diagnostics
 - High-feature module with channel-specific diagnostics and parameterizable input delay or hardware interrupts
- Double or single assignment can be implemented for each M12 in the case of the 8 DI and 8 DO module by selecting CM IO 4 x M12 or CM IO 8 x M12
- IO connection modules are available in metal and plastic versions

Technical specifications

Article number	6ES7141-4BF00-0AA0	6ES7141-4BF00-0AB0	6ES7141-4BH00-0AA0
	ET 200PRO, EM 8DI 24 V DC	ET 200PRO, EM 8DI 24 V DC HF	ET 200PRO, EM 16DI DC 24 V
Supply voltage			
Rated value (DC)	24 V	24 V	24 V
Reverse polarity protection	Yes; Against destruction; encoder power supply outputs applied with reversed polarity	Yes; against destruction; load increasing	Yes; Against destruction; encoder power supply outputs applied with reversed polarity
Input current			
from supply voltage 1L+, max.	20 mA	40 mA	30 mA
from backplane bus 3.3 V DC, max.	20 mA	20 mA	20 mA
Encoder supply			
Number of outputs	8	8	8
Short-circuit protection	Yes; per module, electronic	Yes; per channel, electronic	Yes; per module, electronic
Output current			
• up to 55 °C, max.	1 A	1 A	1 A
Power loss			
Power loss, typ.	2.5 W	2.5 W	3 W
Address area			
Occupied address area			
• Inputs	1 byte	1 byte	2 byte
Digital inputs			
Number of digital inputs	8	8	16
Input characteristic curve in accordance with IEC 61131, type 1	Yes	No	Yes
Input characteristic curve in accordance with IEC 61131, type 2	No	Yes	
Number of simultaneously controllable inputs			
all mounting positions			
- up to 55 °C, max.	8	8	16
Input voltage			
• Rated value (DC)	24 V	24 V	24 V
• for signal "0"	-3 to +5V	-3 to +5V	-3 to +5V
• for signal "1"	13 to 30V	+11 to +30V	+11 to +30V
Input current			
• for signal "1", typ.	7 mA	7 mA	4 mA
Input delay (for rated value of input voltage)			
for standard inputs			
- parameterizable	No	Yes	No
- at "0" to "1", min.	1.2 ms	0.5 ms; 0.5 ms/ 3ms/ 15 ms/ 20 ms	1.2 ms
- at "0" to "1", max.	4.8 ms	20 ms	4.8 ms
- at "1" to "0", min.	1.2 ms	0.5 ms; 0.5 ms/ 3ms/ 15 ms/ 20 ms	0.7 ms
- at "1" to "0", max.	4.8 ms	20 ms	3 ms

Technical specifications (continued)

Article number	6ES7141-4BF00-0AA0 ET 200PRO, EM 8DI 24 V DC	6ES7141-4BF00-0AB0 ET 200PRO, EM 8DI 24 V DC HF	6ES7141-4BH00-0AA0 ET 200PRO, EM 16DI DC 24 V
Cable length			
• shielded, max.	30 m	30 m	30 m
• unshielded, max.	30 m	30 m	30 m
Encoder			
Connectable encoders			
• 2-wire sensor	Yes	Yes	Yes
- permissible quiescent current (2-wire sensor), max.	1.5 mA	1.5 mA	1.5 mA
Isochronous mode			
Isochronous operation (application synchronized up to terminal)	No	No	No
Interrupts/diagnostics/status information			
Diagnostic functions	Yes	Yes; channel by channel, parameterizable	Yes
Alarms			
• Diagnostic alarm	Yes	Yes	Yes
Diagnostic messages			
• Diagnostic information readable	Yes	Yes	Yes
• Wire-break		Yes; Monitoring, I < 0.3 mA	
• Short-circuit	Yes; Sensor supply to M; module by module	Yes	Yes; Sensor supply to M; module by module
Diagnostics indication LED			
• Group error SF (red)	Yes	Yes	Yes
• Status indicator digital input (green)	Yes; Per channel	Yes; Per channel	Yes; Per channel
Parameter			
Diagnostics wire break		channel by channel	
Diagnostics short-circuit	Sensor supply to M; module by module	channel by channel	
Potential separation			
between backplane bus and all other circuit components	Yes	Yes	Yes
Potential separation digital inputs			
• between the channels	No	No	No
• between the channels and backplane bus	Yes	Yes	Yes
Isolation			
Isolation tested with	707 V DC (type test)	707 V DC (type test)	707 V DC (type test)
Dimensions			
Width	45 mm	45 mm	45 mm
Height	130 mm	130 mm	130 mm
Depth	35 mm	35 mm; without terminal module	35 mm
Weights			
Weight, approx.	140 g	140 g	140 g

Article number	6ES7142-4BD00-0AA0 ET 200PRO, EM 4DO 24V DC/2.0A	6ES7142-4BD00-0AB0 ET 200PRO, EM 4DO 24VDC/2.0A HF	6ES7142-4BF00-0AA0 ET 200PRO, EM 8DO DC24V/0.5A
Supply voltage			
Load voltage 2L+			
• Rated value (DC)	24 V	24 V	24 V
• Short-circuit protection	Yes; per channel, electronic	Yes; per channel, electronic	Yes; per channel, electronic
• Reverse polarity protection	Yes; against destruction; load increasing	Yes; against destruction; load increasing	Yes; against destruction; load increasing
Input current			
from load voltage 2L+ (without load), max.	20 mA	40 mA	30 mA
from backplane bus 3.3 V DC, max.	20 mA	30 mA	30 mA
Power loss			
Power loss, typ.	2 W	2.5 W	2 W
Address area			
Address space per module			
• with packing	4 bit	4 bit	8 bit
• without packing	1 byte	1 byte	1 byte

I/O systems

SIMATIC ET 200 systems without control cabinet

SIMATIC ET 200pro

I/O modules > Digital expansion modules**Technical specifications (continued)**

Article number	6ES7142-4BD00-0AA0 ET 200PRO, EM 4DO 24V DC/2.0A	6ES7142-4BD00-0AB0 ET 200PRO, EM 4DO 24VDC/2.0A HF	6ES7142-4BF00-0AA0 ET 200PRO, EM 8DO DC24V/0.5A
Digital outputs			
Number of digital outputs	4	4	8
Short-circuit protection	Yes	Yes	Yes
• Response threshold, typ.	2.8 A	2.8 A	0.7 A
Limitation of inductive shutdown voltage to	2L+ (-47 V)	2L+ (-47 V)	2L+ (-47 V)
Controlling a digital input	Yes	Yes	Yes; Isolation between 1L+ and 2L+ is no longer provided, as 1M and 2M are jumpered
Switching capacity of the outputs			
• on lamp load, max.	10 W	10 W	5 W
Load resistance range			
• lower limit	12 Ω	12 Ω	48 Ω
• upper limit	4 kΩ	4 kΩ	4 kΩ
Output voltage			
• for signal "1", min.	2L+ (-0,8 V)	2L+ (-0,8 V)	2L+ (-0,8 V)
Output current			
• for signal "1" rated value	2 A	2 A	0.5 A
• for signal "0" residual current, max.	0.5 mA	0.5 mA	0.5 mA
Parallel switching of two outputs			
• for uprating	No	No	No
• for redundant control of a load	Yes	Yes	Yes
Switching frequency			
• with resistive load, max.	100 Hz	100 Hz	100 Hz
• with inductive load, max.	0.5 Hz	0.5 Hz	0.5 Hz
• on lamp load, max.	1 Hz	1 Hz	1 Hz
Total current of the outputs (per group)			
all mounting positions			
- up to 55 °C, max.	4 A	4 A	4 A
Cable length			
• shielded, max.	30 m	30 m	30 m
• unshielded, max.	30 m	30 m	30 m
Interrupts/diagnostics/status information			
Diagnostic functions	Yes	Yes	Yes
Substitute values connectable		Yes	
Alarms			
• Diagnostic alarm	Yes	Yes	Yes
Diagnostic messages			
• Diagnostic information readable	Yes	Yes	Yes
• Wire-break		Yes	
• Short-circuit	Yes; Short-circuit of outputs to ground; module by module	Yes	Yes; Short-circuit of outputs to ground; module by module
Diagnostics indication LED			
• Group error SF (red)	Yes	Yes	Yes
• Status indicator digital output (green)	Yes	Yes	Yes
• Channel fault indicator F (red)		Yes	

Technical specifications (continued)

Article number	6ES7142-4BD00-0AA0 ET 200PRO, EM 4DO 24V DC/2.0A	6ES7142-4BD00-0AB0 ET 200PRO, EM 4DO 24VDC/2.0A HF	6ES7142-4BF00-0AA0 ET 200PRO, EM 8DO DC24V/0.5A
Parameter			
Diagnostics wire break		channel by channel	
Diagnostics short-circuit		channel by channel	
Potential separation			
between backplane bus and all other circuit components	Yes	Yes	Yes
Potential separation digital outputs			
• between the channels	No	No	No
• between the channels and backplane bus	Yes	Yes	Yes
Isolation			
Isolation tested with	707 V DC (type test)	707 V DC (type test)	707 V DC (type test)
Dimensions			
Width	45 mm	45 mm	45 mm
Height	130 mm	130 mm	130 mm
Depth	35 mm	35 mm; without terminal module	35 mm
Weights			
Weight, approx.	140 g	140 g	140 g

Article number	6ES7143-4BF50-0AA0 ET 200PRO, EM 4DI / 4DO DC 24V, 0.5A	6ES7143-4BF00-0AA0 ET 200PRO, EM 4 DIO / 4 DO DC 24V, 0.5A
Supply voltage		
Rated value (DC)		24 V
Reverse polarity protection		Yes; Against destruction; encoder power supply outputs applied with reversed polarity
Load voltage 2L+		
• Rated value (DC)	24 V	24 V
• Short-circuit protection	Yes	Yes
• Reverse polarity protection	Yes	Yes; against destruction; load increasing
Input current		
from supply voltage 1L+, max.		20 mA
from load voltage 2L+ (without load), max.	20 mA	20 mA
from backplane bus 3.3 V DC, max.	20 mA	30 mA
Encoder supply		
Number of outputs	4	4
Short-circuit protection	Yes; per module, electronic	Yes; per module, electronic
Output current		
• up to 55 °C, max.	1 A	1 A
Power loss		
Power loss, typ.	2 W	3 W
Digital inputs		
Number of digital inputs	4	4; 4 DI0s can be parameterized
Input characteristic curve in accordance with IEC 61131, type 3	Yes	Yes
Number of simultaneously controllable inputs		
all mounting positions		
- up to 55 °C, max.		4
Input voltage		
• Rated value (DC)	24 V	24 V
• for signal *0*	-3 to +5V	-3 to +5V
• for signal *1*	+11 to +30V	+11 to +30V
Input current		
• for signal *1*, typ.	7 mA	7 mA

I/O systems

SIMATIC ET 200 systems without control cabinet

SIMATIC ET 200pro

I/O modules > Digital expansion modules**Technical specifications (continued)**

Article number	6ES7143-4BF50-0AA0 ET 200PRO, EM 4DI / 4DO DC 24V, 0.5A	6ES7143-4BF00-0AA0 ET 200PRO, EM 4 DIO / 4 DO DC 24V, 0.5A
Input delay (for rated value of input voltage)		
for standard inputs		
- at "0" to "1", min.		1.2 ms
- at "0" to "1", max.	3 ms	4.8 ms
- at "1" to "0", min.		1.2 ms
- at "1" to "0", max.	3 ms	4.8 ms
Cable length		
• shielded, max.	30 m	30 m
• unshielded, max.	30 m	30 m
Digital outputs		
Number of digital outputs	4	8; 4 DO fixed, 4 DIO parameterizable
• in groups of		4; 2 load groups for 4 outputs each
Short-circuit protection	Yes; per channel, electronic	Yes; per channel, electronic
• Response threshold, typ.	0.7 A	0.7 A
Limitation of inductive shutdown voltage to	Typ. (2L+) -47 V	Typ. (L1+, L2+) -47 V
Controlling a digital input	Yes	Yes
Switching capacity of the outputs		
• on lamp load, max.	5 W	5 W
Load resistance range		
• lower limit	48 Ω	48 Ω
• upper limit	4 kΩ	4 kΩ
Output voltage		
• for signal "1", min.		2L+ (-0.8 V)
Output current		
• for signal "1" rated value	0.5 A	0.5 A
• for signal "0" residual current, max.	0.5 mA	0.5 mA
Parallel switching of two outputs		
• for uprating	No	No
• for redundant control of a load	Yes	Yes
Switching frequency		
• with resistive load, max.	100 Hz	100 Hz
• with inductive load, max.	0.5 Hz	0.5 Hz
• on lamp load, max.	1 Hz	1 Hz
Total current of the outputs (per group)		
all mounting positions		
- up to 55 °C, max.	2 A	2 A
Cable length		
• shielded, max.	30 m	30 m
• unshielded, max.	30 m	30 m
Encoder		
Connectable encoders		
• 2-wire sensor	Yes	Yes
- permissible quiescent current (2-wire sensor), max.	1.5 mA	1.5 mA
Interrupts/diagnostics/ status information		
Diagnostic functions	Yes	Yes
Alarms		
• Diagnostic alarm	Yes	Yes

Technical specifications (continued)

Article number	6ES7143-4BF50-0AA0 ET 200PRO, EM 4DI / 4DO DC 24V, 0.5A	6ES7143-4BF00-0AA0 ET 200PRO, EM 4 DIO / 4 DO DC 24V, 0.5A
Diagnostic messages		
• Diagnostic information readable	Yes	Yes
• Short-circuit	Yes; Short-circuit of outputs to ground; module by module	Yes; Short-circuit of outputs to ground; module by module
Diagnostics indication LED		
• Group error SF (red)		Yes
• Status indicator digital input (green)	Yes	Yes
• Status indicator digital output (green)	Yes	Yes
Potential separation		
between backplane bus and all other circuit components	Yes	Yes
Potential separation digital inputs		
• between the channels	No	No
• between the channels and backplane bus	Yes	Yes
Potential separation digital outputs		
• between the channels	No	
• between the channels and backplane bus	Yes	Yes
Isolation		
Isolation tested with	707 V DC (type test)	707 V DC (type test)
Dimensions		
Width	45 mm	45 mm
Height	130 mm	130 mm
Depth	35 mm	35 mm
Weights		
Weight, approx.	140 g	140 g

I/O systems

SIMATIC ET 200 systems without control cabinet

SIMATIC ET 200pro

I/O modules > Digital expansion modules

Ordering data	Article No.		Article No.
8 DI digital input module 24 V DC, with module-specific diagnostics, including bus module. Connection module must be ordered separately	6ES7141-4BF00-0AA0	CM IO 8 x M12 connection module 8 M12 sockets for connecting digital sensors or actuators to ET 200pro	6ES7194-4CB00-0AA0
8 DI High Feature digital input module 24 V DC, with channel-specific diagnostics, including bus module. Connection module must be ordered separately	6ES7141-4BF00-0AB0	CM IO 8 x M12 P connection module 8 M12 sockets for connecting digital sensors or actuators to ET 200pro; plastic version	6ES7194-4CB10-0AA0
16 DI digital input module 24 V DC, with module-specific diagnostics, including bus module. Connection module 6ES7194-4CB50-0AA0 must be ordered separately	6ES7141-4BH00-0AA0	CM IO 8 x M12D connection module 8 M12 sockets for connecting digital sensors or actuators to ET 200pro	6ES7194-4CB50-0AA0
4 DO digital output module 24 V DC, 2 A, with module-specific diagnostics, including bus module. Connection module must be ordered separately	6ES7142-4BD00-0AA0	CM IO 8 x M8 connection module 8 sockets M8 for connection of digital sensors or actuators to ET 200pro	6ES7194-4EB00-0AA0
4 DO High Feature digital output module 24 V DC, 2 A, with channel-specific diagnostics, including bus module. Connection module must be ordered separately	6ES7142-4BD00-0AB0	CM IO 2 x M12 connection module 2 M12 8-pin sockets; for use with: EM 8 DI, 24 V DC and 8 DO, 24 V DC/0.5 A	6ES7194-4FB00-0AA0
8 DO digital output module 24 V DC, 0.5 A, with module-specific diagnostics, including bus module. Connection module must be ordered separately	6ES7142-4BF00-0AA0	CM IO 1 x M23 connection module 1 M23 socket; for use with: EM 8 DI, 24 V DC and 8 DO, 24 V DC/0.5 A	6ES7194-4FA00-0AA0
4 DI/4 DO digital input and output module 24 V DC, 0.5 A, with module-specific diagnostics, including bus module. Connection module must be ordered separately	6ES7143-4BF50-0AA0	Module identification labels For color coding of the CM IOs in the colors of white, red, blue and green; pack with 100 units each	6ES7194-4HA00-0AA0
Digital input and output module 4 DIO / 4 DO 24 V DC, 0.5 A, with module-specific diagnostics, including bus module. Connection module must be ordered separately	6ES7143-4BF00-0AA0	M12 sealing cap For protection of unused M12 connections with ET 200pro	3RX9802-0AA00
Accessories		Labels 20 x 7, pale turquoise, 340 items per pack	3RT1900-1SB20
CM IO 4 x M12 connection module 4 M12 sockets for connecting digital or analog sensors or actuators to ET 200pro	6ES7194-4CA00-0AA0	M12 Y circular connector For double connection of sensors via a single cable, 5-pole; cannot be used for F DI 4/8	6ES7194-1KA01-0XA0
CM IO 4 x M12 inverse connection module 4 M12 sockets for connection of digital actuators to ET 200pro (4 DO and 4 DO HF); 2 x M12 single assignment, 2 x M12 double assignment	6ES7194-4CA50-0AA0	M12 Y cable For double connection of I/O by means of a single cable on ET 200, 5-pole	6ES7194-6KA00-0XA0
CM IO 4 x M12 P connection module 4 M12 sockets for connecting digital sensors or actuators to ET 200pro; plastic version	6ES7194-4CA10-0AA0	M8 sealing cap For IP67 modules	3RK1901-1PN00

Overview



- Expansion modules with analog inputs and outputs for connecting sensors or actuators
- With diagnostics functionality, limit values and substitute values

Technical specifications

Article number	6ES7144-4FF01-0AB0 ET 200PRO, EM 4AI-U HF	6ES7144-4GF01-0AB0 ET 200PRO, EM 4AI-I HF	6ES7144-4JF00-0AB0 ET 200PRO, EM 4 AI-RTD HF	6ES7144-4PF00-0AB0 ET 200PRO, EM 4 AI-TC HF
Supply voltage				
Rated value (DC)	24 V	24 V	24 V	24 V
Reverse polarity protection	Yes; against destruction	Yes; against destruction	Yes; against destruction	Yes; against destruction
Input current				
from supply voltage 1L+, max.	40 mA; Typical	40 mA; Typical	27 mA; Typical	34 mA; Typical
from backplane bus 3.3 V DC, max.	12 mA; Typical	12 mA; Typical	10 mA; Typical	20 mA; Typical
Encoder supply				
Number of outputs	4	4		
Short-circuit protection	Yes; per module, electronic to frame	Yes; per module, electronic to frame		
Output current				
• up to 55 °C, max.	1 A	1 A		
Power loss				
Power loss, typ.	1.1 W	1.1 W	0.7 W	0.7 W
Address area				
Address space per module				
• Address space per module, max.	8 byte	8 byte	8 byte	8 byte
Analog inputs				
Number of analog inputs	4	4	4	4
permissible input voltage for voltage input (destruction limit), max.	35 V			20 V
permissible input current for current input (destruction limit), max.		40 mA		
Constant measurement current for resistance-type transmitter, typ.			1.25 mA; 1.25 / 0.5 mA depending on measuring range	
Cycle time (all channels) max.	5 ms	10 ms	83 ms; 83 ms at 50 Hz; 69 ms at 60 Hz	Number of active channels per module x basic conversion time
Technical unit for temperature measurement adjustable			Yes; Degrees Celsius/degrees Fahrenheit	Yes; °C/°F/K
Input ranges				
• Voltage	Yes	No	No	Yes
• Current	No	Yes	No	No
• Thermocouple	No	No	No	Yes
• Resistance thermometer	No	No	Yes	No
• Resistance	No	No	Yes	No

I/O systems

SIMATIC ET 200 systems without control cabinet

SIMATIC ET 200pro

I/O modules > Analog expansion modules

Technical specifications (continued)

Article number	6ES7144-4FF01-0AB0 ET 200PRO, EM 4AI-U HF	6ES7144-4GF01-0AB0 ET 200PRO, EM 4AI-I HF	6ES7144-4JF00-0AB0 ET 200PRO, EM 4 AI-RTD HF	6ES7144-4PF00-0AB0 ET 200PRO, EM 4 AI-TC HF
Input ranges (rated values), voltages • 0 to +10 V • 1 V to 5 V • -10 V to +10 V • -5 V to +5 V • -80 mV to +80 mV • Input resistance (-80 mV to +80 mV)	Yes Yes Yes Yes			Yes 10 MΩ
Input ranges (rated values), currents • 0 to 20 mA • Input resistance (0 to 20 mA) • -20 mA to +20 mA • Input resistance (-20 mA to +20 mA) • 4 mA to 20 mA • Input resistance (4 mA to 20 mA)		Yes 50 Ω Yes 50 Ω Yes 50 Ω		
Input ranges (rated values), thermocouples • Type B • Input resistance (Type B) • Type E • Input resistance (Type E) • Type J • Input resistance (type J) • Type K • Input resistance (Type K) • Type L • Input resistance (Type L) • Type N • Input resistance (Type N) • Type R • Input resistance (Type R) • Type S • Input resistance (Type S) • Type T • Input resistance (Type T)				Yes 10 MΩ Yes 10 MΩ Yes 10 MΩ Yes 10 MΩ Yes 10 MΩ Yes 10 MΩ Yes 10 MΩ Yes 10 MΩ Yes 10 MΩ
Input ranges (rated values), resistance thermometer • Cu 10 • Ni 100 • Input resistance (Ni 100) • Ni 1000 • Input resistance (Ni 1000) • Ni 120 • Input resistance (Ni 120) • Ni 200 • Input resistance (Ni 200) • Ni 500 • Input resistance (Ni 500) • Pt 100 • Input resistance (Pt 100) • Pt 1000 • Input resistance (Pt 1000) • Pt 200 • Input resistance (Pt 200) • Pt 500 • Input resistance (Pt 500)			No Yes 10 000 kΩ Yes 10 000 kΩ Yes 10 000 kΩ Yes 10 000 kΩ Yes 10 000 kΩ Yes 10 000 kΩ Yes 10 000 kΩ Yes 10 000 kΩ Yes 10 000 kΩ	

Technical specifications (continued)

Article number	6ES7144-4FF01-0AB0 ET 200PRO, EM 4AI-U HF	6ES7144-4GF01-0AB0 ET 200PRO, EM 4AI-I HF	6ES7144-4JF00-0AB0 ET 200PRO, EM 4 AI-RTD HF	6ES7144-4PF00-0AB0 ET 200PRO, EM 4 AI-TC HF
Input ranges (rated values), resistors 0 to 150 ohms - Input resistance (0 to 150 ohms) 0 to 300 ohms - Input resistance (0 to 300 ohms) 0 to 600 ohms - Input resistance (0 to 600 ohms) 0 to 3000 ohms - Input resistance (0 to 3000 ohms)			Yes 10 000 kΩ Yes 10 000 kΩ Yes 10 000 kΩ Yes 10 000 kΩ	
Thermocouple (TC) Temperature compensation - internal temperature compensation - external temperature compensation with compensations socket				Yes Yes
Characteristic linearization - parameterizable - for resistance thermometer			Yes Ptxxx, Nixxx	
Cable length shielded, max.	30 m	30 m	30 m	30 m
Analog value generation for the inputs Measurement principle	integrating	integrating	integrating	integrating
Integration and conversion time/ resolution per channel - Resolution with overrange (bit including sign), max. - Integration time (ms) - Interference voltage suppression for interference frequency f1 in Hz - Conversion time (per channel)	15 bit; 15 bits + sign at ±10 V, at ±5 V; 15 bits at 0 V to 10 V, at 1 V to 5 V 0,3 / 16,7 / 20 / 60 16,67 / 50 / 60 / 3 600 1.1 ms	15 bit; 15 bits + sign at ±10 V, at ±5 V; 15 bits at 0 V to 10 V, at 1 V to 5 V 0,3 / 16,7 / 20 / 60 16,67 / 50 / 60 / 3 600 1.1 ms	15 bit; at 150, 300, 600 und 3000 ohms; otherwise 15 bits + sign 20 / 16,667 50 / 60 Hz 20.625 ms; 20.625 ms at 50 Hz; 17.25 ms at 60 Hz	15 bit; + sign 2,5 / 16,67 / 20 / 100 ms 10 / 50 / 60 / 400 Hz 4.7/19/22/102 ms
Smoothing of measured values - parameterizable - Step: None - Step: low - Step: Medium - Step: High	Yes Yes; 1 x cycle time Yes; 4 x cycle time Yes; 16 x cycle time Yes; 64 x cycle time	Yes Yes; 1 x cycle time Yes; 4 x cycle time Yes; 16 x cycle time Yes; 64 x cycle time	Yes Yes; 1 x cycle time Yes; 4 x cycle time Yes; 16 x cycle time Yes; 64 x cycle time	Yes Yes; 1 x cycle time Yes; 4 x cycle time Yes; 16 x cycle time Yes; 64 x cycle time
Encoder Connection of signal encoders - for voltage measurement - for current measurement as 2-wire transducer - for current measurement as 4-wire transducer - for resistance measurement with two-wire connection - for resistance measurement with three-wire connection - for resistance measurement with four-wire connection	Yes	Yes Yes	Yes; Line resistances are also measured Yes Yes	Yes

I/O systems

SIMATIC ET 200 systems without control cabinet

SIMATIC ET 200pro

I/O modules > Analog expansion modules

Technical specifications (continued)

Article number	6ES7144-4FF01-0AB0 ET 200PRO, EM 4AI-U HF	6ES7144-4GF01-0AB0 ET 200PRO, EM 4AI-I HF	6ES7144-4JF00-0AB0 ET 200PRO, EM 4 AI-RTD HF	6ES7144-4PF00-0AB0 ET 200PRO, EM 4 AI-TC HF
Errors/accuracies				
Linearity error (relative to input range), (+/-)	0.0075 %	0.0075 %	0.05 %	0.01 %
Temperature error (relative to input range), (+/-)	0.00075 %/K	0.00075 %/K	0.002 %/K	0.0004 %/K; Positive temperature
Crosstalk between the inputs, min.	-70 dB	-70 dB	-50 dB	-90 dB; max.
Repeat accuracy in steady state at 25 °C (relative to input range), (+/-)	0.004 %	0.004 %	0.015 %	0.01 %
Operational error limit in overall temperature range				
• Voltage, relative to input range, (+/-)	0.1 %			0.12 %; Positive temperature
• Current, relative to input range, (+/-)		0.1 %		
• Resistance thermometer, relative to input range, (+/-)			0.175 %	
Basic error limit (operational limit at 25 °C)				
• Voltage, relative to input range, (+/-)	0.075 %			0.1 %
• Current, relative to input range, (+/-)		0.075 %		
• Resistance thermometer, relative to input range, (+/-)			0.125 %	
Interference voltage suppression for $f = n \times (f_1 \pm 1 \%)$, f_1 = interference frequency				
• Series mode interference (peak value of interference < rated value of input range), min.			50 dB	42 dB
• Common mode interference (USS < 2.5 V), min.			70 dB; Interference voltage < 5 V	85 dB; Interference voltage < 10 V
Interference voltage suppression for $f = n \times (f_1 \pm 0.5 \%)$, f_1 = interference frequency				
• Series mode interference (peak value of interference < rated value of input range), min.	60 dB	60 dB		
• Common mode interference (USS < 2.5 V), min.	80 dB; Interference voltage < 10 V	80 dB; Interference voltage < 5 V		
Interrupts/diagnostics/status information				
Diagnostic functions	Yes	Yes	Yes	Yes
Alarms				
• Diagnostic alarm	Yes; Parameterizable	Yes; Parameterizable	Yes; Parameterizable	Yes; Parameterizable
• Hardware interrupt	Yes; (limit value alarm), can be parameterized for channel 0	Yes; (limit value alarm), can be parameterized for channel 0	No	No
Diagnostic messages				
• Diagnostic information readable	Yes	Yes	Yes	Yes
• Wire-break	Yes; at 1 to 5 V	Yes; at 4 to 20 mA	Yes	Yes
• Short-circuit	Yes; at 1 to 5 V	Yes; at 4 to 20 mA		
• Overflow/underflow			Yes	Yes
Diagnostics indication LED				
• Group error SF (red)	Yes	Yes	Yes	Yes

Technical specifications (continued)

Article number	6ES7144-4FF01-0AB0 ET 200PRO, EM 4AI-U HF	6ES7144-4GF01-0AB0 ET 200PRO, EM 4AI-I HF	6ES7144-4JF00-0AB0 ET 200PRO, EM 4 AI-RTD HF	6ES7144-4PF00-0AB0 ET 200PRO, EM 4 AI-TC HF
Parameter				
Diagnostics wire break			Yes	Yes
Measurement type/range			R4L / R3L / R2L / TR4L / TR3L / TR2L	Deactivated/ +/- 80 mV/ TC-EL Type T (Cu-CuNi)/ TC-EL Type K (NiCr-Ni)/ TC-EL Type B (PtRh-PtRh)/ TC-EL Type N (NiCrSi-NiSi)/ TC-EL Type E (NiCr-CuNi)/ TC-EL Type R (PtRh-Pt)/ TC-EL Type S (PtRh-Pt)/ TC-EL Type J (Fe-Cu-Ni)/ TC-EL Type L (Fe-CuNi)
Comparison point				None/internal/RTD(0)/dyn. ref. temp./fix. ref. temp.
Potential separation				
Potential separation analog inputs				
• between the channels	No	No	No	No
• between the channels and backplane bus	Yes	Yes	Yes	Yes
Isolation				
Isolation tested with	707 V DC (type test)	707 V DC (type test)	707 V DC (type test)	707 V DC (type test)
Dimensions				
Width	45 mm	45 mm	45 mm	45 mm
Height	130 mm	130 mm	130 mm	130 mm
Depth	35 mm	35 mm	35 mm	35 mm
Weights				
Weight, approx.	150 g	150 g	150 g	150 g

Article number	6ES7145-4FF00-0AB0 ET 200PRO, EM 4AO-U HF	6ES7145-4GF00-0AB0 ET 200PRO, EM 4 AO-I HF
Supply voltage		
Rated value (DC)	24 V	24 V
Reverse polarity protection	Yes; against destruction	Yes; against destruction
Input current		
from supply voltage 1L+, max.	65 mA	110 mA
from backplane bus 3.3 V DC, max.	10 mA	10 mA
Actuator supply		
Number of outputs	4	4
Short-circuit protection	Yes; per module	Yes; per module
Output current		
• up to 55 °C, max.	1 A	1 A
Power loss		
Power loss, typ.	1.7 W	2.3 W
Address area		
Address space per module		
• Address space per module, max.	8 byte	8 byte
Analog outputs		
Number of analog outputs	4	4
Voltage output, short-circuit protection	Yes; per channel, electronic to chassis	Yes; per module, electronic to frame
Voltage output, short-circuit current, max.	50 mA	
Current output, no-load voltage, max.		16 V
Cycle time (all channels) max.	3 ms	3 ms
Output ranges, voltage		
• 0 to 10 V	Yes	
• 1 V to 5 V	Yes	
• -10 V to +10 V	Yes	

I/O systems

SIMATIC ET 200 systems without control cabinet

SIMATIC ET 200pro

I/O modules > Analog expansion modules

Technical specifications (continued)

Article number	6ES7145-4FF00-0AB0 ET 200PRO, EM 4AO-U HF	6ES7145-4GF00-0AB0 ET 200PRO, EM 4 AO-I HF
Output ranges, current		
• 0 to 20 mA		Yes
• -20 mA to +20 mA		Yes
• 4 mA to 20 mA		Yes
Connection of actuators		
• for voltage output two-wire connection	Yes	
• for voltage output four-wire connection	Yes	
• for current output two-wire connection		Yes
• for current output four-wire connection		Yes
Load impedance (in rated range of output)		
• with voltage outputs, min.	1 000 Ω	
• with voltage outputs, capacitive load, max.	1 μF	
• with current outputs, max.		600 Ω
• with current outputs, inductive load, max.		1 mH
Destruction limits against externally applied voltages and currents		
• Voltages at the outputs towards MANA	16 V; Permanent	
• Current, max.		100 mA
Cable length		
• shielded, max.	30 m	30 m
Analog value generation for the outputs		
Integration and conversion time/resolution per channel		
• Resolution with overrange (bit including sign), max.	15 bit; at -10 to +10 V; 14 bits at 1 to 5 V; 15 bits at 0 to 10 V	15 bit; at +/- 20 mA; 14 bits at 0 to 20 mA; 15 bits at 4 to 20 mA
• Conversion time (per channel)	0.7 ms	0.7 ms
Settling time		
• for resistive load	0.1 ms	0.1 ms
• for capacitive load	6 ms	
• for inductive load		1 ms
Errors/accuracies		
Output ripple (relative to output range, bandwidth 0 to 50 kHz), (+/-)	0.02 %	0.02 %
Linearity error (relative to output range), (+/-)	0.1 %	0.1 %
Temperature error (relative to output range), (+/-)	0.01 %/K	0.01 %/K
Repeat accuracy in steady state at 25 °C (relative to output range), (+/-)	0.05 %	0.05 %
Operational error limit in overall temperature range		
• Voltage, relative to output range, (+/-)	0.2 %	
• Current, relative to output range, (+/-)		0.2 %
Basic error limit (operational limit at 25 °C)		
• Voltage, relative to output range, (+/-)	0.15 %	
• Current, relative to output range, (+/-)		0.15 %

Technical specifications (continued)

Article number	6ES7145-4FF00-0AB0 ET 200PRO, EM 4AO-U HF	6ES7145-4GF00-0AB0 ET 200PRO, EM 4 AO-I HF
Interrupts/diagnostics/ status information		
Diagnostic functions		Yes
Substitute values connectable	Yes	Yes
Alarms		
• Diagnostic alarm	Yes; Parameterizable	Yes; Parameterizable
• Hardware interrupt	No	No
Diagnostic messages		
• Diagnostic information readable	Yes	Yes
• Wire-break	No	Yes; per channel, not in zero range
• Short-circuit	Yes; per channel, not in zero range	No
Diagnostics indication LED		
• Group error SF (red)	Yes	Yes
Parameter		
Diagnostics short-circuit	Outputs; sensor supply to M	Encoder supply to M
Potential separation		
Potential separation analog outputs		
• between the channels	No	No
• between the channels and backplane bus	Yes	Yes
Isolation		
Isolation tested with	707 V DC (type test)	707 V DC (type test)
Dimensions		
Width	45 mm	45 mm
Height	130 mm	130 mm
Depth	35 mm	35 mm
Weights		
Weight, approx.	150 g	150 g

Ordering data

Article No.

Article No.

4AI U analog input module

High Feature, ± 10 V; ± 5 V;
0 to 10 V; 1 to 5 V, channel-specific
diagnostics, including bus module.
Connection module must be
ordered separately

6ES7144-4FF01-0AB0**4AI I analog input module**

High Feature, ± 20 mA; 0 to 20 mA;
4 to 20 mA, channel-specific
diagnostics, including bus module.
Connection module must be
ordered separately

6ES7144-4GF01-0AB0**4AI RTD analog input module**

High Feature; resistances:
150, 300, 600 and 3000 Ohm;
resistance thermometer:
Pt100, 200, 500, 1000, Ni100,
120, 200, 500 and 1000;
channel-discrete diagnostics, incl.
bus module. Connection module
must be ordered separately

6ES7144-4JF00-0AB0**Analog input module 4AI TC**

High Feature; thermocouples:
Type B, E, J, K, L, N, R, S, T;
voltage measurement: ± 80 mV;
channel diagnostics, including bus
module. Connection module must
be ordered separately

6ES7144-4PF00-0AB0**4AO U analog output module**

High Feature, ± 10 V; 0 to 10 V;
1 to 5 V, channel-specific
diagnostics, including bus module.
Connection module must be
ordered separately

6ES7145-4FF00-0AB0**4AO I analog output module**

High Feature, ± 20 mA; 0 to 20 mA;
4 to 20 mA, channel-specific
diagnostics, including bus module.
Connection module must be
ordered separately

6ES7145-4GF00-0AB0**Accessories****CM IO 4 x M12 connection module**

4 M12 sockets for connecting
digital or analog sensors or
actuators to ET 200pro

6ES7194-4CA00-0AA0**M12 compensation connectors**

With integral Pt100 for reference
point compensation when
connecting thermocouples

6ES7194-4AB00-0AA0**Module identification labels**

For color coding of the CM IOs in
the colors of white, red, blue and
green; pack with 100 units each

6ES7194-4HA00-0AA0**M12 sealing cap**

For protection of unused
M12 connections with ET 200pro

3RX9802-0AA00

I/O systems

SIMATIC ET 200 systems without control cabinet

SIMATIC ET 200pro

I/O modules > Communication > IO-Link master modules

Overview

- 45 mm-wide 4 IO-LINK HF electronic module
- 4 IO-Link ports according to IO-Link specification V1.1
- Port Class B
- The IO-Link parameters are configured using the Port Configuration Tool (S7-PCT), version V3.4 and higher

Technical specifications

Article number	6ES7147-4JD00-0AB0 ET 200pro, EM 4 IO-Link HF
Supply voltage	
Rated value (DC)	24 V
Reverse polarity protection	Yes
Load voltage 2L+	
• Rated value (DC)	24 V
• Short-circuit protection	Yes
• Reverse polarity protection	Yes; against destruction; load increasing
Input current	
from supply voltage 1L+, max.	40 mA
from load voltage 2L+ (without load), max.	20 mA
from backplane bus 3.3 V DC, max.	20 mA
Encoder supply	
Number of outputs	4
Short-circuit protection	Yes; per module, electronic
Output current	
• up to 55 °C, max.	2 A
Power loss	
Power loss, typ.	2.6 W
IO-Link	
Number of ports	4
• of which simultaneously controllable	4
IO-Link protocol 1.0	Yes
IO-Link protocol 1.1	Yes
Transmission rate	4.8 kBaud (COM1); 38.4 kBaud (COM2); 230.4 kBaud (COM3)
Size of process data, input per port	32 byte
Size of process data, input per module	32 byte
Size of process data, output per port	32 byte
Size of process data, output per module	32 byte
Memory size for device parameter	2 kbyte; for each port
Master backup	Possible with function block IO_LINK_MASTER
Cable length unshielded, max.	20 m
Operating modes	
• IO-Link	Yes
• DI	Yes
• DQ	Yes; max. 100 mA
Connection of IO-Link devices	
• Port type A	Yes; via 3-core cable
• Port type B	Yes; Additional device supply: for X1 and X2 max. 2 A in total, for X3 and X4 max. 2 A in total

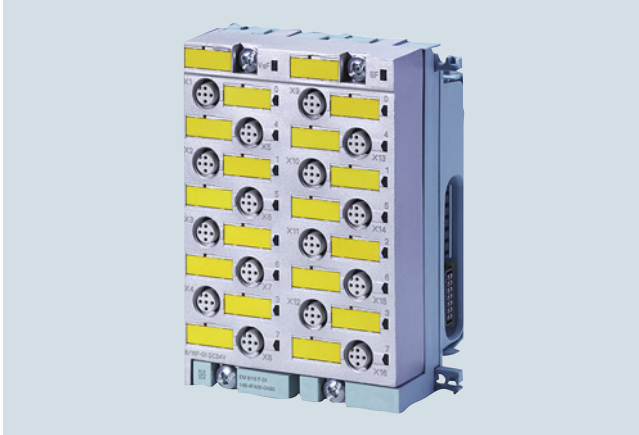
Article number	6ES7147-4JD00-0AB0 ET 200pro, EM 4 IO-Link HF
Interrupts/diagnostics/status information	
Diagnostic functions	Yes
Alarms	
• Diagnostic alarm	Yes
Diagnostic messages	
• Diagnostic information readable	Yes
• Wire-break	Yes
• Short-circuit	Yes
Diagnostics indication LED	
• Channel status display	Yes; One green LED for channel status Qn (SIO mode) and port status IO-Ln (IO-Link mode)
• Group error SF (red)	Yes
• Channel fault indicator F (red)	Yes; combined with the IO-Link port status
Parameter	
Diagnostics wire break	channel by channel
Diagnostics short-circuit	channel by channel
Potential separation	
between the load voltages	Yes
between backplane bus and all other circuit components	Yes
Potential separation channels	
• between the channels	No
Isolation	
Isolation tested with	707 V DC (type test)
Dimensions	
Width	45 mm
Height	130 mm
Depth	35 mm
Weights	
Weight, approx.	150 g

Ordering data

Article No.

4 IO-LINK HF electronic module	6ES7147-4JD00-0AB0
4 IO-Link ports according to IO-Link Specification V1.1, port Class B; High Feature, channel diagnostics, including bus module. Connection module must be ordered separately	
Accessories	
CM IO-Link 4 x M12 P connection module	6ES7194-4CA20-0AA0
4 M12 sockets for connecting IO-Link devices to ET 200pro electronic module 4 IO-LINK HF	
Module identification labels	6ES7194-4HA00-0AA0
For color coding of the CM IOs in the colors of white, red, blue and green; pack with 100 units each	
M12 sealing cap	3RX9802-0AA00
For protection of unused M12 connections with ET 200pro	

Overview



Fail-safe digital inputs/outputs with IP65/66/67 degree of protection for application on the machine level without control cabinet

Fail-safe digital inputs

- For fail-safe reading of sensor information (1 or 2 channels)
- Provide integral discrepancy evaluation for 2-out-of-2 signals
- Internal sensor supplies (incl. test function) available

Fail-safe digital outputs

- Fail-safe 2-channel activation (sink/source output) by actuators
- Actuators can be driven by up to 2 A

All modules are certified up to SIL 3 (IEC 61508) and feature detailed diagnostics.

The modules support PROFIsafe, both in PROFIBUS, and in PROFINET configurations. They can be used with IM151-7 F-CPU, CPU31xF-2 DP, CPU31xF-2 PN/DP and CPU416F-2.

Technical specifications

Article number	6ES7148-4FA00-0AB0 ET 200PRO, EL-MOD., 8/16 F-DI 24V DC
Supply voltage	
Rated value (DC)	24 V
Reverse polarity protection	Yes
Power loss	
Power loss, typ.	4.5 W
Digital inputs	
Number of digital inputs	16
Input current	
• for signal *1*, typ.	3.7 mA
Dimensions	
Width	90 mm
Height	130 mm
Depth	65 mm

Article number	6ES7148-4FC00-0AB0 ET 200PRO, EL-MOD, 4/8 F-DI/4 F-DO 24VDC/2A	6ES7148-4FS00-0AB0 ET 200PRO, EL-MOD, F-SWITCH PROFISAFE
Supply voltage		
Rated value (DC)	24 V	24 V
Power loss		
Power loss, typ.	5.8 W	3 W
Digital inputs		
Number of digital inputs	8	2
Input current		
• for signal *1*, typ.	3.7 mA	3.5 mA
Digital outputs		
Number of digital outputs	4	3
Short-circuit protection	Yes	Yes
Output current		
• for signal *1* rated value	2 A	
Dimensions		
Width	90 mm	45 mm
Height	130 mm	130 mm
Depth	65 mm	65 mm

I/O systems

SIMATIC ET 200 systems without control cabinet

SIMATIC ET 200pro

I/O modules > Fail-safe expansion modules > Fail-safe digital expansion modules

Ordering data	Article No.		Article No.
Fail-safe digital input module 8/16 F-DI PROFIsafe 24 V DC, including bus module. Connection module must be ordered separately	6ES7148-4FA00-0AB0	Accessories	
Fail-safe digital input/output module 4/8 F-DI, 4 F-DO 2 A 24 V DC, including bus module. Connection module must be ordered separately	6ES7148-4FC00-0AB0	Connection module For the fail-safe electronic module F-Switch PROFIsafe	6ES7194-4DA00-0AA0
Fail-safe electronic module F-Switch PROFIsafe Three fail-safe PP-switching outputs for safe switching of the rear panel busbar (2L+, F0, F1); two fail-safe digital inputs, 45 mm; usable up to SIL3 (IEC 61508)	6ES7148-4FS00-0AB0	Connection module For the fail-safe electronic module 4/8 F-DI/4 F-DO, 24 V DC/2 A	6ES7194-4DC00-0AA0
		Connection module For the fail-safe electronic module 8/16 F-DI, 24 V DC	6ES7194-4DD00-0AA0
		PROFIBUS DP interface module IM154-2 Including termination module	6ES7154-2AA01-0AB0
		PROFINET interface module IM154-4 PN Including termination module	6ES7154-4AB10-0AB0
		M12 sealing cap For protection of unused M12 connections with ET 200pro	3RX9802-0AA00

Overview



- PM-E 24 V DC power module

Technical specifications

Article number	6ES7148-4CA00-0AA0 ET 200PRO, PM-E 24V DC
Supply voltage	
Load voltage 2L+	
• Rated value (DC)	24 V
• Short-circuit protection	Yes; via an exchangeable fuse in the power module
• Reverse polarity protection	Yes; against destruction
Input current	
from load voltage 2L+, max.	3 mA
Current carrying capacity	
max.	10 A; up to 55 °C (on the internal busbars of the ET 200pro)
Power loss	
Power loss, typ.	0.1 W
Interrupts/diagnostics/status information	
Diagnostic functions	Yes
Diagnostic messages	
• Diagnostic information readable	Yes
• missing load voltage	Yes
Diagnostics indication LED	
• Group error SF (red)	Yes
• Load voltage monitoring 24 V DC (green)	Yes

Article number	6ES7148-4CA00-0AA0 ET 200PRO, PM-E 24V DC
Parameter	
Missing load voltage	Potential group of the power module
Potential separation	
between load voltage and backplane bus	Yes
Isolation	
Isolation tested with	707 V DC (type test)
Degree and class of protection	
Degree of protection acc. to EN 60529	
• IP65	Yes
• IP66	Yes
• IP67	Yes
Dimensions	
Width	45 mm
Height	130 mm
Depth	35 mm
Weights	
Weight, approx.	140 g

I/O systems

SIMATIC ET 200 systems without control cabinet

SIMATIC ET 200pro

I/O modules > PM-E power module

Ordering data	Article No.	Article No.
PM-E 24 V DC power module For backfeed and group formation of the 24 V DC load supply for electronic modules within an ET 200pro station	6ES7148-4CA00-0AA0	
Accessories		
CM PM-E ECOFAST connecting module For supplying of 24 V load voltage, 1 ECOFAST Cu connection	6ES7194-4BA00-0AA0	
CM PM-E direct connecting module For backfeed of 24 V load voltage, up to 2 M20 screwed cable glands	6ES7194-4BC00-0AA0	
CM PM-E 7/8" connecting module For backfeed of 24 V load voltage, 1 x 7/8"	6ES7194-4BD00-0AA0	
CM PM-E PP connection module For supplying 24 V load voltage, 2 x push-pull, with spare fuse	6ES7194-4BE00-0AA0	
Spare fuse 12.5 A quick-response, for interface and power modules, 10 items per package unit	6ES7194-4HB00-0AA0	
PROFIBUS ECOFAST hybrid cable, copper Trailing-type cable (PUR casing) with two shielded copper cables for PROFIBUS DP and four copper cores of 1.5 mm ² in cross-section <u>Unassembled</u> • 50 m • 100 m <u>Pre-assembled with ECOFAST male and female connector, fixed length</u> • 1.5 m • 3 m • 5 m • 10 m • 15 m • 20 m	6XV1830-7AN50 6XV1830-7AT10 6XV1830-7BH15 6XV1830-7BH30 6XV1830-7BH50 6XV1830-7BN10 6XV1830-7BN15 6XV1830-7BN20	PROFIBUS ECOFAST hybrid cable, GP Trailing-type cable with 4 x copper cores and 2 x copper cores, shielded, with UL approval Pre-assembled with ECOFAST male and female connector • 1.5 m • 3 m • 5 m • 10 m • 15 m • 20 m 6XV1860-3PH15 6XV1860-3PH30 6XV1860-3PH50 6XV1860-3PN10 6XV1860-3PN15 6XV1860-3PN20
		ECOFAST cable connector, for user assembly Female connector; ordering unit 5 items 6GK1905-0CB00
		PROFIBUS ECOFAST hybrid plug, angled With 2 x shielded copper cores and 4 x 1.5 mm ² copper cores; 5 items; with assembly instructions; female insert 6GK1905-0CD00
		Push-pull cable connector For 1L+/ 2L+, unassembled 6GK1907-0AB10-6AA0
		Cover caps for push-pull female connectors 5 units 6ES7194-4JA50-0AA0
		Accessories for CM PM-E direct
		Power line 5-core, 5 x 1.5 mm ² , trailing type, sold by the meter, minimum order quantity 20 m, maximum order quantity 1,000 m 6XV1830-8AH10
		Accessories for CM PM-E 7/8"
		7/8" connecting cable to power supply 5-core, 5 x 1.5 mm ² , trailing type, pre-assembled with two 7/8" connectors, 5-pin • 1.5 m long • 2.0 m long • 3.0 m long • 5.0 m long • 10 m long • 15 m long 6XV1822-5BH15 6XV1822-5BH20 6XV1822-5BH30 6XV1822-5BH50 6XV1822-5BN10 6XV1822-5BN15
		7/8" cable connector With axial cable outlet • with female insert, 5 per pack 6GK1905-0FB00

Overview



PM-O 2 x 24 V DC power module with CM PM-O PP

- PM-O 2x 24 V DC power module

Technical specifications

Article number	6ES7148-4CA60-0AA0 ET 200PRO, PM-O DC 2X24V
Supply voltage	
Load voltage 2L+	
• Rated value (DC)	24 V
• Short-circuit protection	Yes
• Reverse polarity protection	Yes; against destruction
Input current	
from load voltage 2L+, max.	3 mA
Current carrying capacity	
max.	10 A; up to 55 °C (on the internal busbars of the ET 200pro)
Power loss	
Power loss, typ.	1.1 W
Interrupts/diagnostics/status information	
Diagnostic functions	Yes
Diagnostic messages	
• Diagnostic information readable	Yes
• missing load voltage	No
Diagnostics indication LED	
• Group error SF (red)	Yes
• Load voltage monitoring 24 V DC (green)	No; Signalled in IM or in PM

Article number	6ES7148-4CA60-0AA0 ET 200PRO, PM-O DC 2X24V
Parameter	
Diagnostics short-circuit	Diagnosis short circuit implemented after M for 1L+
Potential separation	
between load voltage and backplane bus	Yes
Isolation	
Isolation tested with	707 V DC (type test)
Degree and class of protection	
Degree of protection acc. to EN 60529	
• IP65	Yes
• IP66	Yes
• IP67	Yes
Dimensions	
Width	45 mm
Height	130 mm
Depth	35 mm
Weights	
Weight, approx.	150 g

Ordering data

PM-O 2 x 24 V DC power module	6ES7148-4CA60-0AA0
For drawing the 24 V load voltage 2L+ and electronic/encoder supply voltage 1L+ within an ET 200pro station	
Accessories	
CM PM-O PP connection module	6ES7194-4BH00-0AA0
For drawing the 24 V load voltage and electronic/encoder supply voltage, 2 x push-pull connector	

Article No.

Push-pull cable connector	6GK1907-0AB10-6AA0
For 1L+/ 2L+, unassembled	
Cover caps for push-pull female connectors	6ES7194-4JA50-0AA0
5 units	

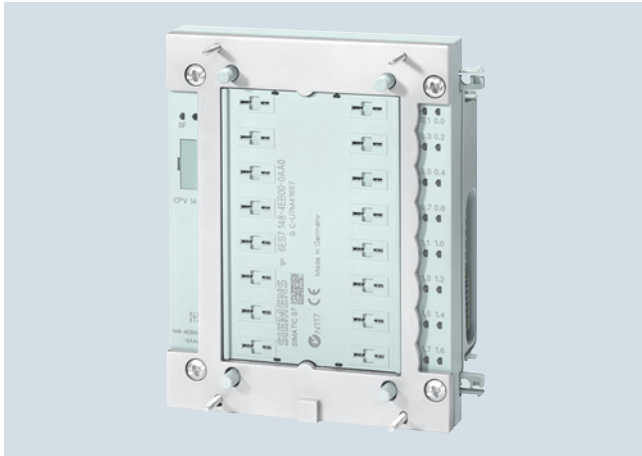
I/O systems

SIMATIC ET 200 systems without control cabinet

SIMATIC ET 200pro

I/O modules > ET 200pro pneumatic interface

Overview



- Interface for holding an original FESTO CPV 10 or CPV 14 compact performance valve terminal
- For using the ET 200pro in applications with flexible pneumatics
- Highly flexible pneumatics due to a variety of valve functions and choice of flow rates

Technical specifications

Article number	6ES7148-4EA00-0AA0 ET 200PRO, 16DO,PNEUMATIC INTERFACE CPV10	6ES7148-4EB00-0AA0 ET 200PRO, 16DO,PNEUMATIC INTERFACE CPV14
Supply voltage		
Load voltage 2L+		
• Rated value (DC)	24 V	24 V
• Short-circuit protection	Yes	Yes
• Reverse polarity protection	Yes	Yes
Input current		
from load voltage 2L+, max.	300 mA	370 mA
from backplane bus 3.3 V DC, max.	25 mA	25 mA
Power loss		
Power loss, typ.	2.6 W	3.7 W
Address area		
Address space per module		
• without packing	2 byte	2 byte
Digital outputs		
Number of digital outputs	16	16
Load resistance range		
• lower limit	500 Ω	500 Ω
• upper limit	2 500 Ω	2 500 Ω
Output current		
• for signal "1" rated value	12 mA	16 mA
Switching frequency		
• with inductive load, max.	25 Hz	20 Hz
Total current of the outputs (per group)		
all mounting positions		
- up to 55 °C, max.	250 mA; only up to 50 °C, limited by valves	330 mA; only up to 50 °C, limited by valves
Interrupts/diagnostics/status information		
Diagnostic functions	Yes	Yes
Alarms		
• Diagnostic alarm	Yes	Yes
Diagnostic messages		
• Diagnostic information readable	Yes	Yes
Diagnostics indication LED		
• Group error SF (red)	Yes	Yes
• Status indicator digital output (green)	Yes	Yes

Technical specifications (continued)

Article number	6ES7148-4EA00-0AA0 ET 200PRO, 16DO,PNEUMATIC INTERFACE CPV10	6ES7148-4EB00-0AA0 ET 200PRO, 16DO,PNEUMATIC INTERFACE CPV14
Pneumatics		
permissible working pressure, min.	3 bar	3 bar
permissible working pressure, max.	8 bar	8 bar
Rated flow rate	400 l/min	800 l/min
Number of connectable valves, max.	16	16
Parameter		
Remark	Diagnosis load voltage 2L+	Diagnosis load voltage 2L+
Response to CPU/master STOP	No	
Potential separation		
between backplane bus and all other circuit components	Yes	Yes
Potential separation digital outputs		
• between the channels and backplane bus	Yes	Yes
Isolation		
Isolation tested with	707 V DC (type test)	707 V DC (type test)
Dimensions		
Width	90 mm	120 mm
Height	130 mm	152 mm
Depth	47 mm	47 mm

Ordering data**EM 148-P pneumatic interface**

DO 16 x P/CPV 10 for direct accommodation of FESTO valve terminal CPV 10 16 DO x P

DO 16 x P/CPV 14 for direct accommodation of FESTO valve terminal CPV 14 16 DO x P

Article No.**6ES7148-4EA00-0AA0****6ES7148-4EB00-0AA0****Article No.**

FESTO CPV 10 valve terminal

FESTO CPV 14 valve terminal

available from FESTO

available from FESTO

FESTO AG & Co
Ruiterstr. 82
D-73732 Esslingen

More addresses
on the Internet at:
<http://www.festo.de>

I/O systems

SIMATIC ET 200 systems without control cabinet

SIMATIC ET 200pro

I/O modules > RF170C

Overview



The SIMATIC RF170C is a communication module for connecting the SIMATIC identification systems to the ET 200pro distributed I/O system. The readers (SLGs) of all RFID systems as well as the MV400 optical reader devices and MV300 optical handheld readers can be operated on the RF170C. In addition, the RF170C provides a universal RS 232/RS 422 interface for connecting devices using the Freeprotocol.

Thanks to the high degree of protection and ruggedness, ET 200pro is particularly suitable for machine-level use. The modular structure with PROFIBUS and PROFINET connection systems allows it to be used in all applications. The uniform plug-in connection system ensures rapid commissioning.

Technical specifications

Article number	6GT2002-0HD01
Product type designation	RF170C communication module
Suitability for operation	Dezentrale Peripherie ET 200pro together with RF200/300/600, MV300/400, MOBY D/E/I/U and RS232 devices
Transmission rate	
Transfer rate at the point-to-point connection serial maximum	115.2 kbit/s
Interfaces	
Design of the interface for point-to-point connection	RS422/RS232 via connection block
Number of readers connectable	2
Type of electrical connection	
• of the backplane bus	ET 200pro backplane bus
• of the PROFIBUS interface	(according to the head module)
• of Industrial Ethernet interface	(according to the head module)
• for supply voltage	ET 200pro backplane bus
Design of the interface to the reader for communication	Internal plug to the connection block
Mechanical data	
Material	Thermoplastic (Valox 467, fiberglass reinforced)
Color	IP Basic 714
Tightening torque of the screw for securing the equipment maximum	1.5 N·m
Supply voltage, current consumption, power loss	
Supply voltage	
• at DC Rated value	24 V
• at DC	20 ... 30 V
Consumed current at DC at 24 V	
• without connected devices typical	0.13 A
• with connected devices maximum	1 A

Article number	6GT2002-0HD01
Product type designation	RF170C communication module
Permitted ambient conditions	
Ambient temperature	
• during operation	-25 ... +55 °C
• during storage	-40 ... +70 °C
• during transport	-40 ... +70 °C
Protection class IP	IP67
Shock resistance	According to IEC 61131-2
Shock acceleration	300 m/s ²
Vibrational acceleration	100 m/s ²
Design, dimensions and weight	
Width	90 mm
Height	130 mm
Depth	35 mm
Net weight	0.27 kg
Mounting type	ET 200pro rack
Cable length for RS 422 interface maximum	1 000 m
Product properties, functions, components general	
Display version	(see connection block)
Product function transponder file handler can be addressed	No
Protocol is supported	
• S7 communication	Yes
Type of parameterization	HSP
Type of programming	FB 45, FB 55, ident profile, (FC 45/55 with limited functionality)
Type of computer-mediated communication	acyclic communication
Standards, specifications, approvals	
Certificate of suitability	CE, FCC, cULus
MTBF	77 y
Accessories	
accessories	Connection block for RF170C

Ordering data	Article No.		Article No.
SIMATIC RF170C communication module For connecting to the ET 200pro distributed I/O system	6GT2002-0HD01	MOBY D reader cable PUR material, CMG approval, suitable for cable carriers, 2 m	6GT2691-4FH20
Accessories		Reader cable for MV300 handheld readers Coiled cable with usable length of 1.6 m to 4 m for MV320, material: PUR Coiled cable with usable length of 1.6 m to 4 m for MV340, material: PUR	6GT2191-0BH50 6GT2191-0AH50
Connection block for SIMATIC RF170C For connecting 2 readers or other RS 422/RS 432 devices via an M12 connector	6GT2002-1HD01	Connector for connection of other RS 422/RS232 devices 8-pin M12 connector, male, screw contacts for wires up to 0.5 mm ² . Order quantity 1 pack with 5 units	6GT2090-0BE00
Reader cable for SIMATIC RF200 / RF300 / RF600 / MV440 Or MOBY D extension cable and SIMATIC RF200 / RF300 / RF600 / MV400, PUR material, CMG approval, suitable for cable carriers		M12 sealing caps for unused reader connections Minimum order quantity 10 units, price per 100 units	3RX9802-0AA00
2 m, straight connector	6GT2891-4FH20	DVD "RFID Systems Software & Documentation"	6GT2080-2AA20
5 m, straight connector	6GT2891-4FH50		
10 m, straight connector	6GT2891-4FN10		
20 m, straight connector	6GT2891-4FN20		
50 m, straight connector	6GT2891-4FN50		
2 m, plug angled at reader	6GT2891-4JH20		
5 m, plug angled at reader	6GT2891-4JH50		
10 m, plug angled at reader	6GT2891-4JN10		

I/O systems

SIMATIC ET 200 systems without control cabinet

SIMATIC ET 200pro

Power supplies > 3-phase, 24 V DC (ET 200pro PS, IP67)

Overview



Power supply for ET 200pro:

- 3-phase, 24 V DC/8 A

The SIMATIC ET 200pro PS power supply unit with degree of protection IP67 is used as the electronics/encoder supply and load voltage supply of the new SIMATIC ET 200pro distributed I/O system for use close to the machine without a cabinet. With a signaling contact for "24 V OK" and "Overtemperature", as well as a second plug connector for input voltage loop-through.

Technical specifications

Article number	6ES7148-4PC00-0HA0
Product	SIMATIC ET 200pro PS
Power supply, type	24 V/8 A
Input	
Input	3-phase AC
Rated voltage value $V_{in \text{ rated}}$	400 ... 480 V
Voltage range AC	340 ... 550 V
• Note	320 ... 340 V for max. 1 min
Wide-range input	Yes
Overvoltage resistance	Implemented internally with varistors
Mains buffering at $I_{out \text{ rated}}$, min.	15 ms; at $V_{in} = 400 \text{ V}$
Rated line frequency 1	50 Hz
Rated line frequency 2	60 Hz
Rated line range	45 ... 66 Hz
Input current	
• at rated input voltage 400 V	0.5 A
Switch-on current limiting (+25 °C), max.	40 A
I^2t , max.	3.5 A ² ·s
Built-in incoming fuse	T 4 A
Protection in the mains power input (IEC 898)	Required: Circuit breaker 3RV2011-1DA10 or 3RV2711-1DD10 (UL 489)
Output	
Output	Controlled, isolated DC voltage
Rated voltage $V_{out \text{ DC}}$	24 V
Total tolerance, static ±	3 %
Static mains compensation, approx.	0.5 %
Static load balancing, approx.	0.5 %
Residual ripple peak-peak, max.	200 mV
Spikes peak-peak, max. (bandwidth: 20 MHz)	250 mV
Product function Output voltage adjustable	No
Output voltage setting	-
Status display	Green LED for 24 V OK
Signaling	max. 30 V, 10 mA; Power-Good (High-Pegel 1L+ for V_{out} in range 21.3 ... 29 V); Overtemperature warning at least 30 s before switch-off (high level 1L+ when the max. internal temperature is exceeded)

Article number	6ES7148-4PC00-0HA0
Product	SIMATIC ET 200pro PS
Power supply, type	24 V/8 A
On/off behavior	Overshoot of $V_{out} < 2 \%$
Startup delay, max.	1.5 s
Voltage rise, typ.	40 ms
Rated current value $I_{out \text{ rated}}$	8 A
Current range	0 ... 8 A
Supplied active power typical	192 W
Short-term overload current	
• on short-circuiting during the start-up typical	50 A
• at short-circuit during operation typical	50 A
Duration of overloading capability for excess current	
• on short-circuiting during the start-up	100 ms
• at short-circuit during operation	100 ms
Parallel switching for enhanced performance	No
Efficiency	
Efficiency at $V_{out \text{ rated}}$, $I_{out \text{ rated}}$, approx.	88 %
Power loss at $V_{out \text{ rated}}$, $I_{out \text{ rated}}$, approx.	25 W
Closed-loop control	
Dynamic mains compensation ($V_{in \text{ rated}} \pm 15 \%$), max.	0.5 %
Dynamic load smoothing (I_{out} : 50/100/50 %), $U_{out} \pm \text{typ.}$	1 %
Setting time maximum	2 ms
Protection and monitoring	
Output overvoltage protection	< 33 V
Current limitation, typ.	9.4 A
Property of the output	Yes
Short-circuit proof	
Short-circuit protection	Electronic shutdown, automatic restart
Enduring short circuit current RMS value	
• maximum	10 A
Overload/short-circuit indicator	-

Technical specifications (continued)

Article number	6ES7148-4PC00-0HA0
Product	SIMATIC ET 200pro PS
Power supply, type	24 V/8 A
Safety	
Primary/secondary isolation	Yes
Galvanic isolation	Protective extra low output voltage Vout according to EN 60950-1 and EN 50178
Protection class	Class I
Leakage current	
• maximum	3.5 mA
• typical	0.4 mA
CE mark	Yes
UL/cUL (CSA) approval	UL-Listed (UL 508) according to NFPA compatibility (National Fire Protection Association), see operating instructions
Explosion protection	No
FM approval	-
CB approval	Yes
Marine approval	No
Degree of protection (EN 60529)	IP67, enclosure type 5 indoor
EMC	
Emitted interference	EN 55022 Class A
Supply harmonics limitation	-
Noise immunity	EN 61000-6-2
Operating data	
Ambient temperature	
• during operation	-25 ... +55 °C
- Note	with natural convection
• during transport	-40 ... +70 °C
• during storage	-40 ... +70 °C
Humidity class according to EN 60721	Climate class 3K3, no condensation

Article number	6ES7148-4PC00-0HA0
Product	SIMATIC ET 200pro PS
Power supply, type	24 V/8 A
Mechanics	
Connection technology	screw-type terminals
Connections	
• Supply input	L1, L2, L3, PE: Plug connector HAN Q4/2 (counterpart see "Electrical accessories")
• Output	L+, M: 2 x 1.5 mm ² each (4-pole cable for +/- with open, labeled ends, 4 x 1.5 mm ²)
• Auxiliary	Alarm signals: M12 plug-in connector 5-pin
Width of the enclosure	310 mm
Height of the enclosure	135 mm
Depth of the enclosure	90 mm
Weight, approx.	2.8 kg
Product feature of the enclosure housing for side-by-side mounting	No
Installation	Can be mounted onto ET200pro DIN rail
Electrical accessories	Power connector (Input: 3RK1911-2BE30 (6 mm ²)) (Output: 3RK1911-2BF10 (4 mm ²))
MTBF at 40 °C	196 354 h
Other information	Specifications at rated input voltage and ambient temperature +25 °C (unless otherwise specified)

Ordering data

Article No.

SIMATIC ET 200pro PS

Stabilized power supply in distributed I/O system design, permitting the loop-through of energy to further modules; with IP67 degree of protection; Input: 400-480 V 3 AC Output: 24 V DC/8 A

Accessories

Power connector

For connecting to the distributed I/O system

- For X1 (6 mm²)
- For X2 (4 mm²)

6ES7148-4PC00-0HA0
3RK1911-2BE30
3RK1911-2BF10

Article No.

National Fire Protection Association compatible

These devices are only approved for installation in industrial machinery according to the NFPA79 Electrical Standard for Industrial Machinery.

- for X1 SIMATIC ET 200pro PS 61 88 201 1003.xx (AWG10)*
- for X1 SITOP PSU 300P 61 88 201 1000.xx / 61 88 201 1002.xx (AWG14)*
- for X2 SIMATIC ET 200pro PS 61 88 202 1010.xx (AWG10)*
supplied blanking cap for X2
- for X3
Phoenix Contact
SAC-5P-M12-M12FS
supplied blanking cap for X3

Sealing cap

For 9-pole power sockets

- X2 (1 unit)
- X2 (10 units)

* <http://www.harting.com/startseite>

3RK1902-0CK00
3RK1902-0CK00
3RK1902-0CJ00

I/O systems

SIMATIC ET 200 systems without control cabinet
SIMATIC ET 200pro

ET 200pro motor starters > General data

Overview

ET 200pro motor starters in the ET 200pro I/O system

SIMATIC ET 200pro is the modular I/O system with high IP65/66/67 degree of protection for local, cabinet-free use. The ET 200pro motor starters with the IP65 high degree of protection are an integral part of ET 200pro.



ET 200pro motor starter: Isolator module, Standard starter and High Feature starter mounted on a wide module rack

ET 200pro motor starters

- Only two variants up to 5.5 kW
- All settings can be parameterized by bus
- Comprehensive diagnostic signals
- Support for PROFlenergy
- Overload can be acknowledged by remote reset
- Current unbalance monitoring
- Stall protection
- EMERGENCY START function on overload
- Current value transmission by bus
- Current limit monitoring
- Fully supports of acyclic services
- Direct-on-line or reversing starters
- Power bus connection can be plugged in using Han Q4/2 plug connectors
- Motor feeder with Han Q8/0 connector
- Conductor cross-section up to 6 x 4 mm²
- 25 A per segment (power looped through using jumper plug)
- In Standard and High Feature versions (with 4 DI on board)
- Electromechanical switching and electronic switching
- Electronic starter for direct activation or with integrated soft starter function
- Supplied with 400 V AC brake contact as an option
- Temperature sensor can be connected (Thermoclick or PTC type A)
- Provision of the motor current in PROFlenergy format to higher-level systems, motor current shutdown in dead times using PROFlenergy

ET 200pro isolator modules (see page 9/267)

The isolator module with switch disconnecter function is used for safe disconnection of the 400 V operational voltage during repair work in the plant and provides an integrated group fusing function (i.e. additional group short-circuit protection for all subsequently supplied motor starters).

Depending on the power distribution concept, all stations can be equipped with an isolator module as an option.

More information

Home page, see www.siemens.com/ET200pro
Industry Mall, see www.siemens.com/product?3RK1304
Further components in the ET 200pro distributed I/O system:
• Catalog ST 70, see www.siemens.com/industry/infocenter
• Industry Mall, see www.siemens.com/product?ET200pro

Safety applications

Safety Solution local (see page 9/268)

With the Safety modules local

- Safety local isolator module and
- 400 V disconnecting module

and an appropriate connection, safety level PL e (according to ISO 13849-1) can be reached.

Safety Solution PROFIsafe (see page 9/271)

With the Safety modules PROFIsafe

- F-Switch and
 - 400 V disconnecting module
- and an appropriate connection, safety levels SIL 3 (according to IEC 62061) and PL e (according to ISO 13849-1) can also be reached.

Functionality

With the ET 200pro motor starters, any three-phase loads can be protected and switched.

The ET 200pro motor starters are available with mechanical and also electronic contacts.

The ET 200pro electromechanical starters are offered as direct-on-line starters (DSe) and reversing starters (RSe) as **Standard** and **High Feature** versions. There are device versions with or without control for externally fed brakes with 400 V AC.

Compared with the Standard motor starters, the **High Feature mechanical** motor starter also has:

- Four digital inputs
- Advanced parameterization options

The ET 200pro electronic starters are offered as direct-on-line starters (sDSSSte/sDSte) and reversing starters (sRSSSte/sRSte) in the High Feature version:

Compared with the High Feature mechanical motor starters, the **High Feature electronic** motor starter also has:

- Soft starting and smooth ramp-down function
- Deactivated soft start function as an electronic starter for applications with a high switching frequency
- Advanced parameterization options

As a result of the protection concept with solid-state overload evaluation and the use of SIRIUS switching devices, size S00, additional advantages are realized on the Standard and High Feature motor starters – advantages that soon make themselves positively felt particularly in manufacturing processes with high plant stoppage costs:

- Configuration is made easier by the fine modular structure with ET 200pro. When using ET 200pro motor starters, the parts list per load feeder is reduced to two main items: the bus module and the motor starter. This makes the ET 200pro ideal for modular machine concepts or solutions for conveying systems and machine-tool building.

- Expansions are easily possible through the subsequent adding of modules. The innovative plug-in technology also does away with the wiring needed up to now. Through the hot-swapping function (disconnection and connection during operation) a motor starter can be replaced within seconds if necessary, without having to shut down the ET 200pro station and with it the process in the plant. The motor starters are therefore recommendable in particular for applications with special demands on availability. Storage costs are also optimized by the low level of variance (two units up to 5.5 kW).

With four locally acting inputs available on the High Feature motor starter, it is possible to realize autonomous special functions that work independently of the bus and the higher-level control system, e.g. as a quick stop on gate valve controls or limit position disconnectors. In parallel with this, the states of these inputs are signaled to the control system.

Article No. scheme

Product versions		Article number									
Motor starters		3RK1304 - 5 ☐ S ☐ 0 - ☐ A A ☐									
Setting range	0.15 ... 2.0 A	K	L								
	1.5 ... 12 A										
Product function	Direct-on-line starters DSe				4	4					Standard
	Reversing starters RSe				4	5					Standard
	Direct-on-line starters DSe				4	2					High Feature
	Reversing starters RSe				4	3					High Feature
	Direct-on-line starters sDSSSte/sDSte				7	2					High Feature
	Reversing starters sDSSSte/sDSte				7	3					High Feature
Inputs/outputs	Without brake output									0	
	With brake output									3	400 V AC, with High Feature + 4 inputs
Example		3RK1304 - 5 K S 4 0 - 4 A A 0									

Product versions		Article number									
Modules		3RK1304 - 0 H S 0 0 - ☐ A A 0									
Product function	Isolator modules					6					
	Isolator modules					7					Safety modules local
	400 V disconnecting modules					8					Safety modules local/PROFIsafe
Example		3RK1304 - 0 H S 0 0 - 6 A A 0									

Note:

The Article No. scheme shows an overview of product versions for better understanding of the logic behind the article numbers.

For your orders please use the article numbers quoted in the selection and ordering data.

I/O systems

SIMATIC ET 200 systems without control cabinet

SIMATIC ET 200pro

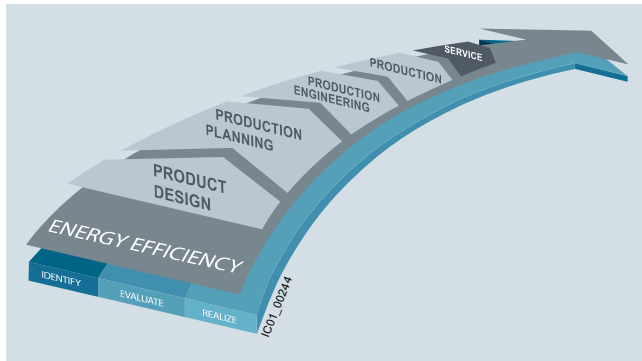
ET 200pro motor starters > General data

Type Technology designation ¹⁾		Standard motor starters		High Feature motor starters	
		DSe, RSe		DSe, RSe	sDSSSte, sDSte, sRSSSte, sRSte
Device functions (firmware features)					
Parameterizable rated operational current		✓			
Integrated short-circuit protection		✓			
Parameterizable current limit values		--		✓ 2 limit values	
Parameterizable response in case of current limit violation		--		✓	
Zero current monitoring		✓			
Parameterizable response in case of zero current violation		✓			
Parameterizable current unbalance limit		%	-- Fixed limit value (30 x I _e)	✓ 30 ... 60 x I _e	
Parameterizable response in case of unbalance limit violation		✓			
Motor blocking monitoring		--		✓	
Parameterizable blocking current limit		%	--	✓ 150 ... 1 000 x I _e	
Parameterizable blocking time limit		s	--	✓ 1 ... 5	
Current value transmission		✓			
Group warning diagnostics		--		✓ Parameterizable	
Group diagnostics		✓ Parameterizable			
EMERGENCY START		✓			
Digital inputs			--	✓ 4 inputs	
• Parameterizable input signal			--	✓ Latching/non-latching	
• Parameterizable input level			--	✓ NC/NO	
• Parameterizable input signal delay	ms	--	--	✓ 10 ... 80	
• Parameterizable input signal extension	ms	--	--	✓ 0 ... 200	
• Parameterizable input control actions		--	--	✓ 12 different actions	
Brake output (400 V AC)		✓ Order option			
Parameterizable brake enabling delay		s	✓ -2.5 ... +2.5		
Parameterizable holding time of the brake during stopping		s	✓ 0 ... 25		
Parameterizable start-up type			--		✓
Parameterizable ramp-down time			--		✓
Parameterizable starting voltage			--		✓
Parameterizable stopping voltage			--		✓
Local device interface		✓			
Firmware update		✓ By specialists			
Thermal motor model		✓			
Parameterizable trip class			-- CLASS 10 fixed	✓ CLASS 5, 10, 15, 20	
Parameterizable response in case of overload of thermal motor model			--	✓ 3 possible states	
Advance warning limit for motor heating		%	--	✓ Parameterizable 0 ... 95	
Advance warning limit for time-related trip reserve		s	--	✓ Parameterizable 0 ... 500	
Parameterizable recovery time		min	--	✓ 1 ... 30	
Parameterizable protection against voltage failure			-- Permanently integrated	✓	
Reversing start function		✓ Order option			
Parameterizable interlock time for reversing starters			-- 150 ms fixed	✓ 0 ... 60 s	
Integrated logbook functions		✓ 3 device logbooks			
Integrated statistics data memory		✓			
Parameterizable response in case of CPU/master stop		✓			
PROFenergy profile support					
• Disconnection of the motor current during idle times			✓		
• Measured motor current values			✓		
Device indications					
• Group fault			SF LED (red)		
• Switching state			STATE LED (red, yellow, green)		
• Device status			DEVICE LED (red, yellow, green)		
• Digital inputs			--	IN 1 ... IN 4, LED	

✓ Function available

-- Function not available

- ¹⁾ DS Direct-on-line starters
 RS Reversing starters
 DSS .. Direct-on-line soft starters
 RSS .. Reversing soft starters
 e Electronic motor protection
 te Full motor protection (thermal + electronic)
 s Electronic switching with semiconductor.

Benefits**Advantages through energy efficiency**

Overview of the energy management process

We offer you a unique portfolio for industrial energy management, using an energy management system that helps to optimally define your energy needs. We split up our industrial energy management into three phases – identify, evaluate, and realize – and we support you with the appropriate hardware and software solutions in every process phase.

The innovative products of the SIRIUS industrial controls portfolio can also make a substantial contribution to a plant's energy efficiency (see www.siemens.com/sirius/energysaving).

SIMATIC ET 200pro motor starters contribute to energy efficiency as follows:

- **Energy management:**
Provision of energy data (current) by bus to higher-level systems using PROFlenergy
- **Elimination of energy consumption in dead times** through disconnection using PROFlenergy
- **Current management:**
Avoidance of current peaks with the electronic soft starter, thus reducing the load on the grid and the mechanical system
- Depending on technology, lower intrinsic power loss than speed-controlled drive systems
- Solid-state modules equipped with soft start technology with bypass contactor, resulting in lower power losses than with conventional soft starters after start-up

Product advantages

ET 200pro motor starters provide the following advantages:

- High flexibility thanks to a modular and compact design
- Little variance among all motor starter versions (two units up to 5.5 kW)
- Extensive parameterization using STEP 7 HW Config
- Increase of plant availability through fast replacement of units (easy mounting and plug-in technology)
- Extensive diagnostics and information for preventive maintenance
- Parameterizable inputs for on-site control functions (High Feature)
- Cabinet-free design thanks to IP65 high degree of protection

Application

The SIMATIC ET 200pro motor starters are ideal for the use of several spatially concentrated distributed drive solutions in which several motors or digital or analog sensors and actuators are addressed from a distributed station. They are perfectly suited for protecting and switching any AC loads.

Use of ET 200pro motor starters in conjunction with IE3/IE4 motorsNote:

For the use of ET 200pro motor starters in conjunction with highly energy-efficient IE3/IE4 motors, please observe the information on dimensioning and configuring; see "Application manual - Controls with IE3/IE4 motors", <https://support.industry.siemens.com/cs/ww/en/view/94770820>.

For more information, see Catalog IC 10.

Application areas

The SIMATIC ET 200pro motor starters are suitable for numerous sectors of industry, e.g. machinery and plant engineering or conveying applications.

I/O systems

SIMATIC ET 200 systems without control cabinet

SIMATIC ET 200pro

ET 200pro motor starters > General data

Technical specifications

More information			
"AS-Interface Basic" manual, see https://support.industry.siemens.com/cs/ww/en/view/35016496 "AS-Interface Standard" manual, see https://support.industry.siemens.com/cs/ww/en/view/38722160		Note on security: For plant networking, suitable protective measures (including IT security, e. g. network segmentation) must be taken to ensure safe operation of the plant. For more information about the subject of Industrial Security, see www.siemens.com/industrialsecurity .	
Type		Standard motor starters Mechanically switching without inputs	High Feature motor starters Mechanically switching with inputs
Technology designation ¹⁾		DSe, RSe	DSe, RSe sDSSSte, sDSte, sRSSSte, sRSte
Mechanics and environment			
Motor starters or modules that can be connected to ET 200pro with 110 mm width		max. 8	
Mounting dimensions (W x H x D) • Direct-on-line starters and reversing starters		mm	110 x 230 x 150 110 x 230 x 160
Permissible ambient temperature • During operation • During storage		°C °C	-25 ... +55, from +40 with derating -40 ... +70
Permissible mounting position			Vertical, horizontal
Vibration resistance acc. to IEC 60068, Part 2-6		g	2
Shock resistance acc. to IEC 60068, Part 2-27		g/ms	Half-sine 15/11
Degree of protection			IP65
Pollution degree			3, IEC 60664 (IEC 61131)
Electrical specifications			
Current consumption at 24 V DC • From auxiliary circuit L+/M (U1) • From auxiliary circuit A1/A2 (U2)		mA mA	Approx. 40 Approx. 200
Rated operational current I_e for power bus		A	25
Rated operational voltage U_e • Approval according to EN 60947-1, Appendix N • Approval according to CSA and UL		V AC V AC V AC	400 (50/60 Hz) Up to 400 (50/60 Hz) Up to 600 (50/60 Hz) Up to 400 (50/60 Hz) Up to 480 (50/60 Hz)
Approval • DIN VDE 0106, Part 101 • CSA and UL approval		V V	Up to 400 Up to 600 Up to 480 Up to 480
Conductor cross-sections • Incoming power supply		mm ²	max. 6 x 4
Touch protection			Finger-safe
Rated impulse withstand voltage U_{imp}		kV	6
Rated insulation voltage U_i		V	400
Rated operational current for starters I_e • AC-1/2/3 at 40 °C - At 400 V - At 500 V • AC-4 at 40 °C - At 400 V		A A A	0.15 ... 2.0/1.5 ... 12.0 0.15 ... 2.0/1.5 ... 9.0 0.15 ... 2.0/1.5 ... 4.0 0.15 ... 2.0/1.5 ... 12.0 ²⁾
Rated short-circuit breaking capacity		kA	100 at 400 V
Type of coordination acc. to IEC 60947-4-1			1
Power of three-phase motors at 400 V		kW	Max. 5.5 Max. 5.5/4 ³⁾
Utilization categories			AC-1, AC-2, AC-3, AC-4 AC-53a ⁴⁾ (max. 9 A with deactivated soft start function up to CLASS 10)
Protective separation between main and auxiliary circuits		V	400, acc. to EN 60947-1, Appendix N
Endurance of contactor • Mechanical • Electrical		Operating cycles Operating cycles	30 million Up to 10 million; depending on the current loading (see manual, https://support.industry.siemens.com/cs/ww/en/view/22332388) -- --
Permissible switching frequency			Depending on the current load, motor starting time, and relative ON period (see manual, https://support.industry.siemens.com/cs/ww/en/view/22332388)
Switching times at 0.85 ... 1.1 x U_e • Closing delay • Opening delay		ms ms	11 ... 50 5 ... 45 -- --

¹⁾ DS Direct-on-line starters
 RS Reversing starters
 DSS .. Direct-on-line soft starters
 RSS .. Reversing soft starters
 e Electronic motor protection
 te Full motor protection (thermal + electronic)

s Electronic switching with semiconductor.
²⁾ If the soft starter control function is deactivated, the permissible rated operational current is reduced to 9 A up to CLASS 10.
³⁾ With parameterization as electronic starter max. 4 kW.
⁴⁾ 8-hour operation.

Overview

The functionality, device functions, and technical specifications of the Standard motor starter are described in "ET 200pro motor starters, General Data" ([see from page 9/260](#)).

Selection and ordering data

Version		Article No.
Standard motor starters, mechanical Motor protection: thermal model		
 DSe Standard	Direct-on-line starters DSe¹⁾	
	• Without brake output	3RK1304-5□S40-4AA0
	• With brake output 400 V AC	3RK1304-5□S40-4AA3
	Reversing starters RSe¹⁾	
	• Without brake output	3RK1304-5□S40-5AA0
	• With brake output 400 V AC	3RK1304-5□S40-5AA3
Setting range Rated operational current		
• 0.15 ... 2.0 A		K L
• 1.5 ... 12.0 A		

¹⁾ Only functions when used together with the backplane bus module and the wide module rack. The backplane bus module and the wide module rack must be ordered separately ([see "Accessories for ET 200pro motor starters", page 9/276](#)).

I/O systems

SIMATIC ET 200 systems without control cabinet

SIMATIC ET 200pro

ET 200pro motor starters > High Feature motor starters **IE3/IE4 ready**

Overview

The functionality, device functions, and technical specifications of the High Feature motor starter are described in "ET 200pro motor starters, General Data" (see from page 9/260).

The High Feature motor starter differs from the Standard motor starter in having more parameters and four integrated, freely-parameterizable digital inputs.

Selection and ordering data

Version		Article No.
High Feature motor starters, mechanical		
Motor protection: thermal model		
	Direct-on-line starters DSe¹⁾	
	- Without brake output and with 4 inputs - With brake output 400 V AC and 4 inputs	3RK1304-5□S40-2AA0 3RK1304-5□S40-2AA3
	Reversing starters RSe¹⁾	
	- Without brake output and with 4 inputs - With brake output 400 V AC and 4 inputs	3RK1304-5□S40-3AA0 3RK1304-5□S40-3AA3
RSe High Feature	Setting range Rated operational current 0.15 ... 2.0 A 1.5 ... 12.0 A	K L
High Feature motor starters²⁾, electronic		
Full motor protection, comprising thermal motor protection and thermistor motor protection		
	Direct-on-line starters sDSSSte/sDSSte¹⁾²⁾	
	- Without brake output and with 4 inputs - With brake output 400 V AC and 4 inputs	3RK1304-5□S70-2AA0 3RK1304-5□S70-2AA3
	Reversing starters sRSSSte/sRSSte¹⁾²⁾	
	- Without brake output and with 4 inputs - With brake output 400 V AC and 4 inputs	3RK1304-5□S70-3AA0 3RK1304-5□S70-3AA3
sRSSSte High Feature	Setting range Rated operational current 0.15 ... 2.0 A 1.5 ... 12.0 A	K L

¹⁾ Only functions when used together with the backplane bus module and the wide module rack. The backplane bus module and the wide module rack must be ordered separately (see "Accessories for ET 200pro motor starters" on page 9/276).

²⁾ The solid-state motor starters can be used not only as solid-state motor starters with a high level of switching frequency but also as fully fledged soft starters for soft starting and stopping. The changeover from motor starter to soft starter takes place through reparameterization in HW Config. Depending on the setting, this results in the following current ranges:

- Parameterization as solid-state motor starter: 0.15 to 2 A and 1.5 to 9 A (4 kW)
- Parameterization as soft starter: 0.15 to 2 A and 1.5 to 12 A (5.5 kW).

Overview

The isolator module with integrated group fusing function (i.e. additional group short-circuit protection for all subsequently supplied motor starters) and switch disconnecter function is used for safe disconnection of the 400 V operational voltage in the plant.

Depending on the power distribution concept, all stations can be equipped with an isolator module as an option.

The following properties apply to the isolator module:

- Increase of plant availability through fast replacement of units (easy mounting and plug-in technology)
- Cabinet-free design thanks to IP65 high degree of protection

The isolator module is also available in a safety version (see page 9/268, "Safety local isolator module").

Technical specifications

Type	Isolator modules	
General data		
Mounting dimensions (W x H x D)		
• Direct-on-line starters and reversing starters	mm	110 x 230 x 170
Permissible ambient temperature		
• During operation	°C	-25 ... +55
• During storage	°C	-40 ... +70
Permissible mounting position		
	Any	
Vibration resistance acc. to IEC 60068 Part 2-6	g	2
Shock resistance acc. to IEC 60068 Part 2-27	g/ms	Half-sine 15/11
Power consumption		
• From auxiliary circuit L+/M (U1)	mA	Approx. 20
• From auxiliary circuit A1/A2 (U2)		--
Rated operational current I_e for power bus	A	25
Rated operational voltage U_e	V	400
Approvals according to		
• DIN VDE 0106, Part 101	V	Up to 500
• CSA and UL	V	Up to 600
Conductor cross-sections		
• Incoming power supply	mm ²	max. 6 x 4

Type	Isolator modules	
Degree of protection	IP65	
Touch protection	Finger-safe	
Pollution degree	3, IEC 60664 (IEC 61131)	
Rated impulse withstand voltage U_{imp}	kV	6
Rated insulation voltage U_i	V	400
Rated operational current for starters I_e		
• AC-1/2/3 at 40 °C		
- At 400 V	A	25
- At 500 V	A	25
Rated short-circuit breaking capacity	kA	50 at 400 V
Type of coordination acc. to IEC 60947-4-1	2	
Protective separation between main and auxiliary circuits	V	400, Acc. to DIN VDE 0106 Part 101
Device functions		
• Group diagnostics	Yes, parameterizable	
Device indications		
• Group fault	SF LED (red)	

Selection and ordering data

Version

Article No.

ET 200pro isolator modules, mechanical



3RK1304-0HS00-6AA0

Isolator modules¹⁾

Rated operational current 25 A

3RK1304-0HS00-6AA0

¹⁾ Only functions when used together with the corresponding 110 mm backplane bus module and the wide module rack. The backplane bus module and the wide module rack must be ordered separately (see page 9/276, "Accessories for ET 200pro motor starters").

I/O systems

SIMATIC ET 200 systems without control cabinet

SIMATIC ET 200pro

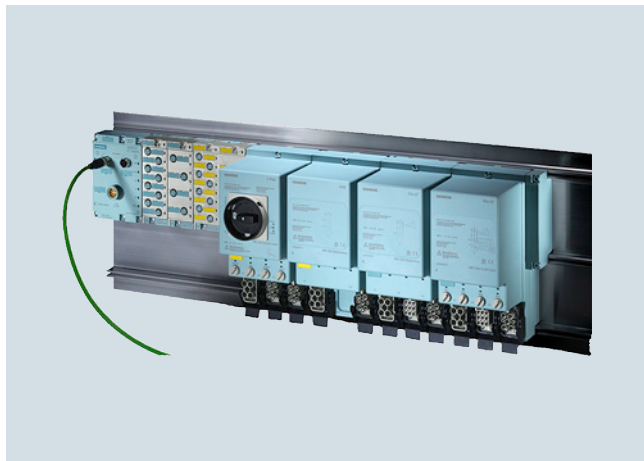
ET 200pro Safety motor starters Solutions local/PROFIsafe > Safety modules local

Overview

Safety Solution local

With the Safety local modules

- Safety local isolator module and
 - 400 V disconnecting module
- and an appropriate connection, safety level PL e (according to ISO 13849-1) can be reached.



ET 200pro motor starter (Safety Solution local):
Safety local isolator module, disconnecting module, Standard starter
and High Feature starter mounted on a wide module rack

Safety local isolator module

The Safety local isolator module is a repair switch with integrated safety evaluation functions that can be parameterized using DIP switches.

It is used for

- Connection of a 1 or 2-channel EMERGENCY STOP circuit up to PL e (protective door or EMERGENCY STOP pushbuttons) and parameterizable start behavior
- For controlling the 400 V disconnecting module by means of a safety rail signal

400 V disconnecting module

The 400 V disconnecting module enables the safe disconnection of an operational voltage of 400 V up to PL e. For operation in a Safety Solution local application, it functions only in combination with the Safety local isolator module.

For operation in a Safety PROFIsafe application, it functions only in combination with the F-Switch.

Functionality

Safety local isolator module

The Safety local isolator module features the same functions as a standard isolator module with an additional local safety function.

The Safety local isolator module contains a 3TK2841 module and is equipped with M12 terminals for the connection of external safety components.

Terminals 1 and 2 can be used to connect either 1-channel or 2-channel EMERGENCY STOP circuits or protective door circuits (IN 1, IN 2).

For monitored starts, an external START switch can be connected to terminal 3.

The required safety functions can be set using two slide switches located under the left M12 opening.

In the event of an EMERGENCY STOP, the Safety local isolator module trips the downstream 400 V disconnecting module. This safely separates the 400 V circuit up to PL e.

In combination with the 400 V disconnecting module, the Safety local isolator module can be used for safety applications up to PL e.

400 V disconnecting module

The 400 V disconnecting module can be used together with the Safety local isolator module for local safety applications and together with the F-Switch for PROFIsafe safety applications.

It contains two contactors connected in series for safety-related disconnection of the main circuit.

The auxiliary circuit supply of the device is over a safety power rail in the backplane bus module.

The 400 V disconnecting module can be used in conjunction with the Safety local isolator module or with the F-Switch for safety applications up to PL e.

Technical specifications

Type		Safety local isolator module	400 V disconnecting module
General data			
Mounting dimensions (W x H x D) in mm			
• Direct-on-line starters and reversing starters	mm	110 x 230 x 170	110 x 230 x 150
Permissible ambient temperature			
• During operation	°C	-25 ... +55	
• During storage	°C	-40 ... +70	
Permissible mounting position		Any	
Vibration resistance acc. to IEC 60068, Part 2-6		2 g	
Shock resistance acc. to IEC 60068, Part 2-27		Half-sine 15 g/11 ms	
Power consumption			
• From auxiliary circuit L+/M (U1)	mA	Approx. 20	
• From auxiliary circuit A1/A2 (U2)		--	
Rated operational current I_e for power bus	A	25	
Rated operational voltage U_e	V	400 (50/60 Hz)	
Approval DIN VDE 0106, Part 101	V	Up to 500	
CSA and UL approval	V	Up to 600	
Conductor cross-sections			
Incoming power supply	mm ²	max. 6 x 4	
Degree of protection		IP65	
Touch protection		Finger-safe	
Pollution degree		3, IEC 60664 (IEC 61131)	
Rated impulse withstand voltage U_{imp}	kV	6	
Rated insulation voltage U_i	V	400	
Rated operational current I_e for starters			
• AC-1/2/3 at 40 °C			
- At 400 V	A	16	25
- At 500 V	A	16	25
Rated short-circuit breaking capacity	kA	50 at 400 V	
Type of coordination acc. to IEC 60947-4-1		2	
Protective separation between main and auxiliary circuits	V	400, Acc. to DIN VDE 0106 Part 101	
Switching times at 0.85 ... 1.1 x U_e			
• Closing delay	ms	--	25 ... 100
• Opening delay	ms	--	7 ... 10
Device functions			
• Group diagnostics		Yes, parameterizable	
Device indications			
• Group fault		SF LED (red)	

I/O systems

SIMATIC ET 200 systems without control cabinet

SIMATIC ET 200pro

ET 200pro Safety motor starters Solutions local/PROFIsafe > Safety modules local

IE3/IE4 ready**Selection and ordering data**

Version	Article No.
Safety modules local	
 Safety local isolator module¹⁾²⁾ Rated operational current 16 A 3RK1304-0HS00-7AA0	3RK1304-0HS00-7AA0
 400 V disconnecting module³⁾⁴⁾ Rated operational current 25 A 3RK1304-0HS00-8AA0	3RK1304-0HS00-8AA0

- ¹⁾ The Safety local isolator module only functions when used together with the 400 V disconnecting module.
- ²⁾ Only in combination with the special backplane bus module for the Safety local isolator module (see page 9/276, "Accessories for ET 200pro motor starters").
- ³⁾ The 400 V disconnecting module functions only when used together with the Safety local isolator module or with the F-Switch.
- ⁴⁾ The 400 V disconnecting module functions only when used together with the backplane bus module and the wide module rack. The backplane bus module and the wide module rack must be ordered separately (see page 9/276, "Accessories for ET 200pro motor starters").

Overview**Safety Solution PROFIsafe**

With the Safety modules PROFIsafe

- F-Switch and
 - 400 V disconnecting module
- and an appropriate connection, safety levels SIL 3 (according to IEC 62061) and PL e (according to ISO 13849-1) can be reached.

F-Switch PROFIsafe

Fail-safe digital inputs/outputs in degrees of protection IP65 to IP67 for machine-level, cabinet-free use.

Fail-safe digital inputs

- For fail-safe reading in of sensor information (1/2-channel)
- Including integrated discrepancy evaluation for 2-out-of-2 signals
- Internal sensor supplies (incl. testing) available

Fail-safe digital outputs

- Three fail-safe PP-switching outputs for safe switching of the backplane busbars

The F-Switch is certified up to SIL 3/PL e and has detailed diagnostics.

It supports PROFIsafe in PROFIBUS configurations as well as in PROFINET configurations.

Note:

For safety characteristics, see [Catalog IC 10 2017 → Chapter 16 "Appendix" → "Standards and approvals" → "Overview"](#).

400 V disconnecting module

See ["Safety modules local", Overview, on page 9/268 and Technical specifications, page 9/269](#).

Functionality

The PROFIsafe F-Switch is a fail-safe electronic module for PROFIsafe safety applications. It has two fail-safe inputs and outputs for safe switching of the 24 V supply over backplane busbars. In combination with the 400 V disconnecting module, fail-safe disconnection of ET 200pro motor starters is possible in PROFIsafe applications up to SIL 3/PL e.

Selection and ordering data

Version		Article No.
ET 200pro safety modules		
 3RK1304-0HS00-8AA0	400 V disconnecting module¹⁾²⁾ Rated operational current 25 A	3RK1304-0HS00-8AA0
	F-Switch PROFIsafe 24 V DC, including bus module Connection module must be ordered separately	6ES7148-4FS00-0AB0
 6ES7148-4FS00-0AB0	Connection modules for F-Switch 24 V DC	6ES7194-4DA00-0AA0

¹⁾ The 400 V disconnecting module functions only when used together with the Safety local isolator module or with the F-Switch.

²⁾ The 400 V disconnecting module functions only when used together with the backplane bus module and the wide module rack. The backplane bus module and the wide module rack must be ordered separately (see [page 9/276, "Accessories for ET 200pro motor starters"](#)).

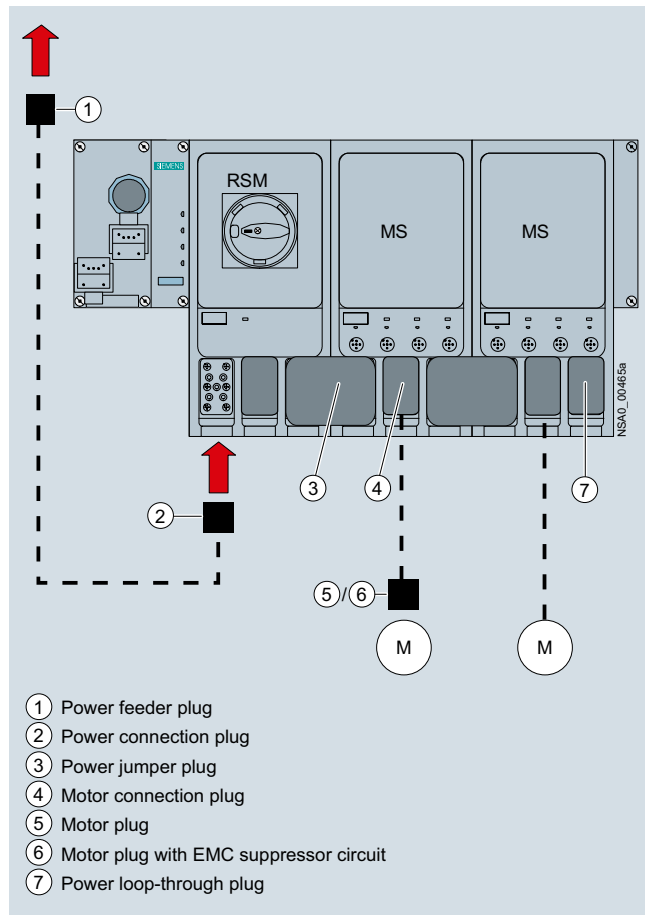
I/O systems

SIMATIC ET 200 systems without control cabinet

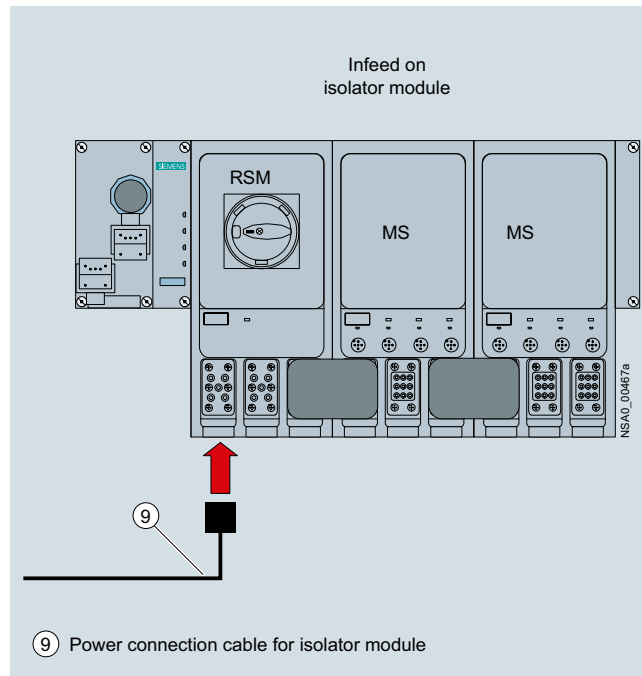
SIMATIC ET 200pro

ET 200pro Safety motor starters Solutions local/PROFIsafe > Accessories for ET 200pro motor starters

Overview



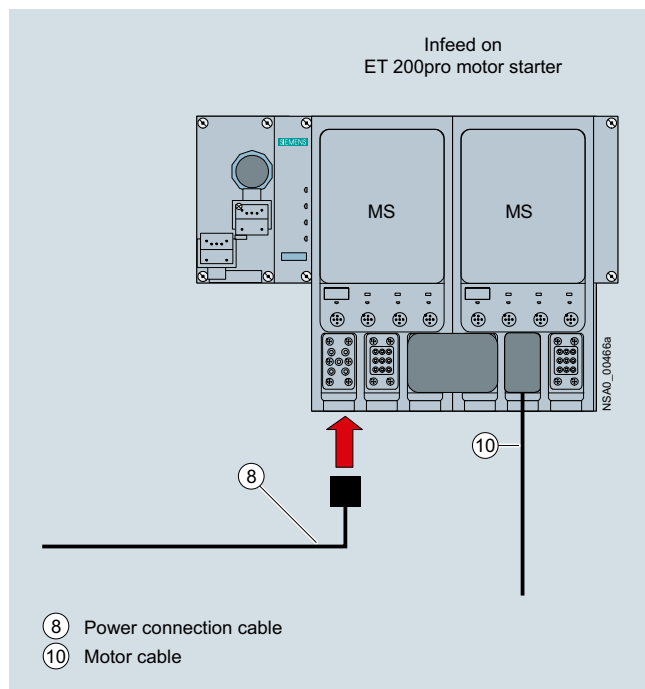
Basic design of an ET 200pro version with (from the left) connection module for IM, interface module for communication (IM), RSM isolator module, two ET 200pro motor starters (MS), and connections for power



Infeed on the RSM isolator module

Legend:

- ① Power feeder plug (see page 9/274)
- ② Power connection plug (see page 9/274)
- ③ Power jumper plug (see page 9/274)
- ④ Motor connection plug (see page 9/274)
- ⑤ Motor plug (see page 9/274)
- ⑥ Motor plug with EMC suppressor circuit (see page 9/274)
- ⑦ Power loop-through plug (see page 9/274)
- ⑧ Power connection cable (see page 9/274)
- ⑨ Power connection cable for isolator modules (see page 9/274)
- ⑩ Motor cable (see page 9/275)



Infeed on the ET 200pro motor starter

Power bus

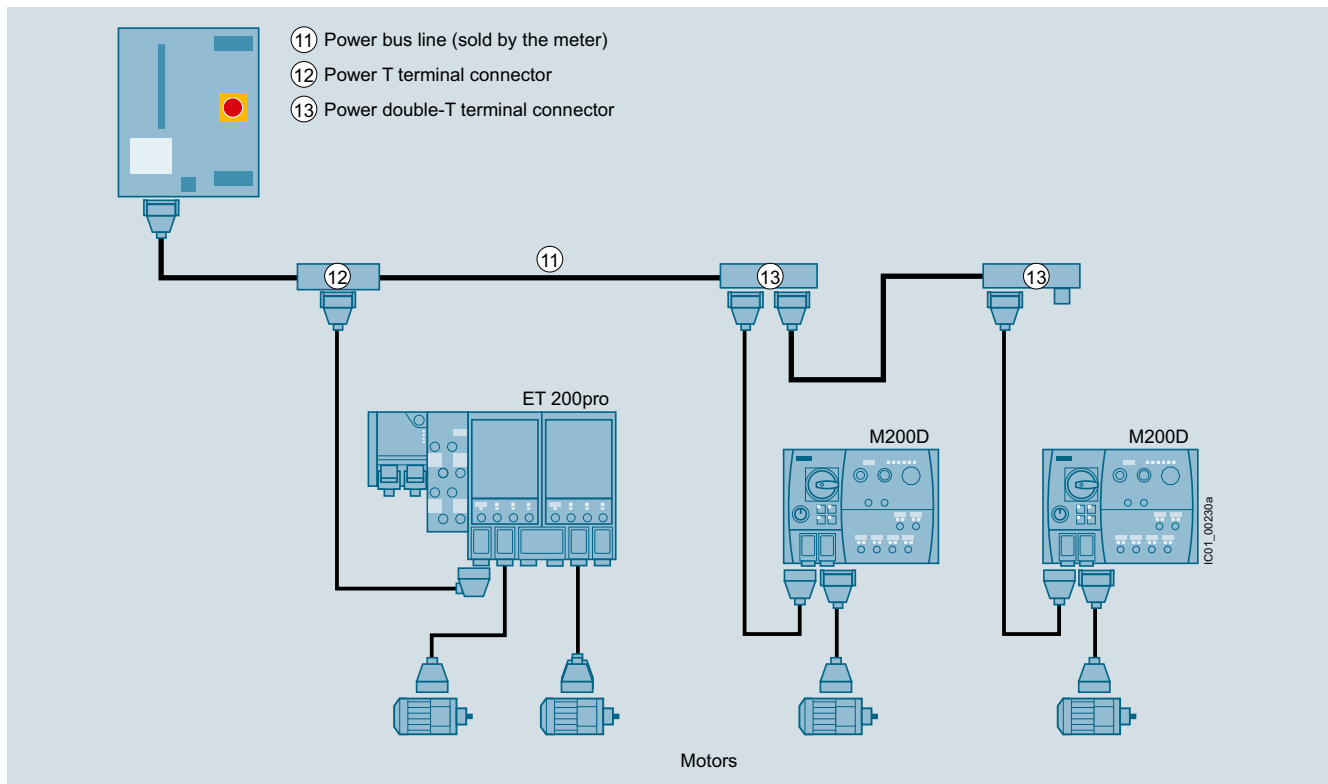
The power supply to the field devices (ET 200pro motor starters, M200D motor starters) is provided via the power bus, in which the power T terminal connectors or power double-T terminal connectors are connected by power bus cables.

Feeders

From the terminal connectors, spur lines with Han Q4/2 plugs lead to the field devices, from which the motors are supplied with power via motor connection cables.

Interruption-free thanks to power terminal connectors

In finger-safe connection technology the power T terminal connectors and power double-T terminal connectors connect the components of a feeder to the power bus. They ensure interruption-free operation, i.e. the power bus is not interrupted when the components are plugged in.



Power supply to the motors via the power bus with power T and double-T terminal connectors linked by power bus cables, spur lines to the field devices (motor starters), and power loop-through connections to the motors via motor connection cables

Motor control via PROFIBUS

The interface modules (IM) for PROFIBUS can be combined with three different connection modules for connecting PROFIBUS DP and the power supply:

- Direct connection with cable glands
- ECOFAST connection with hybrid fieldbus cables (with two copper cores for data transfer with PROFIBUS DP, and four copper cores for the power supply) and ECOFAST connectors (HanBrid)¹⁾
- M12, 7/8" connection
 - with M12 connecting cable and M12 plugs for data transmission with PROFIBUS DP
 - with 7/8" connecting cable and 7/8" plugs for the power supply²⁾

For the connection modules with the associated accessories, see [Accessories ET 200pro interface modules IM 154-1 and IM 154-2, page 9/230](#).

¹⁾ Hybrid fieldbus connections with HanBrid sockets designed as cabinet bushings transmit data and energy from the control cabinet (IP20) to the field (IP65). They are the interface for jointly routing PROFIBUS DP and the auxiliary voltages into the hybrid fieldbus cable.

²⁾ On the control cabinet bushings with two M12 sockets for the PROFIBUS M12 connecting cables, the 24 V supply of the motor starters is implemented via separate 7/8" connecting cables.

Motor control via PROFINET

For the connection modules with the associated accessories, see ["Accessories ET 200pro interface module IM 154-4, page 9/232"](#).

I/O systems

SIMATIC ET 200 systems without control cabinet

SIMATIC ET 200pro

ET 200pro Safety motor starters Solutions local/PROFIsafe > Accessories for ET 200pro motor starters

Selection and ordering data

Version	Article No.
Incoming power supply	
① Power feeder plugs Connector set for energy supply, e.g. for connecting to T terminal connectors, comprising a coupling enclosure, straight outgoing feeder (with bracket), pin insert for HAN Q4/2, incl. gland • 5 male contacts, 2.5 mm² • 5 male contacts, 4 mm² • 5 male contacts, 6 mm²	3RK1911-2BS60 3RK1911-2BS20 3RK1911-2BS40
② Power connection plugs Connector set for energy supply for connection to ET 200pro motor starters/ET 200pro isolator modules, comprising a cable-end connector hood, angular outgoing feeder, female insert for HAN Q4/2, incl. gland • 5 female contacts, 2.5 mm² • 5 female contacts, 4 mm² • 5 female contacts, 6 mm²	3RK1911-2BE50 3RK1911-2BE10 3RK1911-2BE30
⑧ Power connection cables, assembled at one end Power connection cable for ET 200pro motor starters, open at one end, for HAN Q4/2, angular, insert turned at isolator module end, 4 x 4 mm ² • Length 1.5 m • Length 5.0 m	3RK1911-0DB13 3RK1911-0DB33
⑨ Power connection cables for isolator module, assembled at one end Power connection cable for ET 200pro isolator modules, open at one end, for HAN Q4/2, angular, insert turned at isolator module end, 4 x 4 mm ² • Length 1.5 m • Length 5.0 m	3RK1911-0DF13 3RK1911-0DF33
Power loop-through on the field device	
③ Power jumper plugs	3RK1922-2BQ00
⑦ Power loop-through plugs Connector set for power loop-through for connection to ET 200pro motor starters/ET 200pro isolator modules, comprising a cable-end connector hood, angular outgoing feeder, male insert for HAN Q4/2, incl. gland • 4 male contacts, 2.5 mm² • 4 male contacts, 4 mm²	3RK1911-2BF50 3RK1911-2BF10
Motor cables	
④ Motor connection plugs Connector set for motor cable for connection to ET 200pro motor starters, comprising a cable-end connector hood, angular outgoing feeder, pin insert for HAN Q8/0, incl. gland • 8 male contacts, 1.5 mm² • 6 male contacts, 2.5 mm²	3RK1902-0CE00 3RK1902-0CC00
⑤ Motor plugs Connector set for motor cable for connection to motors, comprising a cable-end connector hood, straight outgoing feeder, female insert for HAN 10e, incl. star jumper, incl. gland • 7 female contacts, 1.5 mm² • 7 female contacts, 2.5 mm²	3RK1911-2BM21 3RK1911-2BM22
⑥ Motor plugs with EMC suppressor circuit Connector set for motor cable for connection to motors, comprising a cable-end connector hood, straight outgoing feeder, female insert for HAN 10e with EMC suppressor circuit, incl. star jumper, incl. gland • 7 female contacts, 1.5 mm² • 7 female contacts, 2.5 mm²	3RK1911-2BL21 3RK1911-2BL22

Version	Article No.
Motor cables (continued)	
⑩ Motor cables, assembled at one end Open at one end, HAN Q8, angular, length 5 m • Motor cable for motor without brake for ET 200pro, 4 x 1.5 mm² • Motor cable for motor with brake for ET 200pro, 6 x 1.5 mm² • Motor cables for motor without brake with thermistor for ET 200pro, 6 x 1.5 mm² • Motor cables for motor with brake with thermistor for ET 200pro, 8 x 1.5 mm²	3RK1911-0EB31 3RK1911-0ED31 3RK1911-0EF31 3RK1911-0EG31
Power bus	
⑫ Power T terminal connectors For 400 V AC, for connection of feeders (e.g. motor starters) by means of standard round cable at any point of the power bus, by insulation displacement connection, used with pre-assembled bus segments • 2.5 mm² / 4 mm² • 4 mm² / 6 mm²	3RK1911-2BF01 3RK1911-2BF02
⑬ Power double-T terminal connectors For 400 V AC, for connection of feeders (e.g. motor starters) by means of standard round cable at any point of the power bus, by insulation displacement connection, used with pre-assembled bus segments, connection of two motor starters possible • 4 mm² / 6 mm²	3RK1911-2BG02
Sealing set (comprising 2 seals) For power T/power double-T terminal connectors • For power cables with Ø 10 ... 13 mm • For power cables with Ø 13 ... 16 mm • For power cables with Ø 16 ... 19 mm • For power cables with Ø 19 ... 22 mm • Blanking plugs	3RK1911-5BA00 3RK1911-5BA10 3RK1911-5BA20 3RK1911-5BA30 3RK1911-5BA50
Further accessories for power connections	
 Crimping tool For pins/sockets, 4 mm ² and 6 mm ²	3RK1902-0CW00
 Dismantling tools • For male and female contacts for 9-pole HAN Q4/2 inserts • For male and female contacts for 9-pole HAN Q8 inserts	3RK1902-0AB00 3RK1902-0AJ00
Sealing caps For 9-pole power socket connectors • 1 unit per pack • 10 units per pack	3RK1902-0CK00 3RK1902-0CJ00

For more connection technology products, see "Siemens Solution Partners Automation" under the "Distributed Field Installation System" technology: www.siemens.com/partnerfinder.

I/O systems

SIMATIC ET 200 systems without control cabinet

SIMATIC ET 200pro

ET 200pro Safety motor starters Solutions local/PROFIsafe > Accessories for ET 200pro motor starters

Version	Article No.
Further accessories	
Module racks, wide¹⁾ - Length 500 mm - Length 1 000 mm - Length 2 000 mm	6ES7194-4GB00-0AA0 6ES7194-4GB60-0AA0 6ES7194-4GB20-0AA0
Module racks, wide, compact¹⁾ - Length 500 mm - Length 1 000 mm - Length 2 000 mm	6ES7194-4GD00-0AA0 6ES7194-4GD10-0AA0 6ES7194-4GD20-0AA0
Backplane bus modules 110 mm²⁾	3RK1922-2BA00
Backplane bus module for Safety local isolator modules	3RK1922-2BA01
Hand-held devices For ET 200pro motor starters (or for ET 200S High Feature and M200D motor starters) for local operation. The motor-starter-specific serial interface cables must be ordered separately. The RS 232 interface cable 3RK1922-2BP00 is used for the MS ET 200pro.	3RK1922-3BA00
RS 232 interface cable Serial data connection between ET 200pro (or M200D) motor starters and the RS 232 interface of a PC/PG/laptop (with the Motor Starter ES software) or the handheld device 3RK1922-3BA00.	3RK1922-2BP00
USB interface cables, 2.5 m Serial data connection between ET 200pro (or M200D) motor starters and the USB interface of a PC/PG/laptop (with the Motor Starter ES software).	6SL3555-0PA00-2AA0
M12 sealing caps For sealing unused M12 input or output sockets (one set contains ten sealing caps).	3RK1901-1KA00
Motor control with PROFIBUS	
See page 9/227	
Motor control with PROFINET	
See page 9/231	
SIMATIC ET 200pro motor starters manual	
See https://support.industry.siemens.com/cs/ww/en/view/22332388	



3RK1922-3BA00



3RK1901-1KA00

¹⁾ The wide module rack can accommodate all ET 200pro motor starters and any optional modules (isolator module, Safety local isolator module and 400 V disconnecting module).

²⁾ The backplane bus module is a prerequisite for operation of the ET 200pro motor starter and the optional module.

Overview



SIMATIC ET 200pro FC-2 frequency converter

The SIMATIC ET 200pro FC-2 frequency converter has the design of a SIMATIC ET 200pro module. It supplements the SIMATIC ET 200pro system range with distributed, speed-controlled drives. It is suitable for the open-loop and closed-loop control of induction motors in a wide range of industrial applications. It is predestined for conveyor technology applications using drives networked via PROFIBUS and PROFINET, in particular in distributed designs without control cabinet with high degree of protection (IP65), when combining several drives. The modular, service-friendly concept is ideally suited to manufacturing processes with high plant standstill costs.

Reasons for using distributed drive systems

- Modular drive solutions – therefore standardized mechatronic elements that can be individually tested
- A control cabinet is not required, resulting in a smaller space requirement and lower cooling requirements
- Long motor cables between converter and motor are not required
 - Less power losses
 - Reduced noise radiation
 - Reduced costs for shielded cables
 - No additional filters

- Distributed configurations offer considerable benefits for conveyor systems with their extensive coverage (e.g. in the automotive and logistics industries)

Siemens family of distributed drives

Siemens offers an innovative portfolio of frequency converters to optimally implement distributed drive solutions. The strengths of the individual members of the drive family permit simple adaptation to the widest range of application demands:

- Identical connection systems
- Standard commissioning and engineering tools for the family of distributed drives:
 - SINAMICS G110M frequency inverters
 - SINAMICS G110D frequency inverters
 - SINAMICS G120D frequency inverters
 - SIMATIC ET 200pro FC-2 frequency converters
 - SIRIUS M200D motor starters

Safety Integrated

The distributed SIMATIC ET 200pro FC-2 frequency converters are already equipped with the integrated STO (Safe Torque Off) safety function, certified in accordance with IEC 61508 SIL 2 as well as EN ISO 13849-1 PL d and Category 3. This can be activated by means of PROFIsafe.

STARTER commissioning tool

The STARTER commissioning tool (V4.4 and higher) plus the corresponding SINAMICS Support Package (SSP) supports the commissioning and maintenance of SIMATIC ET 200pro FC-2 frequency converters.

The operator guidance combined with comprehensive, user-friendly functions for the relevant drive solution allow you to commission the device quickly and easily.

STEP 7 classic engineering framework (V5.5 and higher)

Hardware Support Packages (HSP) are available for integrating SIMATIC ET 200pro FC-2 in STEP 7 classic.

TIA Portal engineering framework (V13 SP1 and higher)

TIA Portal is a powerful engineering framework providing full access to the whole digitized automation.

Hardware Support Packages (HSP) are available for integrating SIMATIC ET 200pro FC-2 in TIA Portal.

Technical specifications

Distributed frequency converter	SIMATIC ET 200pro FC-2
Selection features	
Integrated safety functions acc. to IEC 61508 SIL 2 and EN ISO 13849-1 PL d and Category 3	• Safe Torque Off (STO) • Control of the integrated safety function via the Safety Local isolator module F-RSM or via F-Switch PROFIsafe
Electrical data	
Line voltage	380 ... 480 V 3 AC $\pm 10\%$
Power	
• With an ambient temperature of 0 ... 55° C	1.1 kW
• With an ambient temperature of 0 ... 45° C	1.5 kW
Rated input current / output current	
• With an ambient temperature of 0 ... 55° C	2 A/3.5 A
• With an ambient temperature of 0 ... 45° C	2.5 A/3.9 A

I/O systems

SIMATIC ET 200 systems without control cabinet

SIMATIC ET 200pro

SIMATIC ET 200pro FC-2 frequency converter**Technical specifications** (continued)

Distributed frequency converter	SIMATIC ET 200pro FC-2				
Line frequency	47 ... 63 Hz				
Overload capability	- Overload current 1.5 x rated output current (i.e. 150 % overload) for 60 s, cycle time 300 s - Overload current 2 x rated output current (i.e. 200 % overload) for 3 s, cycle time 300 s				
Output frequency	0 ... 550 Hz				
Pulse frequency	4 kHz (standard) 4 ... 16 kHz (in 2 kHz increments)				
Standard SCCR (Short Circuit Current Rating)	10 kA				
Skipped frequency range	1, programmable				
Converter efficiency	95 ... 97 %				
Interfaces	- Connection to PROFIBUS and PROFINET over the SIMATIC ET 200pro backplane bus - Mini USB interface for commissioning via PC (as from STARTER V4.4 plus SSP) - Optical interface for commissioning via the IOP Handheld - Slot for an optional memory card (SD) to upload or download parameter settings - PTC, bimetal, KTY84, Pt1000 interface for motor temperature monitoring				
Functions					
Open-loop/closed-loop control techniques	- V/f control – linear ($M \sim n$) with/without flux current control (FCC), quadratic ($M \sim n^2$) or parameterizable - Vector control – sensorless - Closed-loop torque control				
Operating functions	- Jogging - BICO technology - Automatic restart following interruptions in operation due to a power failure - Smooth connection of converter to rotating motor				
Braking functions	- Integrated regenerative feedback functionality - Control of an electromagnetic holding brake				
	Integrated brake control supplies DC power supply to the brake				
	Line voltage	380 V AC	400 V AC	440 V AC	480 V AC
	Rectified brake voltage	171 V DC	180 V DC	198 V DC	216 V DC
	Recom- mended brake coil voltage for Siemens motors	170 ... 200 V DC	170 ... 200 V DC 184 ... 218 V DC	184 ... 218 V DC	184 ... 218 V DC
Disconnection on the DC side permits "fast" braking.					
Protective functions	- Undervoltage - Overvoltage - Ground fault - Short-circuit - Stall protection - Thermal motor protection (I^2t or sensor) - Converter overtemperature - Motor blocking protection - Phase failure detection				
Connectable motors	- Low-voltage induction motors - Motor cable lengths: max. 15 m (shielded)				
Mechanical data					
Degree of protection	IP65				
Operating temperature	0 ... +55 °C (32 ... +131 °F)				
Mounting position	Vertical wall mounting (vertical alignment of the cooling fins)				
Dimensions (W x H x D)	155 mm x 246 mm x 248 mm				
Weight, approx.	4 kg				
Standards					
Certificates of suitability	UL508C, cUL, CE, Low Voltage Directive 2014/35/EU, EMC Directive 2014/30/EU				

Ordering data	Article No.		Article No.
SIMATIC ET 200pro FC-2 frequency converter With integrated safety function STO (Safe Torque Off)	6SL3514-1KE13-5AE0	PC inverter connection kit 2 Mini USB interface cable for communication with a PC, 3 m long	6SL3255-0AA00-2CA0
Backplane bus module For mounting the frequency converter (absolutely essential for operation of the converter)	6SL3260-2TA00-0AA0	Connecting cable pre-assembled at one end Power supply cable, open at one end, for HAN Q4/2, angled, 4 x 4 mm ² • Length 1.5 m • Length 5 m	3RK1911-0DB13 3RK1911-0DB33
Accessories		Connector set for the power supply HAN Q4/2 • 2.5 mm² • 4 mm² • 6 mm²	3RK1911-2BE50 3RK1911-2BE10 3RK1911-2BE30
IOP Handheld For use with SINAMICS G120, SINAMICS G120C, SINAMICS G120P, SINAMICS G110D, SINAMICS G120D, SINAMICS G110M, SINAMICS S110 and SIMATIC ET 200pro FC-2 Included in the scope of delivery: • Intelligent Operator Panel IOP • Handheld housing • Rechargeable batteries (4 x AA) • Charging unit (international) • RS232 connecting cable (3 m long, for use with SINAMICS G120, SINAMICS G120C, SINAMICS G120P and SINAMICS S110) • USB cable (1 m long)	6SL3255-0AA00-4HA0	Motor cables pre-assembled at one end For motors with brake and temperature sensor with HAN Q8 connector, shielded Cross-section • Length 1.5 m • Length 3 m • Length 5 m • Length 10 m	(HTG: supplied by Harting) (ZKT: supplied by KnorrTec) 4 x 1.5 mm ² 2 x (2 x 0.75 mm ²) HTG: 61 88 201 0288 ZKT: 70020501000150 HTG: 61 88 201 0289 ZKT: 70020501000300 HTG: 61 88 201 0290 ZKT: 70020501000500 HTG: 61 88 201 0299 ZKT: 70020501001000
RS232 interface cable With optical interface to connect the SINAMICS G110D, SINAMICS G120D, SINAMICS G110M or SIMATIC ET 200pro FC-2 converters to the IOP Handheld (2.5 m long)	3RK1922-2BP00	Connector set for motor cable HAN Q8, shielded	HTG: 61 83 401 0131 ZKT: 10032001
SINAMICS Memory Card (SD card)	6SL3054-4AG00-2AA0	Power jumper connector	3RK1922-2BQ00
STARTER commissioning tool ¹⁾ on DVD-ROM	6SL3072-0AA00-0AG0		

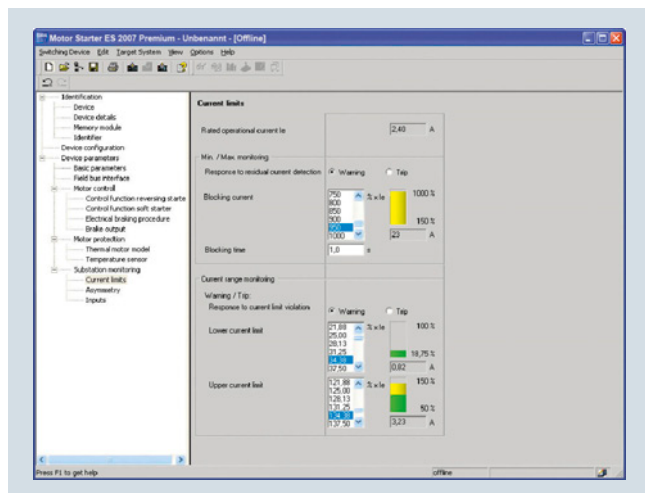
¹⁾ The STARTER commissioning tool is also available on the Internet at www.siemens.com/starter

I/O systems

SIMATIC ET 200 systems without control cabinet
ET 200pro

ET 200pro software > Motor Starter ES

Overview



Motor Starter ES for parameterization, monitoring, diagnostics and testing of motor starters

More information

Home page see www.siemens.com/sirius

Industry Mall see <https://mall.industry.siemens.com/mall/en/de/Catalog/Products/10026777?tree=CatalogTree>

Technical specifications and system requirements, see <https://support.industry.siemens.com/cs/ww/en/ps/16713/tid>

Motor Starter ES is used for the start-up, parameterization, diagnostics, documentation and preventive maintenance of SIMATIC ET 200S, ET 200pro, ECOFAST and M200D motor starters.

Interfacing is performed

- Through the local interface on the device
- With PROFIBUS DP-V1-capable motor starters from any point in PROFIBUS or in PROFINET (applies to ET 200S DP V1/ET 200pro/ECOFAST/M200D)
- With PROFINET-capable motor starters from any point in PROFINET or in PROFIBUS (applies to ET 200S DP V1/ ET 200pro/M200D)

Using Motor Starter ES, the communication-capable motor starters are easily parameterized during start-up, monitored during normal operation and successfully diagnosed for service purposes. Preventive maintenance is supported by a function for reading out diverse statistical data (e.g. operating hours, operating cycles, cut-off currents, etc.). The user is supported during these procedures with comprehensive Help functions and plain text displays.

Motor Starter ES can either be used as a stand-alone program or it can be integrated into STEP 7 via an Object Manager.

Efficient engineering with three program versions

The Motor Starter ES software program is available in three versions which differ in their user-friendliness, scope of functions and price.

Motor Starter ES	Basic	Standard	Premium
ET 200S High Feature PROFIBUS IM	✓	✓	✓
ET 200S High Feature PROFINET IM	✓	✓	✓
ECOFAST AS-Interface High Feature	✓	✓	---
ECOFAST PROFIBUS	✓	✓	✓
ET 200pro PROFIBUS IM	✓	✓	✓
ET 200pro PROFINET IM	✓	✓	✓
M200D AS-Interface Standard	✓	✓	(✓)
M200D PROFIBUS	✓	✓	✓
M200D PROFINET	✓	✓	✓

✓ Function available, (✓) Available with restricted functionality

--- Function not available

Motor Starter ES	Basic	Standard	Premium
Access through the local interface on the device	✓	✓	✓
Parameter assignment	✓	✓	✓
Operating	✓	✓	✓
Diagnostics	---	✓	✓
Creation of typicals	---	✓	✓
Comparison functions	---	✓	✓
Standard-compliant printout according to EN ISO 7200	---	✓	✓
Service data (maximum pointers, statistical data)	---	✓	✓
Access through PROFIBUS	---	---	✓
Access through PROFINET	---	---	✓
S7 routing	---	---	✓
Teleservice through MPI	---	---	✓
STEP 7 Object Manager	---	---	✓
Trace function	---	✓	✓

✓ Function available

--- Function not available

Additional functions

Standard-compliant printouts

The software tool greatly simplifies machine documentation. It enables parameterization printouts according to EN ISO 7200. The elements to be printed are easy to select and group as required.

Easy creation of typicals

Typicals can be created for devices and applications with only minimum differences in their parameters. These typicals contain all the parameters which are needed for parameterization. In addition it is possible to specify which of these parameters are fixed and which can be adapted, e.g. by the startup engineer.

Teleservice through MPI

The Motor Starter ES Premium version supports the use of MPI Teleservice (comprising the Teleservice software and various Teleservice adapters) for remote diagnostics of the devices. This facilitates diagnostics and maintenance, as well as shortening response times for service purposes.

Benefits

- Fast, error-free configuration and startup of motor starters even without extensive previous knowledge
- Transparent setting of the device functions and their parameters – online and offline
- Effective diagnostics functions on the soft starter and display of the most important measured values
- Trace function (oscilloscope function) for recording measured values and events (included in the Motor Starter ES Standard and Premium software version for M200D PROFIBUS and PROFINET).

Selection and ordering data**Parameterization, start-up and diagnostics software
Motor Starter ES 2007**

For ECOFAST Motor Starter, SIMATIC ET 200S High Feature Starter, SIMATIC ET 200pro Starter and M200D (AS-Interface Standard, PROFIBUS, PROFINET)

- Delivered without PC cable

Version	Article No.
Motor Starter ES 2007 Basic  Floating license for one user Engineering software in limited-function version for diagnostics purposes, software and documentation on CD, 3 languages (English/German/French), communication via system interface • License key on USB flash drive, Class A, including CD • License key download, Class A, without CD	3ZS1310-4CC10-0YA5 3ZS1310-4CE10-0YB5
Motor Starter ES 2007 Standard  Floating license for one user Engineering software, Software and documentation on CD, 3 languages (English/German/French), communication via system interface • License key on USB flash drive, Class A, including CD • License key download, Class A, without CD Powerpack for Motor Starter ES 2007 Basic Floating license for one user, engineering software, license key on USB flash drive, Class A 3 languages (English/German/French), communication via system interface Software Update Service For 1 year with automatic extension, requires the current software version, engineering software, Software and documentation on CD, communication via system interface	3ZS1310-5CC10-0YA5 3ZS1310-5CE10-0YB5 3ZS1310-5CC10-0YD5 3ZS1310-5CC10-0YL5

Notes:

Please order PC cable separately; [see page 9/282](#).

For a description of the software versions, [see page 9/280](#).

I/O systems

SIMATIC ET 200 systems without control cabinet

ET 200pro

ET 200pro software > Motor Starter ES

Version	Article No.
Motor Starter ES 2007 Premium	
 Floating license for one user Engineering software, Software and documentation on CD, 3 languages (English/German/French), communication via system interface or PROFIBUS/PROFINET, STEP7 Object Manager • License key on USB flash drive, Class A, including CD • License key download, Class A, without CD	3ZS1310-6CC10-0YA5 3ZS1310-6CE10-0YB5
Powerpack for Motor Starter ES 2007 Standard Floating license for one user, engineering software, license key on USB flash drive, Class A 3 languages (English/German/French), communication via system interface or PROFIBUS/PROFINET, STEP7 Object Manager	3ZS1310-6CC10-0YD5
Software Update Service For 1 year with automatic extension, requires the current software version, engineering software, Software and documentation on CD, communication via system interface or PROFIBUS/PROFINET, STEP7 Object Manager	3ZS1310-6CC10-0YL5

Notes:Please order PC cable separately; see [Accessories](#).For a description of the software versions, see [page 9/280](#).**Accessories**

Version	Article No.
Optional accessories	
RS 232 interface cable Serial data connection between ET 200pro MS/FC, M200D and laptop/PC/PG or MS	3RK1922-2BP00
USB interface cable Serial data connection between ET 200pro MS/FC, M200D and laptop/PC/PG or MS	6SL3555-0PA00-2AA0
USB/serial adapter For connecting an RS 232 PC cable to the USB interface of a PC, recommended for use in conjunction with ET 200S/ECOFAS/ET 200pro motor starters	3UF7946-0AA00-0

Overview

An interface module (EtherNet/IP adapter) is provided for operating the ET 200pro on EtherNet/IP. It can be used together with system and IO components of the ET 200pro distributed I/O system.

Technical specifications

Article number	ZNX:EIP200PRO ETHERNET/IP HEAD ASSEMBLY FOR ET 200PRO
Supply voltage	
Rated value (DC)	24 V
Input current	
from supply voltage 1L+, max.	400 mA
Power loss	
Power loss, typ.	6 W
Address area	
Addressing volume	
• Inputs	255 byte
• Outputs	255 byte
Interfaces	
PROFINET IO	
• automatic detection of transmission rate	Yes
• Transmission rate, max.	100 Mbit/s
• Services	See manual
Diagnostics indication LED	
• Bus fault BF (red)	Yes
• Group error SF (red)	Yes
• Monitoring 24 V voltage supply ON (green)	Yes
• Load voltage monitoring 24 V DC (green)	Yes
Potential separation	
between backplane bus and electronics	Yes
between supply voltage and electronics	Yes
Isolation	
Isolation tested with	707 V DC (type test)

Article number	ZNX:EIP200PRO ETHERNET/IP HEAD ASSEMBLY FOR ET 200PRO
Degree and class of protection	
Degree of protection acc. to EN 60529	
• IP65	Yes
• IP66	Yes
• IP67	Yes
Ambient conditions	
Ambient temperature during operation	
• min.	-25 °C
• max.	55 °C
Ambient temperature during storage/transportation	
• min.	-40 °C
• max.	70 °C
Dimensions	
Width	135 mm
Height	130 mm
Depth	59.3 mm
Weights	
Weight, approx.	490 g
Article number	ZNX:EIP200PROCM1 ET 200PRO, CM IM DP M12 / 7/8"
Input current	
from supply voltage 1L+, max.	No current input, only infeed current, max. 8 A
from load voltage 2L+ (without load), max.	No current input, only infeed current, max. 8 A
Weights	
Weight, approx.	540 g

Ordering data**Article No.**

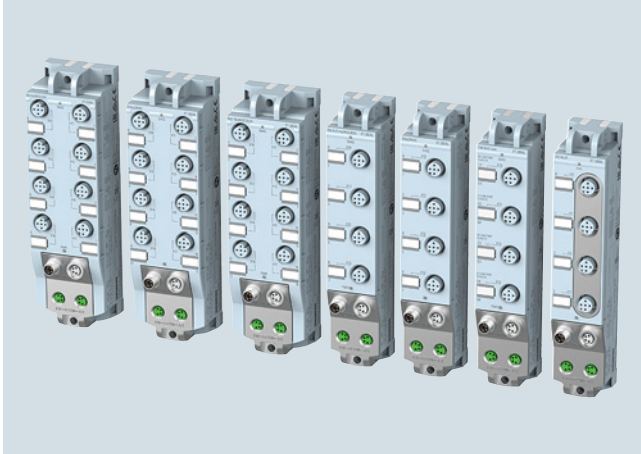
SIMATIC ET 200pro interface module for EtherNet/IP	ZNX:EIP200PRO
Including:	
• Bus termination module for ET 200pro	
• Companion disk with the manuals and the configuration tool	
Connecting module for EtherNet/IP	ZNX:EIP200PROCM1
For connecting the interface module to EtherNet/IP	

I/O systems

SIMATIC ET 200 systems without control cabinet

SIMATIC ET 200AL

Overview



- Modular, distributed I/O system with compact I/O modules in IP65/67
- Especially easy and flexible installation, even in extremely confined spaces
- Easy wiring
- Easy commissioning
- SIMATIC ET 200AL consists of the following components:
 - Interface module for communication with IO controllers on PROFINET
 - Interface module for communication with all masters on the PROFIBUS
 - BusAdapters for connection to the ET 200SP I/O system
 - Various I/O modules, 30 mm and 45 mm-wide
- Maximum configuration of an ET 200AL station:
 - Up to 32 I/O modules with PROFINET or PROFIBUS in any combination
 - Up to 16 I/O modules at the ET 200SP in any combination
- Connection of the modules via an internal backplane bus established using bus cables (ET connection)

Highlights

- Compact dimensions
- Low weight
- Safety-oriented collective shutdown of the outputs (available soon)
- High degree of user-friendliness due to the following design features:
 - Flexible mounting in all positions possible due to screw fastening through the front or side
 - Direct installation on even surfaces or aluminum DIN rails
 - Labels for the identification of channels, modules and slots
 - Integrated cable tie opening
 - Clear and CAx-compliant interface designations
 - Uniform coloring of the system interfaces and system cables
 - 1:1 assignment of channel status LED, I/O socket and label
 - Pin assignment on the side
- I/O module portfolio comprising digital and analog modules as well as IO-Link communication module
- Ambient temperature range from -25 °C to +55 °C
- Extensive system functions
 - All interface and I/O modules support firmware update
 - Configuration control (option handling) via user software
 - System supports PROFIenergy for power saving purposes
 - Consistent use of identification and maintenance data IM0 to IM3/4 (electronic rating plate) for fast electronic and unambiguous identification of individual modules (Article No., serial number, etc.)

Overview



- Interface module for linking the ET 200AL to PROFIBUS
- As DP-V1 slave it handles the data exchange with the PROFIBUS master in the PLC
- Max. 32 I/O modules can be connected
- Max. data volume of 244 bytes, for input and output data respectively
- Automatic detection of baud rate 9.6 kBd ... 12 MBd
- PROFIBUS addresses 1 ... 99; can be set by means of rotary switch
- Identification and maintenance data IM0 ... IM3
- Firmware update
- Configuration management (option handling)

Technical specifications

Article number	6ES7157-1AA00-0AB0 ET 200AL, IM 157-1 DP
General information	
Product type designation	IM 157-1 DP
HW functional status	E01
Firmware version	V1.0.x
Vendor identification (VendorID)	81A9H
Product function	
• I&M data	Yes; I&M0 to I&M3
Engineering with	
• STEP 7 TIA Portal configurable/ integrated as of version	STEP 7 V13 SP1 or higher
• STEP 7 configurable/integrated as of version	From V5.5 SP4 Hotfix 3
• PROFIBUS as of GSD version/ GSD revision	GSD as of Revision 5
Supply voltage	
Load voltage 1L+	
• Rated value (DC)	24 V
• Reverse polarity protection	Yes; against destruction
Input current	
Current consumption (rated value)	50 mA
from load voltage 1L+ (unswitched voltage)	4 A; Maximum value
from load voltage 2L+, max.	4 A; Maximum value
Power loss	
Power loss, typ.	1.7 W
Address area	
Address space per station	
• Address space per station, max.	244 byte
Interfaces	
Number of PROFIBUS interfaces	1

Article number	6ES7157-1AA00-0AB0 ET 200AL, IM 157-1 DP
1. Interface	
Interface type	PROFIBUS DP
Interface types	
• RS 485	Yes
• M12 port	Yes; 2x M12 b-coded
Functionality	
• PROFIBUS DP slave	Yes
Interface types	
RS 485	
• Transmission rate, max.	12 Mbit/s
PROFIBUS	
Services	
- SYNC capability	Yes
- FREEZE capability	Yes
- Direct data exchange (slave-to-slave communication)	Yes
- DPV0	Yes
- DPV1	Yes
Interrupts/diagnostics/ status information	
Alarms	Yes
Diagnostic functions	Yes
Diagnostics indication LED	
• RUN LED	Yes; Green LED
• ERROR LED	Yes; Red LED
• MAINT LED	Yes; yellow LED
• Connection display DP	Yes; Green LED
Potential separation	
between the load voltages	Yes
between PROFIBUS DP and all other circuit components	Yes
Isolation	
Isolation tested with	707 V DC (type test)

I/O systems

SIMATIC ET 200 systems without control cabinet
SIMATIC ET 200AL

Interface modules > IM 157-1 DP

Technical specifications (continued)

Article number	6ES7157-1AA00-0AB0 ET 200AL, IM 157-1 DP
Degree and class of protection	
Degree of protection acc. to EN 60529	
• IP65	Yes
• IP67	Yes
Ambient conditions	
Ambient temperature during operation	
• min.	-25 °C
• max.	55 °C

Article number	6ES7157-1AA00-0AB0 ET 200AL, IM 157-1 DP
Connection method	
Power supply	M8, 4-pole
ET-Connection	
• ET-Connection	M8, 4-pin, shielded
Dimensions	
Width	45 mm
Height	159 mm
Depth	46 mm
Weights	
Weight, approx.	211 g

Ordering data

Article No.

IM 157-1 DP interface module	6ES7157-1AA00-0AB0
For connecting ET 200AL to PROFIBUS	
Accessories	
Bus cable for backplane bus (ET connection)	
4-pin, shielded	
Pre-assembled at both ends, 2 M8 connectors	
0.19 m	6ES7194-2LH02-0AA0
0.3 m	6ES7194-2LH03-0AA0
1 m	6ES7194-2LH10-0AA0
2 m	6ES7194-2LH20-0AA0
5 m	6ES7194-2LH50-0AA0
10 m	6ES7194-2LN10-0AA0
15 m	6ES7194-2LN15-0AA0
Pre-assembled at both ends, 2 M8 connectors, angled	
0.3 m	6ES7194-2LH03-0AB0
1 m	6ES7194-2LH10-0AB0
2 m	6ES7194-2LH20-0AB0
5 m	6ES7194-2LH50-0AB0
10 m	6ES7194-2LN10-0AB0
15 m	6ES7194-2LN15-0AB0
Pre-assembled at one end, 1 M8 connector	
2 m	6ES7194-2LH20-0AC0
5 m	6ES7194-2LH50-0AC0
10 m	6ES7194-2LN10-0AC0
15 m	6ES7194-2LN15-0AC0

Article No.

M8 power cable	
4-pin	
Pre-assembled at both ends, M8 connector and M8 socket	
0.19 m	6ES7194-2LH02-1AA0
0.3 m	6ES7194-2LH03-1AA0
1 m	6ES7194-2LH10-1AA0
2 m	6ES7194-2LH20-1AA0
5 m	6ES7194-2LH50-1AA0
10 m	6ES7194-2LN10-1AA0
15 m	6ES7194-2LN15-1AA0
Pre-assembled at both ends, angled M8 connector and angled M8 socket	
0.3 m	6ES7194-2LH03-1AB0
1 m	6ES7194-2LH10-1AB0
2 m	6ES7194-2LH20-1AB0
5 m	6ES7194-2LH50-1AB0
10 m	6ES7194-2LN10-1AB0
15 m	6ES7194-2LN15-1AB0
Pre-assembled at one end, M8 socket	
2 m	6ES7194-2LH20-1AC0
5 m	6ES7194-2LH50-1AC0
10 m	6ES7194-2LN10-1AC0
15 m	6ES7194-2LN15-1AC0
M8 connector for ET connection	6ES7194-2AB00-0AA0
4-pin, shielded	
M8 power connector	
Male contact insert, 4-pin	6ES7194-2AA00-0AA0
Female contact insert, 4-pin	6ES7194-2AC00-0AA0
ET connection FastConnect stripping tool	6ES7194-2KA00-0AA0
Stripping tool for stripping the ET connection bus cable	
Labels	6ES7194-2BA00-0AA0
10 x 5 mm, RAL 9016; 5 frames with 40 labels each	

Overview



- Interface module for linking the ET 200AL to PROFINET
- Handles data exchange with the PROFINET IO controller in the PLC
- Max. 32 I/O modules can be connected
- Max. data volume of 1430 bytes, for input and output data respectively
- Shortest bus cycle 250 µs
- Automatic power-up by means of topology recognition
- Autocrossover
- Shared device on up to 4 IO controllers
- Support for the MRP (media redundancy protocol) and MRPD (media redundancy with planned duplication) functions
- Identification and maintenance data IM0 ... IM4
- Firmware update
- Configuration management (option handling)
- PROFIenergy

Technical specifications

Article number	6ES7157-1AB00-0AB0 ET 200AL, IM 157-1 PN
General information	
Product type designation	IM 157-1 PN
HW functional status	E01
Firmware version	V1.0.x
Vendor identification (VendorID)	002AH
Product function	
• I&M data	Yes; I&M0 to I&M4
Engineering with	
• STEP 7 TIA Portal configurable/integrated as of version	STEP 7 V13 SP1 or higher
• STEP 7 configurable/integrated as of version	From V5.5 SP4 Hotfix 3
• PROFINET as of GSD version/GSD revision	GSDML V2.3.1
Supply voltage	
Load voltage 1L+	
• Rated value (DC)	24 V
• Reverse polarity protection	Yes; against destruction
Input current	
Current consumption (rated value)	100 mA
from load voltage 1L+ (unswitched voltage)	4 A; Maximum value
from load voltage 2L+, max.	4 A; Maximum value
Power loss	
Power loss, typ.	2.9 W
Address area	
Address space per station	
• Address space per station, max.	1 430 byte
Interfaces	
Number of PROFINET interfaces	1

Article number	6ES7157-1AB00-0AB0 ET 200AL, IM 157-1 PN
1. Interface	
Interface type	PROFINET
Interface types	
• integrated switch	Yes
• M12 port	Yes; 2x M12 d-coded
Functionality	
• PROFINET IO Device	Yes
M12 port	
• Transmission procedure	PROFINET with 100 Mbit/s full duplex (100BASE-TX)
• 10 Mbps	Yes; for Ethernet services
• 100 Mbps	Yes; PROFINET with 100 Mbit/s full duplex (100BASE-TX)
• Autonegotiation	Yes
• Autocrossing	Yes
Protocols	
PROFINET IO Device	
Services	
- Open IE communication	Yes
- IRT	Yes; 250 µs, 500 µs, 1 ms, 2 ms, 4 ms, 8 ms, 16 ms, 32 ms, 64 ms, 128 ms
- MRP	Yes
- MRPD	No
- PROFIenergy	Yes
- Shared device	Yes
- Number of IO Controllers with shared device, max.	4
Open IE communication	
• TCP/IP	Yes
• SNMP	Yes
• LLDP	Yes
Interrupts/diagnostics/status information	
Alarms	Yes
Diagnostic functions	Yes

I/O systems

SIMATIC ET 200 systems without control cabinet
SIMATIC ET 200AL

Interface modules > IM 157-1 PN

Technical specifications (continued)

Article number	6ES7157-1AB00-0AB0 ET 200AL, IM 157-1 PN
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 LED
Potential separation	
between the load voltages	Yes
between PROFINET and all other circuits	Yes
Isolation	
Isolation tested with	707 V DC (type test)
Degree and class of protection	
Degree of protection acc. to EN 60529	
• IP65	Yes
• IP67	Yes

Article number	6ES7157-1AB00-0AB0 ET 200AL, IM 157-1 PN
Ambient conditions	
Ambient temperature during operation	
• min.	-25 °C
• max.	55 °C
Connection method	
Power supply	M8, 4-pole
ET-Connection	
• ET-Connection	M8, 4-pin, shielded
Dimensions	
Width	45 mm
Height	159 mm
Depth	40 mm
Weights	
Weight, approx.	263 g

Ordering data

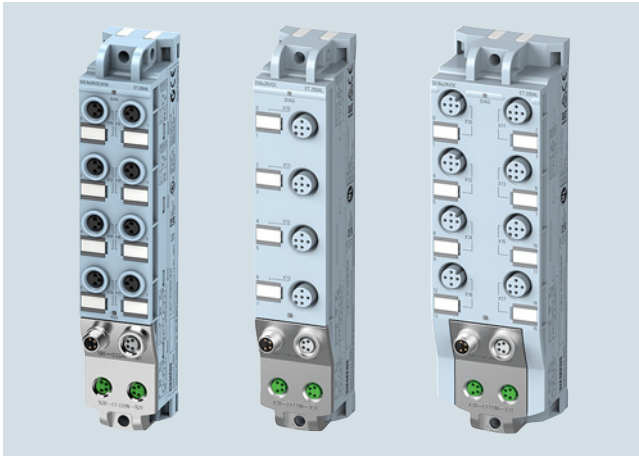
Article No.

IM 157-1 PN interface module	6ES7157-1AB00-0AB0
For connecting ET 200AL to PROFINET	
Accessories	
Bus cable for backplane bus (ET connection)	
4-pin, shielded	
Pre-assembled at both ends, 2 M8 connectors	
0.19 m	6ES7194-2LH02-0AA0
0.3 m	6ES7194-2LH03-0AA0
1 m	6ES7194-2LH10-0AA0
2 m	6ES7194-2LH20-0AA0
5 m	6ES7194-2LH50-0AA0
10 m	6ES7194-2LN10-0AA0
15 m	6ES7194-2LN15-0AA0
Pre-assembled at both ends, 2 M8 connectors, angled	
0.3 m	6ES7194-2LH03-0AB0
1 m	6ES7194-2LH10-0AB0
2 m	6ES7194-2LH20-0AB0
5 m	6ES7194-2LH50-0AB0
10 m	6ES7194-2LN10-0AB0
15 m	6ES7194-2LN15-0AB0
Pre-assembled at one end, 1 M8 connector	
2 m	6ES7194-2LH20-0AC0
5 m	6ES7194-2LH50-0AC0
10 m	6ES7194-2LN10-0AC0
15 m	6ES7194-2LN15-0AC0

Article No.

M8 power cable	
4-pin	
Pre-assembled at both ends, M8 connector and M8 socket	
0.19 m	6ES7194-2LH02-1AA0
0.3 m	6ES7194-2LH03-1AA0
1 m	6ES7194-2LH10-1AA0
2 m	6ES7194-2LH20-1AA0
5 m	6ES7194-2LH50-1AA0
10 m	6ES7194-2LN10-1AA0
15 m	6ES7194-2LN15-1AA0
Pre-assembled at both ends, angled M8 connector and angled M8 socket	
0.3 m	6ES7194-2LH03-1AB0
1 m	6ES7194-2LH10-1AB0
2 m	6ES7194-2LH20-1AB0
5 m	6ES7194-2LH50-1AB0
10 m	6ES7194-2LN10-1AB0
15 m	6ES7194-2LN15-1AB0
Pre-assembled at one end, M8 socket	
2 m	6ES7194-2LH20-1AC0
5 m	6ES7194-2LH50-1AC0
10 m	6ES7194-2LN10-1AC0
15 m	6ES7194-2LN15-1AC0
M8 connector for ET connection	6ES7194-2AB00-0AA0
4-pin, shielded	
M8 power connector	
Male contact insert, 4-pin	6ES7194-2AA00-0AA0
Female contact insert, 4-pin	6ES7194-2AC00-0AA0
ET connection FastConnect stripping tool	6ES7194-2KA00-0AA0
Stripping tool for stripping the ET connection bus cable	
Labels	6ES7194-2BA00-0AA0
10 x 5 mm, RAL 9016; 5 frames with 40 labels each	

Overview



- 30 and 45 mm-wide modules with parameters and diagnostic functions
- 8-channel digital input module with M8 or M12 connection
- 16-channel digital input module with M12 connection
- 8-channel digital input/output module with M8 or M12 connection
- 16-channel digital input/output module with M12 connection
- 8-channel digital output module 2 A with M12 connection

Technical specifications

Article number	6ES7141-5BF00-0BA0 ET 200AL, DI 8X24VDC, 8XM8	6ES7141-5AF00-0BA0 ET 200AL, DI 8X24VDC, 4XM12	6ES7141-5AH00-0BA0 ET 200AL, DI 16X24VDC, 8XM12
General information			
Product type designation	DI 8x24VDC, 8xM8	DI 8x24VDC, 4XM12	DI 16x24VDC, 8XM12
HW functional status	E01	E01	E01
Firmware version	V1.0.x	V1.0.x	V1.0.x
Product function			
• I&M data	Yes; I&M0 to I&M3	Yes; I&M0 to I&M3	Yes; I&M0 to I&M3
Engineering with			
• STEP 7 TIA Portal configurable/ integrated as of version	STEP 7 V13 SP1 or higher	STEP 7 V13 SP1 or higher	STEP 7 V13 SP1 or higher
• STEP 7 configurable/integrated as of version	From V5.5 SP4 Hotfix 3	V5.5 SP4 Hotfix 7 or higher	V5.5 SP4 Hotfix 7 or higher
• PROFIBUS as of GSD version/ GSD revision	GSD as of Revision 5	GSD as of Revision 5	GSD as of Revision 5
• PROFINET as of GSD version/ GSD revision	GSDML V2.3.1	GSDML V2.3.1	GSDML V2.3.1
Supply voltage			
Load voltage 1L+			
• Rated value (DC)	24 V	24 V	24 V
• Reverse polarity protection	Yes; Against destruction; encoder power supply outputs applied with reversed polarity	Yes; Against destruction; encoder power supply outputs applied with reversed polarity	Yes; Against destruction; encoder power supply outputs applied with reversed polarity
Input current			
Current consumption (rated value) from load voltage 1L+ (unswitched voltage)	25 mA; without load 4 A; Maximum value	25 mA; without load 4 A; Maximum value	30 mA; without load 4 A; Maximum value
from load voltage 2L+, max.	4 A; Maximum value	4 A; Maximum value	4 A; Maximum value
Encoder supply			
Number of outputs	8	4	8
24 V encoder supply			
• Short-circuit protection	Yes; per module, electronic	Yes; per module, electronic	Yes; per module, electronic
• Output current, max.	0.7 A; Total current of all encoders	0.7 A; Total current of all encoders	1.4 A; Total current of all encoders
Power loss			
Power loss, typ.	1.9 W	1.9 W	2.7 W
Digital inputs			
Number of digital inputs	8	8	16
Input characteristic curve in accordance with IEC 61131, type 3	Yes	Yes	Yes

I/O systems

SIMATIC ET 200 systems without control cabinet

SIMATIC ET 200AL

I/O modules > Digital I/O modules

Technical specifications (continued)

Article number	6ES7141-5BF00-0BA0 ET 200AL, DI 8X24VDC, 8XM8	6ES7141-5AF00-0BA0 ET 200AL, DI 8X24VDC, 4XM12	6ES7141-5AH00-0BA0 ET 200AL, DI 16X24VDC, 8XM12
Number of simultaneously controllable inputs			
all mounting positions			
- up to 55 °C, max.	8	8	16
Input voltage			
• Type of input voltage	DC	DC	DC
• Rated value (DC)	24 V	24 V	24 V
• for signal "0"	-30 to +5V	-30 to +5V	-30 to +5V
• for signal "1"	+11 to +30V	+11 to +30V	+11 to +30V
Input current			
• for signal "1", typ.	3.2 mA	3.2 mA	3.2 mA
Input delay (for rated value of input voltage) for standard inputs			
- at "0" to "1", min.	1.2 ms	1.2 ms	1.2 ms
- at "0" to "1", max.	4.8 ms	4.8 ms	4.8 ms
- at "1" to "0", min.	1.2 ms	1.2 ms	1.2 ms
- at "1" to "0", max.	4.8 ms	4.8 ms	4.8 ms
Cable length			
• unshielded, max.	30 m	30 m	30 m
Encoder			
Connectable encoders			
• 2-wire sensor	Yes	Yes	Yes
- permissible quiescent current (2-wire sensor), max.	1.5 mA	1.5 mA	1.5 mA
Interrupts/diagnostics/status information			
Alarms			
• Diagnostic alarm	Yes; Parameterizable	Yes; Parameterizable	Yes; Parameterizable
Diagnostic messages			
• Short-circuit	Yes; Sensor supply to M; module by module	Yes; Sensor supply to M; module by module	Yes; Sensor supply to M; module by module
Diagnostics indication LED			
• Channel status display	Yes; Green LED	Yes; Green LED	Yes; Green LED
• for module diagnostics	Yes; Green/red LED	Yes; Green/red LED	Yes; Green/red LED
Potential separation			
between the load voltages	Yes	Yes	Yes
Potential separation channels			
• between the channels	No	No	No
• between the channels and backplane bus	Yes	Yes	Yes
• between the channels and the power supply of the electronics	No	No	No
Isolation			
Isolation tested with	707 V DC (type test)	707 V DC (type test)	707 V DC (type test)
Degree and class of protection			
Degree of protection acc. to EN 60529			
• IP65	Yes	Yes	Yes
• IP67	Yes	Yes	Yes
Ambient conditions			
Ambient temperature during operation			
• min.	-25 °C	-25 °C	-25 °C
• max.	55 °C	55 °C	55 °C
Connection method			
Design of electrical connection for the inputs and outputs	M8, 3-pole	M12, 5-pole	M12, 5-pole
Power supply	M8, 4-pole	M8, 4-pole	M8, 4-pole
ET-Connection			
• ET-Connection	M8, 4-pin, shielded	M8, 4-pin, shielded	M8, 4-pin, shielded

Technical specifications (continued)

Article number	6ES7141-5BF00-0BA0 ET 200AL, DI 8X24VDC, 8XM8	6ES7141-5AF00-0BA0 ET 200AL, DI 8X24VDC, 4XM12	6ES7141-5AH00-0BA0 ET 200AL, DI 16X24VDC, 8XM12
Dimensions			
Width	30 mm	30 mm	45 mm
Height	159 mm	159 mm	159 mm
Depth	40 mm	40 mm	40 mm
Weights			
Weight, approx.	145 g	145 g	184 g

Article number	6ES7142-5AF00-0BA0 ET 200AL, DQ 8X24VDC/2A, 8XM12
General information	
Product type designation	DQ 8X24VDC/2A, 8XM12
HW functional status	E01
Firmware version	V1.0.x
Product function	
• I&M data	Yes; I&M0 to I&M3
Engineering with	
• STEP 7 TIA Portal configurable/ integrated as of version	STEP 7 V13 SP1 or higher
• STEP 7 configurable/integrated as of version	V5.5 SP4 Hotfix 7 or higher
• PROFIBUS as of GSD version/ GSD revision	GSD as of Revision 5
• PROFINET as of GSD version/ GSD revision	GSDML V2.3.1
Supply voltage	
Load voltage 1L+	
• Rated value (DC)	24 V
• Reverse polarity protection	Yes; against destruction; load increasing
Load voltage 2L+	
• Rated value (DC)	24 V
• Reverse polarity protection	Yes; against destruction; load increasing
Input current	
Current consumption (rated value)	40 mA; without load
from load voltage 1L+ (unswitched voltage)	4 A; Maximum value
from load voltage 2L+, max.	4 A; Maximum value
Power loss	
Power loss, typ.	4 W
Digital outputs	
Number of digital outputs	8
• in groups of	4; 2 load groups for 4 outputs each
Short-circuit protection	Yes; per channel, electronic
• Response threshold, typ.	2.8 A
Limitation of inductive shutdown voltage to	2L+ (-47 V)
Switching capacity of the outputs	
• on lamp load, max.	10 W

Article number	6ES7142-5AF00-0BA0 ET 200AL, DQ 8X24VDC/2A, 8XM12
Load resistance range	
• lower limit	12 Ω
• upper limit	4 kΩ
Output voltage	
• for signal "1", min.	L+ (-0.8 V)
Output current	
• for signal "1" rated value	2 A
• for signal "1" permissible range, max.	2 A; with inductive load to IEC 60947-5-1, DC-13 / AC-15
• for signal "0" residual current, max.	0.5 mA
Switching frequency	
• with resistive load, max.	100 Hz
• with inductive load, max.	0.1 Hz; 0.25 Hz at 25 °C
• on lamp load, max.	1 Hz
Total current of the outputs	
• Current per group, max.	4 A; For inductive load max. 2 channels per group
Cable length	
• unshielded, max.	30 m
Interrupts/diagnostics/ status information	
Substitute values connectable	Yes; channel by channel, parameterizable
Alarms	
• Diagnostic alarm	Yes; Parameterizable
Diagnostic messages	
• Short-circuit	Yes; Outputs to ground; module by module
Diagnostics indication LED	
• Channel status display	Yes; Green LED
• for module diagnostics	Yes; Green/red LED
• For load voltage monitoring	Yes; Green LED
Potential separation	
between the load voltages	Yes
Potential separation channels	
• between the channels, in groups of	4
• between the channels and backplane bus	Yes
• between the channels and the power supply of the electronics	No; 4 channels are non-isolated and 4 channels are isolated from supply voltage 1L+
Isolation	
Isolation tested with	707 V DC (type test)
Degree and class of protection	
Degree of protection acc. to EN 60529	
• IP65	Yes
• IP67	Yes

I/O systems

SIMATIC ET 200 systems without control cabinet
SIMATIC ET 200AL

I/O modules > Digital I/O modules

Technical specifications (continued)

Article number	6ES7142-5AF00-0BA0 ET 200AL, DQ 8X24VDC/2A, 8XM12
Ambient conditions	
Ambient temperature during operation	
• min.	-25 °C
• max.	55 °C
Connection method	
Design of electrical connection for the inputs and outputs	M12, 5-pole
Power supply	M8, 4-pole
ET-Connection	
• ET-Connection	M8, 4-pin, shielded

Article number	6ES7142-5AF00-0BA0 ET 200AL, DQ 8X24VDC/2A, 8XM12
Dimensions	
Width	45 mm
Height	159 mm
Depth	40 mm
Weights	
Weight, approx.	192 g

Article number	6ES7143-5BF00-0BA0 ET 200AL, DIQ 4+DQ 4X24VDC/0.5A, 8XM8	6ES7143-5AF00-0BA0 ET 200AL, DIQ 4+DQ 4X24VDC/0.5A, 4XM12	6ES7143-5AH00-0BA0 ET 200AL, DIQ 16x24VDC/0.5A, 8XM12
General information			
Product type designation	DIQ 4+DQ 4X24VDC/0.5A, 8xM8	DIQ 4+DQ 4X24VDC/0.5 A, 4XM12	DIQ 16X24VDC/0.5A, 8XM12
HW functional status	E01	E01	E01
Firmware version	V1.0.x	V1.0.x	V1.0.x
Product function			
• I&M data	Yes; I&M0 to I&M3	Yes; I&M0 to I&M3	Yes; I&M0 to I&M3
Engineering with			
• STEP 7 TIA Portal configurable/integrated as of version	STEP 7 V13 SP1 or higher	STEP 7 V13 SP1 or higher	STEP 7 V14 or higher
• STEP 7 configurable/integrated as of version	From V5.5 SP4 Hotfix 3	V5.5 SP4 Hotfix 7 or higher	V5.5 SP4 Hotfix 7 or higher
• PROFIBUS as of GSD version/GSD revision	GSD as of Revision 5	GSD as of Revision 5	GSD as of Revision 5
• PROFINET as of GSD version/GSD revision	GSDML V2.3.1	GSDML V2.3.1	GSDML V2.3.1
Operating mode			
• DI			Yes
• Counter			Yes
• DQ			Yes
Supply voltage			
Load voltage 1L+			
• Rated value (DC)	24 V	24 V	24 V
• Reverse polarity protection	Yes; Against destruction; encoder power supply outputs applied with reversed polarity, loads pick up	Yes; Against destruction; encoder power supply outputs applied with reversed polarity, loads pick up	Yes; Against destruction; encoder power supply outputs applied with reversed polarity, loads pick up
Load voltage 2L+			
• Rated value (DC)	24 V	24 V	24 V
• Reverse polarity protection	Yes; against destruction; load increasing	Yes; against destruction; load increasing	Yes; Against destruction; encoder power supply outputs applied with reversed polarity, loads pick up
Input current			
Current consumption (rated value) from load voltage 1L+ (unswitched voltage)	40 mA; without load 4 A; Maximum value	40 mA; without load 4 A; Maximum value	75 mA; without load 4 A; Maximum value
from load voltage 2L+, max.	4 A; Maximum value	4 A; Maximum value	4 A; Maximum value
Encoder supply			
Number of outputs	4	4	8
24 V encoder supply			
• Short-circuit protection	Yes; per module, electronic	Yes; per module, electronic	Yes; Per load voltage, electronic
• Output current, max.	0.7 A; Total current of all encoders	0.7 A; Total current of all encoders	1.4 A; Total current of all encoders, max. 0.7 A per load voltage

Technical specifications (continued)

Article number	6ES7143-5BF00-0BA0 ET 200AL, DIQ 4+DQ 4X24VDC/0.5A, 8XM8	6ES7143-5AF00-0BA0 ET 200AL, DIQ 4+DQ 4X24VDC/0.5A, 4XM12	6ES7143-5AH00-0BA0 ET 200AL, DIQ 16x24VDC/0.5A, 8xM12
Power loss			
Power loss, typ.	2.5 W	2.5 W	4 W
Digital inputs			
Number of digital inputs	4; Parameterizable as DIQ	4; Parameterizable as DIQ	16; Parameterizable as DIQ
Input characteristic curve in accordance with IEC 61131, type 3	Yes	Yes	Yes
Number of simultaneously controllable inputs			
all mounting positions			
- up to 55 °C, max.	4	4	16
Digital input functions, parameterizable			
• Freely usable digital input			Yes
• Counter			Yes
- Number, max.			4
- Counting frequency, max.			2 kHz
- Counting width			32 bit; Incl. sign
- Counting direction up/down			Yes
Input voltage			
• Type of input voltage	DC	DC	DC
• Rated value (DC)	24 V	24 V	24 V
• for signal "0"	-3 to +5V	-3 to +5V	-3 to +5V
• for signal "1"	+11 to +30V	+11 to +30V	+11 to +30V
Input current			
• for signal "1", typ.	3.2 mA	3.2 mA	3 mA
Input delay (for rated value of input voltage) for standard inputs			
- parameterizable			Yes
- at "0" to "1", min.	1.2 ms	1.2 ms	0.05 ms; 1.6 ms for channels 8 through 15
- at "0" to "1", max.	4.8 ms	4.8 ms	20 ms
- at "1" to "0", min.	1.2 ms	1.2 ms	0.05 ms; 1.6 ms for channels 8 through 15
- at "1" to "0", max.	4.8 ms	4.8 ms	20 ms
for counter/technological functions			
- parameterizable			Yes
Cable length			
• unshielded, max.	30 m	30 m	30 m
Digital outputs			
Number of digital outputs	8; 4 DQ fixed, 4 DIQ parameterizable	8; 4 DQ fixed, 4 DIQ parameterizable	16; Parameterizable as DIQ
• in groups of	4; 2 load groups for 4 outputs each	4; 2 load groups for 4 outputs each	8; 2 load groups for 8 outputs each
Short-circuit protection	Yes; per channel, electronic	Yes; per channel, electronic	Yes; per channel, electronic
• Response threshold, typ.	0.7 A	0.7 A	0.7 A
Limitation of inductive shutdown voltage to	2L+ (-47 V)	2L+ (-47 V)	L+ (-53 V)
Digital output functions, parameterizable			
• Switching tripped by comparison values			Yes
• Freely usable digital output			Yes
Switching capacity of the outputs			
• on lamp load, max.	5 W	5 W	5 W
Load resistance range			
• lower limit	48 Ω	48 Ω	48 Ω
• upper limit	4 kΩ	4 kΩ	4 kΩ

I/O systems

SIMATIC ET 200 systems without control cabinet

SIMATIC ET 200AL

I/O modules > Digital I/O modules

Technical specifications (continued)

Article number	6ES7143-5BF00-0BA0 ET 200AL, DIQ 4+DQ 4X24VDC/0.5A, 8XM8	6ES7143-5AF00-0BA0 ET 200AL, DIQ 4+DQ 4X24VDC/0.5A, 4XM12	6ES7143-5AH00-0BA0 ET 200AL, DIQ 16x24VDC/0.5A, 8xM12
Output voltage • for signal "1", min.	L+ (-0.8 V)	L+ (-0.8 V)	L+ (-0.8 V)
Output current • for signal "1" rated value • for signal "0" residual current, max.	0.5 A 0.5 mA	0.5 A 0.5 mA	0.5 A 0.5 mA
Switching frequency • with resistive load, max. • with inductive load, max. • on lamp load, max.	100 Hz 0.5 Hz 1 Hz	100 Hz 0.5 Hz 1 Hz	100 Hz 0.5 Hz 1 Hz
Total current of the outputs • Current per group, max.	2 A	2 A	4 A
Cable length • unshielded, max.	30 m	30 m	30 m
Encoder Connectable encoders • 2-wire sensor - permissible quiescent current (2-wire sensor), max.	Yes 1.5 mA	Yes 1.5 mA	Yes 1.5 mA
Interrupts/diagnostics/ status information Substitute values connectable	Yes; channel by channel, parameterizable	Yes; channel by channel, parameterizable	Yes; channel by channel, parameterizable
Alarms • Diagnostic alarm	Yes; Parameterizable	Yes; Parameterizable	Yes; Parameterizable
Diagnostic messages • Short-circuit	Yes; Outputs to M; encoder supply to M; module by module	Yes; Outputs to M; encoder supply to M; module by module	Yes; Outputs to M; encoder supply to M; module by module
Diagnostics indication LED • Channel status display • for module diagnostics • For load voltage monitoring	Yes; Green LED Yes; Green/red LED Yes; Green LED	Yes; Green LED Yes; Green/red LED Yes; Green LED	Yes; Green LED Yes; Green/red LED Yes; Green LED
Potential separation between the load voltages	Yes	Yes	Yes
Potential separation channels • between the channels, in groups of • between the channels and backplane bus • between the channels and the power supply of the electronics	4; DIQ channels are isolated from DQ channels Yes No; DIQ channels are non-isolated and DQ channels are isolated from supply voltage 1L+	4; DIQ channels are isolated from DQ channels Yes No; DIQ channels are non-isolated and DQ channels are isolated from supply voltage 1L+	8 Yes No; 8 channels are non-isolated and 8 channels are isolated from supply voltage 1L+
Isolation Isolation tested with	707 V DC (type test)	707 V DC (type test)	707 V DC (type test)
Degree and class of protection Degree of protection acc. to EN 60529 • IP65 • IP67	Yes Yes	Yes Yes	Yes Yes
Ambient conditions Ambient temperature during operation • min. • max.	-25 °C 55 °C	-25 °C 55 °C	-25 °C 55 °C

Technical specifications (continued)

Article number	6ES7143-5BF00-0BA0	6ES7143-5AF00-0BA0	6ES7143-5AH00-0BA0
	ET 200AL, DIQ 4+DQ 4X24VDC/0.5A, 8XM8	ET 200AL, DIQ 4+DQ 4X24VDC/0.5A, 4XM12	ET 200AL, DIQ 16x24VDC/0.5A, 8xM12
Connection method			
Design of electrical connection for the inputs and outputs	M8, 3-pole	M12, 5-pole	M12, 5-pole
Power supply	M8, 4-pole	M8, 4-pole	M8, 4-pole
ET-Connection			
• ET-Connection	M8, 4-pin, shielded	M8, 4-pin, shielded	M8, 4-pin, shielded
Dimensions			
Width	30 mm	30 mm	45 mm
Height	159 mm	159 mm	159 mm
Depth	40 mm	40 mm	40 mm
Weights			
Weight, approx.	145 g	145 g	195 g

Ordering data

Article No.	Article No.
Digital input modules	M8 power cable
DI 8X24VDC, 8XM8	4-pin
DI 8X24VDC, 4XM12	Pre-assembled at both ends, M8 connector and M8 socket
DI 16X24VDC, 8XM12	0.19 m
Digital output modules	0.3 m
DQ 8X24VDC/2A, 8XM12	1 m
Digital input/output modules	2 m
4 DIO / 4 DO, 24 V DC, 0.5 A	5 m
DIQ 4+DQ 4X24VDC/0.5A, 4XM12	10 m
DIQ 16X24VDC/0.5A, 8XM12	15 m
Accessories	Pre-assembled at both ends, angled M8 connector and angled M8 socket
Bus cable for backplane bus (ET connection)	0.3 m
4-pin, shielded	1 m
Pre-assembled at both ends, 2 M8 connectors	2 m
0.19 m	5 m
0.3 m	10 m
1 m	15 m
2 m	Pre-assembled at one end, M8 socket
5 m	2 m
10 m	5 m
15 m	10 m
Pre-assembled at both ends, two M8 connectors, angled	15 m
0.3 m	M8 connector for ET connection
1 m	4-pin, shielded
2 m	M8 power connector
5 m	Male contact insert, 4-pin
10 m	Female contact insert, 4-pin
15 m	ET connection FastConnect stripping tool
Pre-assembled at one end, one M8 connector	Stripping tool for stripping the ET connection bus cable
2 m	Labels
5 m	10 x 5 mm, RAL 9016;
10 m	5 frames with 40 labels each
15 m	

I/O systems

SIMATIC ET 200 systems without control cabinet
SIMATIC ET 200AL

I/O modules > Analog I/O modules

Overview



- 30-mm-wide module with parameters and diagnostic functions
- For connecting analog actuators and sensors without additional amplifiers
- 4-channel analog input module with M12 connection
- 4-channel analog output module with M12 connection

Technical specifications

Article number	6ES7144-5KD00-0BA0 ET 200AL, AI 4XU/I/RTD, 4XM12
General information	
Product type designation	AI 4xU/I/RTD, 4xM12
HW functional status	E02
Firmware version	V1.0.x
Product function	
• I&M data	Yes; I&M0 to I&M3
Engineering with	
• STEP 7 TIA Portal configurable/integrated as of version	STEP 7 V13 SP1 or higher
• STEP 7 configurable/integrated as of version	From V5.5 SP4 Hotfix 3
• PROFIBUS as of GSD version/GSD revision	GSD as of Revision 5
• PROFINET as of GSD version/GSD revision	GSDML V2.3.1
Supply voltage	
Load voltage 1L+	
• Rated value (DC)	24 V
• Reverse polarity protection	Yes; against destruction
Input current	
Current consumption (rated value)	35 mA; without load
from load voltage 1L+ (unswitched voltage)	4 A; Maximum value
from load voltage 2L+, max.	4 A; Maximum value
Encoder supply	
Number of outputs	4
24 V encoder supply	
• Short-circuit protection	Yes; per channel, electronic
• Output current, max.	0.5 A; per channel, total current of all channels max. 1 A
Power loss	
Power loss, typ.	1.5 W

Article number	6ES7144-5KD00-0BA0 ET 200AL, AI 4XU/I/RTD, 4XM12
Analog inputs	
Number of analog inputs	4
• For current measurement	4
• For voltage measurement	4
• For resistance/resistance thermometer measurement	4
permissible input voltage for voltage input (destruction limit), max.	30 V
permissible input current for current input (destruction limit), max.	50 mA
Cycle time (all channels), min.	8 ms
Technical unit for temperature measurement adjustable	Yes; Degrees Celsius / degrees Fahrenheit / Kelvin
Input ranges (rated values), voltages	
• 0 to +10 V	Yes
• Input resistance (0 to 10 V)	10 MΩ
• 1 V to 5 V	Yes
• Input resistance (1 V to 5 V)	10 MΩ
Input ranges (rated values), currents	
• 0 to 20 mA	Yes
• Input resistance (0 to 20 mA)	50 Ω
• 4 mA to 20 mA	Yes
• Input resistance (4 mA to 20 mA)	50 Ω
Input ranges (rated values), resistance thermometer	
• Ni 100	Yes; Standard/climate
• Input resistance (Ni 100)	10 MΩ
• Pt 100	Yes; Standard/climate
• Input resistance (Pt 100)	10 MΩ
Input ranges (rated values), resistors	
• 0 to 150 ohms	Yes
• Input resistance (0 to 150 ohms)	10 MΩ
• 0 to 300 ohms	Yes
• Input resistance (0 to 300 ohms)	10 MΩ

Technical specifications (continued)

Article number	6ES7144-5KD00-0BA0 ET 200AL, AI 4XU/I/RTD, 4XM12
Cable length	
• shielded, max.	30 m
Analog value generation for the inputs	
Measurement principle	integrating
Integration and conversion time/ resolution per channel	
• Resolution with overrange (bit including sign), max.	16 bit
• Integration time, parameterizable	Yes; channel by channel
• Integration time (ms)	0,3 / 16,7 / 20 / 60
• Interference voltage suppression for interference frequency f1 in Hz	16.7 / 50 / 60 / 3 600
• Conversion time (per channel)	2 / 18 / 21 / 61 ms
Smoothing of measured values	
• parameterizable	Yes
• Step: None	Yes; 1 x cycle time
• Step: low	Yes; 4 x cycle time
• Step: Medium	Yes; 16 x cycle time
• Step: High	Yes; 32 x cycle time
Encoder	
Connection of signal encoders	
• for voltage measurement	Yes
• for current measurement as 2-wire transducer	Yes
• for current measurement as 4-wire transducer	Yes
• for resistance measurement with two-wire connection	Yes
• for resistance measurement with three-wire connection	Yes
Errors/accuracies	
Linearity error (relative to input range), (+/-)	0.025 %
Temperature error (relative to input range), (+/-)	0.01 %/K
Crosstalk between the inputs, max.	-70 dB
Repeat accuracy in steady state at 25 °C (relative to input range), (+/-)	0.01 %
Operational error limit in overall temperature range	
• Voltage, relative to input range, (+/-)	0.35 %
• Current, relative to input range, (+/-)	0.45 %
• Resistance, relative to input range, (+/-)	0.25 %
• Resistance thermometer, relative to input range, (+/-)	0.25 %
Basic error limit (operational limit at 25 °C)	
• Voltage, relative to input range, (+/-)	0.25 %
• Current, relative to input range, (+/-)	0.25 %
• Resistance, relative to input range, (+/-)	0.15 %
• Resistance thermometer, relative to input range, (+/-)	0.15 %

Article number	6ES7144-5KD00-0BA0 ET 200AL, AI 4XU/I/RTD, 4XM12
Interference voltage suppression for $f = n \times (f1 \pm 0.5 \%)$, f1 = interference frequency	
• Series mode interference (peak value of interference < rated value of input range), min.	40 dB
Interrupts/diagnostics/ status information	
Alarms	
• Diagnostic alarm	Yes; Parameterizable
• Limit value alarm	Yes; Parameterizable
Diagnostic messages	
• Wire-break	Yes; at 4 mA to 20 mA and 1 V to 5 V
• Short-circuit	Yes; Encoder supply to M, channel by channel
• Overflow/underflow	Yes
Diagnostics indication LED	
• Channel status display	Yes; Green LED
• for module diagnostics	Yes; Green/red LED
Potential separation	
between the load voltages	Yes
Potential separation channels	
• between the channels	No
• between the channels and backplane bus	Yes
• between the channels and the power supply of the electronics	No
Isolation	
Isolation tested with	707 V DC (type test)
Degree and class of protection	
Degree of protection acc. to EN 60529	
• IP65	Yes
• IP67	Yes
Ambient conditions	
Ambient temperature during operation	
• min.	-25 °C
• max.	55 °C
Connection method	
Design of electrical connection for the inputs and outputs	M12, 5-pole
Power supply	M8, 4-pole
ET-Connection	
• ET-Connection	M8, 4-pin, shielded
Dimensions	
Width	30 mm
Height	159 mm
Depth	40 mm
Weights	
Weight, approx.	168 g

I/O systems

SIMATIC ET 200 systems without control cabinet
SIMATIC ET 200AL

I/O modules > Analog I/O modules

Technical specifications (continued)

Article number	6ES7145-5ND00-0BA0 ET 200AL, AQ 4xU/I, 4xM12
General information	
Product type designation	AQ 4XU/I, 4XM12
HW functional status	E01
Firmware version	V1.0.x
Product function	
• I&M data	Yes; I&M0 to I&M3
Engineering with	
• STEP 7 TIA Portal configurable/ integrated as of version	STEP 7 V14 or higher
• STEP 7 configurable/integrated as of version	V5.5 SP4 Hotfix 7 or higher
• PROFIBUS as of GSD version/ GSD revision	GSD as of Revision 5
• PROFINET as of GSD version/ GSD revision	GSDML V2.3.1
Supply voltage	
Load voltage 1L+	
• Rated value (DC)	24 V
• Reverse polarity protection	Yes; Against destruction; actuator power supply outputs applied with reversed polarity
Input current	
Current consumption (rated value)	110 mA; without load
from load voltage 1L+ (unswitched voltage)	4 A; Maximum value
from load voltage 2L+, max.	4 A; Maximum value
Actuator supply	
Number of outputs	4
Short-circuit protection	Yes; per module, electronic
Output current	
• Rated value	Total current 1 A up to 45 °C; 0.5 A up to 55 °C
Power loss	
Power loss, typ.	2.6 W
Analog outputs	
Number of analog outputs	4
Voltage output, short-circuit protection	Yes
Voltage output, short-circuit current, max.	24 mA
Current output, no-load voltage, max.	15 V
Cycle time (all channels) max.	1 ms
Output ranges, voltage	
• 0 to 10 V	Yes; 15 bit
• 1 V to 5 V	Yes; 14 bit
• -10 V to +10 V	Yes; 16 bit incl. sign
Output ranges, current	
• 0 to 20 mA	Yes; 15 bit
• -20 mA to +20 mA	Yes; 16 bit incl. sign
• 4 mA to 20 mA	Yes; 14 bit
Connection of actuators	
• for voltage output two-wire connection	Yes
• for voltage output four-wire connection	Yes
• for current output two-wire connection	Yes
• for current output four-wire connection	Yes

Article number	6ES7145-5ND00-0BA0 ET 200AL, AQ 4xU/I, 4xM12
Load impedance (in rated range of output)	
• with voltage outputs, min.	1 kΩ
• with voltage outputs, capacitive load, max.	1 μF
• with current outputs, max.	500 Ω
• with current outputs, inductive load, max.	1 mH
Destruction limits against exter- nally applied voltages and currents	
• Voltages at the outputs towards MANA	16 V
Cable length	
• shielded, max.	30 m
Settling time	
• for resistive load	1 ms
• for capacitive load	1 ms
• for inductive load	1 ms
Errors/accuracies	
Output ripple (relative to output range, bandwidth 0 to 50 kHz), (+/-)	0.02 %
Linearity error (relative to output range), (+/-)	0.1 %
Temperature error (relative to output range), (+/-)	0.005 %/K
Crosstalk between the outputs, max.	-70 dB
Repeat accuracy in steady state at 25 °C (relative to output range), (+/-)	0.03 %
Operational error limit in overall temperature range	
• Voltage, relative to output range, (+/-)	0.25 %
• Current, relative to output range, (+/-)	0.25 %
Basic error limit (operational limit at 25 °C)	
• Voltage, relative to output range, (+/-)	0.15 %
• Current, relative to output range, (+/-)	0.15 %
Interrupts/diagnostics/ status information	
Substitute values connectable	Yes; channel by channel, parameterizable
Alarms	
• Diagnostic alarm	Yes; Parameterizable
Diagnostic messages	
• Wire-break	Yes; channel-by-channel, only for output type "current"
• Short-circuit	Yes; Actuator supply module by module; channel by channel for output type "voltage"
Diagnostics indication LED	
• Channel status display	Yes; Green LED
• for module diagnostics	Yes; Green/red LED
Potential separation	
between the load voltages	Yes
Potential separation channels	
• between the channels	No
• between the channels and backplane bus	Yes
• between the channels and the power supply of the electronics	No

Technical specifications (continued)

Article number	6ES7145-5ND00-0BA0 ET 200AL, AQ 4xU/I, 4xM12
Isolation	
Isolation tested with	707 V DC (type test)
Degree and class of protection	
Degree of protection acc. to EN 60529	
• IP65	Yes
• IP67	Yes
Ambient conditions	
Ambient temperature during operation	
• min.	-25 °C
• max.	55 °C

Article number	6ES7145-5ND00-0BA0 ET 200AL, AQ 4xU/I, 4xM12
Connection method	
Design of electrical connection for the inputs and outputs	M12, 5-pole
Power supply	M8, 4-pole
ET-Connection	
• ET-Connection	M8, 4-pin, shielded
Dimensions	
Width	30 mm
Height	159 mm
Depth	40 mm
Weights	
Weight, approx.	175 g

Ordering data

Analog input modules	
AI 4xU/I/RTD, 4xM12	6ES7144-5KD00-0BA0
AQ 4xU/I, 4xM12	6ES7145-5ND00-0BA0
Accessories	
Bus cable for backplane bus (ET connection)	
4-pin, shielded	
Pre-assembled at both ends, 2 M8 connectors	
0.19 m	6ES7194-2LH02-0AA0
0.3 m	6ES7194-2LH03-0AA0
1 m	6ES7194-2LH10-0AA0
2 m	6ES7194-2LH20-0AA0
5 m	6ES7194-2LH50-0AA0
10 m	6ES7194-2LN10-0AA0
15 m	6ES7194-2LN15-0AA0
Pre-assembled at both ends, 2 M8 connectors, angled	
0.3 m	6ES7194-2LH03-0AB0
1 m	6ES7194-2LH10-0AB0
2 m	6ES7194-2LH20-0AB0
5 m	6ES7194-2LH50-0AB0
10 m	6ES7194-2LN10-0AB0
15 m	6ES7194-2LN15-0AB0
Pre-assembled at one end, 1 M8 connector	
2 m	6ES7194-2LH20-0AC0
5 m	6ES7194-2LH50-0AC0
10 m	6ES7194-2LN10-0AC0
15 m	6ES7194-2LN15-0AC0

M8 power cable	
4-pin	
Pre-assembled at both ends, M8 connector and M8 socket	
0.19 m	6ES7194-2LH02-1AA0
0.3 m	6ES7194-2LH03-1AA0
1 m	6ES7194-2LH10-1AA0
2 m	6ES7194-2LH20-1AA0
5 m	6ES7194-2LH50-1AA0
10 m	6ES7194-2LN10-1AA0
15 m	6ES7194-2LN15-1AA0
Pre-assembled at both ends, angled M8 connector and angled M8 socket	
0.3 m	6ES7194-2LH03-1AB0
1 m	6ES7194-2LH10-1AB0
2 m	6ES7194-2LH20-1AB0
5 m	6ES7194-2LH50-1AB0
10 m	6ES7194-2LN10-1AB0
15 m	6ES7194-2LN15-1AB0
Pre-assembled at one end, M8 socket	
2 m	6ES7194-2LH20-1AC0
5 m	6ES7194-2LH50-1AC0
10 m	6ES7194-2LN10-1AC0
15 m	6ES7194-2LN15-1AC0
M8 connector for ET connection	6ES7194-2AB00-0AA0
4-pin, shielded	
M8 power connector	
Male contact insert, 4-pin	6ES7194-2AA00-0AA0
Female contact insert, 4-pin	6ES7194-2AC00-0AA0
ET connection FastConnect stripping tool	6ES7194-2KA00-0AA0
Stripping tool for stripping the ET connection bus cable	
Labels	6ES7194-2BA00-0AA0
10 x 5 mm, RAL 9016; 5 frames with 40 labels each	

I/O systems

SIMATIC ET 200 systems without control cabinet

SIMATIC ET 200AL

I/O modules > Communication > CM IO-Link

Overview



- 30-mm-wide CM IO-Link communication module
- For the connection of up to 4 IO-Link devices according to IO-Link Specification V1.0 and V1.1 and port Class B
- The IO-Link parameters are configured using the Port Configuration Tool (PCT), version V3.2 and higher

Technical specifications

Article number	6ES7147-5JD00-0BA0 ET 200AL, CM 4X IO-LINK, 4XM12
General information	
Product type designation	CM 4x IO-LINK, 4xM12
HW functional status	E03
Firmware version	V1.0.x
Product function	
• I&M data	Yes; I&M0 to I&M3
Engineering with	
• STEP 7 TIA Portal configurable/integrated as of version	STEP 7 V13 SP1 or higher
• STEP 7 configurable/integrated as of version	From V5.5 SP4 Hotfix 3
• PROFIBUS as of GSD version/GSD revision	GSD as of Revision 5
• PROFINET as of GSD version/GSD revision	GSDML V2.3.1
Supply voltage	
Load voltage 1L+	
• Rated value (DC)	24 V
• Reverse polarity protection	Yes
Load voltage 2L+	
• Rated value (DC)	24 V
• Reverse polarity protection	Yes; against destruction; load increasing

Article number	6ES7147-5JD00-0BA0 ET 200AL, CM 4X IO-LINK, 4XM12
Input current	
Current consumption (rated value)	40 mA; without load
from load voltage 1L+ (unswitched voltage)	4 A; Maximum value
from load voltage 2L+, max.	4 A; Maximum value
Encoder supply	
Number of outputs	4
24 V encoder supply	
• Short-circuit protection	Yes; per module, electronic
• Output current, max.	1.4 A; Total current of all ports
Power loss	
Power loss, typ.	2.6 W
IO-Link	
Number of ports	4
• of which simultaneously controllable	4
IO-Link protocol 1.0	Yes
IO-Link protocol 1.1	Yes
Transmission rate	4.8 kBaud (COM1); 38.4 kBaud (COM2), 230 kBaud (COM3)
Size of process data, input per port	32 byte
Size of process data, input per module	32 byte
Size of process data, output per port	32 byte
Size of process data, output per module	32 byte
Memory size for device parameter	2 kbyte; for each port
Cable length unshielded, max.	20 m
Operating modes	
• IO-Link	Yes
• DI	Yes
• DQ	Yes; max. 100 mA
Connection of IO-Link devices	
• Port type A	Yes; via 3-core cable
• Port type B	Yes; Additional device supply: 1.6 A total current of all ports

Technical specifications (continued)

Article number	6ES7147-5JD00-0BA0 ET 200AL, CM 4X IO-LINK, 4XM12
Interrupts/diagnostics/ status information	
Alarms	
• Diagnostic alarm	Yes; Parameterizable
Diagnostic messages	
• Monitoring the supply voltage	Yes
• Wire-break	Yes
• Short-circuit	Yes
Diagnostics indication LED	
• Channel status display	Yes; Green LED
• for module diagnostics	Yes; Green/red LED
• For load voltage monitoring	Yes; Green LED
Potential separation	
between the load voltages	Yes
Potential separation channels	
• between the channels	No
• between the channels and backplane bus	Yes
• between the channels and the power supply of the electronics	No
Isolation	
Isolation tested with	707 V DC (type test)
Degree and class of protection	
Degree of protection acc. to EN 60529	
• IP65	Yes
• IP67	Yes
Standards, approvals, certificates	
Suitable for safety-oriented group deactivation	Yes
Highest safety class achievable in safety mode	
• Performance level according to ISO 13849-1	PL d
• SIL acc. to IEC 61508	SIL 2

Article number	6ES7147-5JD00-0BA0 ET 200AL, CM 4X IO-LINK, 4XM12
Ambient conditions	
Ambient temperature during operation	
• min.	-25 °C
• max.	55 °C
Connection method	
Design of electrical connection for the inputs and outputs	M12, 5-pole
Power supply	M8, 4-pole
ET-Connection	
• ET-Connection	M8, 4-pin, shielded
Dimensions	
Width	30 mm
Height	159 mm
Depth	40 mm
Weights	
Weight, approx.	145 g

I/O systems

SIMATIC ET 200 systems without control cabinet

SIMATIC ET 200AL

I/O modules > Communication > CM IO-Link**Ordering data****Article No.****Article No.****CM IO-Link**

CM 4X IO-Link, 4XM12;
for the connection of up to
4 IO-Link devices according to
IO-Link Specification V1.0 and V1.1
and port Class B

6ES7147-5JD00-0BA0**Accessories****Bus cable for backplane bus
(ET connection)**

4-pin, shielded

Pre-assembled at both ends,
2 M8 connectors

0.19 m

6ES7194-2LH02-0AA0

0.3 m

6ES7194-2LH03-0AA0

1 m

6ES7194-2LH10-0AA0

2 m

6ES7194-2LH20-0AA0

5 m

6ES7194-2LH50-0AA0

10 m

6ES7194-2LN10-0AA0

15 m

6ES7194-2LN15-0AA0

Pre-assembled at both ends,
2 M8 connectors, angled

0.3 m

6ES7194-2LH03-0AB0

1 m

6ES7194-2LH10-0AB0

2 m

6ES7194-2LH20-0AB0

5 m

6ES7194-2LH50-0AB0

10 m

6ES7194-2LN10-0AB0

15 m

6ES7194-2LN15-0AB0

Pre-assembled at one end,
1 M8 connector

2 m

6ES7194-2LH20-0AC0

5 m

6ES7194-2LH50-0AC0

10 m

6ES7194-2LN10-0AC0

15 m

6ES7194-2LN15-0AC0**M8 power cable**

4-pin

Pre-assembled at both ends,
M8 connector and M8 socket

0.19 m

6ES7194-2LH02-1AA0

0.3 m

6ES7194-2LH03-1AA0

1 m

6ES7194-2LH10-1AA0

2 m

6ES7194-2LH20-1AA0

5 m

6ES7194-2LH50-1AA0

10 m

6ES7194-2LN10-1AA0

15 m

6ES7194-2LN15-1AA0

Pre-assembled at both ends,
angled M8 connector and angled
M8 socket

0.3 m

6ES7194-2LH03-1AB0

1 m

6ES7194-2LH10-1AB0

2 m

6ES7194-2LH20-1AB0

5 m

6ES7194-2LH50-1AB0

10 m

6ES7194-2LN10-1AB0

15 m

6ES7194-2LN15-1AB0

Pre-assembled at one end,
M8 socket

2 m

6ES7194-2LH20-1AC0

5 m

6ES7194-2LH50-1AC0

10 m

6ES7194-2LN10-1AC0

15 m

6ES7194-2LN15-1AC0**M8 connector for ET connection**

4-pin, shielded

6ES7194-2AB00-0AA0**M8 power connector**

Male contact insert, 4-pin

6ES7194-2AA00-0AA0

Female contact insert, 4-pin

6ES7194-2AC00-0AA0**ET connection FastConnect
stripping tool****6ES7194-2KA00-0AA0**

Stripping tool for stripping the
ET connection bus cable

Labels**6ES7194-2BA00-0AA0**

10 x 5 mm, RAL 9016;
5 frames with 40 labels each

Overview

- Pre-assembled cables in various designs and lengths:
 - For connecting the interface modules and I/O modules via the internal backplane bus (ET connection)
 - For power supply.

Technical specifications

Article number	6ES7194-2LH02-0AA0 CONNECTING CABLE ET-CONNECTION, 0.19M	6ES7194-2LH03-0AA0 CONNECTING CABLE ET-CONNECTION, 0.3M	6ES7194-2LH10-0AA0 CONNECTING CABLE ET-CONNECTION, 1.0M	6ES7194-2LH20-0AA0 CONNECTING CABLE ET-CONNECTION, 2.0M
General information				
Product type designation	BUS CABLE ET CONNECTION, 0.19M	BUS CABLE ET-CONNECTION, 0.3M	BUS CABLE ET-CONNECTION, 1.0M	BUS CABLE ET-CONNECTION, 2.0M
Product description	Flexible cable (4-core), preassembled at both ends with 2x M8 plugs, 4-pin, shielded	Flexible cable (4-core), preassembled at both ends with 2x M8 plugs, 4-pin, shielded	Flexible cable (4-core), preassembled at both ends with 2x M8 plugs, 4-pin, shielded	Flexible cable (4-core), preassembled at both ends with 2x M8 plugs, 4-pin, shielded
Suitability for use	for connecting ET-CONNECTION node (e.g. SIMATIC ET 200AL) in degree of protection IP65 / 67	for connecting ET-CONNECTION nodes (e.g. SIMATIC ET 200AL) in degree of protection IP65 / 67	for connecting ET-CONNECTION nodes (e.g. SIMATIC ET 200AL) in degree of protection IP65 / 67	for connecting ET-CONNECTION nodes (e.g. SIMATIC ET 200AL) in degree of protection IP65 / 67
Degree and class of protection				
Degree of protection acc. to EN 60529				
• IP65	Yes	Yes	Yes	Yes
• IP67	Yes	Yes	Yes	Yes
Ambient conditions				
Ambient temperature during assembly, min.	-30 °C	-30 °C	-30 °C	-30 °C
Ambient temperature during assembly, max.	80 °C	80 °C	80 °C	80 °C
Ambient temperature during storage/transportation				
• min.	-40 °C	-40 °C	-40 °C	-40 °C
• max.	80 °C	80 °C	80 °C	80 °C
Cables				
Cable designation	2Y(ST)CY 1x4x0.5/1.0-100- GN	2Y(ST)CY 1x4x0.5/1.0-100- GN	2Y(ST)CY 1x4x0.5/1.0-100- GN	2Y(ST)CY 1x4x0.5/1.0-100- GN
Design of shield	Overlapped aluminum-clad foil, sheathed in a braid of tin-plated copper wires	Overlapped aluminum-clad foil, sheathed in a braid of tin-plated copper wires	Overlapped aluminum-clad foil, sheathed in a braid of tin-plated copper wires	Overlapped aluminum-clad foil, sheathed in a braid of tin-plated copper wires
Cable length	0.19 m	0.3 m	1 m	2 m
Number of electrical cores	4	4	4	4
Outer diameter of inner conductor	0.5 mm	0.5 mm	0.5 mm	0.5 mm
Outer diameter of core insulation	1 mm	1 mm	1 mm	1 mm
Outer diameter of cable sheath	5 mm	5 mm	5 mm	5 mm
Number of bending cycles	1 000 000; Cable carrier compliant for 1 million bending cycles with a bending radius of 100 mm, a speed of 4 m/s and an acceleration of 4 m/s ²	1 000 000; Cable carrier compliant for 1 million bending cycles with a bending radius of 100 mm, a speed of 4 m/s and an acceleration of 4 m/s ²	1 000 000; Cable carrier compliant for 1 million bending cycles with a bending radius of 100 mm, a speed of 4 m/s and an acceleration of 4 m/s ²	1 000 000; Cable carrier compliant for 1 million bending cycles with a bending radius of 100 mm, a speed of 4 m/s and an acceleration of 4 m/s ²
Permissible bending radius, single bend, min.	20 mm	20 mm	20 mm	20 mm
Permissible bending radius, multiple bends, min.	40 mm	40 mm	40 mm	40 mm
Bending radius for continuous bending	100 mm	100 mm	100 mm	100 mm
Color of cable sheath	Green	Green	Green	Green
Color of core insulation of data cores	white / yellow / blue / orange	white / yellow / blue / orange	white / yellow / blue / orange	white / yellow / blue / orange
Weight per length	34 kg/km	34 kg/km	34 kg/km	34 kg/km

I/O systems

SIMATIC ET 200 systems without control cabinet

SIMATIC ET 200AL

Accessories > Cables and connectors

Technical specifications (continued)

Article number	6ES7194-2LH02-0AA0 CONNECTING CABLE ET-CONNECTION, 0.19M	6ES7194-2LH03-0AA0 CONNECTING CABLE ET-CONNECTION, 0.3M	6ES7194-2LH10-0AA0 CONNECTING CABLE ET-CONNECTION, 1.0M	6ES7194-2LH20-0AA0 CONNECTING CABLE ET-CONNECTION, 2.0M
Mechanics/material				
Type of cable outlet	180 degree cable outlet	180 degree cable outlet	180 degree cable outlet	180 degree cable outlet
Material of housing	metal	metal	metal	metal
Material of cable sheath	PVC	PVC	PVC	PVC
Material of core insulation	PE	PE	PE	PE

Article number	6ES7194-2LH50-0AA0 CONNECTING CABLE ET-CONNECTION, 5.0M	6ES7194-2LN10-0AA0 BUS CABLE ET-CONNECTION, 10M	6ES7194-2LN15-0AA0 BUS CABLE ET-CONNECTION, 15M
General information			
Product type designation	BUS CABLE ET-CONNECTION, 5.0M	BUS CABLE ET-CONNECTION, 10M	BUS CABLE ET CONNECTION, 15M
Product description	Flexible cable (4-core), preassembled at both ends with 2x M8 plugs, 4-pin, shielded	Flexible cable (4-core), preassembled at both ends with 2x M8 plugs, 4-pin, shielded	Flexible cable (4-core), preassembled at both ends with 2x M8 plugs, 4-pin, shielded
Suitability for use	for connecting ET-CONNECTION nodes (e.g. SIMATIC ET 200AL) in degree of protection IP65 / 67	for connecting ET-CONNECTION nodes (e.g. SIMATIC ET 200AL) in degree of protection IP65 / 67	for connecting ET-CONNECTION nodes (e.g. SIMATIC ET 200AL) in degree of protection IP65 / 67
Degree and class of protection			
Degree of protection acc. to EN 60529			
• IP65	Yes	Yes	Yes
• IP67	Yes	Yes	Yes
Ambient conditions			
Ambient temperature during assembly, min.	-30 °C	-30 °C	-30 °C
Ambient temperature during assembly, max.	80 °C	80 °C	80 °C
Ambient temperature during storage/transportation			
• min.	-40 °C	-40 °C	-40 °C
• max.	80 °C	80 °C	80 °C

Cables			
Cable designation	2Y(ST)CY 1x4x0.5/1.0-100-GN	2Y(ST)CY 1x4x0.5/1.0-100-GN	2Y(ST)CY 1x4x0.5/1.0-100-GN
Design of shield	Overlapped aluminum-clad foil, sheathed in a braid of tin-plated copper wires	Overlapped aluminum-clad foil, sheathed in a braid of tin-plated copper wires	Overlapped aluminum-clad foil, sheathed in a braid of tin-plated copper wires
Cable length	5 m	10 m	15 m
Number of electrical cores	4	4	4
Outer diameter of inner conductor	0.5 mm	0.5 mm	0.5 mm
Outer diameter of core insulation	1 mm	1 mm	1 mm
Outer diameter of cable sheath	5 mm	5 mm	5 mm
Number of bending cycles	1 000 000; Cable carrier compliant for 1 million bending cycles with a bending radius of 100 mm, a speed of 4 m/s and an acceleration of 4 m/s ²	1 000 000; Cable carrier compliant for 1 million bending cycles with a bending radius of 100 mm, a speed of 4 m/s and an acceleration of 4 m/s ²	
Permissible bending radius, single bend, min.	20 mm	20 mm	20 mm
Permissible bending radius, multiple bends, min.	40 mm	40 mm	40 mm
Bending radius for continuous bending	100 mm	100 mm	100 mm
Color of cable sheath	Green	Green	Green
Color of core insulation of data cores	white / yellow / blue / orange	white / yellow / blue / orange	white / yellow / blue / orange
Weight per length	34 kg/km	34 kg/km	34 kg/km
Mechanics/material			
Type of cable outlet	180 degree cable outlet	180 degree cable outlet	180 degree cable outlet
Material of housing	metal	metal	metal
Material of cable sheath	PVC	PVC	PVC
Material of core insulation	PE	PE	PE

Technical specifications (continued)

Article number	6ES7194-2LH03-0AB0 CONNECTING CABLE ET-CON., ANGLED, 0.3M	6ES7194-2LH10-0AB0 CONNECTING CABLE ET-CON., ANGLED, 1.0M	6ES7194-2LH20-0AB0 CONNECTING CABLE ET-CON., ANGLED, 2.0M
General information			
Product type designation	BUS CABLE ET-CONNECTION, ANGLED, 0.3M	BUS CABLE ET-CONNECTION, ANGLED, 1.0M	BUS CABLE ET-CONNECTION, ANGLED, 2.0M
Product description	Flexible cable (4-core), preassembled at both ends with 2x M8 plugs, angled, 4-pin, shielded	Flexible cable (4-core), preassembled at both ends with 2x M8 plugs, angled, 4-pin, shielded	Flexible cable (4-core), preassembled at both ends with 2x M8 plugs, angled, 4-pin, shielded
Suitability for use	for connecting ET-CONNECTION nodes (e.g. SIMATIC ET 200AL) in degree of protection IP65 / 67	for connecting ET-CONNECTION nodes (e.g. SIMATIC ET 200AL) in degree of protection IP65 / 67	for connecting ET-CONNECTION nodes (e.g. SIMATIC ET 200AL) in degree of protection IP65 / 67
Degree and class of protection			
Degree of protection acc. to EN 60529			
• IP65	Yes	Yes	Yes
• IP67	Yes	Yes	Yes
Ambient conditions			
Ambient temperature during assembly, min.	-30 °C	-30 °C	-30 °C
Ambient temperature during assembly, max.	80 °C	80 °C	80 °C
Ambient temperature during storage/transportation			
• min.	-40 °C	-40 °C	-40 °C
• max.	80 °C	80 °C	80 °C
Cables			
Cable designation	2Y(ST)CY 1x4x0.5/1.0-100-GN	2Y(ST)CY 1x4x0.5/1.0-100-GN	2Y(ST)CY 1x4x0.5/1.0-100-GN
Design of shield	Overlapped aluminum-clad foil, sheathed in a braid of tin-plated copper wires	Overlapped aluminum-clad foil, sheathed in a braid of tin-plated copper wires	Overlapped aluminum-clad foil, sheathed in a braid of tin-plated copper wires
Cable length	0.3 m	1 m	2 m
Number of electrical cores	4	4	4
Outer diameter of inner conductor	0.5 mm	0.5 mm	0.5 mm
Outer diameter of core insulation	1 mm	1 mm	1 mm
Outer diameter of cable sheath	5 mm	5 mm	5 mm
Number of bending cycles	1 000 000; Cable carrier compliant for 1 million bending cycles with a bending radius of 100 mm, a speed of 4 m/s and an acceleration of 4 m/s ²	1 000 000; Cable carrier compliant for 1 million bending cycles with a bending radius of 100 mm, a speed of 4 m/s and an acceleration of 4 m/s ²	1 000 000; Cable carrier compliant for 1 million bending cycles with a bending radius of 100 mm, a speed of 4 m/s and an acceleration of 4 m/s ²
Permissible bending radius, single bend, min.	20 mm	20 mm	20 mm
Permissible bending radius, multiple bends, min.	40 mm	40 mm	40 mm
Bending radius for continuous bending	100 mm	100 mm	100 mm
Color of cable sheath	Green	Green	Green
Color of core insulation of data cores	white / yellow / blue / orange	white / yellow / blue / orange	white / yellow / blue / orange
Weight per length	34 kg/km	34 kg/km	34 kg/km
Mechanics/material			
Type of cable outlet	90 degree cable outlet	90 degree cable outlet	90 degree cable outlet
Material of housing	metal	metal	metal
Material of cable sheath	PVC	PVC	PVC
Material of core insulation	PE	PE	PE

I/O systems

SIMATIC ET 200 systems without control cabinet

SIMATIC ET 200AL

Accessories > Cables and connectors**Technical specifications (continued)**

Article number	6ES7194-2LH50-0AB0 CONNECTING CABLE ET-CON., ANGLED, 5.0M	6ES7194-2LN10-0AB0 BUS CABLE ET-CONNECTION, ANGLED, 10M	6ES7194-2LN15-0AB0 BUS CABLE ET-CONNECTION, ANGLED, 15M
General information			
Product type designation	BUS CABLE ET-CONNECTION, ANGLED, 5.0M	BUS CABLE ET-CONNECTION, ANGLED, 10M	BUS CABLE ET CONNECTION, ANGLED, 15M
Product description	Flexible cable (4-core), preassembled at both ends with 2x M8 plugs, angled, 4-pin, shielded	Flexible cable (4-core), preassembled at both ends with 2x M8 plugs, angled, 4-pin, shielded	Flexible cable (4-core), preassembled at both ends with 2x M8 plugs, angled, 4-pin, shielded
Suitability for use	for connecting ET-CONNECTION nodes (e.g. SIMATIC ET 200AL) in degree of protection IP65 / 67	for connecting ET-CONNECTION nodes (e.g. SIMATIC ET 200AL) in degree of protection IP65 / 67	for connecting ET-CONNECTION nodes (e.g. SIMATIC ET 200AL) in degree of protection IP65 / 67
Degree and class of protection			
Degree of protection acc. to EN 60529			
• IP65	Yes	Yes	Yes
• IP67	Yes	Yes	Yes
Ambient conditions			
Ambient temperature during assembly, min.	-30 °C	-30 °C	-30 °C
Ambient temperature during assembly, max.	80 °C	80 °C	80 °C
Ambient temperature during storage/transportation			
• min.	-40 °C	-40 °C	-40 °C
• max.	80 °C	80 °C	80 °C
Cables			
Cable designation	2Y(ST)CY 1x4x0.5/1.0-100-GN	2Y(ST)CY 1x4x0.5/1.0-100-GN	2Y(ST)CY 1x4x0.5/1.0-100-GN
Design of shield	Overlapped aluminum-clad foil, sheathed in a braid of tin-plated copper wires	Overlapped aluminum-clad foil, sheathed in a braid of tin-plated copper wires	Overlapped aluminum-clad foil, sheathed in a braid of tin-plated copper wires
Cable length	5 m	10 m	15 m
Number of electrical cores	4	4	4
Outer diameter of inner conductor	0.5 mm	0.5 mm	0.5 mm
Outer diameter of core insulation	1 mm	1 mm	1 mm
Outer diameter of cable sheath	5 mm	5 mm	5 mm
Number of bending cycles	1 000 000; Cable carrier compliant for 1 million bending cycles with a bending radius of 100 mm, a speed of 4 m/s and an acceleration of 4 m/s ²	1 000 000; Cable carrier compliant for 1 million bending cycles with a bending radius of 100 mm, a speed of 4 m/s and an acceleration of 4 m/s ²	
Permissible bending radius, single bend, min.	20 mm	20 mm	20 mm
Permissible bending radius, multiple bends, min.	40 mm	40 mm	40 mm
Bending radius for continuous bending	100 mm	100 mm	100 mm
Color of cable sheath	Green	Green	Green
Color of core insulation of data cores	white / yellow / blue / orange	white / yellow / blue / orange	white / yellow / blue / orange
Weight per length	34 kg/km	34 kg/km	34 kg/km
Mechanics/material			
Type of cable outlet	90 degree cable outlet	90 degree cable outlet	90 degree cable outlet
Material of housing	metal	metal	metal
Material of cable sheath	PVC	PVC	PVC
Material of core insulation	PE	PE	PE

Technical specifications (continued)

Article number	6ES7194-2LH20-0AC0 CONNECTING CABLE ET-CONNECTION, 2.0M	6ES7194-2LH50-0AC0 CONNECTING CABLE ET-CONNECTION, 5.0M	6ES7194-2LN10-0AC0 BUS CABLE ET-CONNECTION, 10M	6ES7194-2LN15-0AC0 BUS CABLE ET-CONNECTION, 15M
General information				
Product type designation	BUS CABLE ET-CONNECTION, 2.0M	BUS CABLE ET-CONNECTION, 5.0M	BUS CABLE ET-CONNECTION, 10M	BUS CABLE ET CONNECTION, 15M
Product description	Flexible cable (4-core), preassembled at one end with 1x M8 plug, 4-pin, shielded	Flexible cable (4-core), preassembled at one end with 1x M8 plug, 4-pin, shielded	Flexible cable (4-core), preassembled at one end with 1x M8 plug, 4-pin, shielded	Flexible cable (4-core), preassembled at one end with 1x M8 plug, 4-pin, shielded
Suitability for use	for connecting ET-CONNECTION nodes (e.g. SIMATIC ET 200AL) in degree of protection IP65 / 67	for connecting ET-CONNECTION nodes (e.g. SIMATIC ET 200AL) in degree of protection IP65 / 67	for connecting ET-CONNECTION nodes (e.g. SIMATIC ET 200AL) in degree of protection IP65 / 67	for connecting ET-CONNECTION nodes (e.g. SIMATIC ET 200AL) in degree of protection IP65 / 67
Degree and class of protection				
Degree of protection acc. to EN 60529				
• IP65	Yes	Yes	Yes	Yes
• IP67	Yes	Yes	Yes	Yes
Ambient conditions				
Ambient temperature during assembly, min.	-30 °C	-30 °C	-30 °C	-30 °C
Ambient temperature during assembly, max.	80 °C	80 °C	80 °C	80 °C
Ambient temperature during storage/transportation				
• min.	-40 °C	-40 °C	-40 °C	-40 °C
• max.	80 °C	80 °C	80 °C	80 °C
Cables				
Cable designation	2Y(ST)CY 1x4x0.5/1.0-100- GN	2Y(ST)CY 1x4x0.5/1.0-100- GN	2Y(ST)CY 1x4x0.5/1.0-100- GN	2Y(ST)CY 1x4x0.5/1.0-100- GN
Design of shield	Overlapped aluminum-clad foil, sheathed in a braid of tin-plated copper wires	Overlapped aluminum-clad foil, sheathed in a braid of tin-plated copper wires	Overlapped aluminum-clad foil, sheathed in a braid of tin-plated copper wires	Overlapped aluminum-clad foil, sheathed in a braid of tin-plated copper wires
Cable length	2 m	5 m	10 m	15 m
Number of electrical cores	4	4	4	4
Outer diameter of inner conductor	0.5 mm	0.5 mm	0.5 mm	0.5 mm
Outer diameter of core insulation	1 mm	1 mm	1 mm	1 mm
Outer diameter of cable sheath	5 mm	5 mm	5 mm	5 mm
Number of bending cycles	1 000 000; Cable carrier compliant for 1 million bending cycles with a bending radius of 100 mm, a speed of 4 m/s and an acceleration of 4 m/s ²	1 000 000; Cable carrier compliant for 1 million bending cycles with a bending radius of 100 mm, a speed of 4 m/s and an acceleration of 4 m/s ²	1 000 000; Cable carrier compliant for 1 million bending cycles with a bending radius of 100 mm, a speed of 4 m/s and an acceleration of 4 m/s ²	
Permissible bending radius, single bend, min.	20 mm	20 mm	20 mm	20 mm
Permissible bending radius, multiple bends, min.	40 mm	40 mm	40 mm	40 mm
Bending radius for continuous bending	100 mm	100 mm	100 mm	100 mm
Color of cable sheath	Green	Green	Green	Green
Color of core insulation of data cores	white / yellow / blue / orange	white / yellow / blue / orange	white / yellow / blue / orange	white / yellow / blue / orange
Weight per length	34 kg/km	34 kg/km	34 kg/km	34 kg/km
Mechanics/material				
Type of cable outlet	180 degree cable outlet	180 degree cable outlet	180 degree cable outlet	180 degree cable outlet
Material of housing	metal	metal	metal	metal
Material of cable sheath	PVC	PVC	PVC	PVC
Material of core insulation	PE	PE	PE	PE

I/O systems

SIMATIC ET 200 systems without control cabinet

SIMATIC ET 200AL

Accessories > Cables and connectors**Technical specifications (continued)**

Article number	6ES7194-2LH02-1AA0 POWER CABLE M8, 0.19M	6ES7194-2LH03-1AA0 POWER CABLE M8, 0.3M	6ES7194-2LH10-1AA0 POWER CABLE M8, 1.0M	6ES7194-2LH20-1AA0 POWER CABLE M8, 2.0M
General information				
Product type designation	Power cable M8, 0.19M	POWER CABLE M8, 0.3M	POWER CABLE M8, 1.0M	POWER CABLE M8, 2.0M
Product description	Flexible cable (4-core), preassembled at each end with a 4-pin M8 male / female connector	Flexible cable (4-core), preassembled at each end with a 4-pin M8 male / female connector	Flexible cable (4-core), preassembled at each end with a 4-pin M8 male / female connector	Flexible cable (4-core), preassembled at each end with a 4-pin M8 male / female connector
Suitability for use	For connection to ET 200AL for 24 V DC power supply	For connection to ET 200AL for 24 V DC power supply	For connection to ET 200AL for 24 V DC power supply	For connection to ET 200AL for 24 V DC power supply
Degree and class of protection				
Degree of protection acc. to EN 60529				
• IP65	Yes	Yes	Yes	Yes
• IP67	Yes	Yes	Yes	Yes
Ambient conditions				
Ambient temperature during assembly, min.	-30 °C	-30 °C	-30 °C	-30 °C
Ambient temperature during assembly, max.	80 °C	80 °C	80 °C	80 °C
Ambient temperature during storage/transportation				
• min.	-40 °C	-40 °C	-40 °C	-40 °C
• max.	80 °C	80 °C	80 °C	80 °C
Cables				
Cable designation	4 Li9Y 0.50 mm ² Y	4 Li9Y 0.50 mm ² Y	4 Li9Y 0.50 mm ² Y	4 Li9Y 0.50 mm ² Y
Cable length	0.19 m	0.3 m	1 m	2 m
Number of electrical cores	4	4	4	4
Outer diameter of inner conductor	0.8 mm	0.8 mm	0.8 mm	0.8 mm
Outer diameter of core insulation	1.46 mm	1.46 mm	1.46 mm	1.46 mm
Outer diameter of cable sheath	5.2 mm	5.2 mm	5.2 mm	5.2 mm
Number of bending cycles	2 500 000; Cable carrier compliant for 2.5 million bending cycles with a bending radius of 52 mm, a speed of 3 m/s and an acceleration of 10 m/s ²	2 500 000; Cable carrier compliant for 2.5 million bending cycles with a bending radius of 52 mm, a speed of 3 m/s and an acceleration of 10 m/s ²	2 500 000; Cable carrier compliant for 2.5 million bending cycles with a bending radius of 52 mm, a speed of 3 m/s and an acceleration of 10 m/s ²	2 500 000; Cable carrier compliant for 2.5 million bending cycles with a bending radius of 52 mm, a speed of 3 m/s and an acceleration of 10 m/s ²
Permissible bending radius, single bend, min.	26 mm	26 mm	26 mm	26 mm
Permissible bending radius, multiple bends, min.	52 mm	52 mm	52 mm	52 mm
Bending radius for continuous bending	52 mm	52 mm	52 mm	52 mm
Color of cable sheath	gray	gray	gray	gray
Color of core insulation of energy core	white / brown / blue / black	white / brown / blue / black	white / brown / blue / black	white / brown / blue / black
Weight per length	44 kg/km	44 kg/km	44 kg/km	44 kg/km
Mechanics/material				
Type of cable outlet	180 degree cable outlet	180 degree cable outlet	180 degree cable outlet	180 degree cable outlet
Material of housing	plastic	plastic	plastic	plastic
Material of cable sheath	PVC	PVC	PVC	PVC
Material of core insulation	PP	PP	PP	PP

Technical specifications (continued)

Article number	6ES7194-2LH50-1AA0 POWER CABLE M8, 5.0M	6ES7194-2LN10-1AA0 POWER CABLE M8, 10M	6ES7194-2LN15-1AA0 POWER CABLE M8, 15M
General information			
Product type designation	POWER CABLE M8, 5.0M	POWER CABLE M8, 10M	POWER CABLE M8, 15M
Product description	Flexible cable (4-core), preassembled at each end with a 4-pin M8 male / female connector	Flexible cable (4-core), preassembled at each end with a 4-pin M8 male / female connector	Flexible cable (4-core), preassembled at each end with a 4-pin M8 male / female connector
Suitability for use	For connection to ET 200AL for 24 V DC power supply	For connection to ET 200AL for 24 V DC power supply	For connection to ET 200AL for 24 V DC power supply
Degree and class of protection			
Degree of protection acc. to EN 60529			
• IP65	Yes	Yes	Yes
• IP67	Yes	Yes	Yes
Ambient conditions			
Ambient temperature during assembly, min.	-30 °C	-30 °C	-30 °C
Ambient temperature during assembly, max.	80 °C	80 °C	80 °C
Ambient temperature during storage/transportation			
• min.	-40 °C	-40 °C	-40 °C
• max.	80 °C	80 °C	80 °C
Cables			
Cable designation	4 Li9Y 0.50 mm ² Y	4 Li9Y 0.50 mm ² Y	4 Li9Y 0.50 mm ² Y
Cable length	5 m	10 m	15 m
Number of electrical cores	4	4	4
Outer diameter of inner conductor	0.8 mm	0.8 mm	0.8 mm
Outer diameter of core insulation	1.46 mm	1.46 mm	1.46 mm
Outer diameter of cable sheath	5.2 mm	5.2 mm	5.2 mm
Number of bending cycles	2 500 000; Cable carrier compliant for 2.5 million bending cycles with a bending radius of 52 mm, a speed of 3 m/s and an acceleration of 10 m/s ²	2 500 000; Cable carrier compliant for 2.5 million bending cycles with a bending radius of 52 mm, a speed of 3 m/s and an acceleration of 10 m/s ²	2 500 000; Cable carrier compliant for 2.5 million bending cycles with a bending radius of 52 mm, a speed of 3 m/s and an acceleration of 10 m/s ²
Permissible bending radius, single bend, min.	26 mm	26 mm	26 mm
Permissible bending radius, multiple bends, min.	52 mm	52 mm	52 mm
Bending radius for continuous bending	52 mm	52 mm	52 mm
Color of cable sheath	gray	gray	gray
Color of core insulation of energy core	white / brown / blue / black	white / brown / blue / black	white / brown / blue / black
Weight per length	44 kg/km	44 kg/km	44 kg/km
Mechanics/material			
Type of cable outlet	180 degree cable outlet	180 degree cable outlet	180 degree cable outlet
Material of housing	plastic	plastic	plastic
Material of cable sheath	PVC	PVC	PVC
Material of core insulation	PP	PP	PP

I/O systems

SIMATIC ET 200 systems without control cabinet

SIMATIC ET 200AL

Accessories > Cables and connectors**Technical specifications (continued)**

Article number	6ES7194-2LH03-1AB0	6ES7194-2LH10-1AB0	6ES7194-2LH20-1AB0
	POWER CABLE M8, ANGLED, 0.3M	POWER CABLE M8, ANGLED, 1.0M	POWER CABLE M8, ANGLED, 2.0M
General information			
Product type designation	POWER CABLE M8, ANGLED, 0.3M	POWER CABLE M8, ANGLED, 1.0M	POWER CABLE M8, ANGLED, 2.0M
Product description	Flexible cable (4-core), preassembled at each end with a 4-pin M8 male / female connector, angled	Flexible cable (4-core), preassembled at each end with a 4-pin M8 male / female connector, angled	Flexible cable (4-core), preassembled at each end with a 4-pin M8 male / female connector, angled
Suitability for use	For connection to ET 200AL for 24 V DC power supply	For connection to ET 200AL for 24 V DC power supply	For connection to ET 200AL for 24 V DC power supply
Degree and class of protection			
Degree of protection acc. to EN 60529			
• IP65	Yes	Yes	Yes
• IP67	Yes	Yes	Yes
Ambient conditions			
Ambient temperature during assembly, min.	-30 °C	-30 °C	-30 °C
Ambient temperature during assembly, max.	80 °C	80 °C	80 °C
Ambient temperature during storage/transportation			
• min.	-40 °C	-40 °C	-40 °C
• max.	80 °C	80 °C	80 °C
Cables			
Cable designation	4 Li9Y 0.50 mm ² Y	4 Li9Y 0.50 mm ² Y	4 Li9Y 0.50 mm ² Y
Cable length	0.3 m	1 m	2 m
Number of electrical cores	4	4	4
Outer diameter of inner conductor	0.8 mm	0.8 mm	0.8 mm
Outer diameter of core insulation	1.46 mm	1.46 mm	1.46 mm
Outer diameter of cable sheath	5.2 mm	5.2 mm	5.2 mm
Number of bending cycles	2 500 000; Cable carrier compliant for 2.5 million bending cycles with a bending radius of 52 mm, a speed of 3 m/s and an acceleration of 10 m/s ²	2 500 000; Cable carrier compliant for 2.5 million bending cycles with a bending radius of 52 mm, a speed of 3 m/s and an acceleration of 10 m/s ²	2 500 000; Cable carrier compliant for 2.5 million bending cycles with a bending radius of 52 mm, a speed of 3 m/s and an acceleration of 10 m/s ²
Permissible bending radius, single bend, min.	26 mm	26 mm	26 mm
Permissible bending radius, multiple bends, min.	52 mm	52 mm	52 mm
Bending radius for continuous bending	52 mm	52 mm	52 mm
Color of cable sheath	gray	gray	gray
Color of core insulation of energy core	white / brown / blue / black	white / brown / blue / black	white / brown / blue / black
Weight per length	44 kg/km	44 kg/km	44 kg/km
Mechanics/material			
Type of cable outlet	90 degree cable outlet	90 degree cable outlet	90 degree cable outlet
Material of housing	plastic	plastic	plastic
Material of cable sheath	PVC	PVC	PVC
Material of core insulation	PP	PP	PP

Technical specifications (continued)

Article number	6ES7194-2LH50-1AB0	6ES7194-2LN10-1AB0	6ES7194-2LN15-1AB0
	POWER CABLE M8, ANGLED, 5.0M	POWER CABLE M8, ANGLED, 10M	POWER CABLE M8, ANGLED, 15M
General information			
Product type designation	POWER CABLE M8, ANGLED, 5.0M	POWER CABLE M8, ANGLED 10M	POWER CABLE M8, ANGLED, 15M
Product description	Flexible cable (4-core), preassembled at each end with a 4-pin M8 male / female connector, angled	Flexible cable (4-core), preassembled at each end with a 4-pin M8 male / female connector, angled	Flexible cable (4-core), preassembled at each end with a 4-pin M8 male / female connector, angled
Suitability for use	For connection to ET 200AL for 24 V DC power supply	For connection to ET 200AL for 24 V DC power supply	For connection to ET 200AL for 24 V DC power supply
Degree and class of protection			
Degree of protection acc. to EN 60529			
• IP65	Yes	Yes	Yes
• IP67	Yes	Yes	Yes
Ambient conditions			
Ambient temperature during assembly, min.	-30 °C	-30 °C	-30 °C
Ambient temperature during assembly, max.	80 °C	80 °C	80 °C
Ambient temperature during storage/transportation			
• min.	-40 °C	-40 °C	-40 °C
• max.	80 °C	80 °C	80 °C
Cables			
Cable designation	4 Li9Y 0.50 mm ² Y	4 Li9Y 0.50 mm ² Y	4 Li9Y 0.50 mm ² Y
Cable length	5 m	10 m	15 m
Number of electrical cores	4	4	4
Outer diameter of inner conductor	0.8 mm	0.8 mm	0.8 mm
Outer diameter of core insulation	1.46 mm	1.46 mm	1.46 mm
Outer diameter of cable sheath	5.2 mm	5.2 mm	5.2 mm
Number of bending cycles	2 500 000; Cable carrier compliant for 2.5 million bending cycles with a bending radius of 52 mm, a speed of 3 m/s and an acceleration of 10 m/s ²	2 500 000; Cable carrier compliant for 2.5 million bending cycles with a bending radius of 52 mm, a speed of 3 m/s and an acceleration of 10 m/s ²	2 500 000; Cable carrier compliant for 2.5 million bending cycles with a bending radius of 52 mm, a speed of 3 m/s and an acceleration of 10 m/s ²
Permissible bending radius, single bend, min.	26 mm	26 mm	26 mm
Permissible bending radius, multiple bends, min.	52 mm	52 mm	52 mm
Bending radius for continuous bending	52 mm	52 mm	52 mm
Color of cable sheath	gray	gray	gray
Color of core insulation of energy core	white / brown / blue / black	white / brown / blue / black	white / brown / blue / black
Weight per length	44 kg/km	44 kg/km	44 kg/km
Mechanics/material			
Type of cable outlet	90 degree cable outlet	90 degree cable outlet	90 degree cable outlet
Material of housing	plastic	plastic	plastic
Material of cable sheath	PVC	PVC	PVC
Material of core insulation	PP	PP	PP

I/O systems

SIMATIC ET 200 systems without control cabinet

SIMATIC ET 200AL

Accessories > Cables and connectors**Technical specifications (continued)**

Article number	6ES7194-2LH20-1AC0 POWER CABLE M8, 2.0M	6ES7194-2LH50-1AC0 POWER CABLE M8, 5.0M	6ES7194-2LN10-1AC0 POWER CABLE M8, 10M	6ES7194-2LN15-1AC0 POWER CABLE M8, 15M
General information				
Product type designation	POWER CABLE M8, 2.0M	POWER CABLE M8, 5.0M	POWER CABLE M8, 10M	POWER CABLE M8, 15M
Product description	Flexible cable (4-core), preassembled at one end with 1x M8 female connector	Flexible cable (4-core), preassembled at one end with 1x M8 female connector	Flexible cable (4-core), preassembled at one end with 1x M8 plug, 4-pin, shielded	Flexible cable (4-core), preassembled at one end with 1x M8 plug, 4-pin, shielded
Suitability for use	For connection to ET 200AL for 24 V DC power supply	For connection to ET 200AL for 24 V DC power supply	For connection to ET 200AL for 24 V DC power supply	For connection to ET 200AL for 24 V DC power supply
Degree and class of protection				
Degree of protection acc. to EN 60529				
• IP65	Yes	Yes	Yes	Yes
• IP67	Yes	Yes	Yes	Yes
Ambient conditions				
Ambient temperature during assembly, min.	-30 °C	-30 °C	-30 °C	-30 °C
Ambient temperature during assembly, max.	80 °C	80 °C	80 °C	80 °C
Ambient temperature during storage/transportation				
• min.	-40 °C	-40 °C	-40 °C	-40 °C
• max.	80 °C	80 °C	80 °C	80 °C
Cables				
Cable designation	4 Li9Y 0.50 mm ² Y	4 Li9Y 0.50 mm ² Y	4 Li9Y 0.50 mm ² Y	4 Li9Y 0.50 mm ² Y
Cable length	2 m	5 m	10 m	15 m
Number of electrical cores	4	4	4	4
Outer diameter of inner conductor	0.8 mm	0.8 mm	0.8 mm	0.8 mm
Outer diameter of core insulation	1.46 mm	1.46 mm	1.46 mm	1.46 mm
Outer diameter of cable sheath	5.2 mm	5.2 mm	5.2 mm	5.2 mm
Number of bending cycles	2 500 000; Cable carrier compliant for 2.5 million bending cycles with a bending radius of 52 mm, a speed of 3 m/s and an acceleration of 10 m/s ²	2 500 000; Cable carrier compliant for 2.5 million bending cycles with a bending radius of 52 mm, a speed of 3 m/s and an acceleration of 10 m/s ²	2 500 000; Cable carrier compliant for 2.5 million bending cycles with a bending radius of 52 mm, a speed of 3 m/s and an acceleration of 10 m/s ²	2 500 000; Cable carrier compliant for 2.5 million bending cycles with a bending radius of 52 mm, a speed of 3 m/s and an acceleration of 10 m/s ²
Permissible bending radius, single bend, min.	26 mm	26 mm	26 mm	26 mm
Permissible bending radius, multiple bends, min.	52 mm	52 mm	52 mm	52 mm
Bending radius for continuous bending	52 mm	52 mm	52 mm	52 mm
Color of cable sheath	gray	gray	gray	gray
Color of core insulation of energy core	white / brown / blue / black	white / brown / blue / black	white / brown / blue / black	white / brown / blue / black
Weight per length	44 kg/km	44 kg/km	44 kg/km	44 kg/km
Mechanics/material				
Type of cable outlet	180 degree cable outlet	180 degree cable outlet	180 degree cable outlet	180 degree cable outlet
Material of housing	plastic	plastic	plastic	plastic
Material of cable sheath	PVC	PVC	PVC	PVC
Material of core insulation	PP	PP	PP	PP

Technical specifications (continued)

Article number	6ES7194-2AA00-0AA0 M8 POWER CONNECTOR	6ES7194-2AC00-0AA0 M8 POWER CONNECTOR, SOCKET
General information		
Product type designation	M8 POWER CONNECTOR	POWER CONNECTOR M8, SOCKET
Product description	M8 plug connector with high degree of protection, 4-pin, plastic version	M8 plug connector with high degree of protection, socket insert, 4-pin, plastic version
Suitability for use	For connection to ET 200AL for 24 V DC power supply	For connection to ET 200AL for 24 V DC power supply
Degree and class of protection		
Degree of protection acc. to EN 60529		
• IP65	Yes	Yes
• IP67	Yes	Yes
Ambient conditions		
Ambient temperature during assembly, min.	-30 °C	-30 °C
Ambient temperature during assembly, max.	85 °C	85 °C
Ambient temperature during storage/transportation		
• min.	-40 °C	-40 °C
• max.	85 °C	85 °C
Mechanics/material		
Type of cable outlet	180 degree cable outlet	180 degree cable outlet
Material of housing	plastic	plastic
Dimensions		
Width	14 mm	14 mm
Depth	47 mm	47 mm

Article number	6ES7194-2AB00-0AA0 M8 CONNECTOR ET-CONNECTION
General information	
Product type designation	M8 PLUG ET-CONNECTION
Product description	M8 plug connector with high degree of protection, 4-pin, metal version
Suitability for use	for connecting ET-CONNECTION nodes (e.g. SIMATIC ET 200AL) in degree of protection IP65 / 67
Degree and class of protection	
Degree of protection acc. to EN 60529	
• IP65	Yes
• IP67	Yes
Ambient conditions	
Ambient temperature during assembly, min.	-30 °C
Ambient temperature during assembly, max.	80 °C

Article number	6ES7194-2AB00-0AA0 M8 CONNECTOR ET-CONNECTION
Ambient temperature during storage/transportation	
• min.	-40 °C
• max.	80 °C
Mechanics/material	
Type of cable outlet	180 degree cable outlet
Material of housing	metal
Dimensions	
Width	14 mm
Depth	47 mm

Ordering data

Article No.

Bus cable for backplane bus (ET connection)

4-pin, shielded

Pre-assembled at both ends, 2 M8 connectors

0.19 m

6ES7194-2LH02-0AA0

0.3 m

6ES7194-2LH03-0AA0

1 m

6ES7194-2LH10-0AA0

2 m

6ES7194-2LH20-0AA0

5 m

6ES7194-2LH50-0AA0

10 m

6ES7194-2LN10-0AA0

15 m

6ES7194-2LN15-0AA0

PUR line, pre-assembled at both ends, 2 M8 connectors

0.19 m

6ES7194-2MH02-0AA0

0.3 m

6ES7194-2MH03-0AA0

1 m

6ES7194-2MH10-0AA0

2 m

6ES7194-2MH20-0AA0

5 m

6ES7194-2MH50-0AA0

10 m

6ES7194-2MN10-0AA0

15 m

6ES7194-2MN15-0AA0

I/O systems

SIMATIC ET 200 systems without control cabinet

SIMATIC ET 200AL

Accessories > Cables and connectors

Ordering data	Article No.		Article No.
Bus cable for backplane bus (ET connection) (continued)		PUR line, pre-assembled at both ends, M8 connector and M8 socket	
Pre-assembled at both ends, 2 M8 connectors, angled		0.19 m	6ES7194-2MH02-1AA0
0.3 m	6ES7194-2LH03-0AB0	0.3 m	6ES7194-2MH03-1AA0
1 m	6ES7194-2LH10-0AB0	1 m	6ES7194-2MH10-1AA0
2 m	6ES7194-2LH20-0AB0	2 m	6ES7194-2MH20-1AA0
5 m	6ES7194-2LH50-0AB0	5 m	6ES7194-2MH50-1AA0
10 m	6ES7194-2LN10-0AB0	10 m	6ES7194-2MN10-1AA0
15 m	6ES7194-2LN15-0AB0	15 m	6ES7194-2MN15-1AA0
PUR line, pre-assembled at both ends, 2 M8 connectors, angled		Pre-assembled at both ends, angled M8 connector and angled M8 socket	
0.3 m	6ES7194-2MH03-0AB0	0.3 m	6ES7194-2LH03-1AB0
1 m	6ES7194-2MH10-0AB0	1 m	6ES7194-2LH10-1AB0
2 m	6ES7194-2MH20-0AB0	2 m	6ES7194-2LH20-1AB0
5 m	6ES7194-2MH50-0AB0	5 m	6ES7194-2LH50-1AB0
10 m	6ES7194-2MN10-0AB0	10 m	6ES7194-2LN10-1AB0
15 m	6ES7194-2MN15-0AB0	15 m	6ES7194-2LN15-1AB0
Pre-assembled at one end, 1 M8 connector		PUR line, pre-assembled at both ends, angled M8 connector and angled M8 socket	
2 m	6ES7194-2LH20-0AC0	0.3 m	6ES7194-2MH03-1AB0
5 m	6ES7194-2LH50-0AC0	1 m	6ES7194-2MH10-1AB0
10 m	6ES7194-2LN10-0AC0	2 m	6ES7194-2MH20-1AB0
15 m	6ES7194-2LN15-0AC0	5 m	6ES7194-2MH50-1AB0
PUR line, pre-assembled at one end, 1 M8 connector		10 m	6ES7194-2MN10-1AB0
2 m	6ES7194-2MH20-0AC0	15 m	6ES7194-2MN15-1AB0
5 m	6ES7194-2MH50-0AC0	Pre-assembled at one end, M8 socket	
10 m	6ES7194-2MN10-0AC0	2 m	6ES7194-2LH20-1AC0
15 m	6ES7194-2MN15-0AC0	5 m	6ES7194-2LH50-1AC0
Connecting cable for bus cable for backplane bus (ET connection)		10 m	6ES7194-2LN10-1AC0
4-pin, shielded		15 m	6ES7194-2LN15-1AC0
Pre-assembled at both ends, 2 M8 connectors, 0.2 m	6ES7194-2LH02-0AD0	PUR line, pre-assembled at one end, M8 socket	
PUR line, pre-assembled at both ends, 2 M8 connectors, 0.2 m	6ES7194-2MH02-0AD0	2 m	6ES7194-2MH20-1AC0
M8 power cable		5 m	6ES7194-2MH50-1AC0
4-pin		10 m	6ES7194-2MN10-1AC0
Pre-assembled at both ends, M8 connector and M8 socket		15 m	6ES7194-2MN15-1AC0
0.19 m	6ES7194-2LH02-1AA0	M8 connector for ET connection	6ES7194-2AB00-0AA0
0.3 m	6ES7194-2LH03-1AA0	4-pin, shielded	
1 m	6ES7194-2LH10-1AA0	M8 power connector	
2 m	6ES7194-2LH20-1AA0	Male contact insert, 4-pin	6ES7194-2AA00-0AA0
5 m	6ES7194-2LH50-1AA0	Female contact insert, 4-pin	6ES7194-2AC00-0AA0
10 m	6ES7194-2LN10-1AA0	ET connection FastConnect stripping tool	6ES7194-2KA00-0AA0
15 m	6ES7194-2LN15-1AA0	Stripping tool for stripping the ET connection bus cable	

Overview	Ordering data	Article No.
- Labels for the identification of channels, modules and slots of ET 200AL components - Can be used for interface modules and I/O modules	Labels 10 x 5 mm, RAL 9016; 5 frames with 40 labels each	6ES7194-2BA00-0AA0

I/O systems

SIMATIC ET 200 systems without control cabinet

SIMATIC ET 200eco PN

Overview



- Compact block I/O for processing digital, analog and IO-Link signals for connecting to the PROFINET bus system
- Cabinet-free design in IP65/66/67 degree of protection with M12 connections
- Extremely rugged and resistant metal enclosure and casting

- Compact module in two types of enclosures:
 - 30 mm x 200 mm x 37 mm (W x H x D, long and narrow enclosure), with 4 x M12 for digital signals
 - 60 mm x 175 mm x 37 mm (W x H x D, short and wide enclosure), with 8 x M12 for digital signals and IO-Link
 - 60 mm x 175 mm x 37 mm (W x H x D, short and wide enclosure) with 4 x M12 or 8 x M12 for analog signals
- PROFINET connection: 2 x M12 and automatic PROFINET address assignment
- Data transmission rate 100 Mbps
- LLDP proximity detection without PG and fast startup (boot up within approx. 0.5 seconds)
- Supply and load voltage connection: 2 x M12
- Module variance:
 - 8 DI
 - 16 DI
 - 8 DO (2 A)
 - 8 DO (1.3 A)
 - 8 DO (0.5 A)
 - 16 DO (1.3 A)
 - 8 DI/DO (1.3 A)
 - 8 AI (U, I, TC, RTD)
 - 8 AI (TC, RTD)
 - 4 AO (U, I)
 - 4 IO-Link
 - 4 IO-Link + 8 DI + 4 DO (1.3 A)
- Channel-specific diagnostics
- Ambient temperature range -40 °C to 60 °C

Technical specifications

Article number	6ES7141-6BF00-0AB0	6ES7141-6BG00-0AB0	6ES7141-6BH00-0AB0
	ET 200ECO PN, 8DI, DC24V, 4XM12	ET 200ECO PN, 8DI, DC24V, 8XM12	ET 200ECO PN, 16DI, DC24V, 8XM12
General information			
Vendor identification (VendorID)	002AH	002AH	002AH
Device identifier (DeviceID)	0306H	0306H	0306H
Supply voltage			
Rated value (DC)	24 V	24 V	24 V
Reverse polarity protection	Yes	Yes	Yes
Input current			
Current consumption, typ.	100 mA	100 mA	100 mA
Encoder supply			
Number of outputs	4	8	8
Short-circuit protection	Yes; Electronic	Yes; Electronic	Yes; Electronic
Output current			
• Rated value	100 mA; per output	100 mA; per output	100 mA; per output
Power loss			
Power loss, typ.	5.5 W	4.5 W	6.5 W
Digital inputs			
Number of digital inputs	8	8	16
• in groups of	2	1	2
Input characteristic curve in accordance with IEC 61131, type 3	Yes	Yes	Yes
Number of simultaneously controllable inputs			
all mounting positions			
- up to 60 °C, max.	8	8	16

Technical specifications (continued)

Article number	6ES7141-6BF00-0AB0 ET 200ECO PN, 8DI, DC24V, 4XM12	6ES7141-6BG00-0AB0 ET 200ECO PN, 8DI, DC24V, 8XM12	6ES7141-6BH00-0AB0 ET 200ECO PN, 16DI, DC24V, 8XM12
Input voltage			
• Type of input voltage	DC	DC	DC
• Rated value (DC)	24 V	24 V	24 V
• for signal "0"	-3 to +5V	-3 to +5V	-3 to +5V
• for signal "1"	+11 to +30V	+11 to +30V	+11 to +30V
Input current			
• for signal "1", typ.	7 mA	7 mA	7 mA
Input delay (for rated value of input voltage) for standard inputs			
- at "0" to "1", max.	typically 3 ms	typically 3 ms	typically 3 ms
- at "1" to "0", max.	typically 3 ms	typically 3 ms	typically 3 ms
Cable length			
• unshielded, max.	30 m	30 m	30 m
Encoder			
Connectable encoders			
• 2-wire sensor	Yes	Yes	Yes
- permissible quiescent current (2-wire sensor), max.	1.5 mA	1.5 mA	1.5 mA
Interfaces			
Transmission procedure	100BASE-TX	100BASE-TX	100BASE-TX
Number of PROFINET interfaces	1	1	1
PROFINET IO			
• Autocrossing	Yes	Yes	Yes
• automatic detection of transmission rate	Yes	Yes	Yes
• Transmission rate, max.	100 Mbit/s	100 Mbit/s	100 Mbit/s
• integrated switch	Yes	Yes	Yes
PROFINET IO Device			
- IRT with the option "high flexibility"	Yes	Yes	Yes
- Prioritized startup	Yes	Yes	Yes
Protocols			
Supports protocol for PROFINET IO	Yes	Yes	Yes
PROFINET CBA	No	No	No
PROFIsafe	No	No	No
Protocols (Ethernet)			
• TCP/IP	No	No	No
• SNMP	Yes	Yes	Yes
• DCP	Yes	Yes	Yes
• LLDP	Yes	Yes	Yes
• ping	Yes	Yes	Yes
• ARP	Yes	Yes	Yes
Interrupts/diagnostics/ status information			
Status indicator	Yes; Green LED	Yes; Green LED	Yes; Green LED
Diagnostic functions	Yes	Yes	Yes
Alarms			
• Diagnostic alarm	Yes	Yes	Yes
Diagnostic messages			
• Diagnostic information readable	Yes	Yes	Yes
• Monitoring the supply voltage	Yes; Green "ON" LED	Yes; Green "ON" LED	Yes; Green "ON" LED
• Wire-break in signal transmitter cable	Yes	Yes	Yes
• Short-circuit encoder supply	Yes; Per channel group	Yes; Per channel group	Yes; Per channel group
• Group error	Yes; Red/yellow "SF/MT" LED	Yes; Red/yellow "SF/MT" LED	Yes; Red/yellow "SF/MT" LED

I/O systems

SIMATIC ET 200 systems without control cabinet

SIMATIC ET 200eco PN

Technical specifications (continued)

Article number	6ES7141-6BF00-0AB0 ET 200ECO PN, 8DI, DC24V, 4XM12	6ES7141-6BG00-0AB0 ET 200ECO PN, 8DI, DC24V, 8XM12	6ES7141-6BH00-0AB0 ET 200ECO PN, 16DI, DC24V, 8XM12
Potential separation			
between the load voltages	Yes	Yes	Yes
between load voltage and all other switching components	No	No	No
between Ethernet and electronics	Yes	Yes	Yes
Potential separation digital inputs			
• between the channels	No	No	No
Isolation			
tested with			
• 24 V DC circuits	707 V DC (type test)	707 V DC (type test)	707 V DC (type test)
• Interface	1 500 V; According to IEEE 802.3	1 500 V; According to IEEE 802.3	1 500 V; According to IEEE 802.3
Degree and class of protection			
IP degree of protection	IP65/67	IP67	IP67
Connection method			
Design of electrical connection	4/5-pin M12 circular connectors	4/5-pin M12 circular connectors	4/5-pin M12 circular connectors
Dimensions			
Width	30 mm	60 mm	60 mm
Height	200 mm	175 mm	175 mm
Depth	49 mm	49 mm	49 mm
Weights			
Weight (without packaging)	550 g	910 g	910 g

Article number	6ES7142-6BF50-0AB0 ET 200ECO PN, 8DO, DC24V/0.5A, 4XM12	6ES7142-6BF00-0AB0 ET 200ECO PN, 8DO, DC24V/1.3A, 4XM12	6ES7142-6BG00-0AB0 ET 200ECO PN, 8DO, DC24V/1.3A, 8XM12	6ES7142-6BR00-0AB0 ET 200ECO PN, 8 DO, DC24V/2A, 8XM12	6ES7142-6BH00-0AB0 ET 200ECO PN, 16DO, DC24V/1.3A, 8XM12
General information					
Vendor identification (VendorID)	002AH	002AH	002AH	002AH	002AH
Device identifier (DeviceID)	0306H	0306H	0306H	0306H	0306H
Supply voltage					
Rated value (DC)	24 V	24 V	24 V	24 V	24 V
Reverse polarity protection	Yes	Yes	Yes	Yes	Yes
Load voltage 2L+					
• Rated value (DC)	24 V	24 V	24 V	24 V	24 V
• Reverse polarity protection	Yes	Yes	Yes	Yes	Yes
Input current					
Current consumption, typ.	100 mA	100 mA	100 mA	100 mA	100 mA
from supply voltage 1L+, max.	4 A	4 A	4 A	4 A	4 A
from load voltage 2L+, max.	4 A	4 A	4 A	4 A	4 A
Power loss					
Power loss, typ.	3 W	5.5 W	5.5 W	5 W	5.5 W
Digital outputs					
Number of digital outputs	8	8	8	8	16
• in groups of	8	4	4	4	8
Short-circuit protection	Yes	Yes	Yes	Yes	Yes
• Response threshold, typ.	0.7 A	1.8 A	1.8 A	2.8 A	1.8 A
Limitation of inductive shutdown voltage to	Typ. (L1+, L2+) -47 V	Typ. (L1+, L2+) -47 V	Typ. (L1+, L2+) -47 V	Typ. (L1+, L2+) -47 V	Typ. (L1+, L2+) -47 V
Controlling a digital input	Yes	Yes	Yes	Yes	Yes
Switching capacity of the outputs					
• on lamp load, max.	5 W	5 W	5 W	10 W	5 W
Output current					
• for signal "1" rated value	0.5 A	1.3 A; Maximum	1.3 A; Maximum	2 A	1.3 A; Maximum
• for signal "0" residual current, max.	1.5 mA	1.5 mA	1.5 mA	1.5 mA	1.5 mA

Technical specifications (continued)

Article number	6ES7142-6BF50-0AB0 ET 200ECO PN, 8DO, DC24V/0.5A, 4XM12	6ES7142-6BF00-0AB0 ET 200ECO PN, 8DO, DC24V/1.3A, 4XM12	6ES7142-6BG00-0AB0 ET 200ECO PN, 8DO, DC24V/1.3A, 8XM12	6ES7142-6BR00-0AB0 ET 200ECO PN, 8 DO, DC24V/2A, 8XM12	6ES7142-6BH00-0AB0 ET 200ECO PN, 16DO DC24V/1.3A, 8XM12
Parallel switching of two outputs					
• for uprating	No	No	No	No	No
• for redundant control of a load	Yes	Yes	Yes	Yes	Yes
Switching frequency					
• with resistive load, max.	100 Hz	100 Hz	100 Hz	100 Hz	100 Hz
• with inductive load, max.	0.5 Hz	0.5 Hz	0.5 Hz	0.5 Hz	0.5 Hz
• on lamp load, max.	1 Hz	1 Hz	1 Hz	1 Hz	1 Hz
Total current of the outputs (per group)					
all mounting positions					
- up to 55 °C, max.		3.9 A			
- up to 60 °C, max.	4 A	2.6 A	3.9 A	3.9 A	3.9 A
Cable length					
• unshielded, max.	30 m	30 m	30 m	30 m	30 m
Interfaces					
Transmission procedure	100BASE-TX	100BASE-TX	100BASE-TX	100BASE-TX	100BASE-TX
Number of PROFINET interfaces	1	1	1	1	1
PROFINET IO					
• Autocrossing	Yes	Yes	Yes	Yes	Yes
• automatic detection of transmission rate	Yes	Yes	Yes	Yes	Yes
• Transmission rate, max.	100 Mbit/s	100 Mbit/s	100 Mbit/s	100 Mbit/s	100 Mbit/s
• integrated switch	Yes	Yes	Yes	Yes	Yes
PROFINET IO Device					
- IRT with the option "high flexibility"	Yes	Yes	Yes	Yes	Yes
- Prioritized startup	Yes	Yes	Yes	Yes	Yes
Protocols					
Supports protocol for PROFINET IO	Yes	Yes	Yes	Yes	Yes
PROFINET CBA	No	No	No	No	No
PROFIsafe	No	No	No	No	No
Protocols (Ethernet)					
• TCP/IP	No	No	No	No	No
• SNMP	Yes	Yes	Yes	Yes	Yes
• DCP	Yes	Yes	Yes	Yes	Yes
• LLDP	Yes	Yes	Yes	Yes	Yes
• ping	Yes	Yes	Yes	Yes	Yes
• ARP	Yes	Yes	Yes	Yes	Yes
Interrupts/diagnostics/status information					
Status indicator	Yes; Green LED	Yes; Green LED	Yes; Green LED	Yes; Green LED	Yes; Green LED
Diagnostic functions	Yes	Yes	Yes	Yes	Yes
Alarms					
• Diagnostic alarm	Yes	Yes	Yes	Yes	Yes
Diagnostic messages					
• Diagnostic information readable	Yes	Yes	Yes	Yes	Yes
• Monitoring the supply voltage	Yes; Green "ON" LED	Yes; Green "ON" LED	Yes; Green "ON" LED	Yes; Green "ON" LED	Yes; Green "ON" LED
• Wire-break in actuator cable	Yes	Yes	Yes	Yes	Yes
• Short-circuit	Yes	Yes	Yes	Yes	Yes
• Group error	Yes; Red/yellow "SF/MT" LED	Yes; Red/yellow "SF/MT" LED	Yes; Red/yellow "SF/MT" LED	Yes; Red/yellow "SF/MT" LED	Yes; Red/yellow "SF/MT" LED

I/O systems

SIMATIC ET 200 systems without control cabinet

SIMATIC ET 200eco PN

Technical specifications (continued)

Article number	6ES7142-6BF50-0AB0 ET 200ECO PN, 8DO, DC24V/0.5A, 4XM12	6ES7142-6BF00-0AB0 ET 200ECO PN, 8DO, DC24V/1.3A, 4XM12	6ES7142-6BG00-0AB0 ET 200ECO PN, 8DO, DC24V/1.3A, 8XM12	6ES7142-6BR00-0AB0 ET 200ECO PN, 8 DO, DC24V/2A, 8XM12	6ES7142-6BH00-0AB0 ET 200ECO PN, 16DO, DC24V/1.3A, 8XM12
Potential separation					
between the load voltages	Yes	Yes	Yes	Yes	Yes
between load voltage and all other switching components	No	No	No	No	No
between Ethernet and electronics	Yes	Yes	Yes	Yes	Yes
Potential separation digital outputs					
• between the channels	No	No	No	No	No
Isolation					
tested with					
• 24 V DC circuits	707 V DC (type test)	707 V DC (type test)	707 V DC (type test)	707 V DC (type test)	707 V DC (type test)
• Interface	1 500 V; According to IEEE 802.3	1 500 V; According to IEEE 802.3	1 500 V; According to IEEE 802.3	1 500 V; According to IEEE 802.3	1 500 V; According to IEEE 802.3
Degree and class of protection					
IP degree of protection	IP67	IP65/67	IP67	IP67	IP67
Connection method					
Design of electrical connection	4/5-pin M12 circular connectors	4/5-pin M12 circular connectors	4/5-pin M12 circular connectors	4/5-pin M12 circular connectors	4/5-pin M12 circular connectors
Dimensions					
Width	30 mm	30 mm	60 mm	60 mm	60 mm
Height	200 mm	200 mm	175 mm	175 mm	175 mm
Depth	49 mm	49 mm	49 mm	49 mm	49 mm
Weights					
Weight (without packaging)	550 g	550 g	910 g	910 g	910 g

Article number	6ES7147-6BG00-0AB0 ET 200ECO PN, 8 DIO, DC24V/1.3A, 8XM12
General information	
Vendor identification (VendorID)	002AH
Device identifier (DeviceID)	0306H
Supply voltage	
Rated value (DC)	24 V
Reverse polarity protection	Yes
Load voltage 2L+	
• Rated value (DC)	24 V
• Reverse polarity protection	Yes
Input current	
Current consumption, typ.	100 mA
from supply voltage 1L+, max.	4 A
from load voltage 2L+, max.	4 A
Encoder supply	
Number of outputs	8
Short-circuit protection	Yes; Electronic
Output current	
• Rated value	100 mA; per output
Power loss	
Power loss, typ.	6.5 W
Digital inputs	
Number of digital inputs	8
• in groups of	4
Input characteristic curve in accordance with IEC 61131, type 3	Yes
Number of simultaneously controllable inputs	
all mounting positions	
- up to 60 °C, max.	8

Article number	6ES7147-6BG00-0AB0 ET 200ECO PN, 8 DIO, DC24V/1.3A, 8XM12
Input voltage	
• Type of input voltage	DC
• Rated value (DC)	24 V
• for signal "0"	-3 to +5V
• for signal "1"	+11 to +30V
Input current	
• for signal "1", typ.	7 mA
Input delay (for rated value of input voltage) for standard inputs	
- at "0" to "1", max.	typically 3 ms
- at "1" to "0", max.	typically 3 ms
Cable length	
• unshielded, max.	30 m
Digital outputs	
Number of digital outputs	8
• in groups of	4
Short-circuit protection	Yes; Electronic
• Response threshold, typ.	1.8 A
Limitation of inductive shutdown voltage to	Typ. (L1+, L2+) -47 V
Controlling a digital input	Yes
Switching capacity of the outputs	
• on lamp load, max.	5 W
Output current	
• for signal "1" rated value	1.3 A; Maximum
• for signal "0" residual current, max.	1.5 mA

Technical specifications (continued)

Article number	6ES7147-6BG00-0AB0 ET 200ECO PN, 8 DIO, DC24V/1.3A, 8XM12
Parallel switching of two outputs	
• for uprating	No
• for redundant control of a load	Yes
Switching frequency	
• with resistive load, max.	100 Hz
• with inductive load, max.	0.5 Hz
• on lamp load, max.	1 Hz
Total current of the outputs (per group)	
all mounting positions	
- up to 60 °C, max.	3.9 A
Cable length	
• unshielded, max.	30 m
Encoder	
Connectable encoders	
• 2-wire sensor	Yes
- permissible quiescent current (2-wire sensor), max.	1.5 mA
Interfaces	
Transmission procedure	100BASE-TX
Number of PROFINET interfaces	1
PROFINET IO	
• Autocrossing	Yes
• automatic detection of transmission rate	Yes
• Transmission rate, max.	100 Mbit/s
• integrated switch	Yes
PROFINET IO Device	
- IRT with the option "high flexibility"	Yes
- Prioritized startup	Yes
Protocols	
Supports protocol for PROFINET IO	Yes
PROFINET CBA	No
PROFIsafe	No
Protocols (Ethernet)	
• TCP/IP	No
• SNMP	Yes
• DCP	Yes
• LLDP	Yes
• ping	Yes
• ARP	Yes

Article number	6ES7147-6BG00-0AB0 ET 200ECO PN, 8 DIO, DC24V/1.3A, 8XM12
Interrupts/diagnostics/status information	
Status indicator	Yes; Green LED
Diagnostic functions	Yes
Alarms	
• Diagnostic alarm	Yes
Diagnostic messages	
• Diagnostic information readable	Yes
• Monitoring the supply voltage	Yes; Green "ON" LED
• Wire-break in actuator cable	Yes
• Wire-break in signal transmitter cable	Yes
• Short-circuit	Yes
• Short-circuit encoder supply	Yes
• Group error	Yes; Red/yellow "SF/MT" LED
Potential separation	
between the load voltages	Yes
between load voltage and all other switching components	No
between Ethernet and electronics	Yes
Potential separation digital inputs	
• between the channels	No
Potential separation digital outputs	
• between the channels	No
Isolation	
tested with	
• 24 V DC circuits	707 V DC (type test)
• Interface	1 500 V; According to IEEE 802.3
Degree and class of protection	
IP degree of protection	IP65/67
Connection method	
Design of electrical connection	4/5-pin M12 circular connectors
Dimensions	
Width	60 mm
Height	175 mm
Depth	49 mm
Weights	
Weight (without packaging)	910 g

I/O systems

SIMATIC ET 200 systems without control cabinet

SIMATIC ET 200eco PN

Technical specifications (continued)

Article number	6ES7144-6KD00-0AB0 ET 200ECO PN, 8AI; 4 U/I; 4 RTD/TC 8XM12	6ES7144-6KD50-0AB0 ET 200ECO PN, 8AI RTD/TC 8XM12
General information		
Vendor identification (VendorID)	002AH	002AH
Device identifier (DeviceID)	0306H	0306H
Supply voltage		
Rated value (DC)	24 V	24 V
Reverse polarity protection	Yes	Yes; against destruction
Input current		
Current consumption, typ.	110 mA	110 mA
Encoder supply		
Number of outputs	4	
Short-circuit protection	Yes; Electronic at 1.4 A	
Output current		
• Rated value	1 A; Maximum	
Power loss		
Power loss, typ.	2.8 W	2.8 W
Analog inputs		
Number of analog inputs	8	8
• For voltage/current measurement	4	
• For resistance/resistance thermometer measurement	4	8
permissible input voltage for voltage input (destruction limit), max.	28.8 V permanent, 35 V for max. 500 ms	
Input ranges (rated values), voltages		
• 0 to +10 V	Yes	
• 1 V to 5 V	Yes	
• -10 V to +10 V	Yes	
• -80 mV to +80 mV	Yes	Yes
Input ranges (rated values), currents		
• 0 to 20 mA	Yes	
• -20 mA to +20 mA	Yes	
• 4 mA to 20 mA	Yes	
Input ranges (rated values), thermocouples		
• Type E	Yes	Yes
• Type J	Yes	Yes
• Type K	Yes	Yes
• Type N	Yes	Yes
Input ranges (rated values), resistance thermometer		
• Ni 100	Yes	Yes
• Ni 1000	Yes	Yes
• Ni 120	Yes	Yes
• Ni 200	Yes	Yes
• Ni 500	Yes	Yes
• Pt 100	Yes	Yes
• Pt 1000	Yes	Yes
• Pt 200	Yes	Yes
• Pt 500	Yes	Yes
Input ranges (rated values), resistors		
• 0 to 150 ohms	Yes	Yes
• 0 to 300 ohms	Yes	Yes
• 0 to 600 ohms	Yes	Yes
• 0 to 3000 ohms	Yes	Yes

Technical specifications (continued)

Article number	6ES7144-6KD00-0AB0 ET 200ECO PN, 8AI; 4 U/I; 4 RTD/TC 8XM12	6ES7144-6KD50-0AB0 ET 200ECO PN, 8AI RTD/TC 8XM12
Thermocouple (TC)		
Temperature compensation		
- parameterizable	Yes	Yes
- internal temperature compensation	Yes	Yes
- external temperature compensation with compensations socket	Yes	Yes
- external temperature compensation with Pt100		Yes
- dynamic reference temperature value		Yes
- for definable comparison point temperature		Yes
Cable length		
• shielded, max.	30 m	30 m
Analog value generation for the inputs		
Analog value display	SIMATIC S7 format	SIMATIC S7 format
Measurement principle	integrating	integrating
Integration and conversion time/resolution per channel		
• Resolution (incl. overrange)	15 bit + sign	15 bit + sign
• Integration time, parameterizable	Yes	Yes
• Integration time (ms)	2/16.67/20/100 ms	2/16.67/20/100 ms
• Interference voltage suppression for interference frequency f1 in Hz	500 / 60 / 50 / 10 Hz	500 / 60 / 50 / 10 Hz
• Conversion time (per channel)	4 / 19 / 22 / 102 ms	4 / 19 / 22 / 102 ms
Smoothering of measured values		
• parameterizable	Yes	Yes
• Step: None	Yes; 1 x cycle time	Yes; 1 x cycle time
• Step: low	Yes; 4 x cycle time	Yes; 4 x cycle time
• Step: Medium	Yes; 16 x cycle time	Yes; 16 x cycle time
• Step: High	Yes; 64 x cycle time	Yes; 64 x cycle time
Encoder		
Number of connectable encoders, max.	8	8
Connection of signal encoders		
• for voltage measurement	Yes	
• for current measurement as 2-wire transducer	Yes	
• for current measurement as 4-wire transducer	Yes	
• for resistance measurement with two-wire connection	Yes	Yes
• for resistance measurement with three-wire connection	Yes	Yes
• for resistance measurement with four-wire connection	Yes	Yes
Errors/accuracies		
Linearity error (relative to input range), (+/-)	0.01 %	0.01 %
Temperature error (relative to input range), (+/-)	U: 0.0035%/°C; I: 0.006%/°C; RTD: 0.0005%/°C; TC: 0.0035%/°C	RTD: 0.0005%/°C; TC: 0.0035%/°C
Crosstalk between the inputs, min.	85 dB	-85 dB
Repeat accuracy in steady state at 25 °C (relative to input range), (+/-)	0.008 %	0.008 %
Interference voltage suppression for f = n x (f1 +/- 1 %), f1 = interference frequency		
• Series mode interference (peak value of interference < rated value of input range), min.	46 dB	46 dB
• Common mode interference, min.	70 dB	70 dB

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Article number	6ES7144-6KD00-0AB0 ET 200ECO PN, 8AI; 4 U/I; 4 RTD/TC 8XM12	6ES7144-6KD50-0AB0 ET 200ECO PN, 8AI RTD/TC 8XM12
Interfaces		
Transmission procedure	100BASE-TX	100BASE-TX
Number of PROFINET interfaces	1	1
PROFINET IO		
• Autocrossing	Yes	Yes
• automatic detection of transmission rate	Yes	Yes
• Transmission rate, max.	100 Mbit/s	100 Mbit/s
• integrated switch	Yes	Yes
PROFINET IO Device		
- IRT with the option "high flexibility"	Yes	
- Prioritized startup	Yes	Yes
Protocols		
Supports protocol for PROFINET IO	Yes	Yes
PROFINET CBA	No	No
PROFIsafe	No	No
Protocols (Ethernet)		
• TCP/IP	No	No
• SNMP	Yes	Yes
• DCP	Yes	Yes
• LLDP	Yes	Yes
• ping	Yes	Yes
• ARP	Yes	Yes
Interrupts/diagnostics/status information		
Status indicator	Yes	
Diagnostic functions	Yes	Yes
Alarms		
• Diagnostic alarm	Yes	Yes
Diagnostic messages		
• Diagnostic information readable	Yes	Yes
• Monitoring the supply voltage	Yes; Green "ON" LED	Yes; Green "ON" LED
• Short-circuit encoder supply	Yes; per module	
• Group error	Yes; Red/yellow "SF/MT" LED	Yes; Red/yellow "SF/MT" LED
• Overflow/underflow	Yes	Yes
Potential separation		
between the load voltages	Yes	Yes
between load voltage and all other switching components	No	No
between Ethernet and electronics	Yes	Yes
Potential separation analog inputs		
• between the channels	No	No
Permissible potential difference		
Between the inputs and MANA (UCM)	10 Vpp AC	10 Vpp AC
Isolation		
tested with		
• 24 V DC circuits	707 V DC (type test)	707 V DC (type test)
• Interface	1 500 V; According to IEEE 802.3	1 500 V; According to IEEE 802.3
Degree and class of protection		
IP degree of protection	IP65/67	IP65/67
Connection method		
Design of electrical connection	4/5-pin M12 circular connectors	4/5-pin M12 circular connectors
Dimensions		
Width	60 mm	60 mm
Height	175 mm	175 mm
Depth	49 mm	49 mm
Weights		
Weight (without packaging)	930 g	930 g

Technical specifications (continued)

Article number	6ES7145-6HD00-0AB0 ET 200ECO PN, 4AO U/I 4XM12
General information	
Vendor identification (VendorID)	002AH
Device identifier (DeviceID)	0306H
Supply voltage	
Rated value (DC)	24 V
Reverse polarity protection	Yes
Input current	
Current consumption, typ.	280 mA
Actuator supply	
Number of outputs	4
Short-circuit protection	Yes; Electronic at 1.4 A
Output current	
• Rated value	1 A; Maximum
Power loss	
Power loss, typ.	5.5 W
Analog outputs	
Number of analog outputs	4
Voltage output, short-circuit protection	Yes
Voltage output, short-circuit current, max.	30 mA
Current output, no-load voltage, max.	20 V
Output ranges, voltage	
• 0 to 10 V	Yes
• 1 V to 5 V	Yes
• -10 V to +10 V	Yes
Output ranges, current	
• 0 to 20 mA	Yes
• -20 mA to +20 mA	Yes
• 4 mA to 20 mA	Yes
Connection of actuators	
• for voltage output two-wire connection	Yes
• for current output two-wire connection	Yes
Load impedance (in rated range of output)	
• with voltage outputs, min.	1 kΩ
• with voltage outputs, capacitive load, max.	1 μF
• with current outputs, max.	600 Ω
• with current outputs, inductive load, max.	1 mH
Destruction limits against externally applied voltages and currents	
• Voltages at the outputs towards MANA	28.8 V permanent, 35 V for max. 500 ms
Cable length	
• shielded, max.	30 m
Analog value generation for the outputs	
Analog value display	SIMATIC S7 format
Conversion principle	Resistor network
Integration and conversion time/resolution per channel	
• Resolution (incl. overrange)	15 bit + sign
• Conversion time (per channel)	1 ms

Article number	6ES7145-6HD00-0AB0 ET 200ECO PN, 4AO U/I 4XM12
Settling time	
• for resistive load	2 ms
• for capacitive load	1.8 ms
• for inductive load	2 ms
Errors/accuracies	
Output ripple (relative to output range, bandwidth 0 to 50 kHz), (+/-)	U: ±0.6 mVrms; I: ±0.4 nArms
Linearity error (relative to output range), (+/-)	0.02 %
Temperature error (relative to output range), (+/-)	U: 0.001%/°C; I: 0.0025%/°C
Crosstalk between the outputs, min.	70 dB
Repeat accuracy in steady state at 25 °C (relative to output range), (+/-)	0.008 %
Interfaces	
Transmission procedure	100BASE-TX
Number of PROFINET interfaces	1
PROFINET IO	
• Autocrossing	Yes
• automatic detection of transmission rate	Yes
• Transmission rate, max.	100 Mbit/s
• integrated switch	Yes
PROFINET IO Device	
- IRT with the option "high flexibility"	Yes
- Prioritized startup	Yes
Protocols	
Supports protocol for PROFINET IO	Yes
PROFINET CBA	No
PROFIsafe	No
Protocols (Ethernet)	
• TCP/IP	No
• SNMP	Yes
• DCP	Yes
• LLDP	Yes
• ping	Yes
• ARP	Yes
Interrupts/diagnostics/status information	
Status indicator	Yes
Diagnostic functions	Yes
Substitute values connectable	Yes
Alarms	
• Diagnostic alarm	Yes
Diagnostic messages	
• Diagnostic information readable	Yes
• Monitoring the supply voltage	Yes; Green "ON" LED
• Wire-break	Yes; Channel-by-channel with current output
• Short-circuit	Yes; Channel-by-channel with voltage output
• Group error	Yes; Red/yellow "SF/MT" LED

I/O systems

SIMATIC ET 200 systems without control cabinet

SIMATIC ET 200eco PN

Technical specifications (continued)

Article number	6ES7145-6HD00-0AB0 ET 200ECO PN, 4AO U/I 4XM12
Potential separation	
between the load voltages	Yes
between load voltage and all other switching components	No
between Ethernet and electronics	Yes
Potential separation analog outputs	
• between the channels	No
Permissible potential difference	
between M internally and the outputs	10 Vpp AC

Article number	6ES7145-6HD00-0AB0 ET 200ECO PN, 4AO U/I 4XM12
Isolation	
tested with	
• 24 V DC circuits	707 V DC (type test)
• Interface	1 500 V; According to IEEE 802.3
Degree and class of protection	
IP degree of protection	IP65/67
Connection method	
Design of electrical connection	4/5-pin M12 circular connectors
Dimensions	
Width	60 mm
Height	175 mm
Depth	49 mm
Weights	
Weight (without packaging)	930 g

Article number	6ES7148-6JA00-0AB0 ET 200ECO PN: IO-LINK MASTER	6ES7148-6JD00-0AB0 ET 200eco PN: IO-Link master
General information		
Vendor identification (VendorID)	002AH	002AH
Device identifier (DeviceID)	0306H	0306H
Supply voltage		
Rated value (DC)	24 V	24 V
Reverse polarity protection	Yes	Yes
Load voltage 2L+		
• Rated value (DC)	24 V	24 V
• Reverse polarity protection	Yes	Yes; against destruction; load increasing
Input current		
Current consumption, typ.	200 mA	100 mA
from supply voltage 1L+, max.	4 A	4 A
from load voltage 2L+, max.	4 A	4 A
Encoder supply		
Number of outputs	6	4
Short-circuit protection	Yes	Yes; per channel, electronic
Output current		
• Rated value	200 mA; 100 mA per output to X5-X6	500 mA; Per channel
Power loss		
Power loss, typ.	8 W	4.8 W
Digital inputs		
Number of digital inputs	8	
Input characteristic curve in accordance with IEC 61131, type 3	Yes	
Number of simultaneously controllable inputs		
all mounting positions		
- up to 60 °C, max.	8	
Input voltage		
• Rated value (DC)	24 V	
• for signal "0"	-3 to +5V	
• for signal "1"	+11 to +30V	
Input current		
• for signal "0", max. (permissible quiescent current)	1.5 mA	
• for signal "1", typ.	7 mA	

Technical specifications (continued)

Article number	6ES7148-6JA00-0AB0 ET 200ECO PN: IO-LINK MASTER	6ES7148-6JD00-0AB0 ET 200eco PN: IO-Link master
Input delay (for rated value of input voltage) for standard inputs		
- at "0" to "1", max.	typically 3 ms	
- at "1" to "0", max.	typically 3 ms	
Cable length		
• unshielded, max.	30 m	
Digital outputs		
Number of digital outputs	4	
Short-circuit protection	Yes; Electronic	
• Response threshold, typ.	1.8 A	
Limitation of inductive shutdown voltage to	Typ. (L1+, L2+) -47 V	
Controlling a digital input	Yes	
Switching capacity of the outputs		
• on lamp load, max.	5 W	
Output current		
• for signal "1" rated value	1.3 A; Maximum	
• for signal "0" residual current, max.	1.5 mA	
Parallel switching of two outputs		
• for uprating	No	
• for redundant control of a load	Yes	
Switching frequency		
• with resistive load, max.	100 Hz	
• with inductive load, max.	0.5 Hz	
• on lamp load, max.	1 Hz	
Total current of the outputs (per group) all mounting positions		
- up to 60 °C, max.	3.9 A	
Cable length		
• unshielded, max.	30 m	
IO-Link		
Number of ports	4	4
• of which simultaneously controllable	4	4
IO-Link protocol 1.0	Yes	Yes
IO-Link protocol 1.1		Yes
Transmission rate	4.8 kBd (COM1); 38.4 kBd (COM2)	4.8 kBaud (COM1); 38.4 kBaud (COM2), 230 kBaud (COM3)
Size of process data, input per port	32 byte	32 byte
Size of process data, input per module	32 byte	128 bytes + 4 bytes PQI
Size of process data, output per port	32 byte	32 byte
Size of process data, output per module	32 byte	128 byte
Memory size for device parameter		2 kbyte; for each port
Master backup		Possible with function block IO_LINK_MASTER
Configuration without S7-PCT		Possible; autostart function
Cable length unshielded, max.	20 m	20 m
Operating modes		
• IO-Link	Yes	Yes
• DI	Yes	Yes
• DQ	Yes	Yes; max. 100 mA
Connection of IO-Link devices		
• Port type A	Yes	Yes; via 3-core cable
• Port type B		Yes; Additional device supply: max. 2 A per port, max. 4 A per module
• via three-wire connection	Yes	

I/O systems

SIMATIC ET 200 systems without control cabinet

SIMATIC ET 200eco PN

Technical specifications (continued)

Article number	6ES7148-6JA00-0AB0 ET 200ECO PN: IO-LINK MASTER	6ES7148-6JD00-0AB0 ET 200eco PN: IO-Link master
Interfaces		
Transmission procedure	100BASE-TX	100BASE-TX
Number of PROFINET interfaces	1	1
PROFINET IO		
• Autocrossing	Yes	Yes
• automatic detection of transmission rate	Yes	Yes
• Transmission rate, max.	100 Mbit/s	100 Mbit/s
• integrated switch	Yes	Yes
PROFINET IO Device		
- IRT with the option "high flexibility"	Yes	Yes
Protocols		
Supports protocol for PROFINET IO	Yes	Yes
PROFINET CBA	No	No
PROFIsafe	No	No
Protocols (Ethernet)		
• SNMP	Yes	Yes
• DCP	Yes	Yes
• LLDP	Yes	Yes
• ping	Yes	Yes
• ARP	Yes	Yes
Interrupts/diagnostics/status information		
Status indicator	Yes; Green LED	Yes; Green LED
Diagnostic functions	Yes	Yes
Alarms		
• Diagnostic alarm	Yes	Yes
Diagnostic messages		
• Diagnostic information readable	Yes	Yes
• Monitoring the supply voltage	Yes; Green "ON" LED	Yes; Green "ON" LED
• Wire-break in actuator cable	Yes	
• Wire-break in signal transmitter cable	Yes	
• Short-circuit	Yes	Yes; Device supply to M
• Short-circuit encoder supply	Yes	
• Group error	Yes; Red/yellow "SF/MT" LED	Yes; Red/yellow "SF/MT" LED
Potential separation		
between the load voltages	Yes	Yes
between load voltage and all other switching components	No	No
between Ethernet and electronics	Yes	Yes
Potential separation digital inputs		
• between the channels	No	
Potential separation digital outputs		
• between the channels	No	
Isolation		
tested with		
• 24 V DC circuits	707 V DC (type test)	707 V DC (type test)
• Interface	1 500 V; According to IEEE 802.3	1 500 V; According to IEEE 802.3
Degree and class of protection		
IP degree of protection	IP65/67	IP65/67
Connection method		
Design of electrical connection		3/5-pin M12 round connectors
Dimensions		
Width	60 mm	30 mm
Height	175 mm	200 mm
Depth	49 mm	49 mm
Weights		
Weight (without packaging)	910 g	550 g

Ordering data	Article No.		Article No.
ET 200eco PN digital input modules		PROFINET M12 connector, for user assembly	
8 DI 24 V DC; 4 x M12, dual assignment, IP67 degree of protection	6ES7141-6BF00-0AB0	IE FC M12 PRO connector, for user assembly	
8 DI 24 V DC; 8 x M12, IP67 degree of protection	6ES7141-6BG00-0AB0	1 unit 8 units	6GK1901-0DB20-6AA0 6GK1901-0DB20-6AA8
16 DI 24 V DC; 8 x M12, dual assignment, IP67 degree of protection	6ES7141-6BH00-0AB0	PROFINET M12 connecting cables	
ET 200eco PN digital output modules		Pre-assembled connecting cables with 2 M12 connectors (D-coded) in various lengths:	
8 DO 24 V DC/0.5 A; 4 x M12, dual assignment, 1 load voltage supply DO; IP67 degree of protection	6ES7142-6BF50-0AB0	0.3 m	6XV1870-8AE30
8 DO 24 V DC/1.3 A; 4 x M12, dual assignment, IP67 degree of protection	6ES7142-6BF00-0AB0	0.5 m	6XV1870-8AE50
8 DO 24 V DC/1.3 A; 8 x M12, IP67 degree of protection	6ES7142-6BG00-0AB0	1.0 m	6XV1870-8AH10
8 DO 24 V DC/2 A; 8 x M12, IP67 degree of protection	6ES7142-6BR00-0AB0	1.5 m	6XV1870-8AH15
16 DO 24 V DC/1.3 A; 8 x M12, dual assignment, IP67 degree of protection	6ES7142-6BH00-0AB0	2.0 m	6XV1870-8AH20
		3.0 m	6XV1870-8AH30
		5.0 m	6XV1870-8AH50
		10.0 m	6XV1870-8AN10
		15.0 m	6XV1870-8AN15
ET 200eco PN digital input/output modules		M12 connector for 24 V DC load power supply	
8 DI/DO 24 V DC/1.3 A; 8 x M12, IP67 degree of protection	6ES7147-6BG00-0AB0	Connection socket for 24 V DC incoming supply; 4-pin, A-coded, 3 units	6GK1907-0DC10-6AA3
ET 200eco PN analog input modules		Connector for loop-through of 24 V DC; 4-pin, A-coded, 3 units	6GK1907-0DB10-6AA3
8 AI 4 U/I + 4 RTD/TC; 8 x M12, IP67 degree of protection	6ES7144-6KD00-0AB0	M12 plug-in power cables	
8 AI RTD/TC; 8 x M12, IP67 degree of protection	6ES7144-6KD50-0AB0	Pre-assembled plug-in power cables, fitted at each end with M12 socket and plug 4 x 0.75 mm ² , in various lengths:	
ET 200eco PN analog output modules		0.3 m	6XV1801-5DE30
4 AO U/I; 4 x M12, IP67 degree of protection	6ES7145-6HD00-0AB0	0.5 m	6XV1801-5DE50
ET 200eco PN IO-Link master modules		1.0 m	6XV1801-5DH10
4 IO-L + 8 DI + 4 DO, 24 V DC/1.3 A; 8 x M12, IP67 degree of protection, enclosure width 60 mm; for connecting up to 4 IO-Link devices according to IO-Link Specification V1.0 and port Class A as well as 8 digital inputs and 4 digital outputs	6ES7148-6JA00-0AB0	1.5 m	6XV1801-5DH15
4 IO-L; 4 x M12, IP67 degree of protection, enclosure width 30 mm; for connecting up to 4 IO-Link devices according to IO-Link Specification V1.0 and V1.1 and port Class B	6ES7148-6JD00-0AB0	2.0 m	6XV1801-5DH20
		3.0 m	6XV1801-5DH30
		5.0 m	6XV1801-5DH50
		10.0 m	6XV1801-5DN10
		15.0 m	6XV1801-5DN15
Accessories		M12 coupler plug	
PD voltage distributor, 24 V DC; 1 x 7/8", 4 x M12	6ES7148-6CB00-0AA0	Can be assembled, for connecting actuators or sensors, 5-pin	3RK1902-4BA00-5AA0
Terminal block for ET 200eco PN, 10 A insulation displacement terminals	6ES7194-6CA00-0AA0	M12 Y cable	
Spare fuses for terminal block, 10 units	6ES7194-6HB00-0AA0	For double connection of I/O by means of single cable to ET 200, 5-pin	6ES7194-6KA00-0XA0
DIN rail 0.5 m	6ES7194-6GA00-0AA0		
Profile screw for DIN rail, 50 units	6ES7194-6MA00-0AA0		
M12 sealing cap for IP67 modules, 10 units	3RX9802-0AA00		
Labels 10 x 7 mm, pastel turquoise, 816 units	3RT1900-1SB10		

I/O systems

SIMATIC ET 200 systems without control cabinet

ET 200eco PN IO-Link master

Overview



The ET 200eco PN IO-Link master module is part of the ET 200eco PN compact block I/O range and is characterized by:

- Compact block I/O for connection to IO-Link devices and the PROFINET bus system
- Cabinet-free installation in IP67 degree of protection with M12 connection system
- Extremely rugged and resistant metal enclosure and casting
- Compact module with enclosure width of 30 mm or 60 mm
- PROFINET connection: 2 x M12 and automatic PROFINET address assignment
- 100 Mbps data transmission rate
- LLDP proximity detection without the need for a programming device
- Supply and load voltage connection: 2 x M12
- Channel-specific diagnostics

Technical specifications

Article number	6ES7148-6JA00-0AB0 ET 200ECO PN: IO-LINK MASTER	6ES7148-6JD00-0AB0 ET 200eco PN: IO-Link master
General information		
Vendor identification (VendorID)	002AH	002AH
Device identifier (DeviceID)	0306H	0306H
Supply voltage		
Rated value (DC)	24 V	24 V
Reverse polarity protection	Yes	Yes
Load voltage 2L+		
• Rated value (DC)	24 V	24 V
• Reverse polarity protection	Yes	Yes; against destruction; load increasing
Input current		
Current consumption, typ.	200 mA	100 mA
from supply voltage 1L+, max.	4 A	4 A
from load voltage 2L+, max.	4 A	4 A
Encoder supply		
Number of outputs	6	4
Short-circuit protection	Yes	Yes; per channel, electronic
Output current		
• Rated value	200 mA; 100 mA per output to X5-X6	500 mA; Per channel
Power loss		
Power loss, typ.	8 W	4.8 W
Digital inputs		
Number of digital inputs	8	
Input characteristic curve in accordance with IEC 61131, type 3	Yes	
Number of simultaneously controllable inputs		
all mounting positions		
- up to 60 °C, max.	8	
Input voltage		
• Rated value (DC)	24 V	
• for signal "0"	-3 to +5V	
• for signal "1"	+11 to +30V	
Input current		
• for signal "0", max. (permissible quiescent current)	1.5 mA	
• for signal "1", typ.	7 mA	
Input delay (for rated value of input voltage)		
for standard inputs		
- at "0" to "1", max.	typically 3 ms	
- at "1" to "0", max.	typically 3 ms	

Technical specifications (continued)

Article number	6ES7148-6JA00-0AB0 ET 200ECO PN: IO-LINK MASTER	6ES7148-6JD00-0AB0 ET 200eco PN: IO-Link master
Cable length • unshielded, max.	30 m	
Digital outputs Number of digital outputs Short-circuit protection • Response threshold, typ. Limitation of inductive shutdown voltage to Controlling a digital input	4 Yes; Electronic 1.8 A Typ. (L1+, L2+) -47 V Yes	
Switching capacity of the outputs • on lamp load, max.	5 W	
Output current • for signal "1" rated value • for signal "0" residual current, max.	1.3 A; Maximum 1.5 mA	
Parallel switching of two outputs • for uprating • for redundant control of a load	No Yes	
Switching frequency • with resistive load, max. • with inductive load, max. • on lamp load, max.	100 Hz 0.5 Hz 1 Hz	
Total current of the outputs (per group) all mounting positions - up to 60 °C, max.	3.9 A	
Cable length • unshielded, max.	30 m	
IO-Link Number of ports • of which simultaneously controllable IO-Link protocol 1.0 IO-Link protocol 1.1 Transmission rate Size of process data, input per port Size of process data, input per module Size of process data, output per port Size of process data, output per module Memory size for device parameter Master backup Configuration without S7-PCT Cable length unshielded, max.	4 4 Yes Yes 4.8 kBd (COM1); 38.4 kBd (COM2) 32 byte 32 byte 32 byte 32 byte 2 kbyte; for each port Possible with function block IO_LINK_MASTER Possible; autostart function 20 m	4 4 Yes Yes 4.8 kBaud (COM1); 38.4 kBaud (COM2), 230 kBaud (COM3) 32 byte 128 bytes + 4 bytes PQI 32 byte 128 byte Possible with function block IO_LINK_MASTER Possible; autostart function 20 m
Operating modes • IO-Link • DI • DQ	Yes Yes Yes	Yes Yes Yes; max. 100 mA
Connection of IO-Link devices • Port type A • Port type B • via three-wire connection	Yes Yes	Yes; via 3-core cable Yes; Additional device supply: max. 2 A per port, max. 4 A per module

I/O systems

SIMATIC ET 200 systems without control cabinet

ET 200eco PN IO-Link master

Technical specifications (continued)

Article number	6ES7148-6JA00-0AB0 ET 200ECO PN: IO-LINK MASTER	6ES7148-6JD00-0AB0 ET 200eco PN: IO-Link master
Interfaces		
Transmission procedure	100BASE-TX	100BASE-TX
Number of PROFINET interfaces	1	1
PROFINET IO		
• Autocrossing	Yes	Yes
• automatic detection of transmission rate	Yes	Yes
• Transmission rate, max.	100 Mbit/s	100 Mbit/s
• integrated switch	Yes	Yes
PROFINET IO Device		
- IRT with the option "high flexibility"	Yes	Yes
Protocols		
Supports protocol for PROFINET IO	Yes	Yes
PROFINET CBA	No	No
PROFIsafe	No	No
Protocols (Ethernet)		
• SNMP	Yes	Yes
• DCP	Yes	Yes
• LLDP	Yes	Yes
• ping	Yes	Yes
• ARP	Yes	Yes
Interrupts/diagnostics/ status information		
Status indicator	Yes; Green LED	Yes; Green LED
Diagnostic functions	Yes	Yes
Alarms		
• Diagnostic alarm	Yes	Yes
Diagnostic messages		
• Diagnostic information readable	Yes	Yes
• Monitoring the supply voltage	Yes; Green "ON" LED	Yes; Green "ON" LED
• Wire-break in actuator cable	Yes	
• Wire-break in signal transmitter cable	Yes	
• Short-circuit	Yes	Yes; Device supply to M
• Short-circuit encoder supply	Yes	
• Group error	Yes; Red/yellow "SF/MT" LED	Yes; Red/yellow "SF/MT" LED
Potential separation		
between the load voltages	Yes	Yes
between load voltage and all other switching components	No	No
between Ethernet and electronics	Yes	Yes
Potential separation digital inputs		
• between the channels	No	
Potential separation digital outputs		
• between the channels	No	
Isolation		
tested with		
• 24 V DC circuits	707 V DC (type test)	707 V DC (type test)
• Interface	1 500 V; According to IEEE 802.3	1 500 V; According to IEEE 802.3
Degree and class of protection		
IP degree of protection	IP65/67	IP65/67
Connection method		
Design of electrical connection		3/5-pin M12 round connectors
Dimensions		
Width	60 mm	30 mm
Height	175 mm	200 mm
Depth	49 mm	49 mm
Weights		
Weight (without packaging)	910 g	550 g

Ordering data	Article No.		Article No.
ET 200eco PN IO-Link master • 4 IO-L + 8 DI + 4 DO, 24 V DC/1.3 A; 8 x M12, IP67 degree of protection, enclosure width 60 mm; for connecting up to 4 IO-Link devices according to IO-Link Specification V1.0 and Port Class A as well as 8 digital inputs and 4 digital outputs • 4 IO-L; 4 x M12, IP67 degree of protection, enclosure width 30 mm; for connecting up to 4 IO-Link devices according to IO-Link Specification V1.0 and V1.1 and port Class B	6ES7148-6JA00-0AB0	M12 connector for 24 V DC load power supply Connection socket for 24 V DC incoming supply; 4-pin, A-coded, 3 units Connector for loop-through of 24 V DC; 4-pin, A-coded, 3 units	6GK1907-0DC10-6AA3 6GK1907-0DB10-6AA3
Accessories • PD voltage distributor, 24 V DC; 1 X 7/8", 4 X M12 • Terminal block for ET 200eco PN, 10 A insulation displacement terminals • Spare fuses for terminal block, 10 units • DIN rail 0.5 m • Profile screw for DIN rail, 50 units • M12 sealing cap for IP67 modules, 10 units • Labels 10 x 7 mm, pastel turquoise, 816 units	6ES7148-6CB00-0AA0 6ES7194-6CA00-0AA0 6ES7194-6HB00-0AA0 6ES7194-6GA00-0AA0 6ES7194-6MA00-0AA0 3RK1901-1KA00 3RT1900-1SB10	M12 plug-in power cables Pre-assembled plug-in power cables, fitted at each end with M12 socket and plug 4 x 0.75 mm², in various lengths: 0.3 m 0.5 m 1.0 m 1.5 m 2.0 m 3.0 m 5.0 m 10.0 m 15.0 m	6XV1801-5DE30 6XV1801-5DE50 6XV1801-5DH10 6XV1801-5DH15 6XV1801-5DH20 6XV1801-5DH30 6XV1801-5DH50 6XV1801-5DN10 6XV1801-5DN15
PROFINET M12 connector, for user assembly IE FC M12 PRO connector, for user assembly • 1 unit • 8 units	6GK1901-0DB20-6AA0 6GK1901-0DB20-6AA8	M12 Y cable For double connection of I/O by means of single cable to ET 200, 5-pin	6ES7194-6KA00-0XA0
PROFINET M12 connecting cables Pre-assembled connecting cables with 2 M12 connectors (D-coded), in various lengths: 0.3 m 0.5 m 1.0 m 1.5 m 2.0 m 3.0 m 5.0 m 10.0 m 15.0 m	6XV1870-8AE30 6XV1870-8AE50 6XV1870-8AH10 6XV1870-8AH15 6XV1870-8AH20 6XV1870-8AH30 6XV1870-8AH50 6XV1870-8AN10 6XV1870-8AN15		

I/O systems

I/O systems for heating units

Introduction

Overview



SIPLUS HCS heating control systems: Industrial heating processes – maximum precision and efficiency

In manufacturing processes where temperature plays a crucial role, deviations of just a few degrees can cause enormous quality problems. To avoid this and to minimize rejection rates, high-precision and reliable, individual control of the electrical heating elements is essential.

Nearly all industrially manufactured products undergo heat treatment. Even small deviations in the heating process can result in enormous negative effects on product quality.

To increase the quality and quantity of a heat-treated product, it is important to be able to focus the energy required with the highest level of spatial and temporal precision. The SIPLUS HCS ensures utmost precision in the control of electric heating units such as infrared heaters.

Three heating control systems are available:

- With integrated power outputs – compact design
- With integrated power outputs – modular design
- Without integrated power outputs

The SIPLUS HCS family of heating control systems saves time, costs and resources when it comes to configuring, commissioning, operation and maintenance.

This is achieved by:

- Simple integration into existing automation systems such as SIMATIC and SIMOTION
- Lower wiring costs and user-friendly engineering
- Intelligent diagnostics options for swift fault detection
- Service-friendly design thanks to ready-to-use function and data blocks
- Reduced volume in the control cabinet with space savings of up to 50%

For more information, see <http://www.siemens.com/siplus-hcs>.

Overview

SIPLUS HCS3200 heating control system with fixing brackets

The SIPLUS HCS3200 heating control system was developed as a compact solution for controlling linear heat emitter arrays.

Thanks to the high IP65 degree of protection, it can be used independently of a control cabinet at a distributed location near the emitters.

There are two versions:

- HCS3200 fan: For controlling 9 emitters and 1 output for switching an external fan on/off
- HCS3200: With UL Recognized Component certification for controlling 9 emitters

Technical specifications

Article number	6BK1932-0BA00-0AA0 SIPLUS HCS3200 Fan	6BK1932-0AA00-0AA0 SIPLUS HCS3200
General information		
Product brand name	SIPLUS	
Product designation	HCS3200 Fan	HCS3200
Type of control of heat emitters	Half-wave control	
Installation type/mounting		
Mounting type	screw fixing	
Mounting position	vertical	
Type of ventilation	Self-ventilation	
Supply voltage		
Type of supply voltage	AC	
Rated value (AC)	400 V	
Relative negative tolerance	10 %	
Relative positive tolerance	10 %	
Line frequency		
• Rated value 1	50 Hz	
• Rated value 2	60 Hz	
• Relative symmetrical tolerance	5 %	
Resistance thermometer (RTD)		
• Design of electrical connection for supply voltage	Connector, 4-pole + PE	Connector, 2-pole + PE
- Connectable conductor cross-sections, finely stranded with wire end processing	3x (6 ... 25 mm²) and 1x PE (6 ... 16 mm²)	2x (6 ... 25 mm²) and 1x PE (6 ... 16 mm²)
- Connectable conductor cross-sections for AWG cables	3x (8 ... 4)	2x (8 ... 4)
Power supply for the electronics		
Design of the power supply	external	
Type of voltage	DC	
Supply voltage for electronics	24 V	
Relative symmetrical tolerance of the input voltage	20 %	
Input current		
Current consumption for the electronics, max.	0.25 A	

I/O systems

I/O systems for heating units
with integrated power outputs – compact design

SIPLUS HCS3200 heating control system

Technical specifications (continued)

Article number	6BK1932-0BA00-0AA0		6BK1932-0AA00-0AA0	
	SIPLUS HCS3200 Fan		SIPLUS HCS3200	
Power electronics				
Type of load	Ohmic load			
Power capacity, max.	25.2 kW			
Switching capacity current per phase, max.	63 A			
Breaking capacity maximum short-circuit current (Icu) at 400 V	25 kA			
Heating power				
• Number of digital outputs	9			
• Number of heat emitters per output, max.	1			
• Output voltage for heating power	400 V			
• Power carrying capacity per output, min.	200 W			
• Power carrying capacity per output, max.	4 000 W			
• Output current for heating power	10 A			
• Design of short-circuit protection per output	Fuse 16 A		Fuse 15 A	
Fan control				
• Output voltage for fan	230 V			
• Power carrying capacity per output, min.	60 W			
• Power carrying capacity per output, max.	500 W			
• Design of short-circuit protection	Fuse 4 A			
Integration and conversion time/resolution per channel				
• Design of electrical connection at output for heating and fan	Connector, 20-pole + PE			
- Connectable conductor cross-sections, finely stranded with wire end processing	20x (1.5 ... 4 mm²), 1x PE (1.5 ... 16 mm²)		18x (1.5 ... 4 mm²), 1x PE (1.5 ... 16 mm²)	
- Connectable conductor cross-sections for AWG cables, stranded	20x (18 ... 12)		18x (18 ... 12)	
Interfaces				
Interfaces/bus type	PROFIBUS DP			
PROFIBUS DP				
• Transmission rate, max.	12 Mbit/s			
• Design of electrical connection of PROFIBUS interface	ECOFAS [®] T			
Protocols				
PROFIBUS DP	Yes			
Interrupts/diagnostics/status information				
Number of status displays	2			
LED status display	LED green = status indicator, LED red = fault indicator			
Diagnostics function	Voltage diagnostics			
Diagnostic messages				
• Wire-break	Yes			
• Fuse blown	Yes			
• Heat emitter defect	Yes			
Integrated Functions				
Monitoring functions				
• Temperature monitoring	Yes			
• Type of temperature monitoring	NTC thermistor			
Measuring functions				
• Voltage measurement	Yes			
Potential separation				
Design of electrical isolation between the outputs	Optocoupler between main circuit and PELV No			
Isolation				
Overvoltage category	III			

Technical specifications (continued)

Article number	6BK1932-0BA00-0AA0 SIPLUS HCS3200 Fan	6BK1932-0AA00-0AA0 SIPLUS HCS3200
EMC		
EMC interference emission	in accordance with IEC 61000-6-4:2007 + A1:2011	
Electrostatic discharge acc. to IEC 61000-4-2	4 kV contact discharge / 8 kV air discharge	
Field-related interference acc. to IEC 61000-4-3	10 V/m (80 ... 1 000 MHz), 3 V/m (1.4 ... 2.0 GHz), 1 V/m (2.0 ... 2.7 GHz)	
Conducted interference due to burst acc. to IEC 61000-4-4	2 kV power supply lines / 1 kV signal lines	
Conducted interference due to surge acc. to IEC 61000-4-5	On supply lines: 1 kV symmetrical, 2 kV asymmetrical, (24 V DC supply only with external protective measure) for PROFIBUS cable : asymmetrical 1 kV	
Conducted interference due to high-frequency radiation acc. to IEC 61000-4-6	10 V (0.15 ... 80 MHz)	
Degree and class of protection		
IP degree of protection	IP65	
Standards, approvals, certificates		
Certificate of suitability	CE	CE, UL
Degree of pollution	2	
Device tag according to DIN EN 81346-2	Q	
Ambient conditions		
Ambient temperature during operation		
• min.	0 °C	
• max.	50 °C	
Ambient temperature during storage/transportation		
• Storage, min.	-40 °C	
• Storage, max.	70 °C	
• Transportation, min.	-40 °C	
• Transportation, max.	70 °C	
Air pressure acc. to IEC 60068-2-13		
• Operation, min.	860 hPa	
• Operation, max.	1 080 hPa	
• Storage, min.	660 hPa	
• Storage, max.	1 080 hPa	
• Installation altitude above sea level, max.	2 000 m	
Relative humidity		
• at 25 °C, max.	95 %	
• Operation at 50 %, max.	50 %	
Vibrations		
• Vibration resistance during operation acc. to IEC 60068-2-6	10 ... 58 Hz / 0.15 mm, 58 ... 150 Hz / 1 g	
• Vibration resistance during storage acc. to IEC 60068-2-6	5 ... 9 Hz / 3.5 mm, 9 ... 500 Hz / 1 g	
Shock testing		
• Shock resistance acc. to IEC 60068-2-27	15 g / 11 ms / 3 shocks/axis	
• Shock resistance acc. to IEC 60068-2-29	25 g / 6 ms / 1 000 shocks/axis	
Dimensions		
Width	300 mm	
Height	380 mm	
Depth	200 mm	

Ordering data

SIPLUS HCS3200 heating control system

SIPLUS HCS3200 fan
SIPLUS HCS3200 UL-certified

Article No.

6BK1932-0BA00-0AA0
6BK1932-0AA00-0AA0

Article No.

Accessories

SIPLUS HCS3200 fan as spare part
Installation kit for wall mounting

6BK1932-6AA00-0AA0
6BK1932-6BA00-0AA0

I/O systems

I/O systems for heating units
with integrated power outputs – modular design

SIPLUS HCS4200 heating control system

Overview



SIPLUS HCS4200 rack for 12/4 POMs

The SIPLUS HCS4200 heating control system controls and switches heat emitter arrays and other resistive loads in 230 V AC voltage supply systems in industrial environments.

Communication takes place via PROFINET, and together with the SIMATIC S7, SIMOTION or industrial PC, forms a modern and powerful automation system. The modular, compact and space-saving distributed I/O system can be adapted individually to suit the application.

Overview



SIPLUS HCS4200 heating control system

The rack constitutes the basic mechanical structure of SIPLUS HCS4200.

Technical specifications

Article number	6BK1942-0AA00-0AA0 HCS Rack4200 for 12 POM		6BK1942-0BA00-0AA0 HCS Rack4200 for 4 POM	
General information				
Product brand name	SIPLUS			
Product designation	Rack4200 for 12 POMs		RACK4200 for 4 POMs	
Installation type/mounting				
Mounting type	Control cabinet backplane			
Mounting position	Horizontal			
Type of ventilation	Self ventilation or forced ventilation			
Hardware configuration				
Type of power output connectable	POM4220			
Power capacity per rack with fan, max.	193 kW		64 kW	
Power capacity per rack without fan, max.	88 kW		29 kW	
Slots				
• Number of slots	12		4	
Interfaces				
Interfaces/bus type	system interface			
EMC				
EMC interference emission	Limit value in accordance with IEC 61000-6-4:2007 + A1:2011			
Electrostatic discharge acc. to IEC 61000-4-2	4 kV contact discharge / 8 kV air discharge			
Field-related interference acc. to IEC 61000-4-3	10 V/m (80 ... 1 000 MHz), 3 V/m (1.4 ... 2.0 GHz), 1 V/m (2.0 ... 2.7 GHz)			
Degree and class of protection				
IP degree of protection	IP20			
Standards, approvals, certificates				
Degree of pollution	2			
Device tag according to DIN EN 81346-2	K			
Ambient conditions				
Ambient temperature during operation				
• min.	0 °C			
• max.	55 °C			
Ambient temperature during storage/transportation				
• Storage, min.	-25 °C			
• Storage, max.	70 °C			
• Transportation, min.	-25 °C			
• Transportation, max.	70 °C			

I/O systems

I/O systems for heating units
with integrated power outputs – modular design

SIPLUS HCS4200 heating control system > Rack

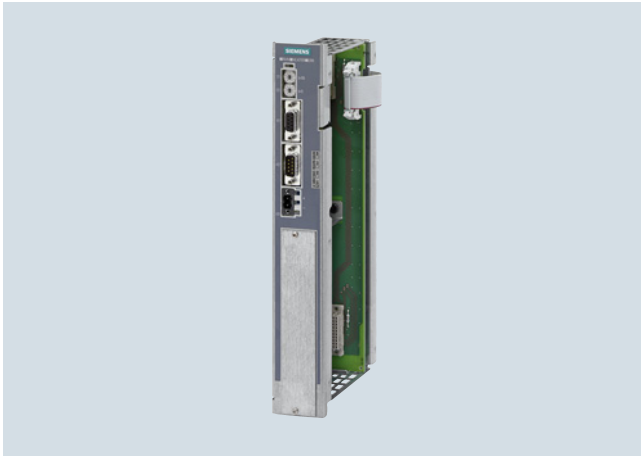
Technical specifications (continued)

Article number	6BK1942-0AA00-0AA0	6BK1942-0BA00-0AA0
	HCS Rack4200 for 12 POM	HCS Rack4200 for 4 POM
Air pressure acc. to IEC 60068-2-13		
• Operation, min.	860 Pa	
• Operation, max.	1 080 Pa	
• Storage, min.	660 Pa	
• Storage, max.	1 080 Pa	
• Installation altitude above sea level, max.	2 000 m	
Relative humidity		
• Operation at 25 °C, max.	95 %	
• Operation at 50 °C, max.	50 %; 95 % at 25 °C, decreasing linearly to 50 % at 50 °C	
Vibrations		
• Vibration resistance during operation acc. to IEC 60068-2-6	10 ... 58 Hz / 0.075 mm, 58 ... 150 Hz / 1 g	
• Vibration resistance during storage acc. to IEC 60068-2-6	5 ... 8.5 Hz / 3.5 mm, 8.5 ... 500 Hz / 1 g	
Shock testing		
• Shock resistance during operation acc. to IEC 60068-2-27	15 g / 11 ms / 3 shocks/axis	
• Shock resistance during storage acc. to IEC 60068-2-29	25 g / 6 ms / 1 000 shocks/axis	
Dimensions		
Width	488 mm	204 mm
Height	285 mm	
Depth	293 mm	

Ordering data

Article No.	Article No.
SIPLUS HCS4200 Rack for 12 POMs	Accessories
Rack for accommodating up to 12 POM4320 power output modules	SIPLUS HCS4200 Fan Module
SIPLUS HCS4200 Rack for 4 POMs	Is attached to the top of the rack for accommodating up to 4 power output modules
Rack for accommodating up to 4 POM4320 power output modules	Blanking cover (10 items)
	For covering unoccupied slots in the rack

Overview



The Central Interface Module (CIM) is the intelligent processor module of the SIPLUS HCS4200 heating control system.

Technical specifications

Article number	6BK1942-1AA00-0AA0		6BK1942-1BA00-0AA0		6BK1942-1CA00-0AA0	
	HCS CIM4210 PROFINET		HCS CIM4210 PROFIBUS		HCS CIM4210 EtherNet/IP	
General information						
Product brand name	SIPLUS					
Product designation	CIM4210 PROFINET		CIM4210 PROFIBUS		CIM4210 EtherNet/IP	
Installation type/mounting						
Mounting type	Screw mounting to rack					
Mounting position	vertical					
Type of ventilation	Forced ventilation					
Supply voltage						
Type of supply voltage	DC					
Rated value (DC)	24 V					
Relative negative tolerance	20 %					
Relative positive tolerance	20 %					
Resistance thermometer (RTD)						
• Design of electrical connection for supply voltage	Connector 2x 2-pin with tension spring connection					
- Connectable conductor cross-sections, solid	1x (0.2 ... 2.5 mm²)					
- Connectable conductor cross-sections, finely stranded with wire end processing	1x (0.2 ... 2.5 mm²)					
- Connectable conductor cross-sections for AWG cables	1x (26 ... 12)					
Power						
Active power input	3 W					
Hardware configuration						
Type of power output connectable	POM4220					
Slots						
• Number of slots	1					
Interfaces						
Interfaces/bus type	PROFINET IO		PROFIBUS DP		EtherNet/IP	
PROFINET IO						
• Transmission rate, max.	100 Mbit/s					
• Design of electrical connection of PROFINET interface	2 x RJ45					
PROFIBUS DP						
• Transmission rate, max.			12 Mbit/s			
• Design of electrical connection of PROFIBUS interface			9-pin sub D socket			
EtherNet/IP						
• Transmission rate, max.					100 Mbit/s	
• Design of EtherNet/IP interface electrical connection					2 x RJ45	

I/O systems

I/O systems for heating units
with integrated power outputs – modular design

SIPLUS HCS4200 heating control system > Central Interface Module (CIM)

Technical specifications (continued)

Article number	6BK1942-1AA00-0AA0 HCS CIM4210 PROFINET	6BK1942-1BA00-0AA0 HCS CIM4210 PROFIBUS	6BK1942-1CA00-0AA0 HCS CIM4210 EtherNet/IP
Protocols			
Supports protocol for PROFINET IO	Yes	No	
PROFIBUS DP	No	Yes	No
Further protocols			
• EtherNet/IP	No		Yes
Interrupts/diagnostics/ status information			
Number of status displays	3		
LED status display	LED green = ready, LED yellow = heating on/off, LED red = error display		
Isolation			
Overvoltage category	III		
EMC			
EMC interference emission	Limit value in accordance with IEC 61000-6-4:2007 + A1:2011		
Electrostatic discharge acc. to IEC 61000-4-2	4 kV contact discharging, 8 kV air discharging		
Field-related interference acc. to IEC 61000-4-3	10 V/m (80 ... 1 000 MHz), 3 V/m (1.4 ... 2.0 GHz), 1 V/m (2.0 ... 2.7 GHz)		
Conducted interference due to burst acc. to IEC 61000-4-4	2 kV power supply lines, 2 kV PROFINET cables	2 kV power supply lines / 2 kV PROFIBUS cables	2 kV power supply lines, 2 kV PROFINET cables
Conducted interference due to surge acc. to IEC 61000-4-5	DC supply lines: 0.5 kV symmetric and unsymmetric PROFINET cables: 1 kV unsymmetric	DC supply lines: 0.5 kV symmetrical and asymmetrical, PROFIBUS lines: 1 kV asymmetrical	DC supply lines: 0.5 kV symmetric and unsymmetric PROFINET cables: 1 kV unsymmetric
Conducted interference due to high-frequency radiation acc. to IEC 61000-4-6	10 V (0.15 ... 80 MHz)		
Degree and class of protection			
IP degree of protection	IP20		
Standards, approvals, certificates			
CE mark	Yes		
UL approval	Yes		
RCM (formerly C-TICK)	Yes		
KC approval	Yes		
EAC (formerly Gost-R)	Yes		
China RoHS compliance	Yes		
Degree of pollution	2		
Device tag according to DIN EN 81346-2	K		
Ambient conditions			
Ambient temperature during operation			
• min.	0 °C		
• max.	55 °C		
Ambient temperature during storage/transportation			
• Storage, min.	-25 °C		
• Storage, max.	70 °C		
• Transportation, min.	-25 °C		
• Transportation, max.	70 °C		
Air pressure acc. to IEC 60068-2-13			
• Operation, min.	860 hPa		
• Operation, max.	1 080 hPa		
• Storage, min.	660 hPa		
• Storage, max.	1 080 hPa		
• Installation altitude above sea level, max.	2 000 m		
Relative humidity			
• Operation at 25 °C, max.	95 %		
• Operation at 50 °C, max.	50 %; 95 % at 25 °C, decreasing linearly to 50 % at 50 °C		

Technical specifications (continued)

Article number	6BK1942-1AA00-0AA0 HCS CIM4210 PROFINET	6BK1942-1BA00-0AA0 HCS CIM4210 PROFIBUS	6BK1942-1CA00-0AA0 HCS CIM4210 EtherNet/IP
Vibrations			
• Vibration resistance during operation acc. to IEC 60068-2-6	10 ... 58 Hz / 0.075 mm, 58 ... 150 Hz / 1 g		
• Vibration resistance during storage acc. to IEC 60068-2-6	5 ... 8.5 Hz / 3.5 mm, 8.5 ... 500 Hz / 1 g		
Shock testing			
• Shock resistance during operation acc. to IEC 60068-2-27	15 g / 11 ms / 3 shocks/axis		
• Shock resistance during storage acc. to IEC 60068-2-29	25 g / 6 ms / 1 000 shocks/axis		
Dimensions			
Width	43 mm		
Height	285 mm		
Depth	136 mm		

Ordering data**Article No.****Article No.****SIPLUS HCS4200 CIM4210 PROFINET**

Central Interface Module with PROFINET communication

6BK1942-1AA00-0AA0**SIPLUS HCS4200 CIM4210 PROFIBUS**

Central Interface Module with PROFIBUS communication

6BK1942-1BA00-0AA0**SIPLUS HCS4200 CIM4210 Ethernet/IP**

Central Interface Module with EtherNet/IP

6BK1942-1CA00-0AA0**Accessories****SIPLUS HCS4200 connector set**
As spare part, consisting of 20 x 2-pole connectors (24 V DC power supply)**6BK1942-6FA00-0AA0****SIPLUS HCS4000 temperature I/O module**
For recording temperatures using temperature sensors, thermocouples and pyrometers**6BK1900-0AA00-0AA0****SIPLUS HCS4000 DI/DO I/O module**
With 8 digital outputs and 8 configurable inputs/outputs**6BK1900-0BA00-0AA0****SIPLUS HCS4000 U/I I/O module**
For current and voltage measurement (line voltage compensation)**6BK1900-0CA00-0AA0**

I/O systems

I/O systems for heating units
with integrated power outputs – modular design

SIPLUS HCS4200 heating control system > Power Output Module (POM)

Overview



The Power Output Modules (POMs) are an essential component of the SIPLUS HCS4200 heating control system. Up to 24 power output modules can be operated on one CIM, split over two racks.

There are three power output module versions:

- POM4220 Low-end
- POM4220 Mid-range
- POM4220 Mid-range phase control

Technical specifications

Article number	6BK1942-2AA00-0AA0		6BK1942-2CA00-0AA0	6BK1942-2CA00-0AA1
General information				
Product brand name	SIPLUS			
Product designation	POM4220 Lowend		POM4220 Midrange	POM4220 mid-range phase control
Type of control of heat emitters	Half-wave control		Half-wave control and soft start	Half-wave control, phase control and soft start
Installation type/mounting				
Mounting type	Screw mounting to rack			
Mounting position	vertical			
Type of ventilation	Self ventilation or forced ventilation			
Supply voltage				
Type of supply voltage	AC			
Rated value (AC)	230 V		277 V	
Relative negative tolerance	10 %		25 %	
Relative positive tolerance	10 %		8 %	
Line frequency				
• Rated value 1	50 Hz			
• Rated value 2	60 Hz			
• Relative symmetrical tolerance	5 %			
Mains buffering				
• Recovery time after power failure, typ.	1 s			
Resistance thermometer (RTD)				
• Design of electrical connection for supply voltage	Connector, 3-pole with spring-loaded connection		Connector, 3-pin	
- Connectable conductor cross-sections, solid	1x (0.2 ... 10 mm²)		1x (0.75 ... 16 mm²)	
- Connectable conductor cross-sections, finely stranded with wire end processing	1x (0.25 ... 6 mm²)		1x (0.75 ... 16 mm²)	
- Connectable conductor cross-sections for AWG cables	1x (24 ... 8)		1x (18 ... 4)	
Power supply for the electronics				
Design of the power supply	Power supply via rack			
Power				
Active power input, max.	1 W			

Technical specifications (continued)

Article number	6BK1942-2AA00-0AA0		6BK1942-2CA00-0AA0		6BK1942-2CA00-0AA1	
Power electronics						
Type of load	Ohmic load					
Power capacity, max.	16.1 kW		27.7 kW			
• for star connection with fan at 40 °C, max.	16.1 kW		27.7 kW			
• for star connection without fan at 40 °C, max.	7.3 kW		9 kW			
Switching capacity current per phase, max.	35 A		50 A			
Heating power						
• Number of digital outputs	16		12			
• Number of heat emitters per output, max.	1					
• Output voltage for heating power	230 V		277 V			
• Power carrying capacity per output, min.	100 W					
• Power carrying capacity per output, max.	1 449 W		3 324 W		4 432 W	
- for heating elements with high inrush current, max.	750 W		1 600 W			
• Output current for heating power	6.3 A		12 A		16 A	
• Melting I2t value	57 A²·s		68 A²·s		120 A²·s	
• Design of short-circuit protection per output	Safety fuse 6.3 A		Fuse 16 A			
• Design of overvoltage protection	Transil Diode					
Integration and conversion time/ resolution per channel						
• Design of electrical connection at output for heating and fan	Connector, 8-pin with tension spring connection		Connector, 6-pole with spring-loaded connection			
- Connectable conductor cross-sections, solid	1x (0.2 ... 10 mm²)					
- Connectable conductor cross-sections, finely stranded with wire end processing	1x (0.25 ... 6 mm²)					
- Connectable conductor cross-sections for AWG cables, stranded	1x (24 ... 8)					
Interfaces						
Interfaces/bus type	system interface					
Interrupts/diagnostics/ status information						
Number of status displays	19		15			
LED status display	LED green = ready, LED yellow = heating on/off, LED red = error display, LED red = error for each channel					
Diagnostics function	Voltage diagnostics					
Diagnostic messages						
• Wire-break	Yes					
• Fuse blown	Yes					
• Heat emitter defect	Yes					
Integrated Functions						
Monitoring functions						
• Temperature monitoring	Yes					
• Type of temperature monitoring	NTC thermistor					
Potential separation						
Design of electrical isolation between the outputs	Optocoupler and/or protective impedance between main circuit and PELV No					
Isolation						
Overvoltage category	III					

I/O systems

I/O systems for heating units
with integrated power outputs – modular design

SIPLUS HCS4200 heating control system > Power Output Module (POM)

Technical specifications (continued)

Article number	6BK1942-2AA00-0AA0	6BK1942-2CA00-0AA0	6BK1942-2CA00-0AA1
EMC			
EMC interference emission	Limit value in accordance with IEC 61000-6-4:2007 + A1:2011		
Electrostatic discharge acc. to IEC 61000-4-2	4 kV contact discharge / 8 kV air discharge		
Field-related interference acc. to IEC 61000-4-3	10 V/m (80 ... 1 000 MHz), 3 V/m (1.4 ... 2.0 GHz), 1 V/m (2.0 ... 2.7 GHz)		
Conducted interference due to burst acc. to IEC 61000-4-4	2 kV power supply lines, 2 kV load lines		
Conducted interference due to surge acc. to IEC 61000-4-5	Supply and load lines: 1 kV symmetrical, 2 kV asymmetrical		
Conducted interference due to high-frequency radiation acc. to IEC 61000-4-6	10 V (0.15 ... 80 MHz)		
Degree and class of protection			
IP degree of protection	IP20		
Standards, approvals, certificates			
Degree of pollution	2		
Device tag according to DIN EN 81346-2	Q		
Ambient conditions			
Ambient temperature during operation			
• min.	0 °C		
• max.	55 °C		
Ambient temperature during storage/transportation			
• Storage, min.	-25 °C		
• Storage, max.	70 °C		
• Transportation, min.	-25 °C		
• Transportation, max.	70 °C		
Air pressure acc. to IEC 60068-2-13			
• Operation, min.	860 hPa		
• Operation, max.	1 080 hPa		
• Storage, min.	660 hPa		
• Storage, max.	1 080 hPa		
• Installation altitude above sea level, max.	2 000 m		
Relative humidity			
• Operation at 25 °, max.	95 %		
• Operation at 50 °, max.	50 %; 95 % at 25 °C, decreasing linearly to 50 % at 50 °C		
Vibrations			
• Vibration resistance during operation acc. to IEC 60068-2-6	10 ... 58 Hz / 0.075 mm, 58 ... 150 Hz / 1 g		
• Vibration resistance during storage acc. to IEC 60068-2-6	5 ... 8.5 Hz / 3.5 mm, 8.5 ... 500 Hz / 1 g		
Shock testing			
• Shock resistance during operation acc. to IEC 60068-2-27	15 g / 11 ms / 3 shocks/axis		
• Shock resistance during storage acc. to IEC 60068-2-29	25 g / 6 ms / 1 000 shocks/axis		
Dimensions			
Width	36 mm		
Height	285 mm		
Depth	281 mm		

Ordering data	Article No.		Article No.
SIPLUS HCS4200 POM4220 Low-end Power output module with 16 outputs for connecting resistive loads	6BK1942-2AA00-0AA0	Accessories	
		Spare fuse, 6.3 A/250 V, for POM4220 Low-end	6BK1942-6AA00-0AA0
		Spare fuse, 16 A/500 V, for the POM4220 Mid-range	6BK1942-6BA00-0AA0
SIPLUS HCS4200 POM4220 Mid-range Power output module with 12 outputs for connecting resistive loads	6BK1942-2CA00-0AA0	Spare fuse, 16 A/500 V, for the POM4220 Mid-range	6BK1942-6HA00-0AA0
		SIPLUS HCS4200 connector set As accessory, comprising 10 con- nectors, 3-pin, for incoming supply, POM4220 Low-end	6BK1943-6AA00-0AA0
SIPLUS HCS4200 POM4220 Mid-range phase control Power output module with 12 outputs for connecting resistive loads	6BK1942-2CA00-0AA1	SIPLUS HCS4200 connector set As accessory, comprising 5 con- nectors, 8-pin, for power outputs, POM4220 Low-end	6BK1942-6CA00-0AA0
		SIPLUS HCS4200 connector set As accessory, comprising 6 con- nectors, 3-pin, for incoming supply, POM4220 Mid-range	6BK1942-6GA00-0AA0
		SIPLUS HCS4200 connector set As accessory, comprising 5 con- nectors, 6-pin, for power outputs, POM4220 Mid-range	6BK1942-6EA00-0AA0

I/O systems

I/O systems for heating units
with integrated power outputs – modular design

SIPLUS HCS4300 heating control system

Overview



SIPLUS HCS4300 heating control systems

The SIPLUS HCS4300 heating control system controls and switches heat emitter arrays and other resistive loads in 400 V/ 480 V voltage supply systems in industrial environments.

Communication takes place via PROFINET and provides, together with the SIMATIC S7, for example, a highly modern and powerful automation system.

Overview

The Central Interface Module (CIM) is the intelligent processor module of the SIPLUS HCS4300 heating control system.

Technical specifications

Article number	6BK1943-1AA00-0AA0	6BK1943-1BA00-0AA0	6BK1943-1CA00-0AA0
	HCS CIM4310 PROFINET	HCS CIM4310 PROFIBUS	HCS CIM4310 EtherNet/IP
General information			
Product brand name	SIPLUS		
Product designation	CIM4310 PROFINET	CIM4310 PROFIBUS	
Installation type/mounting			
Mounting type	Screw mounting to POM		
Mounting position	vertical		
Type of ventilation	Forced ventilation		
Supply voltage			
Type of supply voltage	DC		
Rated value (DC)	24 V		
Relative negative tolerance	20 %		
Relative positive tolerance	20 %		
Resistance thermometer (RTD)			
• Design of electrical connection for supply voltage	Connector 2x 2-pin with tension spring connection		
- Connectable conductor cross-sections, solid	1x (0.2 ... 2.5 mm²)		
- Connectable conductor cross-sections, finely stranded with wire end processing	1x (0.2 ... 2.5 mm²)		
- Connectable conductor cross-sections for AWG cables	1x (26 ... 12)		
Power			
Active power input	3 W		
Hardware configuration			
Type of power output connectable	POM4320		
Slots			
• Number of slots	1		
Interfaces			
Interfaces/bus type	PROFINET IO	PROFIBUS DP	EtherNet/IP
PROFINET IO			
• Transmission rate, max.	100 Mbit/s		
• Design of electrical connection of PROFINET interface	2 x RJ45		

I/O systems

I/O systems for heating units
with integrated power outputs – modular design

SIPLUS HCS4300 heating control system > Central Interface Module (CIM)

Technical specifications (continued)

Article number	6BK1943-1AA00-0AA0	6BK1943-1BA00-0AA0	6BK1943-1CA00-0AA0
	HCS CIM4310 PROFINET	HCS CIM4310 PROFIBUS	HCS CIM4310 EtherNet/IP
PROFIBUS DP • Transmission rate, max. • Design of electrical connection of PROFIBUS interface		12 Mbit/s 9-pin sub D socket	
EtherNet/IP • Transmission rate, max. • Design of EtherNet/IP interface electrical connection			100 Mbit/s 2 x RJ45
Protocols			
Supports protocol for PROFINET IO	Yes	No	
PROFIBUS DP	No	Yes	No
Further protocols • EtherNet/IP			Yes
Interrupts/diagnostics/status information			
Number of status displays	3		
LED status display	LED green = ready, LED yellow = heating on/off, LED red = error display		
Isolation			
Overvoltage category	III		
EMC			
EMC interference emission	Limit value in accordance with IEC 61000-6-4:2007 + A1:2011		
Electrostatic discharge acc. to IEC 61000-4-2	4 kV contact discharge / 8 kV air discharge		
Field-related interference acc. to IEC 61000-4-3	10 V/m (80 ... 1 000 MHz), 3 V/m (1.4 ... 2.0 GHz), 1 V/m (2.0 ... 2.7 GHz)		
Conducted interference due to burst acc. to IEC 61000-4-4	2 kV power supply lines, 2 kV PROFINET cables	2 kV power supply lines / 2 kV PROFIBUS cables	2 kV power supply lines, 2 kV PROFINET cables
Conducted interference due to surge acc. to IEC 61000-4-5	DC supply lines: 0.5 kV symmetric and unsymmetric PROFINET cables: 1 kV unsymmetric	DC supply lines: 0.5 kV symmetrical and asymmetrical, PROFIBUS lines: 1 kV asymmetrical	DC supply lines: 0.5 kV symmetric and unsymmetric PROFINET cables: 1 kV unsymmetric
Conducted interference due to high-frequency radiation acc. to IEC 61000-4-6	10 V (0.15 ... 80 MHz)		
Degree and class of protection			
IP degree of protection	IP20		
Standards, approvals, certificates			
Degree of pollution	2		
Device tag according to DIN EN 81346-2	K		
Ambient conditions			
Ambient temperature during operation • min. • max.	0 °C 55 °C		
Ambient temperature during storage/transportation • Storage, min. • Storage, max. • Transportation, min. • Transportation, max.	-25 °C 70 °C -25 °C 70 °C		
Air pressure acc. to IEC 60068-2-13 • Operation, min. • Operation, max. • Storage, min. • Storage, max. • Installation altitude above sea level, max.	860 hPa 1 080 hPa 660 hPa 1 080 hPa 2 000 m		
Relative humidity • Operation at 25 °C, max. • Operation at 50 °C, max.	95 % 50 %; 95 % at 25 °C, decreasing linearly to 50 % at 50 °C		

Technical specifications (continued)

Article number	6BK1943-1AA00-0AA0 HCS CIM4310 PROFINET	6BK1943-1BA00-0AA0 HCS CIM4310 PROFIBUS	6BK1943-1CA00-0AA0 HCS CIM4310 EtherNet/IP
Vibrations			
• Vibration resistance during operation acc. to IEC 60068-2-6	10 ... 58 Hz / 0.075 mm, 58 ... 150 Hz / 1 g		
• Vibration resistance during storage acc. to IEC 60068-2-6	5 ... 8.5 Hz / 3.5 mm, 8.5 ... 500 Hz / 1 g		
Shock testing			
• Shock resistance during operation acc. to IEC 60068-2-27	15 g / 11 ms / 3 shocks/axis		
• Shock resistance during storage acc. to IEC 60068-2-29	25 g / 6 ms / 1 000 shocks/axis		
Dimensions			
Width	56 mm		
Height	285 mm		
Depth	136 mm		

Ordering data**Article No.****Article No.****SIPLUS HCS4300 CIM4310**

Central Interface Module with PROFINET communication

6BK1943-1AA00-0AA0

Central Interface Module with PROFIBUS communication

6BK1943-1BA00-0AA0

Central Interface module with EtherNet/IP

6BK1943-1CA00-0AA0**Accessories****SIPLUS HCS4300 EM4315**

Expansion module for SIPLUS HCS4300, extends the configuration with 8 power output modules

6BK1943-1AA50-0AA0**SIPLUS HCS4000 temperature I/O module**

For recording temperatures using temperature sensors, thermocouples and pyrometers

6BK1900-0AA00-0AA0**SIPLUS HCS4000 DI/DO I/O module**

With 8 digital outputs and 8 configurable inputs/outputs

6BK1900-0BA00-0AA0**SIPLUS HCS4000 U/I I/O module**

For current and voltage measurement (line voltage compensation)

6BK1900-0CA00-0AA0

I/O systems

I/O systems for heating units
with integrated power outputs – modular design

SIPLUS HCS4300 heating control system > Power Output Module (POM)

Overview



- Module (encapsulated) in a metal enclosure
- 9 outputs for connecting resistive loads
- There are four versions:
 - POM4320 busbar mounting (IEC):
a current of up to 16 A can be used per output
 - POM4320 busbar mounting (UL):
a current of up to 15 A can be used per output
 - POM4320 rear panel mounting (IEC):
a current of up to 16 A can be used per output
 - POM4320 rear panel mounting (UL):
a current of up to 15 A can be used per output
- Connection of the phases via rear busbar adapter or connecting terminals
- Two-pole connection of heat emitters using mating connectors (mating connectors are included in the scope of supply!)
- Two fuses per output for supply and return line in a fuse module which can be plugged on and pulled off
- Heat dissipation by fan fitted to top of module
- Internal serial interface
- Three diagnostics LEDs for displaying module faults
- Nine diagnostics LEDs for displaying output errors

Technical specifications

Article number	6BK1943-2AA00-0AA0	6BK1943-2AA00-0AA2	6BK1943-2BA00-0AA0	6BK1943-2BA00-0AA2	6BK1943-2CA00-0AA0	6BK1943-2CA00-0AA2	6BK1943-2DA00-0AA0	6BK1943-2DA00-0AA2
	HCS POM4320 BUSBAR MOUNTING (IEC)	HCS POM4320 busbar mounting (IEC)	HCS POM4320 BUSBAR MOUNTING (UL)	HCS POM4320 busbar mounting (UL)	HCS POM4320 PANEL MOUNTING (IEC)	HCS POM4320 panel mounting (IEC)	HCS POM4320 PANEL MOUNTING (UL)	HCS POM4320 panel mounting (UL)
General information								
Product brand name	SIPLUS							
Product designation	POM4320 BUSBAR MOUNTING (IEC)		POM4320 BUSBAR MOUNTING (UL)		POM4320 rear panel mounting (IEC)		POM4320 rear panel mounting (UL)	
Type of control of heat emitters	Half-wave control and soft start							
Installation type/mounting								
Mounting type	Busbar mounting				Backplane mounting			
Mounting position	vertical							
Type of ventilation	Self-ventilation							
Supply voltage								
Type of supply voltage	AC							
Rated value (AC)	400 V							
Relative negative tolerance	10 %							
Relative positive tolerance	30 %							
Line frequency								
• Rated value 1	50 Hz							
• Rated value 2	60 Hz							
• Relative symmetrical tolerance	5 %							
Mains buffering								
• Recovery time after power failure, typ.	1 s							
Resistance thermometer (RTD)								
• Design of electrical connection for supply voltage	Busbar adapter, 3-pole + PE				Terminal, 3-pin			
- Connectable conductor cross-sections, solid					1x (1.5 ... 50 mm²)			
- Connectable conductor cross-sections, finely stranded with wire end processing					1x (1.5 ... 35 mm²)			
- Connectable conductor cross-sections for AWG cables					1x (16 ... 1)			
Power supply for the electronics								
Design of the power supply	Power supply via CIM							
Power								
Active power input, max.	8 W							

Technical specifications (continued)

Article number	6BK1943-2AA00-0AA0	6BK1943-2AA00-0AA2	6BK1943-2BA00-0AA0	6BK1943-2BA00-0AA2	6BK1943-2CA00-0AA0	6BK1943-2CA00-0AA2	6BK1943-2DA00-0AA0	6BK1943-2DA00-0AA2
	HCS POM4320 BUSBAR MOUNTING (IEC)	HCS POM4320 busbar mounting (IEC)	HCS POM4320 BUSBAR MOUNTING (UL)	HCS POM4320 busbar mounting (UL)	HCS POM4320 PANEL MOUNTING (IEC)	HCS POM4320 panel mounting (IEC)	HCS POM4320 PANEL MOUNTING (UL)	HCS POM4320 panel mounting (UL)
Power electronics								
Type of load	Ohmic load							
Power capacity, max.	69.1 kW		51.8 kW	64.8 kW	69.1 kW		51.8 kW	64.8 kW
• for delta connection with fan at 40 °C, max.	69.1 kW		51.8 kW	64.8 kW	69.1 kW		51.8 kW	64.8 kW
Switching capacity current per phase, max.	83 A		63 A	80 A	83 A		63 A	80 A
Short-time withstand current (SCCR) acc. to UL 508A			50 kA	100 kA			50 kA	100 kA
Heating power								
• Number of digital outputs	9							
• Number of heat emitters per output, max.	1							
• Output voltage for heating power	400 V							
• Power carrying capacity per output, min.	200 W							
• Power carrying capacity per output, max.	7 680 W		5 760 W	7 200 W	7 680 W		5 760 W	7 200 W
- for heating elements with high inrush current, max.	4 000 W		3 000 W	4 000 W			3 000 W	4 000 W
• Output current for heating power	16 A		12 A	15 A	16 A		12 A	15 A
• Peak current	150 A		100 A	150 A			100 A	150 A
• Melting I2t value	250 A²·s		225 A²·s	400 A²·s	250 A²·s		225 A²·s	400 A²·s
• Design of short-circuit protection per output	Fuse 16 A		Fuse 15 A	Melting fuse 20 A	Fuse 16 A		Fuse 15 A	Melting fuse 20 A
• Design of overvoltage protection	Transil Diode							
Integration and conversion time/resolution per channel								
• Design of electrical connection at output for heating and fan	Connector, 3-pole with spring-loaded connection							
- Connectable conductor cross-sections, solid	1x (0.2 ... 10 mm²)							
- Connectable conductor cross-sections, finely stranded with wire end processing	1x (0.25 ... 6 mm²)							
- Connectable conductor cross-sections for AWG cables, stranded	1x (24 ... 8)							
Interfaces								
Interfaces/bus type	system interface							
Interrupts/diagnostics/status information								
Number of status displays	12							
LED status display	LED green = ready, LED yellow = heating on/off, LED red = error display, LED red = error for each channel							
Diagnostics function	Voltage diagnostics							
Diagnostic messages								
• Wire-break	Yes							
• Fuse blown	Yes							
• Heat emitter defect	Yes							
Integrated Functions								
Monitoring functions								
• Temperature monitoring	Yes							
• Type of temperature monitoring	NTC thermistor							
Measuring functions								
• Voltage measurement	Yes							
Potential separation								
Design of electrical isolation between the outputs	Optocoupler and/or protective impedance between main circuit and PELV No							
Isolation								
Overvoltage category	III							

I/O systems

I/O systems for heating units
with integrated power outputs – modular design

SIPLUS HCS4300 heating control system > Power Output Module (POM)

Technical specifications (continued)

Article number	6BK1943-2AA00-0AA0	6BK1943-2AA00-0AA2	6BK1943-2BA00-0AA0	6BK1943-2BA00-0AA2	6BK1943-2CA00-0AA0	6BK1943-2CA00-0AA2	6BK1943-2DA00-0AA0	6BK1943-2DA00-0AA2
	HCS POM4320 BUSBAR MOUNTING (IEC)	HCS POM4320 busbar mounting (IEC)	HCS POM4320 BUSBAR MOUNTING (UL)	HCS POM4320 busbar mounting (UL)	HCS POM4320 PANEL MOUNTING (IEC)	HCS POM4320 panel mounting (IEC)	HCS POM4320 PANEL MOUNTING (UL)	HCS POM4320 panel mounting (UL)
EMC								
EMC interference emission	Limit value in accordance with IEC 61000-6-4:2007 + A1:2011							
Electrostatic discharge acc. to IEC 61000-4-2	4 kV contact discharge / 8 kV air discharge							
Field-related interference acc. to IEC 61000-4-3	10 V/m (80 ... 1 000 MHz), 3 V/m (1.4 ... 2.0 GHz), 1 V/m (2.0 ... 2.7 GHz)							
Conducted interference due to burst acc. to IEC 61000-4-4	2 kV power supply lines, 2 kV load lines							
Conducted interference due to surge acc. to IEC 61000-4-5	on supply and load lines: 1 kV symmetric, 2 kV unsymmetric							
Conducted interference due to high-frequency radiation acc. to IEC 61000-4-6	10 V (0.15 ... 80 MHz)							
Degree and class of protection								
IP degree of protection	IP20							
Standards, approvals, certificates								
Degree of pollution	2							
Device tag according to DIN EN 81346-2	Q							
Ambient conditions								
Ambient temperature during operation								
• min.	0 °C							
• max.	55 °C							
Ambient temperature during storage/transportation								
• Storage, min.	-25 °C							
• Storage, max.	70 °C							
• Transportation, min.	-25 °C							
• Transportation, max.	70 °C							
Air pressure acc. to IEC 60068-2-13								
• Operation, min.	860 hPa							
• Operation, max.	1 080 hPa							
• Storage, min.	660 hPa							
• Storage, max.	1 080 hPa							
• Installation altitude above sea level, max.	2 000 m							
Relative humidity								
• Operation at 25 °, max.	95 %							
• Operation at 50 °, max.	50 %; 95 % at 25 °C, decreasing linearly to 50 % at 50 °C							
Vibrations								
• Vibration resistance during operation acc. to IEC 60068-2-6	10 ... 58 Hz / 0.075 mm, 58 ... 150 Hz / 1 g							
• Vibration resistance during storage acc. to IEC 60068-2-6	5 ... 8.5 Hz / 3.5 mm, 8.5 ... 500 Hz / 1 g							
Shock testing								
• Shock resistance during operation acc. to IEC 60068-2-27	15 g / 11 ms / 3 shocks/axis							
• Shock resistance during storage acc. to IEC 60068-2-29	25 g / 6 ms / 1 000 shocks/axis							
Dimensions								
Width	104 mm							
Height	340 mm				344 mm			
Depth	250 mm				217 mm			

Ordering data	Article No.		Article No.
SIPLUS HCS4300 POM4320		Accessories	
Power Output Module with 9 out-puts for connecting resistive loads		SIPLUS HCS4300 connecting cable from POM to POM	
IEC, busbar mounting	6BK1943-2AA00-0AA0	• Consisting of 10 items, 10 cm long	6BK1943-5AA00-0AA0
IEC, busbar mounting, redesign version with enhanced interference immunity	6BK1943-2AA00-0AA2	• Consisting of 10 items, 25 cm long	6BK1943-5BA00-0AA0
UL, busbar mounting	6BK1943-2BA00-0AA0	SIPLUS HCS4300 connector set	6BK1943-6AA00-0AA0
UL, busbar mounting, redesign version with enhanced interference immunity and 100 kA SCCR	6BK1943-2BA00-0AA2	• Consisting of 10 x 3-pole connectors	
IEC, real panel mounting	6BK1943-2CA00-0AA0	Spare fuse, 16 A/500 V, for POM4320	6BK1943-6BA00-0AA0
IEC, rear panel mounting, redesign version with enhanced interference immunity	6BK1943-2CA00-0AA2	Fan as spare part	6BK1700-2GA00-0AA0
UL, rear panel mounting	6BK1943-2DA00-0AA0		
UL, rear panel mounting, redesign version with enhanced interference immunity and 100 kA SCCR	6BK1943-2DA00-0AA2		

I/O systems

PROFIBUS components

Power Rail Booster

Overview



- The device for low-cost PROFIBUS DP transfer over contact conductors and slip rings to IP20 degree of protection
- Permissible baud rates from 9600 bit/s to 500 Kbps, self-optimizing
- Permissible busbar length:
From 25 m at 500 Kbps to 1200 m at 9600 bit/s
- Configuring with PRB Checker software
- Up to 125 nodes per segment
- Transparent for data communication:
The Power Rail Booster does not reserve DP addresses
- Easy to install due to connection without terminating resistor and filter element
- Diagnostics LED for power supply, bus activity and group errors
- Isolated electronic changeover contact for external group error display or diagnostic alarm
- Uninterruptible communication beyond segment limits using the "PRB segment controller"

Technical specifications

Degree of protection	IP20
Dimensions (W x H x D, with connector) in mm	90 x 132 x 75
Supply voltage	24 V DC
Power consumption	max. 20 W
Data transmission rate, max.	500 Kbps, self-adjusting
Cable length (depends on baud rate), max.	1200 m
Shock-hazard protected voltage	Yes, to EN 61131-2
Stations per PRB segment, max.	125
Operation without terminating resistance	Yes
Operation without filter	Yes
Wiring options: Line / star	Yes / Yes

Ordering data

Article No.

Power Rail Booster

Signal amplifier for PROFIBUS DP transmission over contact cables, max. 500 Kbps

6ES7972-4AA02-0XA0

PRB segment controller

Automatic change over switch between PRB segments

6ES7972-4AA50-0XA0

Overview



- RS 485 repeater with online line diagnostics for PROFIBUS DP
- PROFIBUS DP standard slave (DP-V1)
- Automatic determination of fault types and locations
- Data transmission rate 9.6 Kbps to 12 Mbps
- Connection through FastConnect using IDC

Technical specifications

Article number	6ES7972-0AB01-0XA0
	SIMATIC S7, DIAGNOSIS-REPEATER
Supply voltage	
Rated value (DC)	24 V
permissible range, lower limit (DC)	20.4 V
permissible range, upper limit (DC)	28.8 V
Interfaces	
PROFIBUS DP	
• Transmission rate, max.	12 Mbit/s; 9.6 kbit/s to 12 Mbit/s
Degree and class of protection	
Degree of protection acc. to EN 60529	
• IP20	Yes

Article number	6ES7972-0AB01-0XA0
	SIMATIC S7, DIAGNOSIS-REPEATER
Ambient conditions	
Ambient temperature during operation	
• min.	0 °C
• max.	60 °C
Ambient temperature during storage/transportation	
• min.	-40 °C
• max.	70 °C
Relative humidity	
• Operation, max.	95 %; at 25 °C
Connection method	
Power supply	Terminal block
Bus cables	FastConnect insulation displacement, 10 clamping cycles possible
Dimensions	
Width	80 mm
Height	125 mm
Depth	67.5 mm
Weights	
Weight, approx.	300 g

I/O systems

PROFIBUS components

Diagnostics

Diagnostics repeater for PROFIBUS DP**Ordering data****Article No.****RS 485 diagnostics repeater**

For connection of
1 or 2 segments to
PROFIBUS DP;
with online diagnostics functions
for monitoring the bus lines

6ES7972-0AB01-0XA0**Accessories****RS 485 bus connector
with 90° cable outlet**

With screw terminals,
max. transfer rate 12 Mbps

- Without PG interface
- With PG interface

6ES7972-0BA12-0XA0
6ES7972-0BB12-0XA0

**PROFIBUS FastConnect
RS 485 bus connector
with 90° cable outlet**

With insulation displacement
terminals,
max. transfer rate 12 Mbps

Without PG interface

- 1 unit
- 100 units

6ES7972-0BA52-0XA0
6ES7972-0BA52-0XB0

With PG interface

- 1 unit
- 100 units

6ES7972-0BB52-0XA0
6ES7972-0BB52-0XB0

without PG interface,
grounding via control cabinet cover

- 1 unit

6ES7972-0BA70-0XA0

with PG interface, grounding
via control cabinet cover

- 1 unit

6ES7972-0BB70-0XA0**RS 485 bus connector
with angled cable outlet (35°)**

With screw terminals,
max. transfer rate 12 Mbps

- Without PG interface
- With PG interface

6ES7972-0BA42-0XA0
6ES7972-0BB42-0XA0

Article No.**PROFIBUS FastConnect RS 485
bus connector
with angular cable outlet (35°)**

With insulation displacement termi-
nals, max. transfer rate 12 Mbps

- Without PG interface
- With PG interface

6ES7972-0BA61-0XA0
6ES7972-0BB61-0XA0

**PROFIBUS FastConnect
stripping tool**

Preadjusted stripping tool
for fast stripping of
PROFIBUS FastConnect bus cables

6GK1905-6AA00**PROFIBUS FC standard cable**

Standard type with special
design for quick mounting,
2-core, shielded,
sold by the meter,
max. delivery unit 1000 m,
minimum order quantity 20 m

6XV1830-0EH10**S7 Manual Collection**

Electronic manuals on DVD,
multilingual:
S7-200, TD 200, S7-300, M7-300,
C7, S7-400, M7-400, STEP 7,
Engineering Tools, Runtime Soft-
ware, SIMATIC DP (Distributed I/O),
SIMATIC HMI (Human Machine
Interface), SIMATIC NET
(Industrial Communication)

6ES7998-8XC01-8YE0**S7 Manual Collection
update service for 1 year**

Scope of delivery: Current DVD
"S7 Manual Collection" and the
three subsequent updates

6ES7998-8XC01-8YE2**Connecting cable for PROFIBUS**

12 Mbps, for PG connection to
PROFIBUS DP, pre-assembled with
2 x 9-pin sub D plug, 3.0 m

6ES7901-4BD00-0XA0

Overview



- RS 485 repeater with online line diagnostics for PROFIBUS DP
- PROFIBUS DP standard slave (DP-V1)
- Automatic determination of fault type and location
- Transmission rate from 9.6 Kbps to 12 Mbps
- Connection via FastConnect IDC

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

SIPLUS diagnostics repeater for PROFIBUS DP

Article No.	6AG1972-0AB01-4XA0
BasedOn Article No.	6ES7972-0AB01-0XA0
Ambient temperature range	0 °C ... +60 °C
Conformal coating	Coating of the printed circuit boards and the electronic components.
Technical specifications	The technical data of the standard product applies except for the ambient conditions.
Ambient conditions	
Relative humidity	100%, condensation/frost permissible. No commissioning if condensation present.
Biologically active substances, compliance with EN 60721-3-3	Class 3B2 mold and fungal spores (excluding fauna). The supplied plug covers must remain in place over the unused interfaces during operation!
Chemically active substances, compliance with EN 60721-3-3	Class 3C4 incl. salt spray in accordance with EN60068-2-52 (degree of severity 3). The supplied plug covers must remain in place over the unused interfaces during operation!
Mechanically active substances, compliance with EN 60721-3-3	Class 3S4 incl. sand, dust. The supplied plug covers must remain in place over the unused interfaces during operation!
Air pressure (depending on the highest positive temperature range specified)	1 080 ... 795 hPa (-1 000 ... +2 000m) See ambient temperature range 795 ... 658 hPa (+2 000 ... +3 500m) Derating 10 K 658 ... 540 hPa (+3 500 ... +5 000 m) Derating 20 K

For technical documentation on SIPLUS, see:

<http://www.siemens.com/siplus-extreme>

Technical specifications

Article number	6AG1972-0AB01-4XA0
Based on	6ES7972-0AB01-0XA0 SIPLUS diagnostics repeater for PROFIBUS
Supply voltage	
Rated value (DC)	24 V
permissible range, lower limit (DC)	20.4 V
permissible range, upper limit (DC)	28.8 V
Interfaces	
PROFIBUS DP	
• Transmission rate, max.	12 Mbit/s; 9.6 kbit/s to 12 Mbit/s
Degree and class of protection	
Degree of protection acc. to EN 60529	
• IP20	Yes
Ambient conditions	
Ambient temperature during operation	
• min.	0 °C
• max.	60 °C
Ambient temperature during storage/transportation	
• min.	-40 °C
• max.	70 °C

Article number	6AG1972-0AB01-4XA0
Based on	6ES7972-0AB01-0XA0 SIPLUS diagnostics repeater for PROFIBUS
Connection method	
Power supply	Terminal block
Bus cables	FastConnect insulation displacement, 10 clamping cycles possible
Dimensions	
Width	80 mm
Height	125 mm
Depth	67.5 mm
Weights	
Weight, approx.	300 g

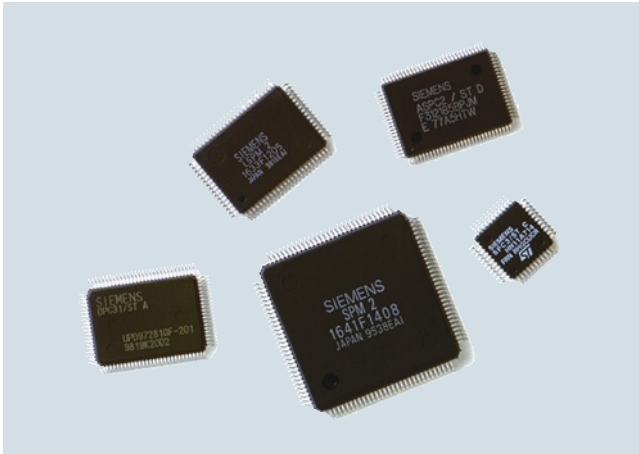
I/O systems

PROFIBUS components

Diagnostics

SIPLUS diagnostics repeater for PROFIBUS

Ordering data	Article No.	Article No.
SIPLUS RS 485 diagnostics repeater To connect up to 2 segments to PROFIBUS DP, with online diagnostics functions for monitoring the bus lines Exposure to media	6AG1972-0AB01-4XA0	Accessories RS 485 bus connector with 90° cable outlet Max. transfer rate 12 Mbps Extended temperature range and exposure to media • without PG interface • with PG interface 6AG1972-0BA12-2XA0 6AG1972-0BB12-2XA0
		RS 485 bus connector with angled cable outlet (Extended temperature range -40 °C ... +70 °C and exposure to media) Max. transfer rate 12 Mbps • without PG interface • with PG interface 6AG1972-0BA42-7XA0 6AG1972-0BB42-7XA0
		Additional accessories See SIMATIC RS 485 diagnostics repeater, page 9/358

Overview


- Easy connection of field devices to PROFIBUS
- Integrated low-power management
- Different ASICs for the different functional requirements and application areas

Technical specifications

	LSPM 2	SPC 3	SPC 3LV	DPC 31
Protocol	PROFIBUS DP	PROFIBUS DP	PROFIBUS DP	PROFIBUS DP, PROFIBUS PA
Application range	simple slave application	intelligent slave application	intelligent slave application	intelligent slave application
Transmission rate, max.	12 Mbps	12 Mbps	12 Mbps	12 Mbps
Bus access	in ASIC	in ASIC	in ASIC	in ASIC
Automatic determination of transmission rate	yes	yes	yes	yes
Microprocessor required	no	yes	yes	integrated
Scope of firmware	not required	6 to 24 KB	6 to 24 KB	approx. 38 KB
Message buffer	-	1.5 KB	1.5 KB	6 KB
Power supply	5 V DC	5 V DC	3.3 V DC	3.3 V DC
Power loss, max.	0.35 W	0.5 W	<0.5 W	0.2 W
Permissible ambient temperature	-40 °C ... +75 °C	-40 °C ... +85 °C	-40 °C ... +85 °C	-40 °C ... +85 °C
Housing	MQFP, 80-pin	PQFP, 44-pin	PQFP, 44-pin	PQFP, 100-pin
Frame size	4 cm ²	2 cm ²	2 cm ²	4 cm ²
Delivery quantities (pcs.)	6/66/330/4950	6/96/750/960/4800	5/160/800/1000/4800	STEP B: 6/60/300/5100 STEP C1: 6/66/660/4620

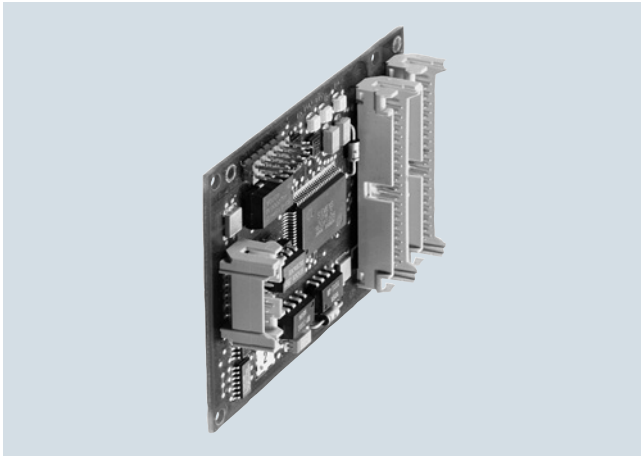
	SPC 4-2	ASPC 2	SIM 1-2	FOCSI
Protocol	PROFIBUS DP PROFIBUS FMS PROFIBUS PA	PROFIBUS DP PROFIBUS FMS PROFIBUS PA	PROFIBUS PA	-
Application range	Intelligent slave application	Master application	Medium Attachment	Medium Management Unit
Transmission rate, max.	12 Mbps	12 Mbps	31.25 Kbps	12 Mbps
Bus access	in ASIC	in ASIC	-	-
Automatic determination of transmission rate	yes	yes	-	-
Microprocessor required	yes	yes	-	-
Scope of firmware	3 ... 30 KB	80 KB	not required	not required
Message buffer	3 KB	1 MB (external)	-	-
Voltage supply	5 V DC, 3.3 V	5 V DC	via bus	3.3 V DC
Power loss, max.	0.6 W at 5V 0.01 W at 3.3 V	0.9 W	0.05 W	0.75 W
Permissible ambient temperature	-40 °C ... +85 °C	-40 °C ... +85 °C	-40 °C ... +85 °C	-40 °C ... +85 °C
Housing	TQFP, 44-pin	P-MQFP, 100-pin	MLPQ, 40-pin	TQFP, 44-pin
Frame size	2 cm ²	4 cm ²	36 mm ²	2 cm ²
Delivery quantities (pcs.)	5/160	6/66/660/4620	30/60/1000	40

I/O systems

PROFIBUS components

PROFIBUS DP ASICs

Ordering data	Article No.	Article No.	
ASIC ASPC 2 For constructing master interfaces (quantity discount) • 6 units (lead-free) • 66 units (lead-free) • 660 units (lead-free) • 4620 units (lead-free)	6ES7195-0AA05-0XA0 6ES7195-0AA15-0XA0 6ES7195-0AA25-0XA0 6ES7195-0AA35-0XA0		
ASIC LSPM 2 For constructing simple slave interfaces (quantity discount) • 6 units (lead-free) • 66 units (lead-free) • 330 units (lead-free) • 4950 units (lead-free)	6ES7195-0BA02-0XA0 6ES7195-0BA12-0XA0 6ES7195-0BA22-0XA0 6ES7195-0BA32-0XA0		
ASIC SPC 3 For constructing intelligent DP slave interfaces (quantity discount) • 6 units (lead-free) • 96 units (lead-free) • 960 units (lead-free) • 4800 units (lead-free) • 750 units (lead-free) (tape & reel)	6ES7195-0BD04-0XA0 6ES7195-0BD14-0XA0 6ES7195-0BD24-0XA0 6ES7195-0BD34-0XA0 6ES7195-0BD44-0XA0		
ASIC SPC 3LV For constructing intelligent DP slave interfaces (quantity discount) • 5 units (lead-free) • 160 units (lead-free) • 800 units (lead-free) • 4800 units (lead-free) • 1000 units (lead-free) (tape & reel)	6ES7195-0BG00-0XA0 6ES7195-0BG10-0XA0 6ES7195-0BG20-0XA0 6ES7195-0BG30-0XA0 6ES7195-0BG40-0XA0		
ASIC DPC 31 STEP B For constructing intelligent DP slave interfaces (quantity discount) • 6 units (lead-free) • 60 units (lead-free) • 300 units (lead-free) • 5100 units (lead-free)	6ES7195-0BE02-0XA0 6ES7195-0BE12-0XA0 6ES7195-0BE22-0XA0 6ES7195-0BE32-0XA0		
		ASIC DPC 31 STEP C1 For constructing intelligent DP slave interfaces (quantity discount) • 6 units (lead-free) • 66 units (lead-free) • 660 units (lead-free) • 4620 units (lead-free)	6ES7195-0BF02-0XA0 6ES7195-0BF12-0XA0 6ES7195-0BF22-0XA0 6ES7195-0BF32-0XA0
		ASIC SPC 4-2 For constructing intelligent DP slave interfaces (quantity discount) • 5 units for laboratory development (lead-free) • 160 units (lead-free, 1 tray)	6GK1588-3AA00 6GK1588-3AA15
		ASIC SIM 1-2 For connection according to IEC H1 for PROFIBUS PA with a transmission rate of 31.25 Kbps • 60 units (in tube) • 1000 units (tape & reel)	6GK1588-3BB02 6GK1588-3BB21
		Accessories	
		Firmware for Siemens ASIC SPC 3 • DP firmware • DP-V1 firmware • DP-V1 firmware upgrade	6ES7195-2BA00-0XA0 6ES7195-2BA01-0XA0 6ES7195-2BA02-0XA0
		Firmware for Siemens ASIC DPC 31 • DP-V1 firmware	6ES7195-2BB00-0XA0

Overview


- IM 182-1 PC slave board for the connection of AT-compatible PCs as DP slaves

Technical specifications

Article number	6ES7182-0AA01-0XA0 IM 182-1 PC SLAVE BOARD F. PROFIBUS DP
General information	
Suitability for use	Slave applications
ASIC	SPC 3
• Scope of firmware	4 to 24 KB (incl. test program)
Supply voltage	
Rated value (DC)	5 V
Input current	
Current consumption, typ.	250 mA
Processor	
Microprocessor type	Processor of the PG/PC
Interfaces	
PROFIBUS DP	
• Transmission rate, max.	12 Mbit/s

Article number	6ES7182-0AA01-0XA0 IM 182-1 PC SLAVE BOARD F. PROFIBUS DP
Protocols	
PROFIBUS DP	Yes
Ambient conditions	
Ambient temperature during operation	
• min.	0 °C
• max.	60 °C
Dimensions	
Width	168 mm
Height	105 mm

Ordering data

SIMATIC S5/S7
IM 182-1 PC slave board
 For PROFIBUS DP, max. 12 Mbps

Article No.
6ES7182-0AA01-0XA0

Accessories
Firmware for Siemens
ASIC SPC 3 and IM 182-1
 • DP firmware
 • DP-V1 firmware
 • DP-V1 firmware upgrade

Article No.
6ES7195-2BA00-0XA0
6ES7195-2BA01-0XA0
6ES7195-2BA02-0XA0

I/O systems

PROFIBUS components

Development kits

Overview

Development kit

With the help of development kits, PROFIBUS hardware and software applications can be developed and tested using the PROFIBUS ASICs SPC 3.

The comprehensive, perfectly interacting hardware and software components considerably reduce the development costs for a PROFIBUS device.

The kits provide a fully functional hardware development environment which development engineers can build on with their special requirements for hardware and software. Documentation is supplied on CD in English and German.

The kits are in the form of a PC module and make our PROFIBUS know-how accessible to other users. The development team is available to provide advice to new users even with their own developments – this consultancy service is also a component part of the development kit.

Following completion of a development, devices can be certified by our experts in the PROFIBUS interface centers – we can help new users here, too.

PROFIBUS DP/PA development kit

The kit facilitates the set up of PROFIBUS slaves with a variety of PROFIBUS standards:

- PROFIBUS DP-V1 (RS 485)
- PROFIBUS PA (IEC 1158) and
- PROFIBUS based on fiber-optic cables

The development environment shows how applications are implemented using PROFIBUS ASIC SPC 3.

Hardware included:

- IM 182-1 (PC module with SPC 3 and ISA interface); without SW

Software to be ordered separately:

- FW for SPC 3 (IM 183-1: evaluation board and IM 182)

When developing PROFIBUS PA applications, you will need to order a PROFIBUS DP/PA coupler (6ES7 157-0AC80-0XA0) separately. The DP/PA coupler converts the PROFIBUS DP physical specifications into those of PROFIBUS PA. This module is not included in the development kit!

PROFIsafe starter kit V3.4

The PROFIsafe starter kit V3.4 is compatible with version 2.4 of the PROFIsafe profile, as specified in IEC 61784-3-3. It meets a series of user requirements such as multi-instance capability and variable process data lengths at runtime.

Along with all of the PI specifications required for development, the PROFIsafe starter kit contains the source files for the PROFIsafe driver software (PSD) and a comprehensive implementation manual in English and German. In addition, it includes various CRC calculation tools and tools for creating GSD files with security-related parameters.

Examples of adaptation of the PSD (PROFIsafe Driver) to current PROFIBUS and PROFINET stack interfaces provide assistance for adaptations that may be necessary. Special "slow-motion monitors" allow the PROFIsafe protocol processes to be monitored in slow motion. A new feature is support for the iPar server and the TCI interface.

Example applications are provided on the CD-ROM for both PROFIBUS and PROFINET. The hardware components supplied in the development kits offer the user step-by-step access to the PROFIsafe world.

The PROFIsafe starter kit consists of the following components:

- Current PROFIsafe specifications with current PROFIsafe certificate
- PROFIsafe driver software (as core component of the development kit)
- Example GSD file for STEP7 (for PROFIBUS DP/PA development kit and DK-ERTEC 200 PN IO)
- Example project for S7-319F (for PROFIBUS DP/PA development kit and DK-ERTEC 200 PN IO)
- GSD tools (e.g. GSD editor and CRC calculation tool)
- iPar server software and instructions (FB24)
- Tool calling interface example and instructions
- F programming guidelines: Layer stacks (V1SL and PN IO)
- Example firmware (for PROFIBUS DP/PA development kit and DK-ERTEC 200 PN IO)
- Project for example development environment (for PROFIBUS DP/PA development kit and DK-ERTEC 200 PN IO)
- Slow-motion monitor (for PROFIBUS: PG-PC and CP5613, for PROFINET: PG-CP1616)
- Comprehensive documentation

Ordering data

Article No.

PROFIBUS DP/PA development kit

Comprising IM 182-1 (PC module with SPC 3 and ISA interface); without SW, additional firmware required

6ES7182-0AA01-0XA0

Article No.

Firmware with development environment for SPC 3

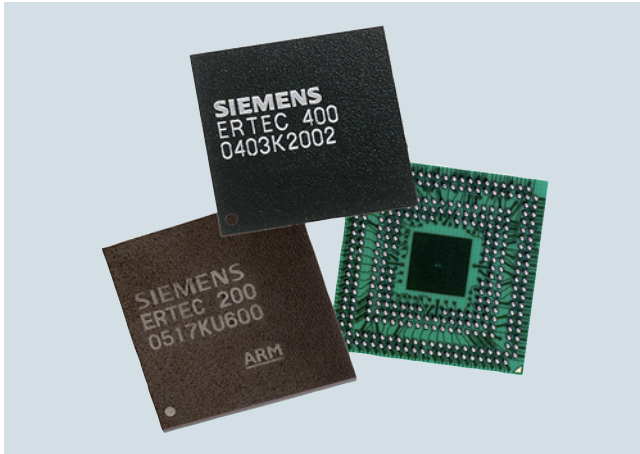
For IM 182-1 (ISA plug-in card) and IM 183-1 (evaluation board)

6ES7195-2BA00-0XA0

PROFIsafe starter kit V3.4

6ES7195-3BF02-0YA0

Overview



With the Industrial Ethernet ASICs of the ERTEC family (Enhanced Real-Time Ethernet Controllers), devices and systems can be connected to PROFINET without great effort. The high-performance Ethernet controllers with 32-bit microprocessor as well as integral real-time switch for Real Time Ethernet have been specially developed for industrial use.

These Ethernet controllers handle all the data transmission for PROFINET with Real-Time (RT) and Isochronous Real-Time (IRT) and thus offload the application processor. Thanks to the integral 2-port switch (ERTEC 200 and ERTEC 200P) or 4-port switch (ERTEC 400), there are no costs for external switches. Flexible topologies such as star, tree and linear topologies can be implemented without any other external network components.

- **ERTEC 200P**
with integral 2-port switch and maximum performance for compact and modular PROFINET field devices. The ERTEC 200P is designed for cycle times up to 31.25 µs. In conjunction with a high-speed ARM 926 CPU, it meets all the requirements for powerful PROFINET implementation.
- **ERTEC 200**
with an integral 2-port switch for developing compact or modular PROFINET field devices.
- **ERTEC 400**
with 4 integral ports and one integral PCI interface for developing network components and field devices with specific requirements regarding communication capabilities.

The EK-ERTEC 200P PN IO, DK-ERTEC 200 PN IO and DK-ERTEC 400 PN IO development kits enable the uncomplicated development of PROFINET field devices thanks to fast and simple integration of the PROFINET IO functionalities based on the ERTEC.

Technical specifications

	ERTEC 400	ERTEC 200	ERTEC 200P
Transmission rate	10/100 Mbps	10/100 Mbps	100 Mbps
Interfaces			
• Ethernet / PHY interface	4 x PHY interface	2 x Ethernet interface (PHY integrated) or alternatively 2 x PHY interface (for connection of optical PHYs)	2 x Ethernet interface (PHY integrated) or alternatively 2 x PHY interface (for connection of optical PHYs)
- In connection with the corresponding PHY types:	• Half/full duplex - Support for copper and fiber-optic cables; autosensing; autocrossover	• Half/full duplex - Support for copper and fiber-optic cables (PHY for copper integrated); autosensing; autocrossover	- Half/full duplex - Support for copper and fiber-optic cables (PHY for copper integrated); autosensing; autocrossover
• Local Bus Unit (LBU)	Local bus master interface for connecting an external host with access to internal areas of the ERTEC; 16 bit data bit width	Local bus master interface for connecting an external host with access to internal areas of the ERTEC; 16 bit data bit width	XHIG (external host interface); 16/32 bit data bit width
• External memory interface (EMIF)			
- SDRAM controller	128 MB/16 bit or 256 MB/32 bit	64 MB/16 bit or 128 MB/32 bit	128 MB/16 bit or 256 MB/32 bit
- SRAM controller	4 x 16 MB for asynchronous blocks (SRAM, flash, I/O 8/16/32 bit)	4 x 16 MB for asynchronous blocks (SRAM, flash, I/O 8/16/32 bit)	4 x 16 MB for asynchronous blocks (SRAM, flash, I/O 8/16/32 bit)
- Chip-select support	yes	yes	yes
• IO interfaces	32 parameterizable I/O (GPIO); multifunctional outputs	45 parameterizable I/O (GPIO); multifunctional outputs	up to 96 parameterizable I/O (GPIO); multifunctional outputs
• Intelligent switching and PROFINET IRT prioritization/timing	yes	yes	yes
ARM processor			
• Integral ARM946 processor	32-bit ARM system	32-bit ARM system	32-bit ARM system
- Adjustable operating frequency	50/100/150 MHz	50/100/150 MHz	125/250 MHz

I/O systems

PROFINET components

Enhanced Real-Time Ethernet Controllers ERTEC

Technical specifications (continued)

	ERTEC 400	ERTEC 200	ERTEC 200P
Supply voltage			
• Core (VDD Core)	1.5 V +/- 10 %	1.5 V +/- 10 %	1.2 V +5%/-0.1 V
• I/Os (VDD IO)	3.3 V +/- 10 %	3.3 V +/- 10 %	3.3 V +5%/-10%
• External host interface (XHIF)	-	-	1.8 V +5%/-10%
• PHY	-	-	1.5 V +5%/-10%
• External host interface (XHIF)	-	-	1.8 V/3.3 V +5%/-10%
Perm. ambient conditions			
• Operating temperature	-40 °C to +85 °C	-40 °C to +85 °C	-40 °C to +85 °C
• Transport/storage temperature	-40 °C to +85 °C	-40 °C to +85 °C	-40 °C to +85 °C
• Relative humidity	Max. 95 % at +25 °C	Max. 95 % at +25 °C	Max. 95 % at +25 °C
Constructional design			
• Housing	Plastic FBGA 304 Pin	Plastic FBGA 304 Pin	Plastic FBGA 400 Pin
• Pinning Ball Pitch	0.8 mm	0.8 mm	0.8 mm
Dimensions (W x H x D) in mm - ERTEC	19 x 1 x 19	19 x 1 x 19	17 x 1 x 17
Supported communications protocols			
• General Ethernet protocols	In accordance with the respective software implementation that uses the ERTEC as Ethernet controller	In accordance with the respective software implementation that uses the ERTEC as Ethernet controller	In accordance with the respective software implementation that uses the ERTEC as Ethernet controller
• PROFINET in combination with a PROFINET Software Stack	Real-Time communication (RT); Isochronous Real-Time communication (IRT)	Real-Time communication (RT); Isochronous Real-Time communication (IRT)	Real-Time communication (RT); Isochronous Real-Time communication (IRT)

Ordering data

Article No.	Article No.
ERTEC 200P ASIC for connection to Switched Ethernet 100 Mbps, Ethernet controller with integral 2-port switch, ARM 926 processor and integral PHYs • 10 units (evaluation pack) • 90 units (single tray) • 450 units (drypack, 5 trays) • 1 000 units (tape & reel)	ERTEC 200 ASIC ERTEC 200 for connection to Switched Ethernet 10/100 Mbps, Ethernet controller with integral 2-port switch, ARM 946 processor and integral PHYs • 70 units (single tray) • 350 units (drypack, 5 trays), • 3500 units (package, 10 dry-packs)
Evaluation Kit EK-ERTEC 200P PN IO	ERTEC 400 ASIC ERTEC 400 for connection to Switched Ethernet 10/100 Mbps, Ethernet controller with integrated 4-port switch, ARM 946 processor and PCI interface (V2.2), data preparation for real-time and isochronous real-time for PROFINET IO • 70 units (single tray) • 350 units (drypack, 5 trays)
6ES7195-0BH00-0XA0 6ES7195-0BH10-0XA0 6ES7195-0BH20-0XA0 6ES7195-0BH30-0XA0	6GK1182-0BB01-0AA1 6GK1182-0BB01-0AA2 6GK1182-0BB01-0AA3
6ES7195-3BE00-0YA0	6GK1184-0BB01-0AA1 6GK1184-0BB01-0AA2

Overview



With the development packages for PROFINET, compact or modular PROFINET field devices can be developed quickly and with little effort. Depending on the application, different development packages are available.

The development packages for the ASICs of the ERTEC family (Enhanced Real-Time Ethernet Controllers) are suitable for the development of field devices with an integrated IRT switch (Isochronous Real-Time). The demand for real-time capability, linear topology capability, and for IT integration is therefore met perfectly.

With the help of the development package for standard Ethernet controllers, PROFINET devices can be developed on the basis of a standard Ethernet controller. Devices with RT (Real-Time) can be implemented in the field device without special hardware.

The PROFI-safe starter kit permits the implementation of fail-safe devices. In so doing, the PROFI-safe stack applicatively builds on the PROFINET stack.

Ordering data

Article No.

Article No.

ERTEC development kits / evaluation kits

Evaluation kit
EK-ERTEC 200P PN IO

6ES7195-3BE00-0YA0

Development kit
for standard Ethernet controllers

6ES7195-3BC00-0YA0

PROFI-safe starter kit V3.5
according to the PROFI-safe V2.6.1
profile

6ES7195-3BF03-0YA0

ERTEC ASICs

ERTEC 200P

ASIC for connection to Switched
Ethernet 100 Mbps, Ethernet con-
troller with integral 2-port switch,
ARM 926 processor and integral
PHYs

- 10 units (evaluation pack)
- 90 units (single tray)
- 450 units (drypack, 5 trays)

6ES7195-0BH00-0XA0
6ES7195-0BH10-0XA0
6ES7195-0BH20-0XA0

ERTEC 200

ASIC ERTEC 200 for connection to
Switched Ethernet 10/100 Mbps,
Ethernet controller with integral
2-port switch, ARM 946 processor
and integral PHYs

- 70 units (single tray)
- 350 units (drypack, 5 trays)
- 3500 units (package, 10 dry-
packs)
- 1050 units (tape & reel)

6GK1182-0BB01-0AA1
6GK1182-0BB01-0AA2
6GK1182-0BB01-0AA3
6GK1182-0BB01-0AA4

ERTEC 400

ASIC ERTEC 400 for connection to
Switched Ethernet 10/100 Mbps,
Ethernet controller with integral
4-port switch, ARM 946 processor
and PCI interface (V2.2)

- 70 units (single tray)
- 350 units (drypack, 5 trays)

6GK1184-0BB01-0AA1
6GK1184-0BB01-0AA2

Accessories

PROFINET IO product line license
for one product line

6ES7195-3BC10-0YA0

I/O systems

PROFINET components

PROFINET Driver

Overview

- For connecting distributed I/O and drives to user-specific control applications via PROFINET
- Operation of the control software on a standard PC using the standard Ethernet interface of the PC
- Supplied as portable source code and can therefore be used with any operating system
- Sample application for Windows included in the scope of delivery; uses SIMATIC IPCs as example hardware

Note

You are provided with the source code of the PN driver V1.1, as well as the source code of the application examples. These codes are to be used for modifying and editing in conjunction with SIMATIC only. You are not permitted to use PN driver source codes or the application examples without SIMATIC, nor are you permitted to pass them on to third parties.

The application examples are not binding and do not claim to be complete regarding configuration, equipment or any eventualities. The application examples do not represent customer-specific solutions. They are only intended to provide support for typical tasks. You are responsible for ensuring that the described products are used correctly. These application examples do not relieve you of your responsibility to use safe practices in application, installation, operation and maintenance processes. By using these application examples, you agree that we cannot be held liable for any damages/claims beyond the liability clause

described. We reserve the right to make changes to these application examples at any time without prior notice. If there are any deviations between the recommendations provided in these application examples and other Siemens publications – e.g. Catalogs – the contents of the other documents have priority.

We do not accept any liability for the information contained in this document.

Any claims against us – based on whatever legal reason – resulting from the use of the examples, information, programs, engineering and performance data etc. described in this application example shall be excluded. Such an exclusion shall not apply in the case of mandatory liability, e.g. under the German Product Liability Act ("Produkthaftungsgesetz"), in case of intent, gross negligence, or injury to life, body or health, guarantee for the quality of a product, fraudulent concealment of a deficiency or breach of a condition which goes to the root of the contract ("wesentliche Vertragspflichten"). The damages for a breach of a substantial contractual obligation are, however, limited to the foreseeable damage, typical for the type of contract, except in the event of intent or gross negligence or injury to life, body or health. The above provisions do not imply a change of the burden of proof to your detriment.

Any form of duplication of these application examples or excerpts thereof is not permitted without the express consent of Siemens AG.

Ordering data

Article No.

PROFINET Driver

For connecting distributed I/O and drives to user-specific control applications via PROFINET

Development license

6ES7195-3AA00-0YA0

Runtime licenses

- 1 unit
- 10 units
- 50 units
- 200 units
- 500 units

6ES7195-3AA05-0XA0
6ES7195-3AA10-0XA0
6ES7195-3AA20-0XA0
6ES7195-3AA30-0XA0
6ES7195-3AA40-0XA0

Overview



- Terminates bus segments at data transmission rates of 9.6 Kbps to 12 Mbps
- Power supply independent of bus stations

Designed for Industry

- Terminal-independent bus termination through onboard power supply

Technical specifications

Article number	6ES7972-0DA00-0AA0 SIMATIC S7, RS 485 RESISTOR
Supply voltage	
Rated value (DC)	24 V
permissible range, lower limit (DC)	20.4 V
permissible range, upper limit (DC)	28.8 V
Input current	
Current consumption, typ.	30 mA
Power loss	
Power loss, max.	0.72 W
Interfaces	
PROFIBUS DP	
• Transmission rate, max.	12 Mbit/s; 9.6 kbit/s to 12 Mbit/s
Degree and class of protection	
Degree of protection acc. to EN 60529	
• IP20	Yes

Article number	6ES7972-0DA00-0AA0 SIMATIC S7, RS 485 RESISTOR
Ambient conditions	
Ambient temperature during operation	
• min.	0 °C
• max.	60 °C
Ambient temperature during storage/transportation	
• min.	-40 °C
• max.	70 °C
Relative humidity	
• Operation, max.	95 %; at +25 °C
Connection method	
Power supply	Screw terminal block
Bus cables	Screw terminal block
Dimensions	
Width	60 mm
Height	70 mm
Depth	43 mm
Weights	
Weight, approx.	95 g

Ordering data

Article No.

Active RS 485 terminating element for PROFIBUS

For terminating bus segments at transmission rates of 9.6 Kbps to 12 Mbps

6ES7972-0DA00-0AA0

I/O systems

Network components for PROFIBUS
Electrical networks (RS 485)

RS 485 repeater for PROFIBUS

Overview



- Automatic detection of transmission rates
- Transmission rates from 9.6 Kbps to 12 Mbps are possible, incl. 45.45 Kbps
- 24 V DC voltage display
- Indication of segment 1 and 2 bus activity
- The separation of segment 1 and segment 2 by means of switches is possible
- Separation of the right segment with an inserted terminating resistor
- Decoupling of segment 1 and segment 2 in the case of static interference

Designed for Industry

- For increasing the expansion
- Electrical isolation of segments
- Commissioning support
 - Switches for separation of segments
 - Bus activity display
 - Segment separation in the case of an incorrectly inserted terminating resistor

In this context, please also note the diagnostics repeater that provides extensive diagnostics functions for physical line diagnostics in addition to the normal repeater functionality. This is described on page 9/357.

Technical specifications

Article number	6ES7972-0AA02-0XA0 REPEATER RS 485 F. PROFIBUS/MPI
Supply voltage	
Rated value (DC)	24 V
permissible range, lower limit (DC)	20.4 V
permissible range, upper limit (DC)	28.8 V
Input current	
Current consumption, max.	100 mA; 100 mA without loads at PG/OP socket; 130 mA load at PG/OP socket (5 V/90 mA); 200 mA load at PG/OP socket (24 V/100 mA)
Power loss	
Power loss, typ.	0.7 W
Interfaces	
PROFIBUS DP	
• Transmission rate, max.	12 Mbit/s; 9.6 kbit/s to 12 Mbit/s
Degree and class of protection	
Degree of protection acc. to EN 60529	Yes
• IP20	

Article number	6ES7972-0AA02-0XA0 REPEATER RS 485 F. PROFIBUS/MPI
Ambient conditions	
Ambient temperature during operation	
• min.	0 °C
• max.	60 °C
Ambient temperature during storage/transportation	
• min.	-40 °C
• max.	70 °C
Relative humidity	
• Operation, max.	95 %; at 25 °C
Connection method	
Power supply	Terminal block
Bus cables	2 terminal blocks
Dimensions	
Width	45 mm
Height	128 mm
Depth	67 mm
Weights	
Weight, approx.	350 g

Ordering data

Article No.

RS 485 repeater for PROFIBUS

Transfer rate up to max. 12 Mbps,
24 V DC, IP20 enclosure

6ES7972-0AA02-0XA0

SIPLUS DP active RS 485 terminating element

Overview



- Used to terminate bus segments at rates of 9.6 Kbps to 12 Mbps
- Power supply independent of the bus participants

Designed for Industry

- End-device – independent bus termination thanks to own power supply

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

SIPLUS active RS 485 terminating element

Article No.	6AG1972-0DA00-2AA0
BasedOn Article No.	6ES7972-0DA00-0AA0
Ambient temperature range	-25 °C ... +60 °C
Conformal coating	Coating of the printed circuit boards and the electronic components.
Technical data	The technical data of the standard product applies except for the ambient conditions.
Ambient conditions	
Relative humidity	100%, condensation/frost permitted. No commissioning if condensation present.
Biologically active substances, compliance with EN 60721-3-3	Class 3B2 mold and fungal spores (excluding fauna). The supplied plug covers must remain in place over the unused interfaces during operation!
Chemically active substances, compliance with EN 60721-3-3	Class 3C4 incl. salt spray in accordance with EN60068-2-52 (degree of severity 3). The supplied plug covers must remain in place over the unused interfaces during operation!
Mechanically active substances, compliance with EN 60721-3-3	Class 3S4 incl. sand, dust. The supplied plug covers must remain in place over the unused interfaces during operation!
Air pressure (depending on the highest positive temperature range specified)	1 080...795 hPa (-1 000 ... +2 000 m) See ambient temperature range 795...658 hPa (+2 000 ... +3,500 m) Derating 10 K 658...540 hPa (+3 500 ... +5 000m) Derating 20K

For technical documentation on SIPLUS, see:

<http://www.siemens.com/siplus-extreme>

Ordering data

Article No.

SIPLUS active RS 485 terminating element for PROFIBUS

to complete bus segments at transmission rates of 9.6 Kbps to 12 Mbps

Extended temperature range and exposure to media

6AG1972-0DA00-2AA0

I/O systems

Network components for PROFIBUS
Electrical networks (RS 485)

SIPLUS RS 485 repeater

Overview



- Automatically detects transmission rate
- 45.45 Kbps transmission rate is possible
- 24 V DC voltage display
- Indication of segment 1 and 2 bus activity
- The separation of segment 1 and segment 2 by means of switches is possible
- Separation of the right segment with an inserted terminating resistor
- Decoupling of segment 1 and segment 2 in the case of static interference

Designed for Industry

- For increasing the number of participants and the expansion
- Electric isolation of segments
- Commissioning support
 - Switches for segment separation
 - Bus activity display
 - Segment separation in the case of an incorrectly inserted terminating resistor

In this context, please also note the diagnostics repeater that provides extensive diagnostics functions for physical line diagnostics in addition to the normal repeater functionality. This is described on page 9/359.

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

For technical documentation on SIPLUS, see:

<http://www.siemens.com/siplus-extreme>

Technical specifications

Article number	6AG1972-0AA02-7XA0
Based on	6ES7972-0AA02-0XA0 SIPLUS DP RS 485-Repeater
Ambient conditions	
Ambient temperature during operation	
• min.	-25 °C
• max.	70 °C
Ambient temperature during storage/transportation	
• min.	-40 °C
• max.	70 °C
Extended ambient conditions	
• relative to ambient temperature-atmospheric pressure-installation altitude	Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m)
Relative humidity	
- With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation/frost (no commissioning under condensation conditions)

Article number	6AG1972-0AA02-7XA0
Based on	6ES7972-0AA02-0XA0 SIPLUS DP RS 485-Repeater
Resistance	
- against biologically active substances / conformity with EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!
- against chemically active substances / conformity with EN 60721-3-3	Yes; Class 3C4 incl. salt spray. The supplied connector covers must remain on the unused interfaces during operation!
- against mechanically active substances / conformity with EN 60721-3-3	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!
Connection method	
Power supply	Terminal block
Bus cables	2 terminal blocks
Dimensions	
Width	45 mm
Height	128 mm
Depth	67 mm
Weights	
Weight, approx.	350 g

Ordering data

Article No.

SIPLUS RS 485 repeater for PROFIBUS

Transfer rate up to max. 12 Mbps,
24 V DC, enclosure IP20

Extended temperature range and exposure to media

6AG1972-0AA02-7XA0

Overview



- Maximum data exchange of 256-byte input data and 256-byte output data between two PROFINET networks
- Maximum of 16 input/output ranges for the exchange of data
- Electrical isolation between the two PROFINET IO subnets
- Redundant power supply
- Supported Ethernet services
 - ping
 - arp
 - network diagnostics (SNMP/MIB-2)
- Diagnostic interrupts
- ReturnOfSubmodule interrupts

Technical specifications

Article number	6ES7158-3AD01-0XA0 PN/PN COUPLER
General information	
Product type designation	PN/PN coupler
Installation type/mounting	
Mounting	Mounting rail 7.5 mm and 15 mm
Supply voltage	
Rated value (DC)	24 V
permissible range, lower limit (DC)	20.4 V
permissible range, upper limit (DC)	28.8 V
Reverse polarity protection	Yes
Mains buffering	
• Mains/voltage failure stored energy time	20 ms
Input current	
from supply voltage 1L+, max.	400 mA
Power loss	
Power loss, typ.	6 W
Address area	
Addressing volume	
• Inputs	1 024 byte; Total, including outputs
• Outputs	1 024 byte; Total, including inputs
Interfaces	
PROFINET IO	
• automatic detection of transmission rate	Yes
• Transmission rate, max.	100 Mbit/s
• Services	Network management functions, network diagnostics (SNMP, MIB-2), ping, arp, PROFINET V2.0
• RJ 45	Yes; 4 RJ45 female connectors, 2 for each side
Protocols	
Supports protocol for PROFINET IO	Yes

Article number	6ES7158-3AD01-0XA0 PN/PN COUPLER
Isochronous mode	
Isochronous operation (application synchronized up to terminal)	No; For operation on isochronous bus
Interrupts/diagnostics/status information	
Status indicator	Yes
Alarms	Yes
Diagnostic functions	Yes
Diagnostics indication LED	
• Bus fault BF (red)	Yes; for each side
• Group error SF (red)	Yes; for each side
• Monitoring 24 V voltage supply ON (green)	Yes; for each side
• Connection to network LINK (green)	Yes; for each port
Potential separation	
between supply voltage and electronics	Yes; to power input 2
between Ethernet and electronics	Yes
Permissible potential difference	
between different circuits	500 V DC
Isolation	
Isolation tested with	500 V
Degree and class of protection	
Degree of protection acc. to EN 60529	
• IP20	Yes
Ambient conditions	
Ambient temperature during operation	
• min.	0 °C
• max.	60 °C
Dimensions	
Width	120 mm; Minimized with good handling
Height	119.5 mm
Depth	75 mm; with mounting rail
Weights	
Weight, approx.	283 g

I/O systems

Network transitions

PN/PN coupler

Ordering data	Article No.
PN/PN coupler For connecting two PROFINET networks	6ES7158-3AD01-0XA0
Power supply connector Spare part; for connecting the 24 V DC supply voltage • with push-in terminals • with screw-type terminals	6ES7193-4JB00-0AA0 6ES7193-4JB50-0AA0

Overview



- For data exchange between PROFINET and CAN Bus 2.0A/B or CANopen Manager or Slave (according to CiA 301 & 302)
- CANopen features:
 - Node / lifeguarding
 - Heartbeat
 - SYNC (producer / consumer)
- Integrated in TIA via HSP, TIA Portal V14 or higher
- PROFINET switch and 9-pin sub D plug integrated for CAN
- Up to 126 CAN nodes
- 512 receiver/transmitter PDOs
- Electrical isolation between the two networks
- Diagnostic interrupts
- Controllers supported: S7-1200, S7-1500, ET 200SP, Open Controller

Technical specifications

Article number	6BK1620-0AA00-0AA0 SIMATIC PN/CAN LINK
General information	
Product type designation	SIMATIC PN/CAN LINK
Firmware version	
• FW update possible	Yes
Vendor identification (VendorID)	ID 09 00 00 53h acc. to CiA
Engineering with	
• STEP 7 TIA Portal configurable/ integrated as of version	STEP 7 V14 or higher
Installation type/mounting	
Mounting	DIN rail, wall mounting, portrait mounting
Mounting position	Any
Recommended mounting position	Horizontal
Supply voltage	
Type of supply voltage	24 V DC
Rated value (DC)	24 V
permissible range, lower limit (DC)	20.4 V
permissible range, upper limit (DC)	28.8 V
Reverse polarity protection	Yes
Overvoltage protection	Yes
Short-circuit protection	Yes
Mains buffering	
• Mains/voltage failure stored energy time	10 ms
Input current	
Current consumption (rated value)	0.09 A
Current consumption, max.	0.11 A
Power loss	
Power loss, typ.	2.2 W

Article number	6BK1620-0AA00-0AA0 SIMATIC PN/CAN LINK
Interfaces	
Interfaces/bus type	2x Ethernet (RJ45), 1x Sub-D (9-pin)
PROFINET IO	
• automatic detection of transmission rate	No
• Transmission rate, max.	100 Mbit/s
• Number of RJ45 ports	2
• Number of FC (FastConnect) connections	2
PROFINET functions	
• Assignment of the IP address, supported	Yes
• Assignment of the device name, supported	Yes
Protocols	
• CAN operating modes	CAN Standard CAN 2.0A/B; CANopen Manager / Slave acc. to CiA
• Specification acc. to CiA	CiA 301 & CiA 302
• Transmission rate, min.	50 kbit/s
• Transmission rate, max.	1 000 kbit/s
• Number of slaves, max.	126
• Number of SDOs in parallel	16; Parallel
• Number of PDOs	512; Send / receive
Type	
- Node/life-guarding	Yes
- Heartbeat	Yes
- SYNC	Yes

I/O systems

Network transitions

PN/CAN LINK

Technical specifications (continued)

Article number	6BK1620-0AA00-0AA0 SIMATIC PN/CAN LINK
1. Interface	
Interface type	CAN according to CiA 303-1
Physics	9-pin sub D socket
Isolated	Yes; 500 V AC or 707 V DC
Interface types	
• Number of ports	1
2. Interface	
Interface type	PROFINET
Physics	Ethernet, 2-port switch, 2*RJ45
Isolated	Yes; 1 500 V AC or 2 250 V DC
Interface types	
• Number of ports	2
• integrated switch	Yes
Functionality	
• PROFINET IO Device	Yes
Interrupts/diagnostics/ status information	
Status indicator	Yes
Alarms	Yes
Diagnostic functions	Yes
Diagnostics indication LED	
• RUN LED	Yes
• ERROR LED	Yes
• MAINT LED	Yes
• LINK LED	Yes
• RX/TX LED	Yes
Potential separation	
Potential separation exists	Yes
Degree and class of protection	
Degree of protection acc. to EN 60529	IP20

Article number	6BK1620-0AA00-0AA0 SIMATIC PN/CAN LINK
Standards, approvals, certificates	
CE mark	Yes
PNO certificate	Yes
RoHS conformity	Yes
Ambient conditions	
Ambient temperature during operation	
• horizontal installation, min.	-25 °C
• horizontal installation, max.	60 °C
• vertical installation, min.	-25 °C
• vertical installation, max.	55 °C
Ambient temperature during storage/transportation	
• min.	-40 °C
• max.	85 °C
Relative humidity	
• Operation, max.	95 %
Dimensions	
Width	70 mm
Height	112 mm
Depth	75 mm
Weights	
Weight, approx.	212 g

Ordering data

Article No.

SIMATIC PN/CAN LINK
PROFINET network transition
according to CAN Bus 2.0A/B,
CANopen Manager according to
CiA301/302, CANopen Slave
according to CiA301/302; IP20

6BK1620-0AA00-0AA0

Overview


- For interconnecting two PROFIBUS DP networks
- The interchange of data between both DP networks takes place by internal copying in the coupler

Technical specifications

DP/DP transceiver	
PROFIBUS transmission rate	max. 12 Mbit/s
Interfaces	
• PROFIBUS DP	9-pin Sub-D connector
Supply voltage	24 V DC
Current consumption typ.	150 mA
Mounting	Upright (DIP switches above)
Perm. environmental conditions	
• Operating temperature	
- horizontal mounting	0 °C ... +60 °C
- all other mounting positions	0 °C ... +40 °C
• Transport/storage temperature	-40 °C ... +70 °C
• Relative humidity	10-95 % at +25 °C
Design	
• Dimensions (W x H x D) in mm	40 x 127 x 117
• Weight	approx. 250 g
Degree of protection	IP20

Ordering data
Article No.
DP/DP coupler
6ES7158-0AD01-0XA0
Note:

The manual is available free on the Internet.

I/O systems

Network transitions

IE/AS-i Link PN IO

Overview



IE/AS-i Link PN IO: Single master (left) and double master (right)

The IE/AS-i Link PN IO is a compact router between PROFINET and AS-Interface, with the following features:

- Single and double AS-Interface master (according to AS-Interface Specification V3.0) for connection of 62 AS-Interface slaves or 124 AS-Interface slaves (with a double master)
- Integrated analog value transmission
- Integrated ground-fault monitoring for the AS-Interface cable
- User-friendly local diagnostics and start-up by means of a full graphic display and control keys or through a web interface with a standard browser on the PC screen
- Vertical integration (standard web interface) through Industrial Ethernet
- Supply via AS-Interface cable or with 24 V DC
- Suitable for AS-i Power24V and AS-Interface with 30 V voltage
- Module exchange without entering the connection parameters (IP address, etc.) using C-PLUG (optional)
- Costs saved by the double AS-Interface master when large volumes of project data are involved

Note

As an alternative to the IE/AS-i Link PN IO, a powerful network transition can be set up between PROFINET and AS-Interface by combining the CM AS-i Master ST and F-CM AS-i Safety ST modules in one ET 200SP station (for safety-related applications), see pages 9/89 and 9/130.

The IE/AS-i Link PN IO occupies the following address area:

- As a single master with full expansion: 62 bytes of input data and 62 bytes of output data in which the I/O data of the connected AS-Interface slaves (standard and A/B slaves) of an AS-i line is stored
- Double the number of bytes as double master
- Optional additional I/O bytes for data from analog slaves

The size of the input/output image can be compressed so that only the actually required I/O address area is occupied in the system of the IO controller.

The IE/AS-i Link PN IO is configured as follows:

- With STEP 7 (classic) V5.4 or higher: When configuring in STEP 7, the AS-Interface configuration can be uploaded in STEP 7 V5.4 SP2 and higher. Furthermore, AS-Interface slaves from Siemens can also be conveniently configured in HW Config (slave selection dialog).
- Alternatively, IE/AS-i Link PN IO can be integrated in the engineering tool by means of the PROFINET GSD file (e.g. for TIA Portal, for STEP 7 versions V5.4 SP2 and lower, or for non-Siemens engineering tools). Please observe the configuration notes in the TIA Portal, see <https://support.industry.siemens.com/cs/ww/en/view/109483764>.

Notes on safety

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 only represent one component of such a concept.

For more information on the topic of Industrial Security, see <http://www.siemens.com/industrialsecurity>.

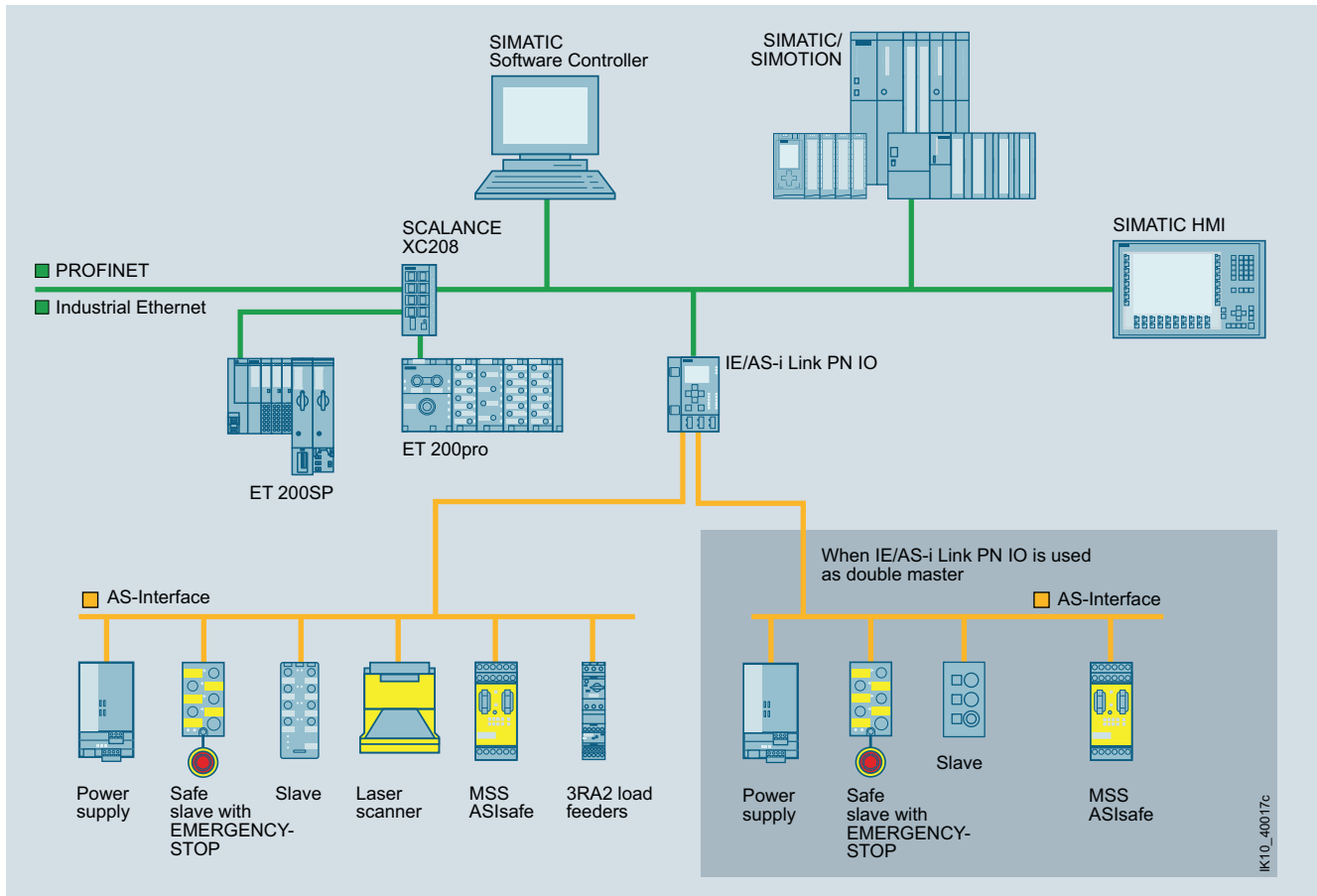
Single master

The AS-i single master version of IE/AS-i Link PN IO is suitable for applications with typical volumes of data. The single master can operate up to 248 DI / 248 DO, using 62 A/B slaves with 4 DI / 4 DO each.

Double master

The AS-i double master version of IE/AS-i Link PN IO is suitable for applications with large volumes of data. In this case, twice the volume of project data can be used on two AS-i lines running independently of each other. The double master can operate up to 496 DI / 496 DO, using two AS-i networks each with 62 A/B slaves with 4 DI / 4 DO each.

Overview (continued)



Integration of AS-Interface on PROFINET through IE/AS-i Link PN IO as single/double master

Ordering data

Article No.

IE/AS-i Link PN IO

Router between PROFINET/Industrial Ethernet and AS-Interface in IP20 degree of protection; including COMBICON plug-in screw terminals for connecting an AS-Interface cable (two AS-Interface cables for a double master) and the optional 24 V supply; complies with AS-Interface Specification V3.0; dimensions (W x H x D / mm): 90 x 132 x 88.5

COMBICON connection

- Single master with display
- Double master with display

6GK1411-2AB10
6GK1411-2AB20

Article No.

Accessories

C-PLUG

Exchange medium for the simple exchange of devices in the event of a fault; for accommodating configuration and application data; can be used in SIMATIC NET products with a C-PLUG slot

6GK1900-0AB00

IE FC RJ45 Plug 90

RJ45 plug-in connector for Industrial Ethernet, with robust metal enclosure and integrated insulation displacement contacts for connection of Industrial Ethernet FC installation cables; with 90° cable feeder

- 1 pack = 1 unit
- 1 pack = 10 units
- 1 pack = 50 units

6GK1901-1BB20-2AA0
6GK1901-1BB20-2AB0
6GK1901-1BB20-2AE0

More information

For manuals, see <https://support.industry.siemens.com/cs/ww/en/ps/15762/man>.

AS-Interface function block library for SIMATIC PCS 7 for easy connection of AS-Interface to PCS 7, see Catalog IC 10, Chapter 14, "Parameterization, Configuration and Visualization with SIRIUS".

