

# ET 200 distributed I/Os

# 5



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Safety Integrated SM 326 F digital output - Safety Integrated SM 336 F analog input - Safety Integrated SIPLUS SM 326 F digital input module - Safety Integrated SIPLUS SM 326 F digital output module - Safety Integrated Isolating module SIPLUS S7-300 isolating modulee</p> <p><b>Digital Modules</b> SM 321 digital input SM 322 digital output SM 323/SM 327 digital input/output SIPLUS SM 321 digital input module SIPLUS SM 322 digital output module SIPLUS SM 323 digital input/output module</p> <p><b>Analog Modules</b> SM 331 analog input SM 332 analog output SM 334 analog input/output SIPLUS SM 331 analog input module SIPLUS SM 332 analog output module SIPLUS SM 334 analog input/output module</p> <p><b>Analog Modules with HART</b> Analog input module with HART Analog output module with HART Ex analog input module with HART Ex analog output module with HART</p> <p><b>Ex Digital Modules</b> Ex digital input modules Ex digital output modules</p> <p><b>Ex Analog Modules</b> Ex analog input modules Ex analog output modules</p> <p><b>IQ Sense Modules and Sensors</b> IQ-Sense sensor module SIMATIC PXO opto proximity switches with IQ-Sense SIMATIC PXS sonar proximity switches with IQ-Sense</p> <p><b>Special Modules</b> SM 374 simulator module DM 370 dummy module</p> <p><b>Power Supplies</b> 2 A, 5 A, 10 A load power supplies</p> <p><b>ET 200eco</b></p> <p><b>ET 200R</b></p>
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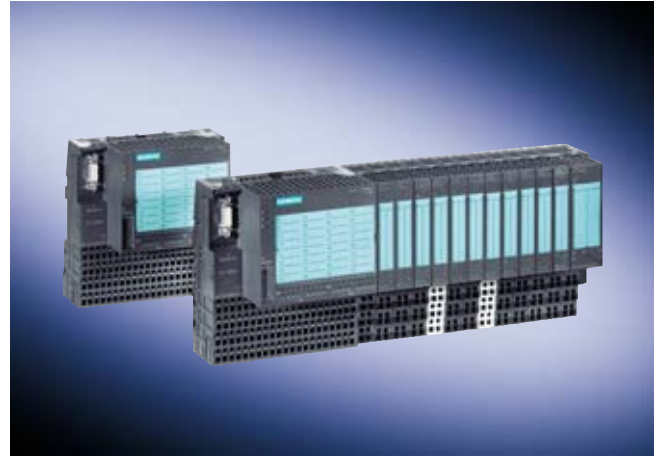


# ET 200 distributed I/Os

## ET 200S

### Introduction

#### Overview



#### SIMATIC ET 200S

- Distributed I/O system to degree of protection IP20 with minimal wiring outlay, also for extremely time-critical tasks such as high-speed closed-loop controls
- Can be used with integrated S7-CPU as mini PLC:
  - also available as fail-safe PROFIsafe version
  - with optional lower-level PROFIBUS DP
- Bit-modular design for exact adaptation to the automation task in hand.
- Interface modules available with PROFIBUS DP or PROFINET interfaces
- Can be built up from digital and analog input or output modules, technology modules, motor starters and frequency converters (new) for controlling drives up to 7.5 or 4 kW
- Modules can be replaced during operation (hot swapping)
- Channel-specific diagnostics for high availability
- Can be supplied with integrated fiber optic interface if required
- Transmission rates up to 12 Mbit/s
- FastConnect with no-strip fast connection technique
- Ex approval to Cat. 3 for Zone 2 acc. to ATEX100 a
- Slot reservation with spare modules
- Interface module with PROFINET interface
- Fail-safe DI modules with safety-related signal processing according to PROFIsafe

#### SIMATIC ET 200S COMPACT

- Block I/O to degree of protection IP20 with 32 channels, comprising terminal block and electronic block
- Discretely modular expansion to maximum of 128 channels or 12 modules
- The complete ET 200S module spectrum can be used (with the exception of PROFIsafe modules)
- The basis of the block I/O is the interface module ET 200S BASIC
- Separation of terminal connections and electronics with permanent wiring
- Screw-type and spring-loaded terminal connections
- Standard terminal block with 2-wire connection system; 3-wire and 4-wire systems available using additional terminals
- Mounting on standard rail
- Hot swapping of expansion modules
- Communication via PROFIBUS
- Up to 100 byte inputs and outputs (address space)

The design of the ET 200S allows it to be used in areas subject to increased mechanical stress.

### General technical specifications

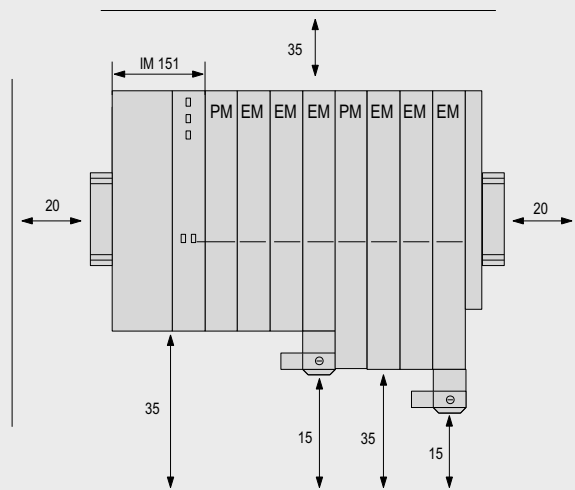
Degree of protection	IP20
Ambient temperature	0 ... 60 °C
Vibration resistance	2 g continuously, 5 g temporarily (motor starter max. 2 g)
Maximum config. (none of the limits listed below must be exceeded)	
<ul style="list-style-type: none"> <li>Number of modules per IM 151, max.</li> </ul>	IM 151-1 BASIC: Up to 12 modules IM 151-1 COMPACT: Up to 12 modules IM 151-1 STANDARD: Up to 63 modules IM 151-1 HIGH-FEATURE: Up to 63 modules IM 151-7 CPU: Up to 63 modules IM 151-3 PN: Up to 63 modules
<ul style="list-style-type: none"> <li>Line width, max.</li> </ul>	IM 151-1 BASIC: Up to 2 m IM 151-1 COMPACT: Up to 2 m IM 151-1 STANDARD: Up to 2 m IM 151-1 HIGH-FEATURE: Up to 2 m IM 151-7 CPU: up to 1 m IM 151-3 PN: Up to 2 m
<ul style="list-style-type: none"> <li>Parameter length</li> </ul>	Depending on the number and type of connected modules IM 151-1 BASIC: 198 byte IM 151-1 COMPACT: 218 byte IM 151-1 STANDARD: Up to 244 byte IM 151-1 HIGH FEATURE: Up to 244 byte IM 151-7 CPU: not relevant IM 151-3 PN: Not relevant
<ul style="list-style-type: none"> <li>Useful data length</li> </ul>	Depending on the number and type of connected modules IM 151-1 BASIC: Up to 88 byte for inputs and outputs IM 151-1 COMPACT: Up to 100 byte for inputs and outputs IM 151-1 STANDARD: Up to 244 byte for inputs and outputs IM 151-1 HIGH FEATURE: Up to 244 byte for inputs and outputs IM 151-7 CPU: not relevant IM 151-3 PN: Not relevant

Requirements of the DP master system	
<ul style="list-style-type: none"> <li>PROFIBUS DP master</li> <li>Parameter length</li> </ul>	In accordance with EN 50170 >32 byte, depending on the number and type of connected modules
<ul style="list-style-type: none"> <li>Useful data length</li> </ul>	Depending on the number and type of connected modules
<ul style="list-style-type: none"> <li>Diagnostics length</li> </ul>	6 to max. 128 byte (adjustable)
<b>Standards and approvals</b>	
<ul style="list-style-type: none"> <li>PROFIBUS</li> <li>IEC 1131</li> <li>UL</li> <li>C-Tick</li> <li>CSA</li> <li>cULus for hazardous locations</li> <li>FM</li> <li>Shipbuilding</li> <li>Ex approval Cat. 3 (for Zone 2 acc. to ATEX-100a)</li> </ul>	EN 50170, Volume 2 IEC 1131, Part 2 acc. to UL508 standard, File No. E 116536/E 75310 (AC modules) AS/NZS 2064 (Class A) Acc. to standard C22.2 No. 142, File No. LR 48323/LR 44226 (AC modules) acc. to UL 508 standard, File No. E 116536 acc. to hazardous locations UL 1604, File no. E 222109 acc. to CSA C22.2 standard, No. 142 Standard Class No. 3611, Class I, Division 2, Group A, B, C, D, Class I, Zone 2, Group IIC (without motor starter and frequency converter) American Bureau of Shipping Bureau Veritas Det Norske Veritas German Lloyd Lloyds Register of Shipping Nippon Kaiji Kyokai (without motor starters and frequency converters) EN 50021

Within the context of converting SIMATIC from UL / CSA to cULus, the ET 200S modules will also be converted

### Dimension drawings

Dimensions in mm



G\_IK10\_XX\_50071

# ET 200 distributed I/Os

## ET 200S

### IM 151-1 interface modules

#### Overview



- Interface module for linking the ET 200S to PROFIBUS DP
- Handles all data exchange with the PROFIBUS DP master
- 6 versions:
  - IM 151-1 BASIC (RS485)
  - IM 151-1 COMPACT 32DI DC24V (RS485)
  - IM 151-1 COMPACT 16DI DC24V / 16DO DC24V/0.5A (RS485)
  - IM 151-1 STANDARD (RS485)
  - IM 151-1 STANDARD (FO)
  - IM 151-1 HIGH FEATURE (RS485)

#### The main differences between the IM 151-1 versions:

	<b>IM 151-1 BASIC</b>	<b>IM 151-1 COMPACT</b>	<b>IM 151-1 STANDARD</b>	<b>IM 151-1 FO STANDARD</b>	<b>IM 151-1 HIGH FEATURE</b>
Order number 6ES7 151-	1CA00-0AB0	1CA00-1BL00 1CA00-3BL00	1AA04-0AB0	1AB02-0AB0	1BA01-0AB0
Integral I/O	-	32 DI 16DI / 16 DO	-	-	-
Maximal number of I/O modules	12	12	63	63	63
Maximum station width	2m	2m	2m	1m	2m
Maximal number of parameters	198 byte	218 byte	244 byte	244 byte	244 byte
Maximum address space for inputs and outputs	88 byte each	100 byte each	244 byte	128 byte	Depending on the DP master: 244 byte or not relevant
Maximum diagnostics length	6 ... 43 byte	6 ... 44 byte	6 ... 122 byte	6 ... 64 byte	6 ... 128 byte
Protocol	DP V0	DP V0	DP V0 and DP V1	DP V0	DP V0 and DP V1
DP connection type	RS485	RS485	RS485	Fiber-optic cable	RS485
Firmware update	No	No	Yes	No	Yes
Option handling	No	No	Yes	Yes	Yes
Isochronous mode	No	No	No	No	Yes
Maximum address volume per module	8 byte	8 byte	32 byte	8 byte	32 byte
Identification data	No	No	Yes	No	Yes
Use of fail-safe modules (PROFIsafe)	No	No	No	No	Yes
I-slave-to-slave communication	No	No	No	No	Yes

#### Technical specifications

	6ES7 151-1AA04-0AB0	6ES7 151-1AB02-0AB0	6ES7 151-1BA01-0AB0	6ES7 151-1CA00-0AB0
<b>Supply voltages</b>				
Supply voltage of electronics 1L+				
• Rated value (DC)	24 V	24 V	24 V	24 V
• reverse polarity protection	Yes	Yes	Yes	Yes
<b>Voltages and currents</b>				
Mains/voltage failure jumpering, min.	20 ms	20 ms	20 ms	
<b>Current consumption</b>				
from supply voltage 1L+, max.	200 mA	200 mA		70 mA
Power loss, typ.	3.3 W	3.3 W		1.5 W
Current output to backplane bus (DC 5 V), max.		700 mA		
<b>Address area</b>				
Addressing volume				
• Outputs	244 Byte	128 Byte	244 Byte	88 Byte
• Inputs	244 Byte	128 Byte	244 Byte	88 Byte
<b>interfaces</b>				
PROFIBUS DP, Output current, max.	80 mA			80 mA
interface physics, RS 485	Yes		Yes	Yes
interface physics, LWL		Yes; 4 x simplex jack	No	
<b>Connection point</b>				
RJ45			No	
<b>Protocols</b>				
PROFIBUS DP protocol	Yes	Yes	Yes	Yes
TCP/IP protocol			No	
PROFINET IO			No	
<b>PROFIBUS DP</b>				
Transmission speed, max.	12 Mbit/s; 9.6 / 19.2 / 45.45 / 93.75 / 187.5 / 500 kbauds; 1.5 / 3 / 6 / 12 Mbps	12 Mbit/s; 9.6 / 19.2 / 45.45 / 93.75 / 187.5 / 500 kbauds; 1.5 / 12 Mbps	12 Mbit/s	12 Mbit/s; 9.6 / 19.2 / 45.45 / 93.75 / 187.5 / 500 kbauds; 1.5 / 3 / 6 / 12 Mbps
Cable length, max.	1,200 m	2 m		
SYNC capability	Yes	Yes	Yes	Yes
FREECE capability	Yes	Yes	Yes	Yes
direct data exchange (cross traffic)	Yes	Yes	Yes	Yes
<b>Isochronous mode</b>				
Isochronous mode	No	No	Yes	No
<b>Status information/alarms/diagnostics</b>				
Alarms				
• Alarms	Yes	No	Yes	No
Diagnoses				
• Diagnostic functions	Yes	Yes	Yes	Yes
Diagnostics indication LED				
• Bus error BF (red)	Yes	Yes	Yes	Yes
• Collective error SF (red)	Yes	Yes	Yes	Yes
• Monitoring 24 V voltage supply ON (green)	Yes	Yes	Yes	Yes
<b>Isolation</b>				
Isolation checked with	500 V DC	57 V DC / 60 V AC	500 V DC	500 V DC
<b>Isolation</b>				
between backplane bus and electronics	No	No	No	No
between electronic block and PROFIBUS DP	Yes		Yes	Yes
between supply voltage and electronics	No	No	No	No

# ET 200 distributed I/Os

## ET 200S

### IM 151-1 interface modules

#### Technical specifications (continued)

	6ES7 151-1AA04-0AB0	6ES7 151-1AB02-0AB0	6ES7 151-1BA01-0AB0	6ES7 151-1CA00-0AB0
<b>Permissible potential difference</b>				
between different circuits	500 V DC	500 V DC	75V DC, 60V AC	500 V DC
<b>General information</b>				
Vendor identification (VendorID)	806Ah	806Bh		80F3h
<b>Dimensions and weight</b>				
Width	45 mm	45 mm	45 mm	45 mm
Height	119.5 mm	119.5 mm	119.5 mm	119.5 mm
Depth	75 mm	75 mm	75 mm	75 mm
<b>Weights</b>				
Weight, approx.	150 g	150 g	150 g	150 g

	6ES7 151-1CA00-1BL0	6ES7 151-1CA00-3BL0
<b>Supply voltages</b>		
Supply voltage of electronics 1L+		
• Rated value (DC)	24 V	24 V
• reverse polarity protection	Yes	Yes
<b>Current consumption</b>		
from supply voltage 1L+, max.		100 mA
<b>Address area</b>		
Addressing volume		
• Outputs	100 Byte	100 Byte
• Inputs	100 Byte	100 Byte
<b>Interfaces</b>		
PROFIBUS DP, Output current, max.		80 mA
interface physics, RS 485	Yes	Yes
interface physics, LWL	No	No
<b>Protocols</b>		
PROFIBUS DP protocol	Yes	Yes
TCP/IP protocol		No
PROFINET IO		No
<b>PROFIBUS DP</b>		
Cable length, max.	1,200 m	1,200 m
direct data exchange (cross traffic)	Yes	Yes
<b>PROFINET IO</b>		
Transmission speed, max.		12 Mbit/s
<b>Isochronous mode</b>		
Isochronous mode	No	No
<b>Digital inputs</b>		
Number of digital inputs	32	16
Cable length		
• Cable length unshielded, max.	1,000 m	1,000 m
Input voltage		
• Rated value, DC	24 V	24 V
Input current		
• for signal "1", typ.	4 mA	3 mA
Input delay (for rated value of input voltage)		
• for standard inputs		
- at "0" to "1", min.	3 ms	3 ms
- at "0" to "1", max.	3 ms	3 ms

	6ES7 151-1CA00-1BL0	6ES7 151-1CA00-3BL0
<b>Digital outputs</b>		
Number of digital outputs		16
Cable length unshielded, max.		1,000 m
Short-circuit protection of the output		Yes
Lamp load, max.		5 W
Controlling a digital input		Yes
Output current		
• for signal "1" permissible range for 0 to 60 °C, min.		0.6 A
• for signal "0" residual current, max.		7 mA
Output delay at resistive load		
• "0" to "1", max.		0.5 ms
• "1" to "0", max.		1.3 ms
Switching frequency		
• with resistive load, max.		100 Hz
• with inductive load, max.		2 Hz
• on lamp load, max.		10 Hz
Aggregate current of the outputs (per group)		
• up to 60 °C, max.		2 A
<b>Encoder</b>		
Connectable encoders		
• 2-wire BEROs		Yes
• permissible quiescent current (2-wire BEROs), max.		1.5 mA
<b>Status information/ alarms/ diagnostics</b>		
Alarms		
• Alarms	No	No
Diagnoses		
• Diagnostic functions	Yes	Yes
Diagnostic indication LED		
• Run mode RUN (green)		Yes
• Collective error SF (red)	Yes	Yes
• Status indicator digital output (green)		Yes
• Status indicator digital input (green)		Yes
• Monitoring 24 V voltage supply ON (green)	Yes	Yes
• Connection to network LINK (green)		No
• Transmit/receive RX/TX (yellow)		No

#### Technical specifications (continued)

	6ES7 151-1CA00-1BL0	6ES7 151-1CA00-3BL0
<b>Isolation</b>		
between backplane bus and electronics		No
between supply voltage and electronics		No
Isolation, digital outputs		
• Galvanic isolation, digital outputs		Yes
Galvanic isolation, digital inputs		
• Galvanic isolation, digital inputs		No

	6ES7 151-1CA00-1BL0	6ES7 151-1CA00-3BL0
<b>Environmental requirements</b>		
Degree and class of protection		
• IP 20	Yes	Yes
<b>Dimensions and weight</b>		
Width	120 mm	120 mm
Height	81 mm	81 mm
Depth	758 mm	58 mm
<b>Weights</b>		
Weight, approx.		230 g

#### Ordering data

	Order No.
<b>IM 151-1 BASIC interface module</b>	<b>6ES7151-1CA00-0AB0</b>
for ET 200S; data transmission rates up to 12 Mbit/s; max. 12 power-, electronic and motor start modules can be connected, bus connection via 9-pin D-sub incl. termination module	
<b>IM 151-1 COMPACT 32 DI 24 V DC interface module</b>	<b>6ES7151-1CA00-1BL0</b>
for ET 200S; data transmission rates up to 12 Mbit/s; max. 32 digital inputs, can be expanded by max. 12 power-, electronic and motor start modules, bus connection via 9-pin D-sub incl. termination module	
<b>IM 151-1 COMPACT 16 DI 24 V DC / 16 DO 24 V/0.5 A interface module</b>	<b>6ES7151-1CA00-3BL0</b>
for ET 200S; data transmission rates up to 12 Mbit/s; max. 16 digital inputs and 16 digital outputs, can be expanded by max. 12 power-, electronic and motor start modules, bus connection via 9-pin D-sub incl. termination module	

	Order No.
<b>IM 151-1 STANDARD interface module</b>	<b>6ES7151-1AA04-0AB0</b>
for ET 200S; data transmission rates up to 12 Mbit/s; Data volumes 244 byte each for inputs and outputs, max. 63 power-, electronic and motor start modules can be connected; bus connection via 9-pin D-sub incl. termination module	
<b>IM 151-1 FO STANDARD interface module</b>	<b>6ES7151-1AB02-0AB0</b>
for ET 200S; data transmission rates up to 12 Mbit/s; Data volumes 128 byte each for inputs and outputs, max. 63 power-, electronic and motor start modules can be connected; bus connection via integrated fiber-optic cable incl. terminating module	
<b>IM 151-1 HIGH FEATURE interface module</b>	<b>6ES7151-1BA01-0AB0</b>
for ET 200S; data transmission rate up to 12 Mbit/s; data volumes 244 byte each for I/O, up to 63 modules can be connected; connection of PROFI-safe modules, isochronous mode (clock synchronization); bus connection via 9-pin Sub-D incl. terminating module	

# ET 200 distributed I/Os

## ET 200S

### IM 151-1 interface modules

#### Ordering data

#### Order No.

##### Accessories

##### TM-C120S terminal module

Terminal module for ET 200S COMPACT, screw-type terminals

6ES7 193-4DL10-0AA0

##### TM-C120C terminal module

Terminal module for ET 200S COMPACT, spring-loaded terminals

6ES7 193-4DL00-0AA0

##### TE-U120S4x10 terminal module

Add-on terminal for TM-C120x terminal modules of ET 200S COMPACT; screw-type terminals for 3-wire connection; please order two for 4-wire connection

6ES7 193-4FL10-0AA0

Can also be attached to TM-E/TM-P, if the same construction height of the terminal module exists for at least 120 mm construction width

##### TE-U120C4x10 terminal module

Add-on terminal for TM-C120x terminal modules of ET 200S COMPACT; spring-loaded terminals for 3-wire connection; please order two for 4-wire connection

6ES7 193-4FL00-0AA0

Can also be attached to TM-E/TM-P, provided at least 120 mm of the construction width attains the same overall height as the terminal module

##### ET 200S distributed I/O system manuals

are available on the Internet as a PDF file:

<http://www.siemens.com/simatic-docu>

##### SIMATIC 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 Software, SIMATIC DP (Distributed I/O), SIMATIC HMI (Human Machine Interface), SIMATIC NET (Industrial Communication)

6ES7 998-8XC01-8YE0

#### Order No.

##### Accessories (continued)

##### SIMATIC Manual Collection – Update service for 1 year

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

6ES7 998-8XC01-8YE2

##### 100 Simplex connectors

For plastic fiber-optic cable incl. 5 polishing sets

6GK1 901-0FB00-0AA0

##### 50 plug adapters

For 2 Simplex connectors each

6ES7 195-1BE00-0XA0

##### Label sheets DIN A4 (10 pieces)

Each sheet contains 60 label strips for peripheral modules and 20 label strips for interface modules

- petrol
- red
- yellow
- light beige

6ES7 193-4BH00-0AA0

6ES7 193-4BD00-0AA0

6ES7 193-4BB00-0AA0

6ES7 193-4BA00-0AA0

##### Label sheets DIN A4 (10 pieces)

Can be used for ET 200S COMPACT. Each sheet has 10 label strips

- beige
- yellow
- red
- petrol

6ES7 193-4BA10-0AA0

6ES7 193-4BB10-0AA0

6ES7 193-4BD10-0AA0

6ES7 193-4BH10-0AA0

##### Terminating module

as spare part for ET 200S

6ES7 193-4JA00-0AA0

##### SIMATIC S5, 35 mm DIN rail, length 483 mm for 19" cabinets

6ES5 710-8MA11

##### SIMATIC S5, 35 mm DIN rail, length 530 mm for 600 mm cabinets

6ES5 710-8MA21

##### SIMATIC S5, 35 mm DIN rail, length 830 mm for 900 mm cabinets

6ES5 710-8MA31

##### SIMATIC S5, 35 mm DIN rail, length 2 m

6ES5 710-8MA41

#### Overview



- Interface module for linking the ET 200S to PROFINET
- Handles all data exchange with the PROFIBUS I/O Controller
- 2 versions:
  - IM 151-3 PN STANDARD
  - IM 151-3 PN HIGH FEATURE (available soon); supports, in contrast to the STANDARD version, the operation of PROFI-safe F modules
- with integrated 2-port switch for line topology



Note:  
Micro Memory Card required for operation of CPU.

#### Technical specifications

	6ES7 151-3AA20-0AB0	6ES7 151-3BA20-0AB0
<b>Supply voltages</b>		
Supply voltage of electronics 1L+		
• Rated value (DC)	24 V	24 V
• reverse polarity protection	Yes	Yes
<b>Voltages and currents</b>		
Mains/voltage failure jumpering, min.	20 ms	20 ms
<b>Current consumption</b>		
from supply voltage 1L+, max.	250 mA	250 mA
Power loss, typ.	2.5 W	2.5 W
<b>Address area</b>		
Addressing volume		
• Outputs	256 Byte	256 Byte
• Inputs	256 Byte	256 Byte
<b>Connection point</b>		
RJ45	Yes	Yes
<b>Protocols</b>		
PROFINET IO	Yes	Yes
<b>PROFINET IO</b>		
Transmission speed, max.	100 Mbit/s	100 Mbit/s
automatic detection of transmission speed	Yes	Yes
<b>Isochronous mode</b>		
Isochronous mode	No	No
<b>Status information/alarms/diagnostics</b>		
Alarms		
• Alarms	Yes	Yes
Diagnoses		
• Diagnostic functions	Yes	Yes
Diagnostics indication LED		
• Bus error BF (red)	Yes	Yes
• Collective error SF (red)	Yes	Yes
• Monitoring 24 V voltage supply ON (green)	Yes	Yes
• Connection to network LINK (green)	Yes	Yes
• Transmit/receive RX/TX (yellow)	Yes	Yes
<b>Isolation</b>		
between backplane bus and electronics	No	No
between Ethernet and electronics	Yes	Yes
between supply voltage and electronics	No	No
<b>General information</b>		
Vendor identification (VendorID)	002AH	002AH
Device identifier (DeviceID)	0301	0301H
<b>Dimensions and weight</b>		
Width	60 mm	60 mm
Height	119.5 mm	119.5 mm
Depth	75 mm	75 mm
<b>Weights</b>		
Weight, approx.	120 g	135 g

# ET 200 distributed I/Os

## ET 200S

### IM 151-3PN interface modules

#### Ordering data

##### IM 151-3 PN interface module

For ET 200S; data transmission rates up to 100 Mbit/s; data volume depends on the number of modules inserted, up to 63 modules can be connected, bus connection through RJ45

- Standard
- High Feature

**6ES7 151-3AA20-0AB0**

**6ES7 151-3BA20-0AB0**

#### Accessories

##### Industrial Ethernet FC RJ45 Plug 90

RJ45 plug connector for Industrial Ethernet with a rugged metal housing and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; with 90° cable outlet

- 1 piece
- 10 pieces
- 50 pieces

**6GK1 901-1BB20-2AA0**

**6GK1 901-1BB20-2AB0**

**6GK1 901-1BB20-2AE0**

##### Industrial Ethernet Fast Connect installation cables

- IE FC TP Standard Cable GP 2 x 2 sold by the meter, max. quantity 1000 m minimum order 20 m
- IE FC TP Trailing Cable 2 x 2 sold by the meter, max. quantity 1000 m minimum order 20 m
- IE FC TP Trailing Cable GP 2 x 2 sold by the meter; max. quantity 1000 m, minimum order 20 m
- IE TP Torsion Cable GP 2 x 2 sold by the meter; max. quantity 1000 m, minimum order 20 m
- IE FC TP Marine Cable 2 x 2 sold by the meter, max. quantity 1000 m minimum order 20 m

**6XV1 840-2AH10**

**6XV1 840-3AH10**

**6XV1 870-2D**

**6XV1 870-2F**

**6XV1 840-4AH10**

##### Industrial Ethernet Fast Connect stripping tool

**6GK1 901-1GA00**

##### MMC 64 KB <sup>1)</sup>

For storing the device name

**6ES7 953-8LF11-0AA0**

##### MMC 128 KB <sup>1)</sup>

For storing the device name

**6ES7 953-8LG11-0AA0**

##### MMC 512 KB <sup>1)</sup>

For storing the device name

**6ES7 953-8LJ11-0AA0**

##### MMC 2 MB <sup>1)</sup>

For storing the device name and/or firmware update

**6ES7 953-8LL11-0AA0**

##### MMC 4 MB <sup>1)</sup>

For storing the device name and/or firmware update

**6ES7 953-8LM11-0AA0**

##### MMC 8 MB <sup>1)</sup>

For storing the device name and/or firmware update

**6ES7 953-8LP11-0AA0**

1) For operating the IM 151-3, an MMC is essential

#### Order No.

#### Accessories (continued)

##### ET 200S distributed I/O system manuals

are available on the Internet as a PDF file:

<http://www.siemens.com/simatic-docu>

##### SIMATIC 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 Software, SIMATIC DP (Distributed I/O), SIMATIC HMI (Human Machine Interface), SIMATIC NET (Industrial Communication)

**6ES7 998-8XC01-8YE0**

##### SIMATIC Manual Collection – Update service for 1 year

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

**6ES7 998-8XC01-8YE2**

##### Label sheets DIN A4 (10 pieces)

Each sheet contains 60 label strips for peripheral modules and 20 label strips for interface modules

- petrol
- red
- yellow
- light beige

**6ES7 193-4BH00-0AA0**

**6ES7 193-4BD00-0AA0**

**6ES7 193-4BB00-0AA0**

**6ES7 193-4BA00-0AA0**

##### Terminating module

as spare part for ET 200S

**6ES7 193-4JA00-0AA0**

##### SIMATIC S5, 35 mm DIN rail, length 483 mm for 19" cabinets

**6ES5 710-8MA11**

##### SIMATIC S5, 35 mm DIN rail, length 530 mm for 600 mm cabinets

**6ES5 710-8MA21**

##### SIMATIC S5, 35 mm DIN rail, length 830 mm for 900 mm cabinets

**6ES5 710-8MA31**

##### SIMATIC S5, 35 mm DIN rail, length 2 m

**6ES5 710-8MA41**

### IM 151-7 CPU interface modules

#### Overview



- Interface module for SIMATIC ET 200S with integrated S7-CPU
- For high-performance control solutions in ET 200S
- Increases the availability of plants and machinery
- Programming via PROFIBUS DP
- Compact SIMATIC Micro Memory Card (MMC)
- Integrated 12 Mbit/s PROFIBUS DP slave/MPI interface in copper design
- Integrated CPU based on CPU S7-314
- IM 151-7 CPU FO available
- Fail-safe IM 151-7 F-CPU PROFIsafe available



Note:  
Micro Memory Card required for operation of CPU.

#### Technical specifications

	6ES7 151-7AB00-0AB0	6ES7 151-7AA13-0AB0
<b>Product status</b>		
associated programming package		STEP 7 V5.3 or higher + HW update
<b>Voltages and currents</b>		
Mains/voltage failure jumpering, min.		5 ms
Load voltage L+		
• Rated value (DC)		24 V
• Short-circuit protection		Yes
• reverse polarity protection		Yes
• permissible range, lower limit (DC)		20.4 V
• permissible range, upper limit (DC)		28.8 V
<b>Current consumption</b>		
Inrush current, max.	3.5 A	
from supply voltage 1L+, max.		250 mA; 280 mA with DP master module
Power loss, typ.		3.3 W
Current output to backplane bus (DC 5 V), max.		700 mA
<b>Memory</b>		
Memory		
• RAM		
- integrated	48 KByte; as of FW V1.13 48 KB, previously 24 KB	96 KByte; for program and data, less the display data No
- expandable		Yes
• Load memory		
- pluggable (MMC)		8 MByte
- pluggable (MMC), max.		
<b>CPU/blocks</b>		
Number of blocks (total)		1,024; (DBs, FCs, FBs) The maximum number of loadable blocks can be reduced by the MMC that you use.

	6ES7 151-7AB00-0AB0	6ES7 151-7AA13-0AB0
<b>DB</b>		
• Number, max.	127	511; from DB1 to DB511
• Size, max.		16 KByte
<b>FB</b>		
• Number, max.	128	1,024; In number band of FB0 to FB2047
• Size, max.		16 KByte
<b>FC</b>		
• Number, max.	128	1,024; In number band of FC0 to FC2047
• Size, max.		16 KByte
<b>OB</b>		
• Number, max.		see Instruction List
• Size, max.		16 KByte
<b>Nesting depth</b>		
• per priority class	8	8
• additional within an error OB		4
<b>CPU/processing times</b>		
for bit operations, min.	0.1 μs	0.1 μs
for word operations, min.	1 μs	0.2 μs
for fixed point arithmetic, min.	2 μs	2 μs
for floating point arithmetic, min.	20 μs	3 μs
<b>Times/counters and their remanence</b>		
<b>S7 counter</b>		
• Number	256	256
• Remanence		
- adjustable		Yes
- lower limit		0
- upper limit		255
- preset		From Z 0 to Z 7
• Counting range		
- adjustable	Yes	Yes
- lower limit	1	0
- upper limit	999	999

# ET 200 distributed I/Os

## ET 200S

### IM 151-7 CPU interface modules

#### Technical specifications (continued)

	6ES7 151-7AB00-0AB0	6ES7 151-7AA13-0AB0		6ES7 151-7AB00-0AB0	6ES7 151-7AA13-0AB0
IEC counter					
• Type		SFB		244 Byte	
• Number		Unlimited (limited only by RAM capacity)		244 Byte	
S7 times			<b>Hardware config.</b>		
• Number	256	256	Number of modules per system, max.	63	
• Remanence			Connectable programming devices/PCs	PG/OPs with STEP 7 connectable via PROFIBUS interface	
- adjustable		Yes			
- lower limit		0			
- upper limit		255			
- preset		no timers retentive			
• Time range			<b>Time</b>		
- lower limit	10 ms	10 ms	Clock		
- upper limit	9,990 s	9,990 s	• Hardware clock (real-time clock)		Yes
IEC timer			• Battery backed and synchronized		Yes
• Type		SFB	• Backup time		6 w; at 40 °C ambient temperature, typically
• Number		Unlimited (limited only by RAM capacity)	• Deviation per day, max.		10 s
<b>Data areas and their remanence</b>			Operating hours counter		
remanent data area in total (incl. times, counters, flags), max.	4 KByte	64 KByte	• Number		1
Flag			• Number/Number range		0
• Number, max.	256 Byte	256 Byte	• Range of values		0 to 2 <sup>31</sup> hours (when using SFC101)
• Remanence available		Yes	• Granularity		1 hour
• Remanence preset		MB 0 to MB 15	• remanent		Yes; must be restarted at each warm restart
• Number of clock memories		8; 1 memory byte			
Data blocks			Clock synchronization		
• Number, max.		511; DB 0 reserved	• supports		Yes
• Size, max.		16 KByte	• to MPI, Master		Yes
Local data			• to MPI, Slave		Yes
• per priority class, max.		510 Byte	• in AS, Master		No
<b>Address area</b>			• in AS, Slave		No
I/O address area			<b>S7 message functions</b>		
• Inputs		2,048 KByte	Number of login stations for message functions, max.		12; depending on the connections configured for PG/OP and ; S7 basic communication
• Outputs		2,048 KByte			
Process image			Process diagnostic messages		Yes; ALARM_S, ALARM_SC, ALARM_SQ
• Inputs		128 Byte; not adjustable	simultaneously active Alarm-S blocks, max.		40
• Outputs		128 Byte; not adjustable	<b>Test commissioning functions</b>		
Digital channels			Status/control		
• Inputs		16,336	• Status/control variable		Yes
• Outputs		16,336	• Variables		Inputs, outputs, memory bits, DB, times, counters
• Inputs, of which central		248			
• Outputs, of which central		248			
Analog channels					
• Inputs		1,021			
• Outputs		1,021			
• Inputs, of which central		124			
• Outputs, of which central		124			

Technical specifications (continued)

	6ES7 151-7AB00-0AB0	6ES7 151-7AA13-0AB0
<b>Monitoring functions</b>		
• Number of variables, max.		30
• of which status variable, max.		30
• of which control variable, max.		14
Forcing		
• Forcing		Yes
• Force, variables		Inputs, outputs
• Forcing, number of variables, max.		10
Status block		Yes
Single step		Yes
Number of breakpoints		2
Diagnostic buffer		
• present	Yes	Yes
• Number of entries, max.	100	100
• adjustable		No
<b>Communication functions</b>		
PG/OP communication		Yes
Global data communication		
• supported		Yes
• Number of GD packets, max.		4
• Number of GD packets, transmitter, max.		4
• Number of GD packets, receiver, max.		4
• Size of GD packets, max.		22 Byte
• Size of GD packet (of which consistent), max.		22 Byte
S7 basic communication		
• supported		Yes
• Useful data per job, max.		76 Byte
• Useful data per job (of which consistent) max.		76 Byte; 76 bytes (XSEND/XRCV), 64 bytes (XPUT/XGET) as server
S7 communication		
• supported		Yes
• as server		Yes
• as client		No
• Useful data per job, max.		180 Byte
• Useful data per job, of which consistent, max.		64 Byte
S5-compatible communication		
• supported		No
Standard communication (FMS)		
• supported		No
Number of connections		
• overall		12
• usable for PG communication		11
• reserved for PG communication		1
• usable for OP communication		11
• reserved for OP communication		1
• usable for S7 basic communication		10

	6ES7 151-7AB00-0AB0	6ES7 151-7AA13-0AB0
• reserved for S7-Basic communication		0
• usable for routing		4; as slave only with active interface, with IM 151-7 CPU as DP master
<b>1st interface</b>		
Type of interface		Integral RS 485 interface
Physics		RS 485
isolated		Yes
Power supply to interface (15 to 30 V DC), max.		80 mA
Functionality		
• MPI		Yes
• DP master		No
• DP slave	Yes	Yes; active/passive
• Point-to-point coupling		No
MPI		
• Number of connections		12; Caution: 12 connections per CPU, not per interface
• Services		
- PG/OP communication		Yes
- Routing		Yes; with master module
- Global data communication		Yes
- S7 basic communication		Yes
- S7 communication		Yes
- S7 communication, as client		No
- S7 communication, as server		Yes
• Transmission speeds, max.		12 Mbit/s
DP slave		
• Number of connections	11	12; Caution: 12 connections per CPU, not per interface
• Services		
- PG/OP communication	Yes	Yes
- Routing		Yes; only when interface active and in master mode
- direct data exchange (cross traffic)	Yes	Yes
- DPV1		No
• GSD file		<a href="http://www.ad.siemens.de/csi_e/gsd">http://www.ad.siemens.de/csi_e/gsd</a>
• Transmission speeds, max.	12 Mbit/s	12 Mbit/s
• automatic baud rate search		Yes; only with passive interface
• Transfer memory		
- Inputs		244 Byte
- Outputs		244 Byte

# ET 200 distributed I/Os

## ET 200S

### IM 151-7 CPU interface modules

#### Technical specifications (continued)

	6ES7 151-7AB00-0AB0	6ES7 151-7AA13-0AB0
<ul style="list-style-type: none"> <li>Address area, max.</li> <li>Useful data per address area, max.</li> </ul>		32 32 Byte; up to max. size of the transfer memory
<b>2nd interface</b>		
Type of interface		External interface via master module 6ES7138-4HA00-0AB0
Physics		RS 485
isolated		Yes
Power supply to interface (15 to 30 V DC), max.		No
Functionality		
<ul style="list-style-type: none"> <li>MPI</li> <li>DP master</li> <li>Point-to-point coupling</li> </ul>		No Yes No
DP master		
<ul style="list-style-type: none"> <li>Number of connections, max.</li> </ul>		12; Caution: 12 connections per CPU, not per interface
<ul style="list-style-type: none"> <li>Services <ul style="list-style-type: none"> <li>PG/OP communication</li> <li>Routing</li> <li>Global data communication</li> <li>S7 basic communication</li> <li>S7 communication</li> <li>S7 communication, as client</li> <li>S7 communication, as server</li> <li>equidistance support</li> <li>SYNC/FREEZE</li> <li>Activation/deactivation of DP slaves</li> <li>direct data exchange (cross traffic)</li> <li>DPV1</li> </ul> </li> <li>Transmission speeds, max.</li> <li>Number of DP slaves, max.</li> <li>Address area <ul style="list-style-type: none"> <li>Inputs, max.</li> <li>Outputs, max.</li> </ul> </li> <li>Useful data per DP slave <ul style="list-style-type: none"> <li>Inputs, max.</li> <li>Outputs, max.</li> </ul> </li> </ul>		Yes Yes No Yes No Yes Yes Yes Yes Yes Yes Yes Yes Yes 12 Mbit/s 32; per station 2 KByte 2 KByte 244 Byte 244 Byte
<b>Isochronous mode</b>		
Isochronous mode		No
<b>CPU/programming</b>		
Configuration rules		max. 63 peripheral modules per station; Station width <1 m or <2 m; max. 10 A per load group (power module); Master interface module on right next to IM 151-7 CPU (X2-interface)

	6ES7 151-7AB00-0AB0	6ES7 151-7AA13-0AB0
Programming language		
<ul style="list-style-type: none"> <li>STEP 7</li> <li>LAD</li> <li>FUP</li> <li>AWL</li> <li>SCL</li> <li>GRAPH</li> </ul>	Yes	Yes Yes Yes Yes Yes; optional Yes; optional
Operational stocks	Binary links, bracketed operations, result allocation, saving, counting, loading, transferring, comparing, shifting, rotating, complementation, calling blocks, fixed point arithmetic, floating point arithmetic, jump functions.	see Instruction List
Nesting levels	8	8
User program protection/password protection	Yes	Yes
System functions (SFC)	Interrupt and error handling, copying of data, clock functions, diagnostic functions, module parameter assignment, mode changes	see Instruction List
System function blocks (SFB)		see Instruction List
<b>Isolation</b>		
Isolation checked with		500 V DC
<b>Isolation</b>		
between load voltage and all other switching components		Yes
between PROFIBUS DP all other circuits		Yes
<b>Permissible potential difference</b>		
between different circuits		500 V DC
<b>Environmental requirements</b>		
Operating temperature		
<ul style="list-style-type: none"> <li>min.</li> <li>max.</li> </ul>	0 °C 60 °C	
<b>Dimensions and weight</b>		
Width	60 mm	60 mm; DP master module: 35 mm
Height	119.5 mm	119.5 mm
Depth	75 mm	75 mm
<b>Weights</b>		
Weight, approx.	200 g	200 g

Ordering data	Order No.		Order No.
<b>Interface module IM 151/CPU (48 K)</b> Including termination module	<b>6ES7 151-7AA11-0AB0</b>	<b>Label sheets DIN A4 (10 pieces)</b> Each sheet contains 60 label strips for peripheral modules and 20 label strips for interface modules	
<b>Interface module IM 151/CPU FO (48 K)</b> Including termination module	<b>6ES7 151-7AB00-0AB0</b>	<ul style="list-style-type: none"> <li>• petrol</li> <li>• red</li> <li>• yellow</li> <li>• light beige</li> </ul>	<b>6ES7 193-4BH00-0AA0</b> <b>6ES7 193-4BD00-0AA0</b> <b>6ES7 193-4BB00-0AA0</b> <b>6ES7 193-4BA00-0AA0</b>
<b>Accessories</b>		<b>ET 200S distributed I/O system manuals</b> are available on the Internet as a PDF file:	<a href="http://www.siemens.com/simatic-docu">http://www.siemens.com/simatic-docu</a>
<b>MMC 64 KB</b> <sup>1)</sup> for program backup	<b>6ES7 953-8LF11-0AA0</b>	<b>Terminating module</b> for ET 200S	<b>6ES7 193-4JA00-0AA0</b>
<b>MMC 128 KB</b> <sup>1)</sup> for program backup	<b>6ES7 953-8LG11-0AA0</b>	<b>SIMATIC S5, 35 mm DIN rail, length 483 mm for 19" cabinets</b>	<b>6ES5 710-8MA11</b>
<b>MMC 512 KB</b> <sup>1)</sup> for program backup	<b>6ES7 953-8LJ11-0AA0</b>	<b>SIMATIC S5, 35 mm DIN rail, length 530 mm for 600 mm cabinets</b>	<b>6ES5 710-8MA21</b>
<b>MMC 2 MB</b> <sup>1)</sup> for program backup and/or firmware update	<b>6ES7 953-8LL11-0AA0</b>	<b>SIMATIC S5, 35 mm DIN rail, length 830 mm for 900 mm cabinets</b>	<b>6ES5 710-8MA31</b>
<b>MMC 4 MB</b> <sup>1)</sup> for program backup	<b>6ES7 953-8LM11-0AA0</b>	<b>SIMATIC S5, 35 mm DIN rail, length 2 m</b>	<b>6ES5 710-8MA41</b>
<b>MMC 8 MB</b> <sup>1)</sup> for program backup	<b>6ES7 953-8LP11-0AA0</b>		
<b>External prommer</b> for e.g. MMC with USB interface	<b>6ES7 792-0AA00-0XA0</b>		
<b>PG</b> with integrated MMC interface	upon request		

1) For operating the CPU, an MMC is essential

# ET 200 distributed I/Os

## ET 200S

### Master interface submodule for IM 151-7 CPU/IM 151-7 F-CPU interface module

#### Overview



PROFIBUS DP master interface module for IM 151-7 CPU and IM 151-7 F-CPU interface modules

- Integrated 12 Mbit/s PROFIBUS DP master interface in copper design
- Facilitates parallel operation of two PROFIBUS DP interfaces on one IM 151-7 CPU
- Increases the availability of plants and machinery
- Functionality corresponds to the interface of an S7-314 CPU configured as DP master

Programming is with STEP 7 from Version V5.2 with Service Pack 1.

#### Technical specifications

	<b>6ES7 138-4HA00-0AB0</b>
<b>Hardware config.</b>	
Number of modules per CPU	1
<b>Dimensions and weight</b>	
Width	35 mm
Height	119.5 mm
Depth	75 mm
<b>Weights</b>	
Weight, approx.	100 g

#### Ordering data

#### Order No.

<b>Master interface module for IM 151-7 CPU / IM 151-7 F-CPU interface modules</b>	<b>6ES7 138-4HA00-0AB0</b>
--	----------------------------

#### Accessories

#### Label sheets DIN A4 (10 pieces)

Each sheet contains 60 label strips for peripheral modules and 20 label strips for interface modules

- petrol
- red
- yellow
- light beige

**6ES7 193-4BH00-0AA0**

**6ES7 193-4BD00-0AA0**

**6ES7 193-4BB00-0AA0**

**6ES7 193-4BA00-0AA0**

#### ET 200S distributed I/O system manuals

are available on the Internet as a PDF file:

<http://www.siemens.com/simatic-docu>

#### Overview



- Interface module with integrated fail-safe CPU for SIMATIC ET 200S
- With DP/MPI interface
- For design of a fail-safe automation system for plants with increased safety requirements
- Complies with safety requirements up to SIL 3 according to IEC 61508 and Cat. 4 according to EN 954-1
- Fail-safe I/O modules can be connected in a distributed configuration through DP master modules (PROFIsafe)
- The fail-safe I/O modules of ET200S PROFIsafe can be connected in a centralized configuration
- Standard modules can be used for non-safety-relevant applications



Note:  
Micro Memory Card required for operation of CPU.

#### Technical specifications

	6ES7 151-7FA01-0AB0
<b>Product status</b>	
associated programming package	STEP 7 V5.2 or higher + SP1, Distributed Safety 5.2 or higher + SP1
<b>Voltages and currents</b>	
Mains/voltage failure jumpering, min.	5 ms
Load voltage L+	
• Rated value (DC)	24 V
• Short-circuit protection	Yes
• reverse polarity protection	Yes
• permissible range, lower limit (DC)	20.4 V
• permissible range, upper limit (DC)	28.8 V
<b>Current consumption</b>	
from supply voltage 1L+, max.	250 mA; 280 mA with DP master module
Power loss, typ.	3.3 W
Current output to backplane bus (DC 5 V), max.	700 A
<b>Memory</b>	
Memory	
• RAM	
- integrated	64 KByte; (freely available); approx 10 K instructions; The number of F instructions compared with a standard program is limited due to F-specific over-heads.
- expandable	No
• Load memory	
- pluggable (MMC)	Yes
- pluggable (MMC), max.	8 MByte
<b>CPU/blocks</b>	
Number of blocks (total)	1,024
DB	
• Number, max.	511
• Size, max.	16 KByte
FB	
• Number, max.	512
• Size, max.	16 KByte

	6ES7 151-7FA01-0AB0
FC	
• Number, max.	512
• Size, max.	16 KByte
OB	
• Size, max.	16 KByte
Nesting depth	
• per priority class	8
• additional within an error OB	4
<b>CPU/processing times</b>	
for bit operations, min.	0.1 µs
for word operations, min.	0.2 µs
for fixed point arithmetic, min.	2 µs
for floating point arithmetic, min.	3 µs
<b>Times/counters and their remanence</b>	
S7 counter	
• Number	256
• Remanence	
- adjustable	Yes
- preset	From Z 0 to Z 7
• Counting range	
- adjustable	Yes
- lower limit	0
- upper limit	999
IEC counter	
• Type	SFB
S7 times	
• Number	256
• Remanence	
- adjustable	Yes
- preset	no timers retentive
• Time range	
- lower limit	10 ms
- upper limit	9,990 s
IEC timer	
• Type	SFB

# ET 200 distributed I/Os

## ET 200S

### IM 151-7 F-CPU interface module

#### Technical specifications (continued)

	6ES7 151-7FA01-0AB0
<b>Data areas and their remanence</b>	
Flag	
• Number, max.	256 Byte
• Remanence available	Yes
• Remanence preset	MB 0 to MB 15
• Number of clock memories	8; 1 memory byte
Data blocks	
• Number, max.	511; DB 0 reserved
• Size, max.	16 KByte
Local data	
• per priority class, max.	510 Byte
<b>Address area</b>	
I/O address area	
• Inputs	2,048 KByte
• Outputs	2,048 KByte
Process image	
• Inputs	128 Byte
• Outputs	128 Byte
Digital channels	
• Inputs	16,336
• Outputs	16,336
• Inputs, of which central	248
• Outputs, of which central	248
Analog channels	
• Inputs	1,021
• Outputs	1,021
• Inputs, of which central	124
• Outputs, of which central	124
<b>Time</b>	
Clock	
• Hardware clock (real-time clock)	Yes
• Battery backed and synchronized	Yes
• Backup time	6 w; at 40 °C ambient temperature, typically
• Deviation per day, max.	10 s
Operating hours counter	
• Number	1
• Number/Number range	0
• Range of values	0 to 2 <sup>^</sup> 31 hours (when using SFC101)
• Granularity	1 hour
• remanent	Yes; must be restarted at each warm restart
Clock synchronization	
• supports	Yes
• to MPI, Master	Yes
• to MPI, Slave	Yes
• in AS, Master	No
• in AS, Slave	No
<b>S7 message functions</b>	
Number of login stations for message functions, max.	12; depending on the connections configured for PG/OP and ; S7 basic communication
Process diagnostic messages	Yes; ALARM_S, ALARM_SC, ALARM_SQ
simultaneously active Alarm-S blocks, max.	40

	6ES7 151-7FA01-0AB0
<b>Test commissioning functions</b>	
Status/control	
• Status/control variable	Yes
• Variables	Inputs, outputs, memory bits, DB, times, counters
<b>Monitoring functions</b>	
• Number of variables, max.	30
• of which status variable, max.	30
• of which control variable, max.	14
Forcing	
• Forcing	Yes
• Force, variables	Inputs, outputs
• Forcing, number of variables, max.	10
Status block	Yes
Single step	Yes
Number of breakpoints	2
Diagnostic buffer	
• present	Yes
• Number of entries, max.	100
• adjustable	No
<b>Communication functions</b>	
PG/OP communication	Yes
Global data communication	
• supported	Yes
• Number of GD packets, max.	4
• Number of GD packets, transmitter, max.	4
• Number of GD packets, receiver, max.	4
• Size of GD packets, max.	22 Byte
• Size of GD packet (of which consistent), max.	22 Byte
S7 basic communication	
• supported	Yes
• Useful data per job, max.	76 Byte
• Useful data per job (of which consistent) max.	76 Byte; 76 bytes (XSEND/XRCV), 64 bytes (XPUT/XGET) as server
S7 communication	
• supported	Yes
• as server	Yes
• Useful data per job, max.	180 Byte
• Useful data per job, of which consistent, max.	64 Byte
S5-compatible communication	
• supported	No
Standard communication (FMS)	
• supported	No
Number of connections	
• overall	12
• usable for PG communication	11
• reserved for PG communication	1
• usable for OP communication	11
• reserved for OP communication	1
• usable for S7 basic communication	10
• reserved for S7-Basic communication	0
• usable for routing	4; only when interface active and in master mode

Technical specifications (continued)

	6ES7 151-7FA01-0AB0
<b>1st interface</b>	
Type of interface	Integral RS 485 interface
Physics	RS 485
isolated	Yes
Power supply to interface (15 to 30 V DC), max.	80 mA
Functionality	
• MPI	Yes
• DP master	No
• DP slave	Yes; active/passive
• Point-to-point coupling	No
MPI	
• Number of connections	12
• Services	
- PG/OP communication	Yes
- Routing	Yes; with master module
- Global data communication	Yes
- S7 basic communication	Yes
- S7 communication	Yes
- S7 communication, as client	No
- S7 communication, as server	Yes
• Transmission speeds, max.	12 Mbit/s
DP slave	
• Number of connections	12
• Services	
- PG/OP communication	Yes
- Routing	Yes; only when interface active and in master mode
- direct data exchange (cross traffic)	Yes
- DPV1	No
• GSD file	<a href="http://www.ad.siemens.de/gsi_e/gsd">http://www.ad.siemens.de/gsi_e/gsd</a>
• Transmission speeds, max.	12 Mbit/s
• automatic baud rate search	Yes; only with passive interface
• Transfer memory	
- Inputs	244 Byte
- Outputs	244 Byte
• Address area, max.	32
• Useful data per address area, max.	32 Byte
<b>2nd interface</b>	
Type of interface	External interface via master module 6ES7138-4HA00-0AB0
Physics	RS 485
isolated	Yes
Functionality	
• MPI	No
• DP master	Yes
• Point-to-point coupling	No
DP master	
• Number of connections, max.	12

	6ES7 151-7FA01-0AB0
• Services	
- PG/OP communication	Yes
- Routing	Yes
- Global data communication	No
- S7 basic communication	No
- S7 communication	Yes
- S7 communication, as client	No
- S7 communication, as server	Yes
- SYNC/FREEZE	Yes
- Activation/deactivation of DP slaves	Yes
- direct data exchange (cross traffic)	Yes
- DPV1	Yes
• Transmission speeds, max.	12 Mbit/s
• Number of DP slaves, max.	32
• Address area	
- Inputs, max.	2 KByte
- Outputs, max.	2 KByte
• Useful data per DP slave	
- Inputs, max.	244 Byte
- Outputs, max.	244 Byte
<b>Isochronous mode</b>	
Isochronous mode	Yes
<b>CPU/programming</b>	
Configuration rules	max. 63 peripheral modules per station; Station width < 1 m or < 2 m; max. 10 A per load group (power module); Master interface module on right next to IM 151-7 CPU (X2-interface)
Programming language	
• STEP 7	Yes
• LAD	Yes
• FUP	Yes
• AWL	Yes
• SCL	Yes; optional
• GRAPH	Yes; optional
Operational stocks	see Instruction List
Nesting levels	8
User program protection/password protection	Yes
System functions (SFC)	see Instruction List
System function blocks (SFB)	see Instruction List
<b>Isolation</b>	
Isolation checked with	500 V DC
<b>Isolation</b>	
between load voltage and all other switching components	Yes
between PROFIBUS DP all other circuits	Yes
<b>Permissible potential difference</b>	
between different circuits	500 V DC
<b>Dimensions and weight</b>	
Width	60 mm; DP master module: 35 mm
Height	119.5 mm
Depth	75 mm
<b>Weights</b>	
Weight, approx.	200 g

# ET 200 distributed I/Os

## ET 200S

### IM 151-7 F-CPU interface module

#### Ordering data

##### IM 151-7 F-CPU interface module

For configuring a fail-safe automation system

#### Accessories

##### Distributed Safety V5.4 programming tool

Task:

Software for configuring fail-safe user programs for SIMATIC S7-300F, S7-400F, ET 200S

Requirement:

STEP 7 V5.3 SP3 and higher

- Floating license

- Software Update Service

##### Distributed Safety Upgrade

From V5.x to V5.3; Floating license for 1 user

##### MMC 64 kbyte

for program backup

##### MMC 128 kbyte

for program backup

##### MMC 512 kbyte

for program backup

#### Order No.

6ES7 151-7FA01-0AB0

6ES7 833-1FC02-0YA5

6ES7 833-1FC00-0YX2

6ES7 833-1FC02-0YE5

6ES7 953-8LF11-0AA0

6ES7 953-8LG11-0AA0

6ES7 953-8LJ11-0AA0

#### Order No.

6ES7 953-8LL11-0AA0

##### MMC 2 Mbyte

For program backup and/or firmware update

##### MMC 4 Mbyte

for program backup

##### External prommer

for MMC with USB interface

##### Terminating module

as spare part for ET 200S

##### SIMATIC S5, 35 mm DIN rail, length 483 mm for 19" cabinets

##### SIMATIC S5, 35 mm DIN rail, length 530 mm for 600 mm cabinets

##### SIMATIC S5, 35 mm DIN rail, length 830 mm for 900 mm cabinets

##### SIMATIC S5, 35 mm DIN rail, length 2 m

6ES7 792-0AA00-0XA0

6ES7 193-4JA00-0AA0

6ES5 710-8MA11

6ES5 710-8MA21

6ES5 710-8MA31

6ES5 710-8MA41

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#### Overview



- For monitoring and, depending on the version, fusing the load and sensor supply voltage
- Can be plugged onto TM-P terminal modules with automatic coding.
- Diagnostics message for voltage and blown fuse (can be switched off via configuration)
- Fail-safe PM-E F PROFIsafe power module for safe switching off of sequentially plugged-in 24 V DC to 10 A digital output modules or external loads; 3 additional integrated fail-safe 24 V DC / 2 A outputs
- 24 to 48 V DC PM-E power module
  - with status information and diagnosis "Load voltage present"
  - for option handling
- PM-E 24 V DC to 230 V AC power module
  - power module for universal use
  - for option handling

#### Design

##### Possible combinations of the TM-E terminal modules and power modules

Power modules	TM-P terminal modules for power modules				
	15S23-A1	15S23-A0	15S22-01	30S44-A0	F30S47-F0
Screw-type terminal →	15S23-A1	15S23-A0	15S22-01	30S44-A0	F30S47-F0
Order No. 6ES7 193...	...4CC20-0AA0	...4CD20-0AA0	...4CE00-0AA0	...4CK20-0AA0	3RK1903-3AA0
Spring-loaded terminal →	15C23-A1	15C23-A0	15C22-01	30C44-A0	–
Order No. 6ES7 193...	...4CC30-0AA0	...4CD30-0AA0	...4CE10-0AA0	...4CK30-0AA0	–
Fast Connect →	15N23-A1	15N23-A0	15N22-01	–	–
Order No. 6ES7 193...	...4CC70-0AA0	...4CD70-0AA0	...4CE60-0AA0	–	–
PM-E 24 V DC	■	■	■		
PM-E 24 to 48 V DC	■	■	■		
PM-E 24 ... 48 V DC/24 ... 230 V AC	■	■	■		
PM-E F 24 V DC PROFIsafe				■	
PM-D F 24 V DC PROFIsafe					■

##### Possible combinations of the electronics modules and power modules

Power modules	Electronic modules
PM-E 24 V DC	Can be used for all electronics modules except 2 DI 120 V AC ST, 2 DI 230 V AC ST and 2 DO 120/230 V AC
PM-E 24 ... 48 V DC	Can be used for all electronics modules of 15 mm in width except 2 DI 120 V AC ST, 2 DI 230 V AC ST and 2 DO 120/230 V AC as well as for 4 DI 24 to 48 V UC in AC operation
PM-E 24 ... 48 V DC/24 ... 230 V AC	Can be used with all electronic modules of 15 mm in width.
PM-E F pp 24 V DC PROFIsafe	For the fail-safe modules
PM-D F pm 24 V DC PROFIsafe	See Manual "ET 200S fail-safe modules" in the documentation packages "S7 F Systems" and "S7 Distributed Safety"

# ET 200 distributed I/Os

## ET 200S

### Power modules for PM-E electronics modules

#### Technical specifications

	6ES7 138-4CA01-0AA0	6ES7 138-4CB10-0AB0
<b>Power supply</b>		
Protection and monitoring		
• Output overload protection		Yes
Current carrying capacity		
• Current carrying capacity to 30 °C, max.		10 A; 10 A (24 to 56.7 V DC), 8 A (24 to 48 V AC / 120 V / 230 V)
• Current carrying capacity to 40 °C, max.		9 A; 9 A (DC 24 to 56.7 V), 7 A (AC 24 to 48 V / 120 V / 130 V)
• Current carrying capacity to 60 °C, max.	10 A	7 A; 7 A (24 to 56.7 V DC), 5 A (24 to 48 V AC / 120 / 230 V)
<b>Voltages and currents</b>		
Load voltage L+		
• Rated values		24 V to 56.7 V DC, 24 to 48 V / 120 V/130 V AC
• Rated value (DC)	24 V	
• Short-circuit protection	No; external (e.g. automatic circuit breaker), tripping characteristic C	Yes; IEC 127-2/1, internal with fuse (5 x 20 mm), 250 V, 10 A, quick-acting, replaceable
• reverse polarity protection	Yes	Yes
<b>Current consumption</b>		
from load voltage 1L+ (without load), max.	4 mA	9 mA
from backplane bus DC 24 V, max.		9.5 mA
Power loss, typ.	0.1 W	5 W
<b>Parameter</b>		
Remark	3 bytes	3 bytes
Diagnosis: fuse blown		disable/enable
missing load voltage	disable/enable	disable/enable
Load voltage		DC/AC
<b>Status information/alarms/diagnostics</b>		
Diagnoses		
• Diagnostic information readable		Yes
• Diagnostics	Yes	Yes
• Fuse blown		Yes
• missing load voltage	Yes	Yes
Diagnostics indication LED		
• Rated load voltage PWR (green)	Yes	Yes
• Collective error SF (red)	Yes	Yes
• Fuse OK FSG (green)		Yes

	6ES7 138-4CA01-0AA0	6ES7 138-4CB10-0AB0
<b>Isolation</b>		
Isolation checked with	500 V DC	1500 V AC
<b>Isolation</b>		
primary/secondary	Yes; between rated load voltage and backplane bus, between power modules	Yes; between rated load voltage and backplane bus, between power modules
<b>Dimensions and weight</b>		
Width	15 mm	15 mm
Height	81 mm	81 mm
Depth	52 mm	52 mm
<b>Weights</b>		
Weight, approx.	35 g	34 g

	6ES7 138-4CA50-0AB0
<b>Power supply</b>	
Current carrying capacity	
• Current carrying capacity to 60 °C, max.	10 A
<b>Voltages and currents</b>	
Load voltage L+	
• Rated values	24 V to 48 V DC
• Short-circuit protection	No; external (e.g. automatic circuit breaker), tripping characteristic B, C
• reverse polarity protection	Yes
<b>Current consumption</b>	
from load voltage 1L+ (without load), max.	12 mA
Power loss, typ.	500 W
<b>Parameter</b>	
Remark	3 bytes
missing load voltage	disable/enable
<b>Status information/alarms/diagnostics</b>	
Diagnoses	
• Diagnostics	Yes
• missing load voltage	Yes
Diagnostics indication LED	
• Rated load voltage PWR (green)	Yes
• Collective error SF (red)	Yes
<b>Isolation</b>	
Isolation checked with	500 V DC
<b>Isolation</b>	
primary/secondary	Yes; between rated load voltage and backplane bus, between power modules
<b>Dimensions and weight</b>	
Width	15 mm
<b>Weights</b>	
Weight, approx.	35 g

Ordering data	Order No.
<b>PM-E 24 V DC power module <sup>1)</sup></b> For electronic modules; with diagnostics	<b>6ES7 138-4CA01-0AA0</b>
<b>24 to 48 V DC PM-E power module</b> For electronic modules; with diagnostics, with status bit "load voltage" present	<b>6ES7 138-4CA50-0AB0</b>
<b>Power module PM-E 24 V DC to 48 V, 42 to 230 V AC</b> For electronic modules; with diagnostics and fuse	<b>6ES7 138-4CB10-0AB0</b>

#### Accessories

##### Label sheets DIN A4 (10 pieces)

Each sheet contains 60 label strips for peripheral modules and 20 label strips for interface modules

- petrol **6ES7 193-4BH00-0AA0**
- red **6ES7 193-4BD00-0AA0**
- yellow **6ES7 193-4BB00-0AA0**
- light beige **6ES7 193-4BA00-0AA0**

1) Can be used for all electronic and technology modules except  
 2 DI 120 V AC / 2 DI 230 V AC / 2 DO 120/230 V AC

# ET 200 distributed I/Os

## ET 200S

### Reserve modules

#### Overview



- Suitable for all TM-E terminal modules (15 mm and 30 mm construction width)
- Reserves one slot for any electronic module. The reserve module is inserted into the reserved slot of the ET 200S configuration.
- Terminal module can be wired up for the function to be used later
- The reserve module has no connection to the terminals of the TM-E terminal module. The TM-E terminal module can therefore be completely wired up and prepared for its future purpose.
- Parameterizable diagnostic response with IM 151-1 STANDARD and IM 151-1 HIGH FEATURE
- Facilitates retrofitting of I/O modules during operation
- Options can be released via the PLC program without the need for re-engineering

#### Technical specifications

	6ES7 138-4AA01-0AA0	6ES7 138-4AA11-0AA0
<b>Current consumption</b>		
Power loss, typ.	0.025 W	0.025 W
<b>Parameter</b>		
Remark	according to configured module	according to configured module
<b>Status information/alarms/diagnostics</b>		
Diagnoses		
• Diagnostic functions	No	No
Diagnostics indication LED		
• Status indicator digital input (green)	No	No
<b>Dimensions and weight</b>		
Width	15 mm	30 mm
Height	81 mm	81 mm
Depth	52 mm	52 mm
<b>Weights</b>		
Weight, approx.	33 g	55 g

#### Ordering data

#### Order No.

##### Reserve modules for ET 200S

for reserving unused slots

- 15 mm overall width (5 units)
- 30 mm overall width (1 unit)

**6ES7 138-4AA01-0AA0**

**6ES7 138-4AA11-0AA0**

### Potential isolation module

- Overview**
- Potential isolation module with 4 outputs
  - Output current 5 A per output / 10 A per module
  - Nominal load voltage: According to the load voltage on the power module of this load voltage group
  - Is suitable for all terminal modules TM-E (construction width 15 mm)

Ordering data	Order No.
<p><b>Potential isolation module for ET 200S</b></p> <p>for preparing the load voltage on additional terminals, 15 mm construction width, 1 piece</p>	<p><b>6ES7138-4FD00-0AA0</b></p>
<p><i>Accessories for labeling</i></p>	
<p><b>Label sheets DIN A4 (10 pieces)</b></p> <p>Each sheet contains 60 label strips for peripheral modules and 20 label strips for interface modules</p> <ul style="list-style-type: none"> <li>• petrol</li> <li>• red</li> <li>• yellow</li> <li>• light beige</li> </ul>	<p><b>6ES7 193-4BH00-0AA0</b></p> <p><b>6ES7 193-4BD00-0AA0</b></p> <p><b>6ES7 193-4BB00-0AA0</b></p> <p><b>6ES7 193-4BA00-0AA0</b></p>

# ET 200 distributed I/Os

## ET 200S

### Digital electronic modules

#### Overview



- 2- and 4-channel digital inputs and outputs for the ET 200S
- Can be plugged onto TM-E terminal modules with automatic coding.
- High-feature versions for enhanced plant availability, additional functions and comprehensive diagnostics
- Hot swapping of modules possible

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#### Design

##### Possible combinations of the TM-E terminal modules and digital modules

Electronic modules	TM-E terminal modules for electronics modules							
	15S26-A1	15S24-A1	15S24-01	15S23-01	15S24-AT	30S44-01	30S46-A1	
Screw-type terminal	→	15S26-A1	15S24-A1	15S24-01	15S23-01	15S24-AT	30S44-01	30S46-A1
Order No. 6ES7 193...	→	...4CA40-0AA0	...4CA20-0AA0	...4CB20-0AA0	...4CB00-0AA0	...4CL20-0AA0	...4CG20-0AA0	...4CF40-0AA0
Spring-loaded terminal	→	15C26-A1	15C24-A1	15C24-01	15C23-01	15C24-AT	30C44-01	30C46-A1
Order No. 6ES7 193...	→	...4CA50-0AA0	...4CA30-0AA0	...4CB30-0AA0	...4CB10-0AA0	...4CL30-0AA0	...4CG30-0AA0	...4CF50-0AA0
Fast Connect	→	15N26-A1	15N24-A1	15N24-01	15N23-01	–	–	–
Order No. 6ES7 193...	→	...4CA80-0AA0	...4CA70-0AA0	...4CB70-0AA0	...4CB60-0AA0			
2DI 24 V DC ST		■	■	■	■			
2DI 24 V DC HF								
4DI 24 V DC ST								
4DI 24 V DC HF								
4DI 24 V DC /SRC ST								
4DI 24 ... 48 V UC HF		■	■	■	■			
4 DI NAMUR		■	■	■	■			
2DI 120 V AC ST		■	■	■	■			
2DI 230 V AC ST		■	■	■	■			
2 DO 24 V DC/0.5 A ST		■	■	■	■			
2 DO 24 V DC/0.5 A HF								
4 DO 24 V DC/0.5 A ST								
2 DO 24 V DC/2 A ST		■	■	■	■			
2 DO 24 V DC/2 A HF								
4 DO 24 V DC/2 A ST								
2 DO 24 ... 230 V AC/2 A		■	■	■	■			
2RO NO		■	■	■	■			
24 ... 120 V DC/5 A								
24 ... 230 V AC/5 A								
2RO NO/NC								
24 ... 48 V DC/5 A								
24 ... 230 V AC/5 A								

Technical specifications

	6ES7 131-4BB01-0AA0	6ES7 131-4BB01-0AB0	6ES7 131-4BD01-0AA0	6ES7 131-4BD01-0AB0	6ES7 131-4BD51-0AA0
<b>Supply voltages</b>					
Rated value					
• DC 24 V	Yes; from power module	Yes; from power module	Yes; from power module	Yes; from power module	Yes; from power module
• Reverse polarity protection	Yes	Yes	Yes	Yes	Yes
<b>Current consumption</b>					
from backplane bus DC 3.3 V, max.	10 mA	10 mA	10 mA	10 mA	
Power loss, typ.	0.4 W	0.4 W	0.7 W	0.7 W	0.7 W
<b>Address area</b>					
Address space per module					
• with packing	2 Bit	2 Bit	4 Bit	4 Bit	4 Bit
• without packing	1 Byte	1 Byte	1 Byte	1 Byte	1 Byte
<b>Digital inputs</b>					
Number of digital inputs	2	2	4	4	4
Cable length					
• cable length, shielded, max.	1,000 m	1,000 m	1,000 m	1,000 m	1,000 m
• Cable length unshielded, max.	600 m	600 m	600 m	600 m	600 m
Input characteristic curve to IEC 1131, Typ 1	Yes	Yes	Yes	Yes	Yes
Input voltage					
• Rated value, DC	24 V	24 V	24 V	24 V	24 V
• for signal "0"	-30 to 5 V	-30 to 5 V	-30 to 5 V	-30 to 5 V	30 to -5 V
• for signal "1"	15 to 30 V	11 to 30 V	15 to 30 V	11 to 30 V	-15 to -30 V
Input current					
• for signal "1", typ.	7 mA; at 24 V	8 mA	7 mA; at 24 V	8 mA	7 mA; at 24 V
Input delay (for rated value of input voltage)					
• for standard inputs					
- programmable	No	Yes; 0.1 / 0.5 / 3 / 15 ms	No	Yes; 0.1 / 0.5 / 3 / 15 ms	No
- at "0" to "1", min.	2 ms; typically 3 ms	0.05 / 0.4 / 2.7 / 14.85	2 ms; typically 3 ms	0.05 / 0.4 / 2.7 / 14.85	2 ms; typically 3 ms
- at "0" to "1", max.	4.5 ms	0.15 / 0.6 / 3.3 / 15.15	4.5 ms	0.15 / 0.6 / 3.3 / 15.15	4.5 ms
- at "1" to "0", min.	2 ms; typically 3 ms	0.05 / 0.4 / 2.7 / 14.85	2 ms; typically 3 ms	0.05 / 0.4 / 2.7 / 14.85	2 ms; typically 3 ms
- at "1" to "0", max.	4.5 ms	0.15 / 0.6 / 3.3 / 15.15	4.5 ms	0.15 / 0.6 / 3.3 / 15.15	4.5 ms
<b>Encoder supply</b>					
Output voltage	min. L+ (-0.5 V), under load	min. L+ (-0.5 V), under load	min. L+ (-0.5 V), under load	min. L+ (-0.5 V), under load	max. M + 0.5 V, under load
Output current, rated value	500 mA	500 mA	500 mA	500 mA	500 mA
Output current, permissible range	0 to 500 mA	0 to 500 mA	0 to 500 mA	0 to 500 mA	0 to 500 mA
Short-circuit protection		Yes; electronic		Yes; electronic	
<b>Encoder</b>					
Connectable encoders					
• 2-wire BEROS	Yes	Yes	Yes	Yes	Yes
• permissible quiescent current (2-wire BEROS), max.	1.5 mA	1.5 mA	1.5 mA	1.5 mA	1.5 mA
<b>Parameter</b>					
Remark	1 byte	3 bytes	1 byte	3 bytes	1 byte
Diagnosis: short circuit		disable/enable		disable/enable	

# ET 200 distributed I/Os

## ET 200S

### Digital electronic modules

#### Technical specifications (continued)

	6ES7 131-4BB01-0AA0	6ES7 131-4BB01-0AB0	6ES7 131-4BD01-0AA0	6ES7 131-4BD01-0AB0	6ES7 131-4BD51-0AA0
<b>Status information/alarms/diagnostics</b>					
Diagnoses					
• Diagnostic functions	No	Yes	No	Yes	No
• Short circuit		Yes; Short-circuit to M, module by module		Yes; Short-circuit to M, module by module	
Diagnostics indication LED					
• Collective error SF (red)	No	Yes	No	Yes	No
• Status indicator digital input (green)	Yes; per channel	Yes; per channel	Yes; per channel	Yes; per channel	Yes; per channel
<b>Isolation</b>					
Isolation checked with	500 V DC	500 V DC	500 V DC	500 V DC	500 V DC
<b>Isolation</b>					
Galvanic isolation, digital inputs					
• between the channels	No	No	No	No	No
• between the channels and the backplane bus	Yes	Yes	Yes	Yes	Yes
<b>Permissible potential difference</b>					
between different circuits	500 V DC	500 V DC	500 V DC	500 V DC	500 V DC
<b>Dimensions and weight</b>					
Width	15 mm	15 mm	15 mm	15 mm	15 mm
Height	81 mm	81 mm	81 mm	81 mm	81 mm
Depth	52 mm	52 mm	52 mm	52 mm	52 mm
<b>Weights</b>					
Weight, approx.	35 g	35 g	35 g	35 g	35 g

	6ES7 131-4CD00-0AB0	6ES7 131-4EB00-0AB0	6ES7 131-4FB00-0AB0	6ES7 131-4RD00-0AB0
<b>Supply voltages</b>				
Rated value				
• DC 24 V	Yes; from power module			Yes
• permissible range, lower limit (DC)	24 V			
• permissible range, upper limit (DC)	48 V			
• AC 24 V	Yes			
• AC 120 V		Yes; from power module		
• AC 230 V			Yes	
• permissible range, lower limit (AC)	24 V			
• permissible range, upper limit (AC)	48 V			
• Reverse polarity protection	Yes; AC or DC automatic			
<b>Current consumption</b>				
from backplane bus DC 3.3 V, max.	10 mA	6 mA	6 mA	
Power loss, typ.	0.7 W	0.5 W	0.7 W	1.6 W
<b>Address area</b>				
Address space per module				
• with packing	4 Bit	2 Bit	2 Bit	4 Bit
• without packing	1 Byte	1 Byte	1 Byte	1 Byte
<b>Isochronous mode</b>				
Isochronous mode	Yes	No	No	

**Technical specifications (continued)**

	6ES7 131-4CD00-0AB0	6ES7 131-4EB00-0AB0	6ES7 131-4FB00-0AB0	6ES7 131-4RD00-0AB0
<b>Digital inputs</b>				
Number of digital inputs	4	2	2	
Number of NAMUR inputs				4
Number of simultaneously controllable inputs				4
Cable length				
• cable length, shielded, max.	1,000 m	1,000 m	1,000 m	200 m
• Cable length unshielded, max.	600 m	600 m	600 m	
Parallel switching of inputs				No
Input characteristic curve to IEC 1131, Typ 1	Yes	Yes	Yes	
Input voltage				
• Rated value, AC		120 V	230 V	
• Rated value, UC	24 V; 24 to 48 V UC			
• for signal "0"	-6 to 6 V DC, 0 to 5 V AC	0 to 20 V AC	0 to 40 V AC	
• for signal "1"	-15 to -57.6 V DC, 15 to 57.6 V DC, 15 to 48 V AC	79 to 132 V AC	164 to 264 V AC	
• Frequency range	47 to 63 Hz	47 to 63 Hz	47 to 63 Hz	
Input current				
• for signal "1", typ.	10 mA; 4 to 10 mA	3 mA; 3 to 9 mA	5 mA; 5 to 15 mA	
• for 10 k switched contact				
- for signal "0"				0.35 mA to 1.2 mA
- for signal "1"				2.1 mA to 7 mA
• for unswitched contact				
- for signal "0", max. (permissible quiescent current)				0.5 mA
- for signal "1"				typ. 8 mA
• for NAMUR encoders				
- for signal "0"				0.35 mA to 1.2 mA
- for signal "1"				2.1 mA to 7 mA
Input delay (for rated value of input voltage)				
• for standard inputs				
- at "0" to "1", min.		15 ms	15 ms	
- at "0" to "1", max.	15 ms			4.6 μs
- at "1" to "0", min.		25 ms	45 ms	
- at "1" to "0", max.	15 ms			4.6 μs
Encoder connection				
• Fixed current limitation for wire break monitoring, min.	18 kΩ; Rated voltage 24 V (15 V to 35 V); rated voltage 48 V (30 V to 60 V): 39 kohms			
<b>Encoder supply</b>				
Number of outputs				1
Output voltage	min. L+ (-0.5 V), under load			min. 8.2 V, loaded
Output current, rated value	500 mA			45 mA
Output current, permissible range	0 to 500 mA			
Short-circuit protection	Yes; per module			Yes; electronic
<b>Encoder</b>				
Connectable encoders				
• 2-wire BEROS	Yes	No	No	
• permissible quiescent current (2-wire BEROS), max.	2 mA; (0.5 to 2 mA), a minimum load current is necessary in the event of a wire break.	1 mA	2 mA	

# ET 200 distributed I/Os

## ET 200S

### Digital electronic modules

#### Technical specifications (continued)

	6ES7 131-4CD00-0AB0	6ES7 131-4EB00-0AB0	6ES7 131-4FB00-0AB0	6ES7 131-4RD00-0AB0
<b>Parameter</b>				
Remark		3 bytes	3 bytes	12 bytes
<b>Status information/alarms/diagnostics</b>				
Alarms				
• Diagnostic alarm				Yes; can be set
• Process alarm				No
Diagnoses				
• Diagnostic functions	Yes; parameterizable	No	No	Yes; Diagnostic alarm
• Diagnostic information readable				Yes
• Short circuit		No	No	
Diagnostics indication LED				
• Collective error SF (red)	Yes			Yes
• Status indicator digital input (green)	Yes; per channel	Yes; per channel	Yes; per channel	Yes; per channel
<b>Isolation</b>				
Isolation checked with	2500 V DC	2500 V DC	4000 V DC	500 V DC
<b>Isolation</b>				
Galvanic isolation, digital inputs				
• between the channels	No	No	No	No
• between the channels and the backplane bus	Yes	Yes	Yes	Yes
• between the channels and the load voltage L+				Yes
<b>Permissible potential difference</b>				
between different circuits	500 V DC			500 V DC
between M internal and the inputs		1500 V AC	1500 V AC	
<b>Dimensions and weight</b>				
Width	15 mm	15 mm	15 mm	15 mm
Height	81 mm	81 mm	81 mm	81 mm
Depth	52 mm	52 mm	52 mm	52 mm
<b>Weights</b>				
Weight, approx.	35 g	31 g	31 g	35 g

	6ES7 132-4BB01-0AB0	6ES7 132-4BB01-0AA0	6ES7 132-4BB31-0AB0	6ES7 132-4BB31-0AA0	6ES7 132-4BD01-0AA0
<b>Voltages and currents</b>					
Reverse voltage protection	Yes; when using the same load voltage as on the power module	Yes; when using the same load voltage as on the power module	Yes; when using the same load voltage as on the power module	Yes; when using the same load voltage as on the power module	Yes; when using the same load voltage as on the power module
Load voltage L+					
• Rated value (DC)	24 V; from the power module	24 V; from the power module	24 V; from the power module	24 V; from the power module	24 V; from the power module
• reverse polarity protection	Yes; polarity reversal can lead to the digital outputs being connected through	Yes; polarity reversal can lead to the digital outputs being connected through	Yes; polarity reversal can lead to the digital outputs being connected through	Yes; polarity reversal can lead to the digital outputs being connected through	Yes; polarity reversal can lead to the digital outputs being connected through
<b>Current consumption</b>					
from load voltage L+ (without load), max.	5 mA; per channel	5 mA; per module	5 mA; per channel	5 mA; per channel	5 mA; per channel
from backplane bus DC 3.3 V, max.	10 mA	10 mA	10 mA	10 mA	10 mA
Power loss, typ.	0.4 W	0.4 W	1.4 W	1.4 W	0.8 W
<b>Address area</b>					
Address space per module					
• with packing	2 Bit	2 Bit	2 Bit	2 Bit	4 Bit
• without packing	1 Byte	1 Byte	1 Byte	1 Byte	1 Byte

Technical specifications (continued)

	6ES7 132-4BB01-0AB0	6ES7 132-4BB01-0AA0	6ES7 132-4BB31-0AB0	6ES7 132-4BB31-0AA0	6ES7 132-4BD01-0AA0
<b>Isochronous mode</b>					
Isochronous mode	Yes	No	Yes	No	Yes
<b>Digital inputs</b>					
Cable length					
• cable length, shielded, max.					1,000 m
• Cable length unshielded, max.					600 m
<b>Digital outputs</b>					
Number of digital outputs	2	2	2	2	4
cable length, shielded, max.	1,000 m	1,000 m	1,000 m	1,000 m	
Cable length unshielded, max.	600 m	600 m	600 m	600 m	
Short-circuit protection of the output	Yes; per channel	Yes; per channel	Yes; per channel	Yes; per channel	Yes; per channel
• Response threshold, typ.	1.5 A	0.7 to 1.8 A	4 A	2.8 to 7.2 A	0.7 to 1.5 A
Limitation of inductive shutdown voltage to	-55 to -60 V, typically L+( )	-55 to -60 V, typically L+( )	-55 to -60 V, typically L+( )	-55 to -60 V, typically L+( )	-55 to -60 V, L+( )
Lamp load, max.	2.5 W	5 W	5 W	10 W	5 W
Controlling a digital input	Yes	Yes	Yes	Yes	Yes
Output voltage					
• for signal "1", min.	L+ (-1.0 V)	L+ (-1.0 V)	L+ (-1.0 V)	L+ (-1.0 V)	L+ (-1.0 V)
Output current					
• for signal "1" rated value	0.5 A	0.5 A	2 A	2 A	0.5 A
• for signal "1" permissible range for 0 to 60 °C, min.	7 mA	7 mA	7 mA	7 mA	7 mA
• for signal "1" permissible range for 0 to 60 °C, max.	600 mA	600 mA	2.4 A	2.4 A	600 mA
• for signal "0" residual current, max.	0.3 mA	0.3 mA	0.5 mA	0.5 mA	0.3 mA
Output delay with resistive load					
• "0" to "1", max.	100 µs	200 µs	100 µs	200 µs	100 µs
• "1" to "0", max.	400 µs	1.3 ms	400 µs	1.3 ms	300 µs
Parallel switching of 2 outputs					
• for increased power	No	No	No	No	No
• for redundant control of a load	Yes; per module	Yes; per module	Yes; per module	Yes; per module	Yes; per module
Switching frequency					
• with resistive load, max.	100 Hz	100 Hz	100 Hz	100 Hz	100 Hz
• with inductive load, max.	2 Hz	2 Hz	2 Hz; 0.5 H	2 Hz; 0.5 H	2 Hz
• on lamp load, max.	10 Hz	10 Hz	10 Hz	10 Hz	10 Hz
Aggregate current of the outputs (per group)					
• horizontal installation					
• up to 60 °C, max.	1 A	1 A	4 A	4 A	2 A
Load impedance range					
• lower limit	48 Ω	48 Ω	12 Ω	12 Ω	48 Ω
• upper limit	3,400 Ω	3,400 Ω	3,400 Ω	3,400 Ω	3,400 Ω
<b>Parameter</b>					
Remark	3 bytes	1 byte	3 bytes	1 byte	1 byte
Diagnosis: wire break	disable/enable		disable/enable		
Diagnosis: short circuit	disable/enable		disable/enable		
Behavior on CPU/Master STOP, channel-wise	Substitute a value / keep last value		Substitute a value / keep last value		

# ET 200 distributed I/Os

## ET 200S

### Digital electronic modules

#### Technical specifications (continued)

	6ES7 132-4BB01-0AB0	6ES7 132-4BB01-0AA0	6ES7 132-4BB31-0AB0	6ES7 132-4BB31-0AA0	6ES7 132-4BD01-0AA0
<b>Status information/alarms/diagnostics</b>					
Substitute values connectable	Yes; 0/1		Yes; 0/1		
Diagnoses					
• Diagnostic functions	Yes; can be read out	No	Yes; can be read out	No	No
• Wire break	Yes; channel by channel		Yes; channel by channel		
• Short circuit	Yes; channel by channel		Yes; channel by channel		
Diagnostics indication LED					
• Collective error SF (red)	Yes		Yes		
• Status indicator digital output (green)	Yes	Yes	Yes	Yes	Yes
<b>Isolation</b>					
Isolation checked with	500 V DC	500 V DC	500 V DC	500 V DC	500 V DC
<b>Isolation</b>					
Isolation, digital outputs					
• between the channels	No	No	No	No	No
• between the channels and the backplane bus	Yes	Yes	Yes	Yes	Yes
<b>Dimensions and weight</b>					
Width	15 mm	15 mm	15 mm	15 mm	15 mm
Height	81 mm	81 mm	81 mm	81 mm	81 mm
Depth	52 mm	52 mm	52 mm	52 mm	52 mm
<b>Weights</b>					
Weight, approx.	40 g	40 g	40 g	40 g	40 g

	6ES7 132-4BD31-0AA0	6ES7 132-4FB00-0AB0	6ES7 132-4HB01-0AB0	6ES7 132-4HB10-0AB0
<b>Voltages and currents</b>				
Reverse voltage protection	Yes; when using the same load voltage as on the power module	Yes; when using the same voltage source as on the power module		
Load voltage L+				
• Rated value (DC)	24 V; from the power module		24 V; from the power module	24 V; from the power module
• reverse polarity protection	Yes; polarity reversal can lead to the digital outputs being connected through	Yes	Yes	Yes
Load voltage L1				
• Rated value (AC)		24.23 V; from power module		
• permissible range, lower limit (AC)		24 V		
• permissible range, upper limit (AC)		230 V		
• permissible frequency range, lower limit		47 Hz		
• permissible frequency range, upper limit		63 Hz		
<b>Current consumption</b>				
from load voltage L+ (without load), max.	5 mA; per channel	30 mA	30 mA	30 mA
from load voltage L1 (without load), max.		15 mA; per channel		
from backplane bus DC 3.3 V, max.	10 mA	18 mA	10 mA	10 mA
Power loss, typ.	1.6 W	4 W	0.6 W	0.6 W

Technical specifications (continued)

	6ES7 132-4BD31-0AA0	6ES7 132-4FB00-0AB0	6ES7 132-4HB01-0AB0	6ES7 132-4HB10-0AB0
<b>Address area</b>				
Address space per module				
• with packing	4 Bit	2 Bit	2 Bit	2 Bit
• without packing	1 Byte	1 Byte	1 Byte	1 Byte
<b>Isochronous mode</b>				
Isochronous mode	No	No	No	No
<b>Digital outputs</b>				
Number of digital outputs	4	2	2	2
cable length, shielded, max.	1,000 m	1,000 m	1,000 m	1,000 m
Cable length unshielded, max.	600 m	600 m	600 m	600 m
Size of motor starter, max.		up to 40 °C size acc. to NEMA: 5; up to 60 °C size acc. to NEMA: 4		
Short-circuit protection of the output	Yes; per channel	Yes; via fuse in power module	No; external fusing, max. 6 A quick-acting	No; external fusing, max. 6 A quick-acting
• Response threshold, typ.	2.8 to 7.2 A			
Limitation of inductive shutdown voltage to	-55 to -60 V, L+ ( )	-55 to -60 V	no	no
Lamp load, max.	10 W	100 W		
Zero-crossing switch		Yes; max. 25 V		
Controlling a digital input	Yes	Yes; possible	Yes	Yes
<b>Output voltage</b>				
• for signal "1", min.	L+ (-1.0 V)	Ua - 1.5 V		
<b>Output current</b>				
• for signal "1" rated value	2 A	2 A		
• for signal "1" permissible range for 0 to 60 °C, min.	7 mA	0.1 mA		
• for signal "1" permissible range for 0 to 60 °C, max.	2.4 A	2.2 A		
• for signal "1" minimum load current			8 mA	8 mA
• for signal "0" residual current, max.	0.5 mA	3 mA		
<b>Output delay with resistive load</b>				
• "0" to "1", max.	200 µs	15 ms		
• "1" to "0", max.	1.3 ms	15 ms		
<b>Parallel switching of 2 outputs</b>				
• for increased power	No	No	No	No
• for redundant control of a load	Yes; per module	Yes; per module	No	No
<b>Switching frequency</b>				
• with resistive load, max.	100 Hz	10 Hz	2 Hz	2 Hz
• with inductive load, max.	2 Hz; 0.5 H	0.5 Hz	0.5 Hz	0.5 Hz
• on lamp load, max.	10 Hz	1 Hz	2 Hz	2 Hz
<b>Aggregate current of the outputs (per group)</b>				
• horizontal installation				
• up to 40 °C, max.		2 A		
• up to 50 °C, max.		1.5 A		
• up to 60 °C, max.	4 A	1 A		
<b>Load impedance range</b>				
• lower limit	12 Ω			
• upper limit	3,400 Ω			
<b>Relay outputs</b>				
Switching capacity of the contacts				
• Thermal continuous current, max.			5 A	5 A

# ET 200 distributed I/Os

## ET 200S

### Digital electronic modules

#### Technical specifications (continued)

	6ES7 132-4BD31-0AA0	6ES7 132-4FB00-0AB0	6ES7 132-4HB01-0AB0	6ES7 132-4HB10-0AB0
<b>Parameter</b>				
Remark	1 byte	3 bytes	3 bytes	3 bytes
Behavior on CPU/Master STOP, channel-wise		Substitute a value / keep last value	Substitute a value / keep last value	
<b>Status information/alarms/diagnostics</b>				
Substitute values connectable		Yes; 0/1	Yes; 0/1	Yes; 0/1
Diagnoses				
• Diagnostic functions	No	No	No	No
Diagnoses indication LED				
• Status indicator digital output (green)	Yes	Yes	Yes	Yes
<b>Isolation</b>				
Isolation checked with	500 V DC	2500 V DC		
tested with				
• Channels against backplane bus and load voltage L+			1500 V AC	2500 V DC
• Load voltage L+ against backplane bus			500 V DC	500 V DC
<b>Isolation</b>				
Isolation, digital outputs				
• between the channels	No	No	Yes	Yes
• between the channels and the backplane bus	Yes	Yes	Yes	Yes
• between the channels and the load voltage L+			Yes	Yes
<b>Dimensions and weight</b>				
Width	15 mm	15 mm	15 mm	15 mm
Height	81 mm	81 mm	81 mm	81 mm
Depth	52 mm	52 mm	52 mm	52 mm
<b>Weights</b>				
Weight, approx.	40 g	37 g	50 g	50 g

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Ordering data	Order No.	Order No.
<b>Digital input modules</b>		
Ordering unit 5 pieces		
• 2 DI 24 V DC Standard	<b>6ES7 131-4BB01-0AA0</b>	
• 2 DI 24 V DC High Feature	<b>6ES7 131-4BB01-0AB0</b>	
• 4 DI 24 V DC Standard	<b>6ES7 131-4BD01-0AA0</b>	
• 4 DI 24 V DC High Feature	<b>6ES7 131-4BD01-0AB0</b>	
• 2 DI 120 V AC	<b>6ES7 131-4EB00-0AB0</b>	
• 2 DI 230 V AC	<b>6ES7 131-4FB00-0AB0</b>	
• 4 DI 24 ... 48 V UC	<b>6ES7 131-4CD00-0AB0</b>	
• 4 DI 24 V DC SOURCE INPUT	<b>6ES7 131-4BD51-0AA0</b>	
Ordering unit 1 piece		
• 4 DI 24 V DC NAMUR	<b>6ES7 131-4RD00-0AB0</b>	
<b>Digital output modules</b>		
Ordering unit 5 pieces		
• 2 DO 24 V DC/0.5 A Standard	<b>6ES7 132-4BB01-0AA0</b>	
• 2 DO 24 V DC/0.5 A High Feature	<b>6ES7 132-4BB01-0AB0</b>	
• 2 DO 24 V DC/2 A Standard	<b>6ES7 132-4BB31-0AA0</b>	
• 2 DO 24 V DC/2 A High Feature	<b>6ES7 132-4BB31-0AB0</b>	
• 4 DO 24 V DC/0.5 A Standard	<b>6ES7 132-4BD01-0AA0</b>	
• 4 DO 24 V DC/2 A Standard	<b>6ES7 132-4BD31-0AA0</b>	
• 2 DO 24 ... 230 V AC/1 A	<b>6ES7 132-4FB00-0AB0</b>	
• 2 DO 24 V DC ... 230 V AC/5 A relay, NO contact	<b>6ES7 132-4HB01-0AB0</b>	
• 2 DO 24 ... 48 V DC to 230 V AC/5 A relay, changeover contact	<b>6ES7 132-4HB10-0AB0</b>	
<b>Accessories</b>		
<b>Label sheets DIN A4 (10 pieces)</b>		
Each sheet contains 60 label strips for peripheral modules and 20 label strips for interface modules		
• petrol		<b>6ES7 193-4BH00-0AA0</b>
• red		<b>6ES7 193-4BD00-0AA0</b>
• yellow		<b>6ES7 193-4BB00-0AA0</b>
• light beige		<b>6ES7 193-4BA00-0AA0</b>

# ET 200 distributed I/Os

## ET 200S

### Analog electronic modules

#### Overview



- Analog inputs and outputs for the ET 200S
- Can be plugged onto TM-E terminal modules with automatic coding
- High-feature versions with enhanced performance, precision and resolution
- Hot swapping of modules possible



Note:  
Consult the configuring guide for selection of the appropriate TM-E terminal modules.

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#### Design

##### Possible combinations of the TM-E terminal modules and analog modules

Electronic modules	Terminal modules TM-E for electronic modules						
Screw-type terminal	→ <b>15S26-A1</b>	<b>15S24-A1</b>	<b>15S24-01</b>	<b>15S23-01</b>	<b>15S24-AT</b>	<b>30S44-01</b>	<b>30S46-A1</b>
Order No. 6ES7 193-...	→ 4CA40-0AA0	4CA20-0AA0	4CB20-0AA0	4CB00-0AA0	4CL20-0AA0	4CG20-0AA0	4CF40-0AA0
Spring-loaded terminal	→ <b>15C26-A1</b>	<b>15C24-A1</b>	<b>15C24-01</b>	<b>15C23-01</b>	<b>15C24-AT</b>	<b>30C44-01</b>	<b>30C46-A1</b>
Order No. 6ES7 193-...	→ 4CA50-0AA0	4CA30-0AA0	4CB30-0AA0	4CB10-0AA0	4CL30-0AA0	4CG30-0AA0	4CF50-0AA0
FastConnect	→ <b>15N26-A1</b>	<b>15N24-A1</b>	<b>15N24-01</b>	<b>15N23-01</b>	-	-	-
Order No. 6ES7 193-...	→ 4CA80-0AA0	4CA70-0AA0	4CB70-0AA0	4CB60-0AA0			
2AI U ST 2AI U HF	■	■	■	■			
2AI I 2WIRE ST	■	■	■	■			
AI I 2WIRE ST	■		■				
2AI I 2/4WIRE HF	■		■				
2 AI I 4WIRE ST	■		■				
2AI RTD ST	■		■				
2AI RTD HF	■	■	■	■			
2 AI TC ST	■	■	■	■			
2 AI TC HF					■		
2AO U ST 2AO U HF	■		■				
2 AO I ST 2AO I HF	■	■	■	■			
4 IQ-SENSE	■		■				

Technical specifications

	6ES7 134-4FB01-0AB0	6ES7 134-4GB01-0AB0	6ES7 134-4GB11-0AB0	6ES7 134-4GD00-0AB0	6ES7 134-4JB00-0AB0
<b>Voltages and currents</b>					
Load voltage L+					
• Rated value (DC)	24 V; from the power module	24 V; from the power module	24 V; from the power module	24 V; from the power module	24 V; from the power module
• reverse polarity protection	Yes	Yes; Destruction limit 35 mA per channel		Yes	Yes
Voltage supply to the transducers					
• present				Yes	
• short-circuit proof				Yes; approx. 200 mA for module	
<b>Current consumption</b>					
from load voltage L+ (without load), max.	30 mA	80 mA	30 mA	125 mA	30 mA
from backplane bus DC 3.3 V, max.	10 mA	10 mA	10 mA	10 mA	10 mA
Power loss, typ.	0.6 W	0.6 W	0.6 W	0.6 W	0.6 W
<b>Address area</b>					
Address space per module					
• Address space per module, max.	4 Byte	4 Byte	4 Byte	8 Byte	4 Byte
<b>Isochronous mode</b>					
Isochronous mode	No	No	No	No	No
<b>Analog inputs</b>					
Number of analog inputs	2	2	2	4	2
cable length, shielded, max.	200 m	200 m	200 m	200 m	50 m
permissible input frequency for voltage input (destruction limit), max.	35 V; 35 V permanent, 75 V for max. 1 ms (pulse duty factor 1:20)				10 V; permanent
permissible input current for current input (destruction limit), max.		40 mA	40 mA	30 mA; limited electronically	
Cycle time (all channels) max.	Number of active channels per module x conversion time	Number of active channels per mod- ule x conversion time	Number of active channels per mod- ule x conversion time	40 ms; 33 to 40 ms	
Input ranges (rated values), voltages					
• Voltage	Yes				Yes
• 1 to 5 V	Yes				
• -10 V to +10 V	Yes				
• -5 V to +5 V	Yes				
• -80 mV to +80 mV					Yes
• Input resistance (-80 mV to +80 mV)					1 MΩ
Input ranges (rated values), currents					
• Current		Yes	Yes	Yes	
• -20 to +20 mA			Yes; 50 ohms		
• 4 to 20 mA		Yes; on 50 ohms	Yes; 50 ohms	Yes; on 25 ohms	

# ET 200 distributed I/Os

## ET 200S

### Analog electronic modules

#### Technical specifications (continued)

	6ES7 134-4FB01-0AB0	6ES7 134-4GB01-0AB0	6ES7 134-4GB11-0AB0	6ES7 134-4GD00-0AB0	6ES7 134-4JB00-0AB0
Input ranges (rated values), thermoelements					
<ul style="list-style-type: none"> <li>• thermocouple</li> <li>• Type B</li> <li>• Input resistance (Type B)</li> <li>• Type E</li> <li>• Input resistance (Type E)</li> <li>• Type J</li> <li>• Input resistance (type J)</li> <li>• Type K</li> <li>• Input resistance (Type K)</li> <li>• Type L</li> <li>• Input resistance (Type L)</li> <li>• Type N</li> <li>• Input resistance (Type N)</li> <li>• Type R</li> <li>• Input resistance (Type R)</li> <li>• Type S</li> <li>• Input resistance (Type S)</li> <li>• Type T</li> <li>• Input resistance (Type T)</li> </ul>					Yes Yes 1 M $\Omega$ Yes 1 M $\Omega$ Yes 1 M $\Omega$ Yes 1 M $\Omega$ Yes 1 M $\Omega$ Yes 1 M $\Omega$ Yes 1 M $\Omega$ Yes 1 M $\Omega$ Yes 1 M $\Omega$
Characteristic linearization					Yes; Type E, N, J, K, L, S, R, B, T to IEC 584
Temperature compensation <ul style="list-style-type: none"> <li>• external temperature compensation with compensations socket</li> </ul>					Yes; possible, one external compensating box per channel
<b>Analog value creation</b>					
Measurement principle	integrating	integrating	integrating		integrating
Integrations and conversion time/resolution per channel					
<ul style="list-style-type: none"> <li>• Resolution with overload area (bit including sign), max.</li> <li>• Integration time, parameterizable</li> <li>• Integration time, ms</li> <li>• Interference voltage suppression for interference frequency f1 in Hz</li> <li>• Conversion time (per channel)</li> </ul>	14 Bit; +/-10 V: 13 bits + sign, +/-5 V: 13 bits + sign, 1 to 5 V: 13 bits	13 Bit; 4 to 20 mA: 13 bits	14 Bit; +/-20 mA: 14 bits; 4 to 20 mA: 13 bits	13 Bit; 4 to 20 mA: 13 bits	16 Bit; 15 bit + sign
	66 ms / 20 ms	66 ms / 20 ms	66 ms / 20 ms	66 ms / 20 ms	66 ms / 20 ms
	60 / 50 Hz	60 / 50 Hz	60 / 50 Hz	60 / 50 Hz	60 / 50 Hz
	65 ms; 55 / 65 ms	65 ms; 55 / 65 ms	65 ms; 55 / 65 ms		65 ms; 55 / 65 ms (additional 20 ms on activated wire-break test)
Smoothing of measured values					
<ul style="list-style-type: none"> <li>• parameterizable</li> <li>• Level: none</li> <li>• Level: weak</li> <li>• Level: middle</li> <li>• Level: strong</li> </ul>	Yes; in four stages by means of digital filtering  Yes; 1 x cycle time Yes; 4x cycle time Yes; 32x cycle time Yes; 64x cycle time	Yes; in four stages by means of digital filtering  Yes; 1 x cycle time Yes; 4x cycle time Yes; 32x cycle time Yes; 64x cycle time	Yes; in four stages by means of digital filtering  Yes; 1 x cycle time Yes; 4x cycle time Yes; 32x cycle time Yes; 64x cycle time	Yes; in 4 stages  Yes; 1 x cycle time Yes; 4x cycle time Yes; 16x cycle time Yes; 32x cycle time	Yes; in four stages by means of digital filtering  Yes; 1 x cycle time Yes; 4x cycle time Yes; 32x cycle time Yes; 64x cycle time
<b>Encoder</b>					
Connection of signal encoders					
<ul style="list-style-type: none"> <li>• for voltage measurement</li> <li>• Burden of 2-wire transmitter, max.</li> </ul>		750 $\Omega$	750 $\Omega$	750 $\Omega$	Yes

Technical specifications (continued)

	6ES7 134-4FB01-0AB0	6ES7 134-4GB01-0AB0	6ES7 134-4GB11-0AB0	6ES7 134-4GD00-0AB0	6ES7 134-4JB00-0AB0
<b>Errors/accuracies</b>					
Linearity error (relative to input area)	+/- 0,01 %	+/- 0,01 %	+/- 0,01 %	+/- 0,01 %	+/- 0,01 %
Temperature error (relative to input areas)	+/- 0,01 %/K	+/- 0,005 %/K	+/- 0,005 %/K	+/- 0,003 %/K	+/- 0,005 %/K
Crosstalk between the inputs, min.	-50 dB	-50 dB	-50 dB	-50 dB	-50 dB
Repeat accuracy in settled status at 25 °C (relative to input area)	+/- 0,05 %	+/- 0,05 %	+/- 0,05 %	+/- 0,05 %	+/- 0,05 %
Operational limit in overall temperature range					
• Voltage, relative to input area	+/- 0,6 %				+/- 0,6 %
• Current, relative to input area		+/- 0,6 %	+/- 0,6 %	+/- 0,4 %	
Basic error limit (operational limit at 25 °C)					
• Voltage, relative to input area	+/- 0,4 %				+/- 0,4 %
• Current, relative to input area		+/- 0,4 %	+/- 0,4 %	+/- 0,3 %	
Interference voltage suppression for $f = n \times (f_l \pm 1 \%)$ , $f_l$ = interference frequency					
• Series mode interference (peak value of interference < rated value of input range), min.	70 dB	70 dB	70 dB	70 dB	70 dB
• common mode voltage (USS < 2.5 V), min.	90 dB				90 dB
<b>Parameter</b>					
Remark	4 bytes	4 bytes	4 bytes	7 bytes	4 bytes
Diagnosis: wire break	inhibit/enable (measuring range 1 to 5 V only)		disable / enable, (only in measuring range 4 to 20 mA)	Yes	inhibit/enable (a break in the wire is only detected on thermocouples)
Measurement type/range	deactivated / +/-5 V / 1 to 5 V / +/-10 V	deactivated / 4 to 20 mA	deactivated / 4 to 20 mA / +/- 20 mA	Yes	Deactivated/ +/- 80 mV; +/- 250 mV / +/- 500 mV /; +/- 1 V /; 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
Collective diagnostics	disable/enable	disable/enable	disable/enable	Yes	disable/enable
Slot comparison point 1 to 8					disable/enable
Overflow/underflow	disable/enable	disable/enable	disable/enable	Yes	disable/enable
Comparison point					none / RTD
Comparison point number					none / 1 / 2 / 3 / 4 / 5 / 6 / 7 / 8
Unit					Celsius

# ET 200 distributed I/Os

## ET 200S

### Analog electronic modules

#### Technical specifications (continued)

	6ES7 134-4FB01-0AB0	6ES7 134-4GB01-0AB0	6ES7 134-4GB11-0AB0	6ES7 134-4GD00-0AB0	6ES7 134-4JB00-0AB0
<b>Status information/alarms/diagnostics</b>					
Diagnoses					
• Diagnostic functions				Yes; can be read out	Yes; can be read out
• Wire break	Yes; only measuring range 1 to 5 V	Yes	Yes; only in measuring range 4 to 20 mA	Yes; only in measuring range 1 to 5 V	Yes; A break in the wire is only detected on thermocouples
• Group error	Yes	Yes	Yes	Yes	Yes
• Overflow/underflow	Yes	Yes	Yes	Yes	Yes
Diagnostics indication LED					
• Collective error SF (red)	Yes	Yes	Yes	Yes	Yes
<b>Isolation</b>					
Isolation checked with	500 V DC	500 V DC	500 V DC	500 V DC	500 V DC
<b>Isolation</b>					
Isolation, analog inputs					
• between the channels	No	No	No	No	No
• between the channels and the backplane bus	Yes	Yes	Yes	Yes	Yes
• between the channels and the load voltage L+	Yes	No	No	No	Yes
<b>Permissible potential difference</b>					
between inputs and MANA (UCM)	2 V AC PP				2 V AC PP
between MANA and M internal (UISO)	75 V DC / 60 V AC				75 V DC / 60 V AC
<b>Dimensions and weight</b>					
Width	15 mm	15 mm	15 mm	15 mm	15 mm
Height	81 mm	81 mm	81 mm	81 mm	81 mm
Depth	52 mm	52 mm	52 mm	52 mm	52 mm
<b>Weights</b>					
Weight, approx.	40 g	40 g	40 g	40 g	40 g
	<b>6ES7 134-4JB50-0AB0</b>	<b>6ES7 134-4LB02-0AB0</b>	<b>6ES7 134-4MB02-0AB0</b>	<b>6ES7 134-4NB01-0AB0</b>	<b>6ES7 134-4NB51-0AB0</b>
<b>Voltages and currents</b>					
Load voltage L+					
• Rated value (DC)	24 V; from the power module	24 V	24 V	24 V; from the power module	24 V; from the power module
• reverse polarity protection	Yes	Yes	Yes	Yes	Yes
Voltage supply to the transducers					
• present	Yes	No	Yes		
• short-circuit proof	Yes		Yes		
<b>Current consumption</b>					
from load voltage L+ (without load), max.	30 mA	55 mA	48 mA	30 mA	30 mA
from backplane bus DC 3.3 V, max.	10 mA	10 mA	10 mA	10 mA	10 mA
Power loss, typ.	0.6 W	0.85 W	1.2 W	0.6 W	0.6 W
<b>Address area</b>					
Address space per module					
• Address space per module, max.	4 Byte	4 Byte	4 Byte	4 Byte	4 Byte
<b>Isochronous mode</b>					
Isochronous mode	No	Yes			No

Technical specifications (continued)

	6ES7 134-4JB50-0AB0	6ES7 134-4LB02-0AB0	6ES7 134-4MB02-0AB0	6ES7 134-4NB01-0AB0	6ES7 134-4NB51-0AB0
<b>Analog inputs</b>					
Number of analog inputs	2	2	2	2	2
cable length, shielded, max.	200 m	200 m	200 m	50 m	200 m
permissible input frequency for voltage input (destruction limit), max.	9 V	35 V; 35 V continuous, 75 V for max. 1 ms		20 V; +/- 20 V, permanent	9 V
permissible input current for current input (destruction limit), max.			50 mA		
Constant measurement current for resistance-type transmitter, typ.	1.5 mA				1.25 mA
Cycle time (all channels) max.	Number of active channels per module x conversion time	0.5 ms; 0.5ms for 2 channels without interference suppression 18/21ms per channel with interf.	0.5 ms; 0.5ms for 2 channels without interf. suppression, 18/21ms per channel with interf.		
technical unit for temperature measurement, adjustable				Yes	Yes
Input ranges (rated values), voltages		Yes		Yes	
• Voltage		Yes			
• 1 to 5 V		Yes			
• Input resistance (1 to 5 V)		800 kΩ			
• -10 V to +10 V		Yes			
• Input resistance (-10 V to +10 V)		800 kΩ			
• -5 V to +5 V		Yes			
• Input resistance (-5 V to +5 V)		800 kΩ			
• -80 mV to +80 mV				Yes	
• Input resistance (-80 mV to +80 mV)				1 MΩ	
Input ranges (rated values), currents					
• Current			Yes		
• -20 to +20 mA			Yes		
• 4 to 20 mA			Yes		
Input ranges (rated values), thermoelements					
• thermocouple				Yes	
• Type B				Yes	
• Input resistance (Type B)				1 MΩ	
• Type C				Yes	
• Input resistance (Type C)				1 MΩ	
• Type E				Yes	
• Input resistance (Type E)				1 MΩ	
• Type J				Yes	
• Input resistance (type J)				1 MΩ	
• Type K				Yes	
• Input resistance (Type K)				1 MΩ	
• Type L				Yes	
• Input resistance (Type L)				1 MΩ	
• Type N				Yes	
• Input resistance (Type N)				1 MΩ	
• Type R				Yes	
• Input resistance (Type R)				1 MΩ	
• Type S				Yes	
• Input resistance (Type S)				1 MΩ	
• Type T				Yes	
• Input resistance (Type T)				1 MΩ	

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## ET 200S

### Analog electronic modules

#### Technical specifications (continued)

	6ES7 134-4JB50-0AB0	6ES7 134-4LB02-0AB0	6ES7 134-4MB02-0AB0	6ES7 134-4NB01-0AB0	6ES7 134-4NB51-0AB0
Input ranges (rated values), resistors					
• Impedance	Yes				Yes
• 0 to 150 Ohm	Yes				Yes
• Input resistance (0 to 150 Ohm)	2,000 kΩ				10 MΩ
• 0 to 300 Ohm	Yes				Yes
• Input resistance (0 to 300 Ohm)	2,000 kΩ				10 MΩ
• 0 to 600 Ohm	Yes				Yes
• Input resistance (0 to 600 Ohm)	2,000 kΩ				10 MΩ
• 0 to 3000 Ohm					Yes
• Input resistance (0 to 3000 Ohm)					10 MΩ
Input ranges (rated values), resistance thermometers					
• Resistance thermometer	Yes				Yes
• Cu 10					Yes
• Input resistance (Cu 10)					10 MΩ
• Ni 100	Yes; Standard/AirCon				Yes
• Input resistance (Ni 100)	2,000 kΩ				10 MΩ
• Ni 1000					Yes
• Input resistance (Ni 1000)					10 MΩ
• Ni 120					Yes
• Input resistance (Ni 120)					10 MΩ
• Ni 200					Yes
• Input resistance (Ni 200)					10 MΩ
• Ni 500					Yes
• Input resistance (Ni 500)					10 MΩ
• Pt 100	Yes; Standard/AirCon				Yes
• Input resistance (Pt 100)	2,000 kΩ				10 MΩ
• Pt 1000					Yes
• Input resistance (Pt 1000)					10 MΩ
• Pt 200					Yes
• Input resistance (Pt 200)					10 MΩ
• Pt 500					Yes
• Input resistance (Pt 500)					10 MΩ
Characteristic linearization					
• programmable	Yes; for Pt 100, Ni 100			Yes	Yes; for Ptxxx, Nixxx
• for thermoelements				Type E, N, J, K, L, S, R, B, T, C to IEC 584	
• for thermoresistor	Pt 100 (standard/climate), Ni 100 (standard/climate)				Ptxxxx and Nixxxx
Temperature compensation					
• external temperature compensation with compensations socket				Yes; one external compensating box per channel	
• internal temperature compensation				Yes; possible with TM-E15S24-AT, TM-E15C24-AT	Yes

#### Technical specifications (continued)

	6ES7 134-4JB50-0AB0	6ES7 134-4LB02-0AB0	6ES7 134-4MB02-0AB0	6ES7 134-4NB01-0AB0	6ES7 134-4NB51-0AB0
<b>Analog value creation</b>					
Measurement principle	integrating		Sigma-Delta	integrating	integrating (Sigma-Delta)
Integrations and conversion time/resolution per channel					
<ul style="list-style-type: none"> <li>Resolution with overload area (bit including sign), max.</li> </ul>	16 Bit; 150 Ohm: 14 bit; 300, 600 Ohm: 15 bit; Pt100, Ni100: 16 bit	16 Bit; ...5 V: 15 bit, +/-10 V: 16 bit, +/-5 V: 16 bit	16 Bit; as required	16 Bit	16 Bit; for Pt100, Ni100, Ni120, Pt200, Ni200, Pt 500, Ni 500, Pt 1000, Ni 1000, Cu 10: 15 bits + sign; for 150, 300, 600, 3000 ohms: 15 bits; for PTC: 1 bit
<ul style="list-style-type: none"> <li>Integration time, parameterizable</li> <li>Integration time, ms</li> <li>Interference voltage suppression for interference frequency f1 in Hz</li> <li>Conversion time (per channel)</li> </ul>	Yes 16.7 / 20 ms 60 / 50 Hz 110 ms; 110 / 130 ms	Yes 60 / 50 Hz / no 0.04 ms; without interference suppression 17ms / 20ms per channel with interference	Yes 60Hz / 50Hz / no 0.04 ms; without interference suppression 17ms / 20ms per channel with interference	16.7 / 20 ms 60 / 50 Hz 66 ms; 66 / 80 ms; additional conversion time for diagnostic wire break test	16.7 / 20 ms 60 / 50 Hz
Smoothing of measured values					
<ul style="list-style-type: none"> <li>parameterizable</li> <li>Level: none</li> <li>Level: weak</li> <li>Level: middle</li> <li>Level: strong</li> </ul>	Yes; in four stages by means of digital filtering Yes; 1 x cycle time Yes; 4x cycle time Yes; 32x cycle time Yes; 64x cycle time	Yes; in 4 stages: 1 x , 4 x , 16 x , 32 x cycle time Yes; 1 x Yes; 4 x Yes; 16 x Yes; 32 x	Yes; in 4 stages: 1 x , 4 x , 16 x , 32 x cycle time Yes; 1 x Yes; 4 x Yes; 16 x Yes; 32 x	Yes; in four stages by means of digital filtering Yes; 1 x cycle time Yes; 4x cycle time Yes; 32 x cycle time Yes; 64 x cycle time	Yes; in four stages by means of digital filtering Yes; 1 x cycle time Yes; 4x cycle time Yes; 32x cycle time Yes; 64x cycle time
<b>Encoder</b>					
Connection of signal encoders					
<ul style="list-style-type: none"> <li>for voltage measurement</li> <li>for resistance measurement with 2-conductor connection</li> <li>for resistance measurement with 3-conductor connection</li> <li>for resistance measurement with 4-conductor connection</li> <li>Burden of 2-wire transmitter, max.</li> </ul>	Yes; Line resistances are also measured, jumpers to TR Yes; Line resistances are also measured, jumpers to TR Yes 750 Ω	Yes			Yes  Yes; internal compensation of the line resistances Yes
<b>Errors/accuracies</b>					
Linearity error (relative to input area)	+/- 0,01 %	+/- 0,01 %	+/- 0,03 %	+/- 0.01 %	+/- 0.01 %
Temperature error (relative to input areas)	+/- 0,005 %/K	+/- 0,003 %/K	+/- 0,03 %/K	+/- 0.005 %/K	+/- 0,0009 %/K
Crosstalk between the inputs, min.	-50 dB	-100 dB	-100 dB	-50 dB	-50 dB
Repeat accuracy in settled status at 25 °C (relative to input area)	+/- 0,05 %	+/- 0,01 %	+/- 0,01 %	+/- 0.05 %	+/- 0.05 %

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## ET 200S

### Analog electronic modules

#### Technical specifications (continued)

	6ES7 134-4JB50-0AB0	6ES7 134-4LB02-0AB0	6ES7 134-4MB02-0AB0	6ES7 134-4NB01-0AB0	6ES7 134-4NB51-0AB0
Operational limit in overall temperature range					
<ul style="list-style-type: none"> <li>Voltage, relative to input area</li> </ul>		+/- 0,1 %; 0.2% without interference frequency suppression		+/- 0.1 %; +/- 1.5 K for thermocouples, +/- 7 K for thermocouples type C, +/- 2,5 K with static thermal state (ambient temperature change < 0.3 K/min)	
<ul style="list-style-type: none"> <li>Current, relative to input area</li> </ul>			+/- 0,1 %; 0.2% without interference frequency suppression		
<ul style="list-style-type: none"> <li>Resistance-type thermometer, relative to input area</li> </ul>	+/- 0,6 %				Resistance sensors: +/-0.1%; Pt100, Pt200, Pt500, Pt1000 standard: +/-1.0K; Pt100, Pt200, Pt500, Pt1000 climatic: +/-0,25K; Ni100, Ni120, Ni200, Ni500, Ni 1000 standard and climatic: +/-0,4K; Cu10 +/-1,5K
Basic error limit (operational limit at 25 °C)					
<ul style="list-style-type: none"> <li>Voltage, relative to input area</li> </ul>		+/- 0,05 %; 0.1% without interference frequency suppression		+/- 0.05 %; +/- 1 K with thermocouples, +/- 5 K with thermocouples type C, +/- 1.5 K with static thermal state (ambient temperature change < 0.3 K/min)	
<ul style="list-style-type: none"> <li>Current, relative to input area</li> </ul>			+/- 0,05 %; 0.1% without interference frequency suppression		
<ul style="list-style-type: none"> <li>Resistance-type thermometer, relative to input area</li> </ul>	+/- 0,4 %				Resistance sensors: +/-0.05%; Pt100, Pt200, Pt500, Pt1000 standard: +/-0.6K; Pt100, Pt200, Pt500, Pt1000 climatic: +/-0.13K; Ni100, Ni120, Ni200, Ni500, Ni 1000 Standard and climatic: +/-0.2K; Cu10 +/-1K
Interference voltage suppression for $f = n \times (fl \pm 1 \%)$ , $fl =$ interference frequency					
<ul style="list-style-type: none"> <li>Series mode interference (peak value of interference &lt; rated value of input range), min.</li> </ul>	70 dB	90 dB	90 dB	70 dB	70 dB
<ul style="list-style-type: none"> <li>common mode voltage (USS &lt; 2.5 V), min.</li> </ul>	90 dB	100 dB	100 dB	90 dB	90 dB
<b>Parameter</b>					
Remark	4 bytes	12 bytes, 4 bytes in compatibility mode	12 bytes, 4 bytes in compatibility mode	4 bytes	7 bytes
Diagnosis: wire break	disable/enable (wire break is detected only on constant current lines)		disable / enable	inhibit/enable (a break in the wire is only detected on thermocouples)	disable/enable

#### Technical specifications (continued)

	6ES7 134-4JB50-0AB0	6ES7 134-4LB02-0AB0	6ES7 134-4MB02-0AB0	6ES7 134-4NB01-0AB0	6ES7 134-4NB51-0AB0
Measurement type/range	deactivated/ 150 Ohm; 300 Ohm/600 Ohm/ Pt100 air con/ Pt100 standard; Ni100 standard / Ni100 air con-	deactivated / +/-5 V / 1 to 5 V / +/-10 V	deactivated / +/- 20mA 4 to 20 mA	Deactivated/ +/- 80 mV; TC-EL type T (Cu-CuNi)/ TC-EL type K (NiCr-Ni)/ TC-EL type B; (PtRh-PtRh); TC-EL type c (Wer-Wer); 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	deactivated/ 150 ohms/ 300 ohms/ 600 ohms/ 300 ohms/ Pt100/ Pt200/ Pt500/ Pt1000 each stan- dard or climate range/ Ni100/ Ni120/ Ni200/ Ni500/ Ni1000 each standard or climate range/ Cu10 each standard or climate range / PTC
Collective diagnostics	disable/enable	disable/enable	disable / enable	disable/enable	disable/enable
Overflow/underflow	disable/enable	disable/enable	disable / enable	disable/enable	disable/enable
Comparison point				none / yes, internal	
Unit				Celsius / Fahrenheit	
<b>Status information/alarms/ diagnostics</b>					
Alarms					
• Process alarm		Yes	Yes		
Diagnoses					
• Diagnostic functions	Yes; can be read out	Yes	Yes		
• Wire break	Yes; A wire break is only detected on constant current lines	Yes; only measuring range 1to 5V	Yes; only in measur- ing range 4 to 20 mA	Yes; only thermo- couples	Yes
• Group error	Yes	Yes	Yes	Yes	Yes
• Overflow/underflow	Yes	Yes	Yes	Yes	Yes
Diagnostics indication LED					
• Collective error SF (red)	Yes	Yes	Yes	Yes	Yes
<b>Isolation</b>					
Isolation checked with	500 V DC	500 V DC		500 V DC	500 V DC
<b>Isolation</b>					
Isolation, analog inputs					
• between the channels	No	No; Functional, yes	No; Functional, yes	No	No
• between the channels and the backplane bus	Yes	Yes	Yes	Yes	Yes
• between the channels and the load voltage L+	Yes	Yes	Yes	Yes	Yes
<b>Permissible potential difference</b>					
between the inputs (UCM)		140 V DC/100 V AC			
between inputs and MANA (UCM)				140 V DC/100 V AC	
between MANA and M internal (UISO)	75 V DC / 60 V AC			75 V DC / 60 V AC	75 V DC / 60 V AC
<b>Dimensions and weight</b>					
Width	15 mm	15 mm	15 mm	15 mm	15 mm
Height	81 mm	81 mm	81 mm	81 mm	81 mm
Depth	52 mm	52 mm	52 mm	52 mm	52 mm
Module width, max.		15 mm	15 mm		
<b>Weights</b>					
Weight, approx.	40 g	45 g	45 g	40 g	40 g

# ET 200 distributed I/Os

## ET 200S

### Analog electronic modules

#### Technical specifications (continued)

	6ES7 135-4FB01-0AB0	6ES7 135-4GB01-0AB0	6ES7 135-4LB02-0AB0	6ES7 135-4MB02-0AB0
<b>Voltages and currents</b>				
Load voltage L+				
• Rated value (DC)	24 V; from the power module	24 V; from the power module	24 V	24 V
• reverse polarity protection	Yes	Yes	Yes	Yes
<b>Current consumption</b>				
from load voltage L+ (without load), max.	130 mA	150 mA	80 mA	80 mA
from backplane bus DC 3.3 V, max.	10 mA	10 mA	10 mA	10 mA
Power loss, max.	2 W	2 W	1.2 W	1.2 W
<b>Address area</b>				
Address space per module				
• Address space per module, max.	4 Byte	4 Byte	4 Byte	4 Byte
<b>Isochronous mode</b>				
Isochronous mode			Yes	Yes
<b>Analog outputs</b>				
Number of analog outputs	2	2	2	2
cable length, shielded, max.	200 m	200 m	200 m; 100m if Twa < 2ms	200 m; 100m if Twa < 2ms
Voltage output, Short-circuit protection	Yes		Yes	
Voltage output, short-circuit current, max..	25 mA		25 mA	
Current output, no-load voltage, max.		18 V		18 V
Cycle time (all channels) max.	1.5 ms	1.5 ms	0.5 ms; at max. 0.5µF	0.5 ms
Output ranges, voltage				
• 1 to 5 V	Yes		Yes; -5 to +5V also implemented	
• -10 to +10 V	Yes		Yes	
Output ranges, current				
• -20 to +20 mA		Yes		Yes
• 4 to 20 mA		Yes		Yes
Connection of actuators				
• for voltage output 2-conductor connection	Yes; without compensation of the line resistances		Yes	
• for voltage output 4-conductor connection	Yes		Yes	
• for current output 2-conductor connection		Yes		Yes
• for current output 4-conductor connection		No		No
Load impedance (in rated range of output)				
• with voltage outputs, min.	1 kΩ		1 kΩ	
• with voltage outputs, capacitive load, max.	1 µF		0.5 µF	
• with current outputs, max.		500 Ω		500 Ω
• with current outputs, inductive load, max.		1 mH		1 mH
Destruction limits against externally applied voltages and currents				
• Voltages at the outputs towards MANA	15 V; max. 15 V continuous, 75 V for max. 1 s (pulse duty ratio 1:20)	15 V; max. 15 V continuous, 75 V for max. 1 s (pulse duty ratio 1:20)	15 V; as required	
• Current, max.	50 mA; DC	50 mA; DC		50 mA

Technical specifications (continued)

<b>Analog value creation</b>				
Integrations and conversion time/resolution per channel				
• Resolution with overload area (bit including sign), max.	14 Bit; 1...5 V: 12 bits, +/-10 V: 13 bits + sign	14 Bit; 4 to 20 mA: 13 bits, +/-20 mA: 14 bits	16 Bit; 15 bit + sign	16 Bit
Settling time				
• for resistive load	0.1 ms	0.1 ms	0.2 ms	0.3 ms
• for capacitive load	0.5 ms	0.5 ms	0.5 ms; at max. 0.5µF	1 ms
• for inductive load	0.5 ms	0.5 ms	0.5 ms	0.5 ms
<b>Ex(i) characteristics</b>				
Max. values of output circuits (per channel)				
• U <sub>o</sub> (output no-load voltage), max.		18 V		
<b>Errors/accuracies</b>				
Output ripple (relative to the output area, bandwidth 0 to 50 kHz)	+/- 0,02 %	+/- 0,02 %	+/- 0,02 %	+/- 0,02 %
Linearity error (relative to output area)	+/- 0,02 %	+/- 0,02 %	+/- 0,01 %	+/- 0,01 %
Temperature error (relative to output area)	+/- 0,01 %/K	+/- 0,01 %/K		+/- 0,003 %/K
Crosstalk between the outputs, min.			60 dB	60 dB
Repeat accuracy in settled status at 25 °C (relative to output area)	+/- 0,05 %	+/- 0,05 %	+/- 0,01 %	+/- 0,01 %
Operational limit in overall temperature range				
• Voltage, relative to output area	+/- 0,4 %		+/- 0,1 %	
• Current, relative to output area		+/- 0,5 %		+/- 0,1 %
Basic error limit (operational limit at 25 °C)				
• Voltage, relative to output area	+/- 0,2 %		+/- 0,05 %	
• Current, relative to output area		+/- 0,3 %		+/- 0,05 %
<b>Parameter</b>				
Remark	7 bytes	7 bytes	7 bytes	7 bytes
Output type/range	deactivated / 1 to 5 V / +/-10 V	deactivated / 4 to 20 mA / +/-20 mA	deactivated / to 5V / +/- 10V / +/- 5V	deactivated / 4 to 20mA / +/- 20mA
Diagnosis: wire break		disable/enable		disable / enable
Diagnosis: short circuit	disable/enable		disable / enable	
Interference frequency suppression			no	disable / enable
Collective diagnostics	disable/enable	disable/enable	disable / enable	disable / enable
Behavior on CPU/Master STOP	Output current and de-energized/substitute a value/keep last value	Output current and de-energized/substitute a value/keep last value	Output current and voltage-free /replacement value / keep last value	Output current and de-energized/substitute a value/keep last value
<b>Status information/alarms/diagnostics</b>				
Substitute values connectable	Yes; 0 to 65535 (range of values must be within the rated range)	Yes; 0 to 65535 (range of values must be within the rated range)	Yes	Yes
Diagnoses				
• Diagnostic information readable			Yes	Yes
• Wire break		Yes		Yes
• Short circuit	Yes		Yes	
• Group error	Yes	Yes	Yes	Yes
Diagnostics indication LED				
• Collective error SF (red)	Yes	Yes	Yes	Yes

# ET 200 distributed I/Os

## ET 200S

### Analog electronic modules

#### Technical specifications (continued)

	6ES7 135-4FB01-0AB0	6ES7 135-4GB01-0AB0	6ES7 135-4LB02-0AB0	6ES7 135-4MB02-0AB0
<b>Isolation</b>				
Isolation checked with			500 V DC	500 V DC
<b>Isolation</b>				
Isolation, analog outputs				
• Galvanic isolation, analog outputs				Yes
• between the channels	No	No	No	No
• between the channels and the backplane bus	Yes	Yes	Yes	Yes
• between the channels and the load voltage L+	Yes	Yes	Yes	Yes
<b>Permissible potential difference</b>				
between MANA and M internal (UISO)	75 V DC / 60 V AC	75 V DC / 60 V AC	75V DC / 60V AC	75 V DC / 60 V AC
<b>Dimensions and weight</b>				
Width	15 mm	15 mm	15 mm	15 mm
Height	81 mm	81 mm	81 mm	81 mm
Depth	52 mm	52 mm	52 mm	52 mm
<b>Weights</b>				
Weight, approx.	40 g	40 g	40 g	40 g

#### Ordering data

##### Analog input modules

Ordering unit 1 piece

- 2 AI U Standard
- 2 AI U High Feature
- 2 AI I Standard 2-wire
- 2 AI I Standard 4-wire
- 2 AI I High Feature 2-wire/4-wire (15-bit + sign)
- 2 AI RTD standard
- 2 AI TC standard
- 2 AI RTD High Feature
- 2 AI TC High Feature
- 4 AI Standard 2-wire

6ES7 134-4FB01-0AB0  
6ES7 134-4LB02-0AB0  
6ES7 134-4GB01-0AB0  
6ES7 134-4GB11-0AB0  
6ES7 134-4MB02-0AB0  
6ES7 134-4JB50-0AB0  
6ES7 134-4JB00-0AB0  
6ES7 134-4NB51-0AB0  
6ES7 134-4NB01-0AB0  
6ES7 134-4GD00-0AB0

##### Analog output modules

Ordering unit 1 piece

- 2 AO U Standard
- 2 AO U High Feature
- 2 AO I Standard
- 2 AO I High Feature

6ES7 135-4FB01-0AB0  
6ES7 135-4LB02-0AB0  
6ES7 135-4GB01-0AB0  
6ES7 135-4MB02-0AB0

#### Order No.

##### Accessories for labeling

##### Label sheets DIN A4 (10 pieces)

Each sheet contains 60 label strips for peripheral modules and 20 label strips for interface modules

- petrol
- red
- yellow
- light beige

6ES7 193-4BH00-0AA0  
6ES7 193-4BD00-0AA0  
6ES7 193-4BB00-0AA0  
6ES7 193-4BA00-0AA0

##### Accessories for system-integrated shield connection

##### Shield connection element

Ordering unit 5 pieces  
For plugging into TM-E and TM-P

6ES7 193-4GA00-0AA0

##### Shield clamps

Ordering unit 5 pieces  
For 3 × 10 mm busbars

6ES7 193-4GB00-0AA0

##### Grounding terminal

Ordering unit 1 piece  
For cable cross-sections up to 25 mm<sup>2</sup>

8WA2 868

##### 3 × 10 mm busbars

Ordering unit 1 piece

8WA2 842

### Overview



The fail-safe SIMATIC S7 CPUs, plus the fail-safe signal modules of SIMATIC ET 200S / ET200 / 200pro/ ET200eco and ET200M have been specially developed for distributed applications in manufacturing systems. Thanks to the discrete structure of the F 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;
- Hybrid configurations of F modules (F stands for fail-safe) and standard modules in a station;
- Single-bus concept, F signals and standard signals are transferred over one bus medium (PROFIBUS DP, PROFINET).

### *Totally Integrated Automation (TIA)*

Safety technology (Safety Integrated) is a component of Totally Integrated Automation resulting in the total integration of safety and standard automation (SIMATIC S7).

Whereas today, standard automation (conventional PLCs) and safety automation (electromechanics) are still separate, these two worlds are growing closer together to form one uniform, integrated overall system.

Siemens can therefore present itself as a complete supplier for automation engineering for which safety technology is part of the standard automation and uniformity exists throughout the complete system.

# ET 200 distributed I/Os

## ET 200S – Fail-safe Modules

### PM-E F PROFIsafe F power module

#### Overview

Fail-safe PM-E F PROFIsafe power modules for safety shutdown of standard digital output modules.

- Up to 2 fail-safe digital outputs onboard (source/sink outputs, up to 2A, up to SIL3/Cat. 4)
- The standard digital output modules can be shut down up to Cat.3 (EN 954) and SIL 2 (IEC61508) up to 10 A. The following modules can be used down-circuit of the power modules.
  - 2DO / 0.5 A ST 6ES7 132-4BB01-0AA0
  - 2 DO / 2 A ST 6ES7 132-4BB31-0AA0
  - 2 DO / 0.5 A HF 6ES7 132-4BB01-0AB0
  - 2 DO / 2 A HF 6ES7 132-4BB31-0AB0
  - 4 DO / 0.5 A ST 6ES7 132-4BD01-0AA0
  - 4 DO / 2 A ST 6ES7 132-4BD31-0AA0

The modules support PROFIsafe, both in PROFIBUS, and in PROFINET configurations. They can be used with all fail-safe SIMATIC S7-CPU's.

#### Technical specifications

	6ES7 138-4CF01-0AB0
<b>Power supply</b>	
Current carrying capacity	
- Current carrying capacity up to 40 °C, max.	10 A;
- Current carrying capacity up to 60 °C, max.	6 A for vertical installation
<b>Voltages and currents</b>	
Load voltage L+	
- Rated value (DC)	24 V
- Short-circuit protection	Yes; electronic
- Reverse polarity protection	No
<b>Parameters</b>	
• Comment	20 byte
• No load voltage	inhibit/enable
• Load voltage	DC
<b>Status information/ interrupts/ diagnostics</b>	
Diagnostics	
- Diagnostics	Yes
Diagnostic display LED	
- Rated load voltage PWR (green)	Yes
- Group fault SF (red)	Yes
- Status display digital output (green)	Yes
<b>Dimensions and weight</b>	
• Weight, approx.	88 g
• Width	30 mm

#### Ordering data

#### Order No.

##### Power module PM-E F pm PROFIsafe, 24 V DC

6ES7 138-4CF02-0AB0

For safe shutdown of digital output modules

##### Power module PM-E F pp PROFIsafe, 24 V DC

6ES7 138-4CF41-0AB0

For safe shutdown of digital output modules

#### Accessories

##### IM 151-1 HIGH FEATURE interface module

6ES7151-1BA01-0AB0

For ET 200S; data transmission rate up to 12 Mbit/s; data volumes 244 byte each for I/O, up to 63 modules can be connected; connection of PROFIsafe modules, isochronous mode; bus connection via 9-pin Sub-D incl. terminating module

##### Terminal modules for power modules

##### TM-P30S44-A0

6ES7 193-4CK20-0AA0

Ordering unit 1 item  
7 x 2 terminals, terminal access to AUX1 bus, AUX1 interrupted to the left, screw-type terminals for PM-E F PROFIsafe

##### TM-P30C44-A0

6ES7 193-4CK30-0AA0

Ordering unit 1 item  
7 x 2 terminals, terminal access to AUX1 bus, AUX1 interrupted to the left, spring-loaded terminals for PM-E F PROFIsafe

##### Distributed Safety V5.4 programming tool

#### Task:

Software for configuring fail-safe user programs for SIMATIC S7-300F, S7-400F, ET 200S

#### Requirement:

STEP 7 V5.3 SP3 and higher

Floating license

6ES7 833-1FC02-0YA5

Software Update Service

6ES7 833-1FC00-0YX2

##### Distributed Safety Upgrade

6ES7 833-1FC02-0YE5

From V5.x to V5.3; Floating license for 1 user

##### SIMATIC Manual Collection

6ES7 998-8XC01-8YE0

Electronic manuals on CD-ROM, five languages: S7-200/300/400, C7, LOGO!, SIMATIC DP, PC, PG, STEP 7, engineering software, runtime software, PCS 7, SIMATIC HMI, SIMATIC NET

##### SIMATIC Manual Collection update service for 1 year

6ES7 998-8XC01-8YE2

### Overview



Digital inputs/outputs for the fail-safe SIMATIC S7 systems

Fail-safe digital input module

- For fail-safe reading of sensor information (1 or 2 channels)
- Provides integral discrepancy evaluation for 2-out-of-2 signals
- 2 internal sensor supplies (incl. test function) onboard

Fail-safe digital output module

- 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 Cat. 4 (EN 954-1) and up to SIL 3 (IEC 61508).

The modules support PROFIsafe, both in PROFIBUS, and in PROFINET configurations.

They can be used with all fail-safe SIMATIC S7 CPUs.

### Technical specifications

	6ES7 138-4FA02-0AB0
<b>Supply voltages</b>	
Rated value	
• DC 24 V	Yes
• permissible range, lower limit (DC)	20.4 V
• permissible range, upper limit (DC)	28.8 V
• Reverse polarity protection	No
<b>Current consumption</b>	
Power loss, typ.	4 W
<b>Address area</b>	
Occupied address area	
• Outputs	4 Byte
• Inputs	6 Byte
<b>Digital inputs</b>	
Number of digital inputs	8; 8 single channel, 4 two-channel
Number of simultaneously controllable inputs	8
Cable length	
• cable length, shielded, max.	200 m
• Cable length unshielded, max.	200 m
Input characteristic curve to IEC 1131, Typ 1	Yes
Input voltage	
• Rated value, DC	24 V
• for signal "0"	-30 to 5 V
• for signal "1"	15 to 30 V
Input current	
• for signal "1", typ.	3.7 mA
Input delay (for rated value of input voltage)	
• for standard inputs	Yes
- programmable	Yes
- at "0" to "1", min.	0.3 ms
- at "0" to "1", max.	17 ms
- at "1" to "0", min.	0.3 ms
- at "1" to "0", max.	17 ms

	6ES7 138-4FA02-0AB0
<b>Encoder supply</b>	
Number of outputs	2
Output voltage	min. L+ (-1.5V)
Output current, rated value	300 mA
Output current, permissible range	0 to 300 mA
Short-circuit protection	Yes; electronic (response threshold 0.7 A to 1.8 A)
<b>Encoder</b>	
Connectable encoders	
• 2-wire Beros	No
<b>Status information/alarms/diagnostics</b>	
Diagnoses	
• Diagnostic functions	Yes
Diagnostics indication LED	
• Collective error SF (red)	Yes
• Status indicator digital input (green)	Yes
<b>Isolation</b>	
Galvanic isolation, digital inputs	
• between the channels	No
• between the channels and the backplane bus	Yes
• between the channels and the load voltage L+	No
<b>Standards, approvals, certificates</b>	
Highest safety class achievable in safety mode	
• to EN 954	Cat. 3 (single channel), Cat. 4 (two-channel)
• to IEC 61508	SIL 2 (single channel), SIL 3 (two-channel)
<b>Dimensions and weight</b>	
Width	30 mm
Height	81 mm
Depth	52 mm
<b>Weights</b>	
Weight, approx.	78 g

# ET 200 distributed I/Os

## ET 200S – Fail-safe Modules

### F electronic modules

#### Technical specifications (continued)

	6ES7 138-4FB02-0AB0
<b>Voltages and currents</b>	
Load voltage L+	
• Rated value (DC)	24 V
• reverse polarity protection	No
<b>Current consumption</b>	
from load voltage L+ (without load), max.	typically 100 mA
from backplane bus DC 3.3 V, max.	28 mA
Power loss, typ.	3.5 W
<b>Digital outputs</b>	
Number of digital outputs	4
cable length, shielded, max.	200 m
Cable length unshielded, max.	200 m
Short-circuit protection of the output	Yes; electronic
Limitation of inductive shutdown voltage to	typically L+ (-47 V)
Lamp load, max.	10 W
Controlling a digital input	No
Output voltage	
• for signal "1", min.	L+ (-2,0 V), current sourcing switch: L+ (-1,5 V), voltage drop on current sinking switch: max. 0.5 V
Output current	
• for signal "1" rated value	2 A
• for signal "1" permissible range for 0 to 60 °C, min.	20 mA
• for signal "1" permissible range for 0 to 60 °C, max.	2.4 A
• for signal "0" residual current, max.	0.5 mA; Current sourcing switch: max. 0.5 mA; current sinking switch: max. 4 mA
Parallel switching of 2 outputs	
• for increased power	No
• for redundant control of a load	No
Switching frequency	
• with resistive load, max.	30 Hz
• with inductive load, max.	0.1 Hz
• on lamp load, max.	10 Hz

	6ES7 138-4FB02-0AB0
<b>Aggregate current of the outputs (per group)</b>	
• vertical installation	4 mA
- up to 40 °C, max.	
• horizontal installation	6 A
- up to 40 °C, max.	
- up to 55 °C, max.	5 A
• up to 60 °C, max.	4 mA
<b>Load impedance range</b>	
• lower limit	12 Ω
• upper limit	1 kΩ
<b>Status information/alarms/diagnostics</b>	
Diagnoses	
• Diagnostic functions	Yes
• Wire break	Yes
• Short circuit	Yes
Diagnostics indication LED	
• Collective error SF (red)	Yes
• Status indicator digital output (green)	Yes
<b>Isolation</b>	
Isolation, digital outputs	
• between the channels	No
• between the channels and the backplane bus	Yes
• between the channels and the load voltage L+	No
<b>Standards, approvals, certificates</b>	
Highest safety class achievable in safety mode	
• to EN 954	Cat. 4
• to IEC 61508	SIL 3
<b>Dimensions and weight</b>	
Width	30 mm
Height	81 mm
Depth	52 mm
<b>Weights</b>	
Weight, approx.	85 g

Ordering data	Order No.	Order No.
<b>Electronic module 4/8 F-DI PROFIsafe 24 V DC</b> 30 mm construction width, up to Category 4 (EN954-1)	<b>6ES7 138-4FA02-0AB0</b>	
<b>Electronic module 4 F-DO PROFIsafe 24 V DC/2A</b> 30 mm construction width, up to Category 4 (EN954-1)	<b>6ES7 138-4FB02-0AB0</b>	
<b>Accessories</b>		
<b>Terminal modules for electronic modules</b>	See F terminal modules	
<b>IM 151-1 High Feature interface module</b> For ET200S; transmission rate up to 12 Mbit/s; max. 63 modules can be connected, with isochronous mode, bus connection via 9-pin Sub-D connector incl. terminating module	<b>6ES7 151-1BA01-0AB0</b>	
<b>Accessories (continued)</b>		
<b>Distributed Safety V5.4 programming tool</b> <i>Task:</i> Software for configuring fail-safe user programs for SIMATIC S7-300F, S7-400F, ET 200S <i>Requirement:</i> STEP 7 V5.3 SP3 and higher		
Floating license		<b>6ES7 833-1FC02-0YA5</b>
Software Update Service		<b>6ES7 833-1FC00-0YX2</b>
<b>Distributed Safety Upgrade</b> From V5.x to V5.3; Floating license for 1 user		<b>6ES7 833-1FC02-0YE5</b>
<b>SIMATIC Manual Collection</b> Electronic manuals on CD, multilingual: 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)		<b>6ES7 998-8XC01-8YE0</b>
<b>SIMATIC Manual Collection – Update service for 1 year</b> Scope of delivery: Current CD "S7 Manual Collection" and the three subsequent updates		<b>6ES7 998-8XC01-8YE2</b>

# ET 200 distributed I/Os

## ET 200S – Fail-safe Modules

### F terminal modules

#### Overview



- Mechanical modules as receptacles for the electronic modules
- For setting up permanent wiring through self-configuring voltage buses
- Keyed connection technology to ensure an enhanced vibration resistance of up to 5 g
- Different versions to accommodate power modules and electronic modules
- Replaceable terminal box (even within the station network)
- Automatic coding of the electronic modules
- Self-shielding of the backplane bus for high data security
- Color coding facility for the terminals and for identifying the slot numbers
- Alternatively available with screw-type or spring-loaded terminals
- For up to 60 % faster process wiring also with FastConnect connection method (av. soon)

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Ordering data	Order No.
<b>Terminal modules for power modules</b>	
<b>TM-P30S44-A0</b> Ordering unit 1 piece 7 x 2 terminals, terminal access to AUX1 bus, AUX1 interrupted to the left, screw-type terminals for PM-E F PROFIsafe	<b>6ES7 193-4CK20-0AA0</b>
<b>TM-P30C44-A0</b> Ordering unit 1 piece 7 x 2 terminals, terminal access to AUX1 bus, AUX1 interrupted to the left, spring-loaded terminals for PM-E F PROFIsafe	<b>6ES7 193-4CK30-0AA0</b>
<b>Accessories for shield connecting</b>	
<b>Shield connecting element</b> 5 pack for TM-E and TM-P	<b>6ES7 193-4GA00-0AA0</b>
<b>Shield clamp</b> 5 pack for busbar 3 x 10 mm	<b>6ES7 193-4GB00-0AA0</b>
<b>Grounding terminal</b> 1 item for cross-sections up to 25 mm <sup>2</sup>	<b>8WA2 868</b>
<b>Busbar 3 x 10 mm</b> 1 item	<b>8WA2 842</b>

Ordering data	Order No.
<b>Accessories for coding</b>	
<b>Color coding plates</b> Ordering unit 200 pieces for TM-P, TM-E	
• white	<b>6ES7 193-4LA20-0AA0</b>
• yellow	<b>6ES7 193-4LB20-0AA0</b>
• yellow/green	<b>6ES7 193-4LC20-0AA0</b>
• red	<b>6ES7 193-4LD20-0AA0</b>
• blue	<b>6ES7 193-4LF20-0AA0</b>
• brown	<b>6ES7 193-4LG20-0AA0</b>
• turquoise	<b>6ES7 193-4LH20-0AA0</b>
<b>Labels, inscribed</b> Ordering unit 1 set	
• 200 items for slot numbering (1 to 20) 10 x	<b>8WA8 861-0AB</b>
• 200 items for slot numbering (1 to 40) 5 x	<b>8WA8 861-0AC</b>
• 200 items for slot numbering (1 to 64) 1 x, (1 to 68) 2 x	<b>8WA8 861-0DA</b>
<b>Labels, blank</b> 200 pieces for slot numbering	<b>8WA8 848-2AY</b>

**i** Note:  
Additional terminal modules can be found under "Terminal Modules for Power and Electronic Modules" on page 5/79.

#### Overview



- The 4 IQ-Sense sensor module is an intelligent 4-channel electronic module for the ET 200S distributed I/O in PROFIBUS DP networking systems. It is used to connect photoelectric sensors using IQ-Sense technology.
- The 8xIQ-Sense sensor module is an intelligent 8-channel I/O module for SIMATIC S7-300 and ET 200M and is used to connect photoelectric and ultrasonic sensors using IQ-Sense technology. It is possible to combine different types of sensors on one module.

Standard function blocks are available for simplified handling of a SIMATIC S7. Conventional sensors cannot be operated on these modules.

The main applications of the IQ-Sense system are found in installations and machines:

- with high availability demands
- with a high probability of interaction between sensors
- with the need for high flexibility and dynamic changing of sensor parameters.

#### Design

- Module width (15 mm or 40 mm)
- LEDs:
  - 1 green LED for each sensor channel
  - 1 red LED for group fault display
- Maximum cable length to sensor 50 m, standard cables from 0.25 mm<sup>2</sup>
- The module can be mounted in the same way as any other ET 200S module with permanent wiring, and can be easily installed and removed without tools. The following can be used as terminal modules:
  - TM-E15S24-01
  - TM-E15C24-01
  - TM-E15S26-A1
  - TM-E15C26-A1

#### Technical specifications

6ES7 138-4GA00-0AB0	
<b>Voltages and currents</b>	
Load voltage L+	
• Rated value (DC)	24 V; from the power module
• reverse polarity protection	Yes
<b>Current consumption</b>	
from load voltage L+ (without load), max.	300 mA
Power loss, typ.	0.85 W
<b>Digital inputs</b>	
Number of digital inputs	4
Cable length	
• cable length, shielded, max.	50 m
• Cable length unshielded, max.	50 m
<b>Analog inputs</b>	
Cycle time (all channels) max.	3.24 ms
<b>Encoder</b>	
Connectable encoders	
• Description	Photoelectric proximity switches with IQ-SENSE, cycle time 3.24 ms
<b>Status information/alarms/diagnostics</b>	
Diagnoses	
• Diagnostic functions	Yes; Diagnostic information readable
Diagnostics indication LED	
• Collective error SF (red)	Yes
• Status indicator sensor channel (green)	Yes
<b>Isolation</b>	
Isolation checked with	500 V DC
<b>Isolation</b>	
Galvanic isolation, digital inputs	
• between the channels	No
• between the channels and the backplane bus	Yes
<b>Permissible potential difference</b>	
between different circuits	500 V DC
<b>Dimensions and weight</b>	
Width	15 mm
Height	81 mm
Depth	52 mm
<b>Weights</b>	
Weight, approx.	35 g

# ET 200 distributed I/Os

## ET 200S – IQ-Sense Modules and Sensors

### 4 IQ-Sense and 8 IQ-Sense sensor modules

#### Technical specifications

6ES7 338-7XF00-0AB0	
<b>Voltages and currents</b>	
Load voltage L+	
• Rated value (DC)	24 V
<b>Current consumption</b>	
from load voltage L+ (no load), max.	1 A
from backplane bus 5 V DC, max.	150 mA; typ.
<b>Connection system</b>	
Requisite front connector	20-pin
<b>Digital inputs</b>	
Number of digital inputs	8
Length of cable	
• Length of cable unshielded, max	50 m
<b>Sensor</b>	
Connectable encoders	
• Description	photoelectronic proximity switches and ultrasonic sensors with IQ-Sense, cycle time 2.88 - 6 ms
<b>Status information/ interrupts/ diagnostics</b>	
Diagnostic display LED	
• Status display digital input (green)	Yes
<b>Insulation</b>	
Insulation tested with	500 V DC
<b>Potentials/ electrical isolation</b>	
Digital input functions	
• between the channels	No
• between the channels and the backplane bus	Yes
<b>Dimensions and weight</b>	
Width	40 mm
Height	125 mm
Depth	120 mm
Weight, approx.	250 g

#### Ordering data

Ordering data	Order No.
<b>Sensor module 4IQ-Sense</b>	<b>6ES7 138-4GA00-0AB0</b>
<b>Sensor module 8 x IQ-Sense</b>	<b>6ES7 338-7XF00-0AB0</b>
<b>Sensors</b>	
for connecting to the 4 IQ-Sense sensor module	
• Diffuse sensor, type C40 IQ-Sense	<b>3SF7 240-3JQ00</b>
• Diffuse sensor, type K80 IQ-Sense	<b>3SF7 210-3JQ00</b>
• Reflex sensor, type C40 IQ-Sense	<b>3SF7 241-3JQ00</b>
• Reflex sensor, type K80 IQ-Sense	<b>3SF7 211-3JQ00</b>
• Diffuse sensor with background suppression, type K80 IQ-Sense	<b>3SF7 214-3JQ00</b>
• Ultrasonic sensors M18 IQ-Sense Sensing range 5 to 30 cm	<b>3SF6 232-3JA00</b>
• Ultrasonic sensors M18 IQ-Sense Sensing range 15 to 100 cm	<b>3SF6 233-3JA00</b>

### IQ-Sense proximity switch

#### More information

For further information, see ET 200M from page 5/288.

### Design

#### Possible combinations of TM-E terminal modules and electronic modules

Electronic modules	TM-E terminal modules for electronic modules						
Screw-type terminal →	<b>15S26-A1</b>	<b>15S24-A1</b>	<b>15S24-01</b>	<b>15S23-01</b>	<b>15S24-AT</b>	<b>30S44-01</b>	<b>30S46-A1</b>
Order No. 6ES7 193...	→ ...4CA40-0AA0	→ ...4CA20-0AA0	→ ...4CB20-0AA0	→ ...4CB00-0AA0	→ ...4CL20-0AA0	→ ...4CG20-0AA0	→ ...4CF40-0AA0
Spring-loaded terminal →	<b>15C26-A1</b>	<b>15C24-A1</b>	<b>15C24-01</b>	<b>15C23-01</b>	<b>15C24-AT</b>	<b>30C44-01</b>	<b>30C46-A1</b>
Order No. 6ES7 193...	→ ...4CA50-0AA0	→ ...4CA30-0AA0	→ ...4CB30-0AA0	→ ...4CB10-0AA0	→ ...4CL30-0AA0	→ ...4CG30-0AA0	→ ...4CF50-0AA0
Fast Connect →	<b>15N26-A1</b>	<b>15N24-A1</b>	<b>15N24-01</b>	<b>15N23-01</b>	–	–	–
Order No. 6ES7 193...	→ ...4CA80-0AA0	→ ...4CA70-0AA0	→ ...4CB70-0AA0	→ ...4CB60-0AA0			
1 COUNT 24 V/100 kHz	■		■				
1 COUNT 5 V/500 kHz						■	
1 SSI	■		■				
1 STEP 5 V/204 kHz	■		■				
2 PULSE	■		■				
1 POS INC/Digital						■	
1 POS SSI/Digital						■	
1 POS INC/Analog						■	
1 POS SSI/Analog						■	
1 SI 3964/ASCII	■		■				
1 SI Modbus/US\$	■		■				
4/8 F-DI 24 V DC <sup>1)</sup>						■	■
4 F-DO 24 V DC/2 A <sup>1)</sup>						■	■
RESERVE (overall width 15 mm)	■	■	■	■	■		
RESERVE (overall width 30 mm)						■	■

1) See the manual "ET 200S fail-safe modules" in the "S7 F Systems" and "S7 Distributed Safety" documentation packages

### SSI module

#### Overview



- 1-channel module for connecting SSI sensors to the ET 200S
- For position decoding and simple positioning tasks
- With two comparison operations with specifiable comparison values (standard mode)
- With a digital input for latching actual values (standard mode)
- Can be plugged into TM-E terminal module with automatic coding
- Fast mode for high-speed acquisition of encoder values (e.g. for drive controls)
- Module replacement possible during operation and when live (hot swapping)
- Simple parameterization without additional software



**Note:**  
We supply positioning systems and prepared connection cables for counting and positioning functions as SIMODRIVE Sensors or Motion Connect 500 (also visit <http://www.siemens.com/simatic-technology>)

#### Technical specifications

	6ES7 138-4DB02-0AB0
<b>Voltages and currents</b>	
Load voltage L+	
• Rated value (DC)	24 V
• reverse polarity protection	Yes
• permissible range, lower limit (DC)	20.4 V
• permissible range, upper limit (DC)	28.8 V
<b>Current consumption</b>	
from load voltage L+ (without load), max.	34 mA
from backplane bus DC 3.3 V, max.	10 mA
Power loss, typ.	0.8 W
<b>Digital inputs</b>	
Number of digital inputs	1
Input voltage	
• for signal "0"	-30 to 5V
• for signal "1"	11 to 30V
Input current	
• for signal "0", max. (permissible quiescent current)	2 mA
• for signal "1", typ.	9 mA
<b>Encoder supply</b>	
Absolute encoder (SSI) encoder supply	
• Absolute encoder (SSI)	Yes
• Output voltage	L+ (-0.8 V)

	6ES7 138-4DB02-0AB0
<b>Encoder</b>	
Number of connectable encoders, max.	1
Connectable encoders	
• Absolute encoder (SSI)	Yes
• 2-wire BEROs	Yes; Type 2
<b>Status information/alarms/diagnostics</b>	
Diagnostics indication LED	
• Collective error SF (red)	Yes
• Status indicator digital input (green)	Yes
• Status indicator backward counting (green)	Yes
• Status indicator forward counting (green)	Yes
<b>Isolation</b>	
Isolation counter	
• between the channels and the backplane bus	Yes
• between the channels and the load voltage L+	No
<b>Dimensions and weight</b>	
Width	15 mm
Height	81 mm
Depth	52 mm
<b>Weights</b>	
Weight, approx.	40 g

Ordering data	Order No.
<b>SSI module</b> For connecting absolute encoders with an SSI interface	<b>6ES7 138-4DB02-0AB0</b>
<b>Accessories</b>	
<b>Label sheets DIN A4 (10 pieces)</b> Each sheet contains 60 label strips for peripheral modules and 20 label strips for interface modules	
<ul style="list-style-type: none"> <li>• petrol</li> </ul>	<b>6ES7 193-4BH00-0AA0</b>
<ul style="list-style-type: none"> <li>• red</li> </ul>	<b>6ES7 193-4BD00-0AA0</b>
<ul style="list-style-type: none"> <li>• yellow</li> </ul>	<b>6ES7 193-4BB00-0AA0</b>
<ul style="list-style-type: none"> <li>• light beige</li> </ul>	<b>6ES7 193-4BA00-0AA0</b>
<b>Signal cable</b> Preassembled for SSI absolute encoder 6FX2001-5, without Sub-D connector, UL/DESINA	<b>6FX5 002-2CC12-....</b>

### 2 PULSE pulse generator

#### Overview



- 2-channel pulse generator and timer module for ET 200S
- For controlling final control elements, valves, heater elements, etc.
- Pulse width modulation (PWM)
- Pulse sequences
- Pulse trains
- Accurately timed switching signals to 24 V DC output

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#### Technical specifications

	6ES7 138-4DD00-0AB0
<b>Voltages and currents</b>	
Load voltage L+	
• Rated value (DC)	24 V; from the power module
• reverse polarity protection	Yes
<b>Current consumption</b>	
from load voltage L+ (without load), max.	40 mA
from backplane bus DC 3.3 V, max.	10 mA
Power loss, typ.	1.8 W
<b>Digital inputs</b>	
Number of digital inputs	2
Cable length	
• cable length, shielded, max.	100 m
Input characteristic curve to IEC 1131, Typ 2	Yes
Input voltage	
• Rated value, DC	24 V
• for signal "0"	-30 V to 5 V
• for signal "1"	11 to 30 V
Input current	
• for signal "1", typ.	9 mA
Input delay (for rated value of input voltage)	
• Input frequency (with 0.1 ms delay), max.	20 kHz
• Minimum pulse width for program reactions	100 µs

	6ES7 138-4DD00-0AB0
<b>Digital outputs</b>	
Number of digital outputs	2
cable length, shielded, max.	1,000 m
Cable length unshielded, max.	600 m
Short-circuit protection of the output	Yes
• Response threshold, typ.	10 A
Limitation of inductive shutdown voltage to	L+ - (50 V to 65 V)
Lamp load, max.	10 W
Accuracy of pulse duration	+/- (pulse duration x 100 ppm) , +/- 100 µs with a load <= 50 Ohm
minimum pulse duration	200 µs
Controlling a digital input	Yes
Output voltage	
• for signal "1", min.	L+ (-1.0 V)
Output current	
• for signal "1" rated value	2 A
• for signal "1" permissible range for 0 to 60 °C, min.	7 mA
• for signal "1" permissible range for 0 to 60 °C, max.	2 A
• for signal "0" residual current, max.	0.5 mA
Output delay with resistive load	
• "0" to "1", max.	100 µs
• "1" to "0", max.	200 µs
Switching frequency	
• with resistive load, max.	2.5 kHz
• with inductive load, max.	2 Hz
• on lamp load, max.	10 Hz

#### Technical specifications (continued)

6ES7 138-4DD00-0AB0	
<b>Encoder supply</b>	
Output voltage	L+ (-0.8 V)
Output current, rated value	500 mA
Short-circuit protection	Yes
<b>Encoder</b>	
Connectable encoders	
• 2-wire BEROS	Yes
• permissible quiescent current (2-wire BEROS), max.	2 mA
<b>Pulse generator</b>	
Number of channels	2; 1 digital input and 1 digital output per channel
<b>Status information/alarms/diagnostics</b>	
Diagnostics indication LED	
• Collective error SF (red)	Yes
• Status indicator digital output (green)	Yes
• Status indicator digital input (green)	Yes
<b>Isolation</b>	
Isolation checked with	500 V DC
<b>Isolation</b>	
Isolation, digital outputs	
• between the channels	No
• between the channels and the backplane bus	Yes
Galvanic isolation, digital inputs	
• between the channels	No
• between the channels and the backplane bus	Yes
<b>Permissible potential difference</b>	
between different circuits	500 V DC
<b>Dimensions and weight</b>	
Width	15 mm
Height	81 mm
Depth	52 mm
<b>Weights</b>	
Weight, approx.	40 g

#### Ordering data

##### Pulse generator and timer module 2PULSE

For ET 200S

##### Accessories

##### Label sheets DIN A4 (10 pieces)

Each sheet contains 60 label strips for peripheral modules and 20 label strips for interface modules

- petrol
- red
- yellow
- light beige

#### Order No.

6ES7 138-4DD00-0AB0

6ES7 193-4BH00-0AA0

6ES7 193-4BD00-0AA0

6ES7 193-4BB00-0AA0

6ES7 193-4BA00-0AA0

# ET 200 distributed I/Os

## ET 200S – Technology Modules

### 1 STEP stepper module

#### Overview



- Single channel module for ET 200S for the controlled positioning of a stepper motor
- Reference point or incremental operating modes
- Connection of power circuits with pulse/ direction interface using 5 V differential signals
- External stop with/without ramp through digital input
- Status display and error display by LED: positioning errors and status errors in the digital inputs are displayed on LEDs and indicated to the interface to the master

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#### Technical specifications

6ES7 138-4DC00-0AB0	
<b>Voltages and currents</b>	
Load voltage L+	
• Rated value (DC)	24 V
<b>Current consumption</b>	
Power loss, typ.	1.5 W
<b>Digital inputs</b>	
Number of digital inputs	2
Functions	Input REF: reference cams, input DI: pulse disable or external stop
Cable length	
• cable length, shielded, max.	1,000 m
• Cable length unshielded, max.	600 m
Repeat frequency, max.	1 kHz
Input characteristic curve to IEC 1131, Typ 2	Yes
Input voltage	
• Rated value, DC	24 V
• for signal "0"	-30 to +5V ( -15% / + 20%)
• for signal "1"	11 to 30 V
Input current	
• for signal "0", max. (permissible quiescent current)	2 mA
• for signal "1", typ.	9 mA
Input delay (for rated value of input voltage)	
• for standard inputs	
- at "0" to "1", max.	300 μs
- at "1" to "0", max.	300 μs

6ES7 138-4DC00-0AB0	
<b>Encoder</b>	
Connectable encoders	
• 2-wire BEROS	Yes
<b>Drive technology</b>	
Cable length, max.	100 m; twisted and shielded in pairs
<b>Step controllers</b>	
Connection for stepper motors	Differential signals for pulses (PULSE, notPULSE) and direction (DIR, notDIR) to RS422
Number of stepper motor channels	1
<b>Status information/alarms/diagnostics</b>	
Diagnostics indication LED	
• Description	1 green LED for status indication "Ready for positioning jobs"
• Positioning mode POS (green)	Yes
• Collective error SF (red)	Yes
• Status indicator digital input (green)	Yes
<b>Dimensions and weight</b>	
Width	15 mm
Height	81 mm
Depth	52 mm
<b>Weights</b>	
Weight, approx.	40 g

Ordering data	Order No.
<b>1STEP stepper module</b> for simple positioning tasks with stepper motor axes	<b>6ES7 138-4DC00-0AB0</b>
<b>Accessories</b>	
<b>Label sheets DIN A4 (10 pieces)</b> Each sheet contains 60 label strips for peripheral modules and 20 label strips for interface modules	
<ul style="list-style-type: none"> <li>• petrol</li> </ul>	<b>6ES7 193-4BH00-0AA0</b>
<ul style="list-style-type: none"> <li>• red</li> </ul>	<b>6ES7 193-4BD00-0AA0</b>
<ul style="list-style-type: none"> <li>• yellow</li> </ul>	<b>6ES7 193-4BB00-0AA0</b>
<ul style="list-style-type: none"> <li>• light beige</li> </ul>	<b>6ES7 193-4BA00-0AA0</b>
<b>SIMOSTEP stepper motors</b>	See Catalog ST 70
<b>FM STEPDRIVE power module for stepper motors</b>	See Catalog ST 70

# ET 200 distributed I/Os

## ET 200S – Technology Modules

### 1 POS U positioning module

#### Overview

- Positioning module 1 POS U is a single-channel positioning module for ET 200S for the positioning of positioning and operational axes
- For controlled positioning using digital outputs according to the rapid/creep feed principle
- With actual position value sensing for
  - incremental encoders with 5 V difference signals or 24 V signals, or for SSI encoders
  - proportioning mode (single evaluation of encoder signal A only)
- Reference-point approach, actual value setting
- Parameter change during operation
  - reversing difference
  - shutdown difference
- Functions
  - Inching: Direct application of control signals by the master
  - Traversing: Absolute or relative
  - Axes: For linear and rotary axes
  - Latch function: Saves the current value by setting a digital input



Note:  
Siemens is offering position measuring systems and pre-assembled connecting cables for counting and positioning functions under SIMODRIVE Sensor or Motion Connect 500.

#### Technical specifications

6ES7 138-4DL00-0AB0	
<b>Voltages and currents</b>	
Load voltage L+	
• Rated value (DC)	24 V
• reverse polarity protection	Yes
• permissible range, lower limit (DC)	20.4 V
• permissible range, upper limit (DC)	28.8 V
<b>Current consumption</b>	
from load voltage L+ (without load), max.	50 mA
from backplane bus DC 3.3 V, max.	10 mA
Power loss, typ.	2 W
<b>Digital inputs</b>	
Cable length	
• Cable length unshielded, max.	50 m
Input characteristic curve to IEC 1131, Typ 2	Yes
Input voltage	
• Rated value, DC	24 V
• for signal "0"	-30 V to 5 V
• for signal "1"	11 V to 30 V
Input current	
• for signal "0", max. (permissible quiescent current)	2 mA
• for signal "1", typ.	9 mA

#### Technical specifications (continued)

6ES7 138-4DL00-0AB0	
<b>Digital outputs</b>	
cable length, shielded, max.	1,000 m
Cable length unshielded, max.	600 m
Short-circuit protection of the output	Yes
• Response threshold, typ.	0.7 A to 1.8 A
Limitation of inductive shutdown voltage to	Yes; L+ -(55 to 60 V)
Lamp load, max.	5 W
Controlling a digital input	Yes
Output voltage	
• Rated value (DC)	24 V
• for signal "0" (DC), max.	3 V
• for signal "1", min.	L+ -1 V
Output current	
• for signal "1" permissible range for 0 to 60 °C, min.	7 mA
• for signal "1" permissible range for 0 to 60 °C, max.	600 mA
• for signal "0" residual current, max.	0.3 mA
Switching frequency	
• with resistive load, max.	100 Hz
• with inductive load, max.	2 Hz
• on lamp load, max.	10 Hz
<b>Encoder supply</b>	
5 V encoder supply	
• 5 V	Yes
• Short-circuit protection	Yes
• Output current, max.	500 mA
24 V encoder supply	
• 24 V	Yes
• Short-circuit protection	Yes
• Output current, max.	500 mA
Absolute encoder (SSI) encoder supply	
• Absolute encoder (SSI)	Yes
• Output voltage	L+ -0.8 V
• Output current, max.	500 mA
• Short-circuit protection	Yes

#### Technical specifications (continued)

	6ES7 138-4DL00-0AB0
<b>Encoder</b>	
Connectable encoders	
• Absolute encoder (SSI)	Yes
• 2-wire BEROS	Yes; Type 2
Encoder signals, incremental encoder (symmetrical)	
• Encoder signal 5 V	
- Signal level	to RS-422
- Terminating resistor	330 Ω
- Differential input voltage, min.	1 V
- Input frequency, max.	500 Hz
- cable length, shielded, max.	50 m
• Encoder signal 24 V	
- Rated value DC 24 V	Yes
- Input voltage for signal "0"	5 V
- Input voltage for signal "1"	30 V
- Input current, for signal "0", max. (permissible idle current)	2 mA
- Input current for signal "1", typ.	9 mA
- Input frequency, max.	100,000 Hz
- cable length, shielded, max.	50 m
Encoder signals, absolute encoder (SSI)	
• Updating the encoder value	
- Telegram runtime at 13 bit, min.	7 ms
- Telegram runtime at 25 Bit, min.	13 ms
• Monoflop time	64 ms
<b>Reaction times</b>	
Updating time of the feedback messages	1 ms
<b>Status information/alarms/diagnostics</b>	
Diagnostics indication LED	
• Actual value falling DN (green)	Yes
• Actual value rising UP (green)	Yes
• Positioning mode POS (green)	Yes
• Collective error SF (red)	Yes
• Status indicator digital input (green)	Yes
<b>Isolation</b>	
between backplane bus and all other circuit parts	Yes
between the channels and backplane bus	Yes
<b>Dimensions and weight</b>	
Width	30 mm
Height	81 mm
Depth	52 mm
<b>Weights</b>	
Weight, approx.	65 g

#### Ordering data

**1 POS U positioning module**  
 Single-channel positioning module for ET 200S for positioning the adjustment and operation axes

#### Order No.

**6ES7 138-4DL00-0AB0**

# ET 200 distributed I/Os

## ET 200S – Technology Modules

### 1 COUNT 24 V/100 kHz counter module

#### Overview



- 1-channel 32-bit intelligent counter module for universal count tasks and time-based measuring tasks
- For the direct connection of 24 V incremental sensors or initiators
- Comparison function with predefinable comparison values
- Integrated digital output to output the reaction when the comparison value is attained
- Can be plugged into TM-E terminal module with automatic coding
- Module replacement possible during operation and under power (hot swapping)
- Simple parameterization without additional software



**Note:**  
Siemens is now able to offer distance measuring systems and pre-assembled connecting cables for counting and positioning functions in the product ranges SIMODRIVE Sensor and Motion Connect 500.

#### Technical specifications

	6ES7 138-4DA04-0AB0
<b>Voltages and currents</b>	
Load voltage L+	
• Rated value (DC)	24 V
• reverse polarity protection	Yes
• permissible range, lower limit (DC)	20.4 V
• permissible range, upper limit (DC)	28.8 V
<b>Current consumption</b>	
from load voltage L+ (without load), max.	42 mA
from backplane bus DC 3.3 V, max.	10 mA
Power loss, typ.	1 W
<b>Hardware config.</b>	
Module exchange	
• Hot swapping the IM-DP	Yes
• Module exchange under process voltage	Yes
<b>Digital inputs</b>	
Number of digital inputs	1
Functions	Gate control, synchronization, latch function
Cable length	
• cable length, shielded, max.	100 m; Filter 20 kHz: 100m, Filter 200 kHz: 50m
Input characteristic curve to IEC 1131, Typ 2	Yes
Input voltage	
• Rated value, DC	24 V
• for signal "0"	-30 V to 5 V
• for signal "1"	11 to 30 V
Input current	
• for signal "0", max. (permissible quiescent current)	2 mA
• for signal "1", typ.	9 mA
Input delay (for rated value of input voltage)	
• for standard inputs	
- at "0" to "1", max.	2.5 µs; Filter off: 2.5 µs (200 kHz), filter on: 25 µs (20 kHz)

	6ES7 138-4DA04-0AB0
<b>Digital outputs</b>	
Number of digital outputs	1
cable length, shielded, max.	1,000 m
Cable length unshielded, max.	600 m
Short-circuit protection of the output	Yes
• Response threshold, typ.	2.6 A to 4 A
Limitation of inductive shutdown voltage to	L+ -(50 to 60 V)
Lamp load, max.	5 W
Controlling a digital input	Yes
Output voltage	
• Rated value (DC)	24 V
• for signal "0" (DC), max.	3 V
• for signal "1", min.	L+ (-1.0 V)
Output current	
• for signal "1" permissible range for 0 to 40 °C, min.	5 mA
• for signal "1" permissible range for 0 to 40 °C, max.	2,000 mA
• for signal "1" permissible range for 0 to 60 °C, min.	5 mA
• for signal "1" permissible range for 0 to 60 °C, max.	500 mA; 1000 mA to 50 °C
• for signal "0" residual current, max.	0.5 mA
Output delay with resistive load	
• "0" to "1", max.	100 µs
Switching frequency	
• with resistive load, max.	100 Hz
• with inductive load, max.	2 Hz
• on lamp load, max.	10 Hz
<b>Encoder supply</b>	
24 V encoder supply	
• 24 V	Yes; L+ (-0.8 V)
• Short-circuit protection	Yes
• Output current, max.	500 mA

### Technical specifications (continued)

	6ES7 138-4DA04-0AB0
<b>Encoder</b>	
Number of connectable encoders, max.	1
Connectable encoders	
• Incremental encoder (asymmetrical)	Yes
• 24 V initiator	Yes
• 2-wire BEROS	Yes
<b>Counters</b>	
Number of counter inputs	1; 32 bit
Minimum pulse width	2.5 µs; Filter off: 2.5 µs (200 kHz), Filter on: 25 µs (20 kHz)
<b>Frequency measurement</b>	
Measurement range, min.	0.1 Hz
Measurement range, max.	100 kHz
<b>Cycle duration measurement</b>	
Measuring range, lower limit	10 µs
Measuring range, upper limit	120 s
<b>Speed measurement</b>	
Measurement range, min. (lower limit)	1 1/min
Measurement range, max. (upper limit)	25,000 1/min
<b>Parameter</b>	
Remark	16 byte

	6ES7 138-4DA04-0AB0
<b>Status information/alarms/diagnostics</b>	
Diagnoses	
• Diagnostic functions	Yes
Diagnostics indication LED	
• Collective error SF (red)	Yes
• Status indicator digital output (green)	Yes
• Status indicator digital input (green)	Yes
• Status indicator backward counting (green)	Yes
• Status indicator forward counting (green)	Yes
<b>Isolation</b>	
Galvanic isolation, digital inputs	
• galvanic isolation, digital inputs	No
Isolation counter	
• between the channels and the backplane bus	Yes
• between the channels and the load voltage L+	No
<b>Dimensions and weight</b>	
Width	15 mm
Height	81 mm
Depth	52 mm
<b>Weights</b>	
Weight, approx.	40 g

# ET 200 distributed I/Os

## ET 200S – Technology Modules

### 1 COUNT 24 V/100 kHz counter module

#### Ordering data

##### 1 COUNT 24 V/100 kHz counter module

For universal counting and measuring tasks with ET 200S

#### Accessories

##### Label sheets DIN A4 (10 pieces)

Each sheet contains 60 label strips for I/O modules and 20 label strips for interface modules

- petrol
- red
- yellow
- light beige

##### Shield connection element

For TM-P and TM-E terminal modules, as fixing for busbars 3 x 10 mm, 5 pieces

##### Shield clamps

For connecting braided cable shields to the busbar, 5 pieces

#### Order No.

6ES7 138-4DA04-0AB0

6ES7 193-4BH00-0AA0

6ES7 193-4BD00-0AA0

6ES7 193-4BB00-0AA0

6ES7 193-4BA00-0AA0

6ES7 193-4GA00-0AA0

6ES7 193-4GB00-0AA0

#### Order No.

##### SIMODRIVE sensor incremental encoder

Externally mounted encoder, optical, incremental with HTL level, operating voltage 10 to 30 V

- With synchronous flange, universal axial/radial cable outlet with connector

- 100 pulses/revolution
- 500 pulses/revolution
- 1000 pulses/revolution
- 2500 pulses/revolution

6FX2 001-4DA10

6FX2 001-4DA50

6FX2 001-4DB00

6FX2 001-4DC50

- With synchronous flange, radial flange outlet

- 100 pulses/revolution
- 500 pulses/revolution
- 1000 pulses/revolution
- 2500 pulses/revolution

6FX2 001-4FA10

6FX2 001-4FA50

6FX2 001-4FB00

6FX2 001-4FC50

- With synchronous flange, axial flange outlet

- 100 pulses/revolution
- 500 pulses/revolution
- 1000 pulses/revolution
- 2500 pulses/revolution

6FX2 001-4HA10

6FX2 001-4HA50

6FX2 001-4HB00

6FX2 001-4HC50

- With clamping flange, universal axial/radial cable outlet with connector

- 100 pulses/revolution
- 500 pulses/revolution
- 1000 pulses/revolution
- 2500 pulses/revolution

6FX2 001-4NA10

6FX2 001-4NA50

6FX2 001-4NB00

6FX2 001-4NC50

- With clamping flange, radial flange outlet

- 100 pulses/revolution
- 500 pulses/revolution
- 1000 pulses/revolution
- 2500 pulses/revolution

6FX2 001-4QA10

6FX2 001-4QA50

6FX2 001-4QB00

6FX2 001-4QC50

- With clamping flange, axial flange outlet

- 100 pulses/revolution
- 500 pulses/revolution
- 1000 pulses/revolution
- 2500 pulses/revolution

6FX2 001-4SA10

6FX2 001-4SA50

6FX2 001-4SB00

6FX2 001-4SC50

##### Signal cable

Pre-assembled for HTL and TTL encoder, without Sub-D connector, UL/DESINA

6FX5 002-2CA12-....

### Overview



- 1-channel 32-bit intelligent counter module for universal count tasks and time-based measuring tasks
- For direct connection of 5 V incremental encoders (RS 422)
- Comparison function with predefinable comparison values
- 2 integrated digital outputs to output the response upon reaching the comparison value
- Can be plugged into TM-E terminal module with automatic coding
- Module replacement possible during operation and under power (hot swapping)
- Simple parameterization without additional software



**Note:**  
Siemens is now able to offer distance measuring systems and pre-assembled connecting cables for counting and positioning functions in the product ranges SIMODRIVE Sensor and Motion Connect 500

### Technical specifications

	6ES7 138-4DE02-0AB0
<b>Voltages and currents</b>	
Load voltage L+	
• Rated value (DC)	24 V
• reverse polarity protection	Yes
• permissible range, lower limit (DC)	20.4 V
• permissible range, upper limit (DC)	28.8 V
<b>Current consumption</b>	
from load voltage L+ (without load), max.	45 mA
from backplane bus DC 3.3 V, max.	10 mA
Power loss, typ.	2 W
<b>Hardware config.</b>	
Module exchange	
• Hot swapping the IM-DP	Yes
• Module exchange under process voltage	Yes
<b>Digital inputs</b>	
Number of digital inputs	1
Functions	Gate control, synchronization, latch function
Cable length	
• cable length, shielded, max.	50 m
Input characteristic curve to IEC 1131, Typ 2	Yes
Input voltage	
• Rated value, DC	24 V
• for signal "0"	-30 V to 5 V
• for signal "1"	11 to 30 V
Input current	
• for signal "0", max. (permissible quiescent current)	2 mA
• for signal "1", typ.	9 mA
Input delay (for rated value of input voltage)	
• for standard inputs - at "0" to "1", max.	2.5 µs

	6ES7 138-4DE02-0AB0
<b>Digital outputs</b>	
Number of digital outputs	2
cable length, shielded, max.	1,000 m
Cable length unshielded, max.	600 m
Short-circuit protection of the output	Yes
• Response threshold, typ.	2.6 A to 4 A
Limitation of inductive shutdown voltage to	L+ -(50 to 60 V)
Lamp load, max.	10 W
Controlling a digital input	Yes
Output voltage	
• Rated value (DC)	24 V
• for signal "0" (DC), max.	3 V
• for signal "1", min.	L+ (-1.0 V)
Output current	
• for signal "1" rated value	2 A
• for signal "1" permissible range for 0 to 60 °C, min.	5 mA
• for signal "1" permissible range for 0 to 60 °C, max.	2.4 A
• for signal "0" residual current, max.	0.5 mA
Output delay with resistive load	
• "0" to "1", max.	100 µs
Switching frequency	
• with resistive load, max.	100 Hz
• with inductive load, max.	2 Hz
• on lamp load, max.	10 Hz
<b>Encoder supply</b>	
24 V encoder supply	
• 24 V	Yes; L+ (-0.8 V)
• Short-circuit protection	Yes
• Output current, max.	500 mA

# ET 200 distributed I/Os

## ET 200S – Technology Modules

### 1 COUNT 5 V/500 kHz counter module

#### Technical specifications (continued)

	6ES7 138-4DE02-0AB0
<b>Encoder</b>	
Number of connectable encoders, max.	1
Connectable encoders	
• Incremental encoder (symmetrical)	Yes
• 2-wire BEROs	Yes
Encoder signals, incremental encoder (symmetrical)	
• Trace mark signals	A, notA, B, notB, A and B offset by 90°
• Zero mark signal	N, notN
• Input signal	5 V difference signal (phys. RS 422)
• Input frequency, max.	500 kHz
• cable length, shielded, max.	50 m
<b>Counters</b>	
Number of counter inputs	1; 32 bit
Minimum pulse width	1 µs
<b>Frequency measurement</b>	
Measurement range, min.	0.1 Hz
Measurement range, max.	500 kHz
<b>Cycle duration measurement</b>	
Measuring range, lower limit	10 µs
Measuring range, upper limit	120 s
<b>Speed measurement</b>	
Measurement range, min. (lower limit)	1 1/min
Measurement range, max. (upper limit)	25,000 1/min
<b>Parameter</b>	
Remark	16 byte

	6ES7 138-4DE02-0AB0
<b>Status information/alarms/diagnostics</b>	
Diagnoses	
• Diagnostic functions	Yes
Diagnostics indication LED	
• Collective error SF (red)	Yes
• Status indicator digital output (green)	Yes
• Status indicator digital input (green)	Yes
• Status indicator backward counting (green)	Yes
• Status indicator forward counting (green)	Yes
• Synchronization SYN (green)	Yes
<b>Isolation</b>	
Galvanic isolation, digital inputs	
• galvanic isolation, digital inputs	No
Isolation counter	
• between the channels and the backplane bus	Yes
• between the channels and the load voltage L+	No
<b>Dimensions and weight</b>	
Width	30 mm
Height	81 mm
Depth	52 mm
<b>Weights</b>	
Weight, approx.	65 g

Ordering data	Order No.	Order No.
<b>1 COUNT 5 V/500 kHz counter module</b> For universal counting and measuring tasks with ET 200S	<b>6ES7 138-4DE02-0AB0</b>	
<b>Accessories</b>		
<b>Label sheets DIN A4 (10 pieces)</b> Each sheet contains 60 label strips for I/O modules and 20 label strips for interface modules		
<ul style="list-style-type: none"> <li>petrol</li> <li>red</li> <li>yellow</li> <li>light beige</li> </ul>	<b>6ES7 193-4BH00-0AA0</b> <b>6ES7 193-4BD00-0AA0</b> <b>6ES7 193-4BB00-0AA0</b> <b>6ES7 193-4BA00-0AA0</b>	
<b>Shield connection element</b> For TM-P and TM-E terminal modules, as fixing for busbars 3 x 10 mm, 5 pieces	<b>6ES7 193-4GA00-0AA0</b>	
<b>Shield clamps</b> For connecting braided cable shields to the busbar, 5 pieces	<b>6ES7 193-4GB00-0AA0</b>	
<b>SIMODRIVE Incremental shaft encoder</b> with RS 422 (TTL), operating voltage 10 to 30 V		
<ul style="list-style-type: none"> <li>With synchronous flange, universal axial/radial cable outlet with connector                             <ul style="list-style-type: none"> <li>- 500 pulses/revolution</li> <li>- 1000 pulses/revolution</li> <li>- 1024 pulses/revolution</li> <li>- 1250 pulses/revolution</li> <li>- 1500 pulses/revolution</li> <li>- 2000 pulses/revolution</li> <li>- 2048 pulses/revolution</li> <li>- 2500 pulses/revolution</li> <li>- 3600 pulses/revolution</li> <li>- 5000 pulses/revolution</li> </ul> </li> <li>With synchronous flange, radial flange outlet                             <ul style="list-style-type: none"> <li>- 500 pulses/revolution</li> <li>- 1000 pulses/revolution</li> <li>- 1024 pulses/revolution</li> <li>- 1250 pulses/revolution</li> <li>- 1500 pulses/revolution</li> <li>- 2000 pulses/revolution</li> <li>- 2048 pulses/revolution</li> <li>- 2500 pulses/revolution</li> <li>- 3600 pulses/revolution</li> <li>- 5000 pulses/revolution</li> </ul> </li> </ul>	<b>6FX2 001-2DA50</b> <b>6FX2 001-2DB00</b> <b>6FX2 001-2DB02</b> <b>6FX2 001-2DB25</b> <b>6FX2 001-2DB50</b> <b>6FX2 001-2DC00</b> <b>6FX2 001-2DC04</b> <b>6FX2 001-2DC50</b> <b>6FX2 001-2DD60</b> <b>6FX2 001-2DF00</b>  <b>6FX2 001-2FA50</b> <b>6FX2 001-2FB00</b> <b>6FX2 001-2FB02</b> <b>6FX2 001-2FB25</b> <b>6FX2 001-2FB50</b> <b>6FX2 001-2FC00</b> <b>6FX2 001-2FC04</b> <b>6FX2 001-2FC50</b> <b>6FX2 001-2FD60</b> <b>6FX2 001-2FF00</b>	<ul style="list-style-type: none"> <li>With synchronous flange, axial flange outlet                             <ul style="list-style-type: none"> <li>- 500 pulses/revolution</li> <li>- 1000 pulses/revolution</li> <li>- 1024 pulses/revolution</li> <li>- 1250 pulses/revolution</li> <li>- 1500 pulses/revolution</li> <li>- 2000 pulses/revolution</li> <li>- 2048 pulses/revolution</li> <li>- 2500 pulses/revolution</li> <li>- 3600 pulses/revolution</li> <li>- 5000 pulses/revolution</li> </ul> </li> <li>With clamping flange, universal axial/radial cable outlet with connector                             <ul style="list-style-type: none"> <li>- 500 pulses/revolution</li> <li>- 1000 pulses/revolution</li> <li>- 1024 pulses/revolution</li> <li>- 1250 pulses/revolution</li> <li>- 1500 pulses/revolution</li> <li>- 2000 pulses/revolution</li> <li>- 2048 pulses/revolution</li> <li>- 2500 pulses/revolution</li> <li>- 3600 pulses/revolution</li> <li>- 5000 pulses/revolution</li> </ul> </li> <li>With clamping flange, radial flange outlet                             <ul style="list-style-type: none"> <li>- 500 pulses/revolution</li> <li>- 1000 pulses/revolution</li> <li>- 1024 pulses/revolution</li> <li>- 1250 pulses/revolution</li> <li>- 1500 pulses/revolution</li> <li>- 2000 pulses/revolution</li> <li>- 2048 pulses/revolution</li> <li>- 2500 pulses/revolution</li> <li>- 3600 pulses/revolution</li> <li>- 5000 pulses/revolution</li> </ul> </li> <li>With clamping flange, axial flange outlet                             <ul style="list-style-type: none"> <li>- 500 pulses/revolution</li> <li>- 1000 pulses/revolution</li> <li>- 1024 pulses/revolution</li> <li>- 1250 pulses/revolution</li> <li>- 1500 pulses/revolution</li> <li>- 2000 pulses/revolution</li> <li>- 2048 pulses/revolution</li> <li>- 2500 pulses/revolution</li> <li>- 3600 pulses/revolution</li> <li>- 5000 pulses/revolution</li> </ul> </li> </ul>
<b>Signal cable</b> Pre-assembled for HTL and TTL encoder, without Sub-D connector, UL/DESINA		<b>6FX5 002-2CA12-....</b>

# ET 200 distributed I/Os

## ET 200S – Technology Modules

### 1SI interface module

#### Overview



- 1-channel module for serial data exchange through point-to-point connection
- For message frames max. 200 byte long
- RS 232C, RS 422, RS 485
- 2 versions
  - ASCII and 3964(R) protocol
  - Modbus and USS protocol
- Parameter assignment through GSD file or STEP 7 (V5.1 and newer)

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#### Technical specifications

	6ES7 138-4DF01-0AB0	6ES7 138-4DF11-0AB0
<b>Voltages and currents</b>		
Load voltage L+		
• Rated value (DC)	24 V	24 V
<b>Current consumption</b>		
from backplane bus DC 24 V, max.	80 mA; typically 20 mA	80 mA
from backplane bus DC 3.3 V, max.	10 mA	10 mA
Power loss, typ.	1.2 W	1.2 W
<b>Memory</b>		
Memory		
• Standard blocks	5,100 Byte; S_SEND 2700, S_RCV 2400, S_XON 2600, S_RTS 2600, S_V24 2700, S_VSTAT 1800, S_VSET 1800	11,100 Byte; Modbus: S_SEND 2700, S_RCV 2400, S_MODB 6000 USS: S_SEND 2700, S_RCV 2400, S_USST 1900, S_USSR 2600, S_USSI 1500
<b>Interfaces</b>		
Number of interfaces	1	1
RS 232C	Yes; RS 232C signals: 8 (TxD, RxD, RTS, CTS, DTR, DSR, DCD, PE)	Yes; RS 232C signals: 8 (TxD, RxD, RTS, CTS, DTR, DSR, DCD, PE)
RS 422/RS 485	Yes; RS-422 signals: 5 (TxD(A), RxD(A), TxD(B), RxD(B), PE); RS-485 signals: 3 (R/T(A), R/T(B), PE)	Yes; RS-422 signals: 5 (TxD(A), RxD(A), TxD(B), RxD(B), PE); RS-485 signals: 3 (R/T(A), R/T(B), PE)
RS 232, cable length, shielded, max.	15 m	15 m
RS 422/485, cable length, shielded, max.	1,200 m	1,200 m

	6ES7 138-4DF01-0AB0	6ES7 138-4DF11-0AB0
<b>Point-to-point</b>		
Integrated protocol driver		
• 3964 (R)	Yes	
• ASCII	Yes	
• Modbus		Yes
• Transmission speed, Modbus protocol, max.		115.2 kBit/s; half duplex: 110, 300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 76800, 115200 bps
• USS		Yes
• Transmission speed, USS protocol, max.		115.2 kBit/s; half duplex: 110, 300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 76800, 115200 bps
Transmission speed, RS 422/485		
• with 3964 (R) protocol, max.	115.2 kBit/s; half duplex: 110, 300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 76800, 115200 bps	
• with ASCII protocol, max.	115.2 kBit/s; full duplex: 110, 300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 76800, 115200 bps	

#### Technical specifications (continued)

	6ES7 138-4DF01-0AB0	6ES7 138-4DF11-0AB0
Transmission speed, RS232		
• with 3964 (R) protocol, max.	115.2 kBit/s; half duplex: 110, 300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 76800, 115200 bps	
• with ASCII protocol, max.	115.2 kBit/s; full duplex: 110, 300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 76800, 115200 bps	
Character frame (adjustable)		
• Bits per character	7 or 8	8
• Number of start/stop bits	1 or 2	1 or 2 (USS only 1)
• Bits per character frame	10	10 or 11 (USS only 11 bits)
• Parity	none, odd, even, any	none, odd, even (USS only even)
Number of bytes per PLC sampling cycle		
• Data quantity per PLC sampling cycle, receiving	32 Byte; With IM151-1 Standard as of 6ES7151-1AA04-0AB0; With IM151-1 High Feature as of 6ES7151-1BA01-0AB0; otherwise 8 bytes	32 Byte; With IM151-1 Standard as of 6ES7151-1AA04-0AB0; With IM151-1 High Feature as of 6ES7151-1BA01-0AB0; otherwise 8 bytes
• Data quantity per PLC sampling cycle, transmitting	32 Byte; With IM151-1 Standard as of 6ES7151-1AA04-0AB0; With IM151-1 High Feature as of 6ES7151-1BA01-0AB0; otherwise 8 bytes	32 Byte; With IM151-1 Standard as of 6ES7151-1AA04-0AB0; With IM151-1 High Feature as of 6ES7151-1BA01-0AB0; otherwise 8 bytes

	6ES7 138-4DF01-0AB0	6ES7 138-4DF11-0AB0
<b>Status information/alarms/diagnostics</b>		
Diagnostics indication LED		
• Receive RxD (green)	Yes	Yes
• Collective error SF (red)	Yes	Yes
• Transmit TxD (green)	Yes	Yes
<b>Isolation</b>		
Isolation interface		
• between 422/485 and internal power supply	Yes	Yes
• between RS 232 and internal power supply	Yes	Yes
<b>Environmental requirements</b>		
Operating temperature		
• min.	0 °C	0 °C
• max.	60 °C	60 °C
Storage/transport temperature		
• min.	-40 °C	-40 °C
• max.	70 °C	70 °C
<b>Dimensions and weight</b>		
Width	15 mm	15 mm
Height	81 mm	81 mm
Depth	52 mm	52 mm
<b>Weights</b>		
Weight, approx.	50 g	50 g

#### Ordering data

##### 1 SI interface module

- ASCII and 3964(R) protocols
- Modbus and USS protocols

#### Order No.

**6ES7 138-4DF01-0AB0**  
**6ES7 138-4DF11-0AB0**

#### Order No.

##### Accessories

<b>TM-E15S 26-A1 terminal module</b> Ordering unit 5 items	<b>6ES7 193-4CA40-0AA0</b>
<b>TM-E15S 26-A1 terminal module</b> Ordering unit 5 items	<b>6ES7 193-4CA50-0AA0</b>
<b>TM-E15N24-A1 terminal module</b> Ordering unit 5 items	<b>6ES7 193-4CA80-0AA0</b>
<b>TM-E15S24-01 terminal module</b> Ordering unit 5 items	<b>6ES7 193-4CB20-0AA0</b>
<b>TM-E15C24-01 terminal module</b> Ordering unit 5 items	<b>6ES7 193-4CB30-0AA0</b>
<b>TM-E15N24-01 terminal module</b> Ordering unit 5 items	<b>6ES7 193-4CB70-0AA0</b>

# ET 200 distributed I/Os

## ET 200S – Technology Modules

### SIWAREX CS

#### Overview



SIWAREX CS is a versatile weighing module for all simple weighing and force measuring tasks. The compact module is easy to install in all SIMATIC automation systems. Data can be accessed directly in the SIMATIC.

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#### Technical specifications

Integration in automation systems	
• S7-400, S7-300, C7	Through ET 200S
• IM 151-7 CPU	Through backplane bus
• Automation systems from other manufacturers (available soon)	Through ET 200S
Communications interfaces	SIMATIC S7 (ET 200S backplane bus), RS 232, TTY
Connection of remote indicators (through TTY serial interface)	Legal-for-trade weight value
Adjustment of scales settings	Using SIMATIC S7/C7 IM 151-7 CPU or SIWATOOL CS PC parameterization software (RS 232)
Measuring properties	
• Error limit according to DIN 1319-1 of full-scale value at 20°C±10K	0,05 %
• $n_{IND}$ according to EN 45501 Minimum measuring signal $\Delta U_{min}$ per d	2,000 (legal-for-trade) 1.5 $\mu V$
• Internal resolution Data format of weight values	65.535 2 byte (fixed-point)
Number of measurements/second	50
Digital filter	0.05 - 5 Hz (in 7 steps), mean-value filter
Weighing functions	
• Weight values	Gross, net
• Limits	2 (min./max.)
• Zero setting function	Per command
• Tare function	Per command
• Tare specification	Per command
Load cells	Strain gauges in 4-wire or 6-wire system

Load cell powering	
• Supply voltage $U_s$ (rated value)	6 V DC typ.
• Max. supply current	$\leq 68$ mA
• Permissible load impedance	
- $R_{Lmin}$	$> 87 \Omega$
- $R_{Lmax}$	$< 4010 \Omega$
	With SIWAREX IS Ex interface:
- $R_{Lmin}$	$> 87 \Omega$
- $R_{Lmax}$	$< 4010 \Omega$
Load cell characteristic	1 mV/V to 4 mV/V
Permissible range of measuring signal (at greatest set characteristic)	-1.5 to +42.5 mV
Max. distance of load cells	1000 m
Intrinsically-safe load cell powering	Optional (SIWAREX IS Ex interface)
External load cell powering	Possible up to 24 V
Connection to load cells in Ex zone 1	Optionally via SIWAREXIS Ex interface
Ex approvals zone 2 and safety	ATEX 100a, FM, UL, cULUS Haz. Loc. (all available soon)
Supply voltage 24 V DC	
• Rated voltage	24 V DC
• Max. current consumption	150 mA
Certification	EC type approval (CE, OIML R76)
IP degree of protection to DIN EN 60529; IEC 60529	IP20
Climatic requirements $T_{min}$ (IND) to $T_{max}$ (IND) (operating temperature)	
• Vertical installation	-10 ... +60 °C
• Horizontal installation	-10 ... +40 °C
EMC requirements according to	EN 61326, EN 45501 NAMUR NE21, Part 1

Ordering data	Order No.	Order No.
<b>SIWAREX CS</b> Weighing electronics for scales in SIMATIC ET 200S for applications with and without obligation of verification EU type approval 2000 d Note: Observe approval conditions for applications with obligation of verification. It is recommendable to use the calibration set and contact the SIWAREX hotline.	<b>7MH4910-0AA01</b>	<b>Shield connection terminal</b> Contents: 5 items, sufficient for 5 cables Note: one shield connection terminal is required each for the <ul style="list-style-type: none"> <li>• scales connection and</li> <li>• TTY interface or</li> <li>• RS 232 interface</li> </ul>
<b>SIWAREX CS Manual</b> • German, English, Italian, Spanish, French	Free download in the Internet at: <a href="http://www.siemens.com/weighing-technology">www.siemens.com/weighing-technology</a>	<b>N busbar, galvanized</b> 3 x 10 mm, 1.5 m long
<b>Configuration package SIWAREX CS on CD-ROM for SIMATIC S7, version V5.2 or higher</b> • Software for SIWATOOL CS scale adjustment (German/English) • Manuals on CD (German/English) • S7 function block	<b>7MH4910-0AK01</b>	<b>Feeder terminal for N busbar</b> <b>8WA2868</b>
<b>SIWAREX CS "Getting started"</b> Example software for easy acquaintance with scale programming in STEP 7.	Free download in the Internet at: <a href="http://www.siemens.com/weighing-technology">www.siemens.com/weighing-technology</a>	<b>Remote display (option)</b> The digital remote displays can be connected directly to the SIWAREX CS through the TTY interface. The following remote display can be used: S102 <i>Siebert Industrieelektronik GmbH</i> P.O. Box 1180 D-66565 Eppelborn Tel.: +49 6806/980-0 Fax: +49 6806/980-999 Internet: <a href="http://www.siebert.de">http://www.siebert.de</a> Detailed information available from manufacturer.
<b>Calibration set for SIWAREX CS</b> For verification of up to 5 scales comprising: <ul style="list-style-type: none"> <li>• 1 x inscription foil for labeling</li> <li>• 1 x cover for connections</li> <li>• 1 x protection foil</li> <li>• 10 x EC verification marks (black M on green background)</li> <li>• Guidelines for verification, verification certificates and approvals, adaptable label</li> <li>• SIWAREX CS Manual</li> </ul>	<b>7MH4910-0AY10</b>	<b>Accessories</b> <b>SIWAREX JB junction box, aluminium housing</b> for connecting up to 4 load cells in parallel, and for connecting several junction boxes
<b>SIWATOOL cable</b> from SIWAREX U/CS with serial PC interface, for 9-pin PC interfaces (RS 232), 3 m long	<b>7MH4607-8CA</b>	<b>SIWAREX JB junction box, stainless steel housing</b> for connecting up to 4 load cells in parallel
<b>Installation material (mandatory)</b>		<b>Ex interface, type SIWAREX Pi</b> With UL and FM approvals, but <b>without ATEX approval</b> for intrinsically-safe connection of load cells, suitable for the SIWAREX U, M, FTA, FTC, CS and P weighing modules. Use in the EC is not possible.
<b>Terminal module</b> TM-E 30 mm wide (required for each SIWAREX module)	<b>6ES7193-4CG20-0AA0</b> or compatible	<b>Manual for Ex interface type SIWAREX Pi</b> <b>C71000-T5974-C29</b>
<b>Shield contact element</b> Contents 5 items, sufficient for 5 cables	<b>6ES7193-4GA00-0AA0</b>	<b>SIWAREX IS Ex interface</b> With ATEX approval, but <b>without UL and FM approvals</b> for intrinsically-safe connection of load cells, including Manual, suitable for the SIWAREX U, M, FTA, FTC, CS and P weighing modules. Use in the EC is possible. <ul style="list-style-type: none"> <li>• With short-circuit current &lt; 199 mA DC</li> <li>• With short-circuit current &lt; 137 mA DC</li> </ul>
		<b>7MH4710-1BA</b> <b>7MH4710-1EA</b> <b>7MH4710-5AA</b> <b>7MH4710-5BA</b> <b>7MH4710-5CA</b>

# ET 200 distributed I/Os

## ET 200S – Technology Modules

### SIWAREX CS

#### Ordering data

#### Order No.

##### *Cable (optional)*

**Cable Li2Y 1 x 2 x 0.75 ST + 2 x (2 x 0.34 ST) - CY, orange sheath**

**7MH4702-8AG**

to connect SIWAREX U, M, P, FTA, FTC and CS to the junction box (JB), extension box (EB) or Ex interface (Ex-I) or between two JB's, for fixed laying, occasional bending is possible, 10.8 mm outer diameter, for ambient temperature -40 to +80 °C

**Cable Li2Y 1 x 2 x 0.75 ST + 2 x (2 x 0.34 ST) - CY, blue sheath**

**7MH4702-8AF**

to connect the junction box (JB) or extension box (EB) in a potentially explosive atmosphere to the Ex interface (Ex-I), for fixed laying, occasional bending is possible, blue PVC insulating sheath, approx. 10.8 mm outer diameter, for ambient temperature -40 to +80 °C

**Cable LiYCY 4 x 2 x 0.25 mm<sup>2</sup>**

**7MH4407-8BD0**

for TTY (connect 2 pairs of conductors in parallel), for connection of a remote indicator

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### Overview



SIWAREX CF force transmitter

SIWAREX CF is a transmitter for connecting strain-gauge sensors for measuring force and torque, for example. The compact module is easy to install in all SIMATIC automation systems. Complete data access to the current measured values is then possible via the SIMATIC.

### Technical specifications

Integration into automation systems	
<ul style="list-style-type: none"> <li>S7-400, S7-300, C7</li> <li>Automation systems from other vendors</li> </ul>	<p>Through ET 200S</p> <p>Possible through ET 200S with IM 151-1</p>
Communication interfaces	SIMATIC S7 (ET 200S backplane bus), 8 byte, I/O area
Module parameterization	Not required (module is pre-parameterized)
Measuring properties	
<ul style="list-style-type: none"> <li>Error limit according to DIN 1319-1 of upper limit of effective range at 20°C±10K</li> <li>Signal resolution</li> </ul>	<p>≤ 0.15 %</p> <p>14 bit plus 1 bit sign</p>
Number of measurements/second	50
Low-pass filter	Without or 2 Hz
Sensors	In accordance with the principle of expansion measurement (full bridge) 4-wire connection
Sensor feed	
<ul style="list-style-type: none"> <li>Supply voltage, short-circuit-proof</li> <li>Permissible sensor resistance                             <ul style="list-style-type: none"> <li>- <math>R_{Lmin}</math></li> <li>- <math>R_{Lmax}</math></li> </ul> </li> </ul>	<p>6 V DC ± 5%</p> <p>&gt; 250 Ω</p> <p>&lt; 4010 Ω</p>

Permissible sensor cell coefficient	Up to 4 mV/V
Permissible range of the measuring signal	-25.2 to +25.2 mV
Supply voltage 24 V DC	
<ul style="list-style-type: none"> <li>Nominal voltage</li> <li>Max. current consumption</li> </ul>	<p>24 V DC</p> <p>150 mA</p>
Voltage supply from backplane bus	Typ. 10 mA
Certification	UL, CSA, FM
IP degree of protection to DIN EN 60529; IEC 60529	IP 20
Climatic requirements $T_{min} (IND)$ to $T_{max} (IND)$ (operating temperature)	
<ul style="list-style-type: none"> <li>Vertical mounting</li> <li>Horizontal installation</li> </ul>	<p>0 ... +60 °C</p> <p>0 ... +40 °C</p>
EMC requirements according to	NAMUR NE21, Part 1 89/386/EEC

# ET 200 distributed I/Os

## ET 200S – Technology Modules

### SIWAREX CF

#### Ordering data

##### SIWAREX CF

Force module for strain-gauge sensors in SIMATIC ET 200S (SIWAREX CF configuring package not required)

#### Order No.

**7MH4920-0AA01**

##### SIWAREX CF manual

• German, English

Free download in the Internet at: [www.siemens.com/weighing-technology](http://www.siemens.com/weighing-technology)

##### SIWAREX CF "Getting started"

Sample software for easy acquaintance with programming in STEP 7.

Free download in the Internet at: [www.siemens.com/weighing-technology](http://www.siemens.com/weighing-technology)

#### Installation material (mandatory)

##### Terminal module

TM-E 30 mm wide (required for each SIWAREX module)

**6ES7193-4CG20-0AA0**  
or compatible

##### Shield contact element

Contents 5 items, sufficient for 5 cables

**6ES7193-4GA00-0AA0**

#### Order No.

##### Shield terminal element

Contents: 5 items, sufficient for 5 cables

One shield terminal element is required per sensor cable

**6ES7193-4GB00-0AA0**

##### N busbar, galvanized

3 x 10 mm, 1.5 m long

**8WA2842**

##### Feeder terminal for N busbar

**8WA2868**

#### Accessories

##### SIWAREX EB extension box

for extending sensor cables

**7MH4710-2AA**

#### Cable (optional)

##### Cable Li2Y 1 x 2 x 0.75 ST + 2 x (2 x 0.34 ST) - CY, orange sheath

To connect SIWAREX U, M, P, FTA, FTC, CS and CF to the junction box (JB), extension box (EB) or Ex interface (Ex-I) or between two JB's, for fixed laying, occasional bending is possible, 10.8 mm outer diameter, for ambient temperature -40 to +80°C

**7MH4702-8AG**

### Overview



- Mechanical modules as receptacles for the electronic modules
- For setting up permanent wiring via build-as-you-go voltage buses
- Keyed connection technology to ensure an enhanced vibration resistance of up to 5 g
- Different variants for accepting power modules and electronic modules
- Replaceable terminal box (even within the station network)
- Automatic coding of the electronics modules
- Build-as-you-go shielding of the backplane bus for high data security
- Color coding facility for the terminals and for identifying the slot numbers
- Alternatively available with screw-type or spring-loaded terminals as well as with no-strip fast connection system "FastConnect" for up to 60 % quicker process wiring

### Ordering data

### Order No.

#### TM-P terminal modules for PM-E power modules

Ordering data	Order No.
<b>TM-P15S23-A1</b> Ordering unit 1 piece 2 x 3 terminals, terminal access to AUX1 bus, AUX1 interconnected to the left, screw-type terminals	<b>6ES7 193-4CC20-0AA0</b>
<b>TM-P15C23-A1</b> Ordering unit 1 piece 2 x 3 terminals, terminal access to AUX1 bus, AUX1 interconnected to the left, spring-loaded terminals	<b>6ES7 193-4CC30-0AA0</b>
<b>TM-P15N23-A1</b> Ordering unit 1 piece 2 x 3 terminals, terminal access to AUX1 bus, AUX1 interconnected to the left, FastConnect	<b>6ES7 193-4CC70-0AA0</b>
<b>TM-P15S23-A0</b> Ordering unit 1 piece 2 x 3 terminals, terminal access to AUX1 bus, AUX1 interrupted to the left, screw-type terminals	<b>6ES7 193-4CD20-0AA0</b>
<b>TM-P15C23-A0</b> Ordering unit 1 piece 2 x 3 terminals, terminal access to AUX1 bus, AUX1 interrupted to the left, spring-loaded terminals	<b>6ES7 193-4CD30-0AA0</b>
<b>TM-P15N23-A0</b> Ordering unit 1 piece 2 x 3 terminals, terminal access to AUX1 bus, AUX1 interrupted to the left, FastConnect	<b>6ES7 193-4CD70-0AA0</b>
<b>TM-P15S22-01</b> Ordering unit 1 piece 2 x 2 terminals, no terminal access to AUX1 bus, AUX1 interconnected to the left, screw-type terminals	<b>6ES7 193-4CE00-0AA0</b>

1) Observe project planning help for selecting the suitable TM-E and TM-P

### Order No.

<b>TM-P15C22-01</b> Ordering unit 1 piece 2 x 2 terminals, terminal access to AUX1 bus, AUX1 interconnected to the left, spring-loaded terminals	<b>6ES7 193-4CE10-0AA0</b>
<b>TM-P15N22-01</b> Ordering unit 1 piece 2 x 2 terminals, terminal access to AUX1 bus, AUX1 interconnected to the left, FastConnect	<b>6ES7 193-4CE60-0AA0</b>
<b>TM-P30S44-A0</b> Ordering unit 1 piece 7 x 2 terminals, terminal access to AUX1 bus, AUX1 interrupted to the left, screw-type terminals for PM-E F PROFIsafe	<b>6ES7 193-4CK20-0AA0</b>
<b>TM-P30C44-A0</b> Ordering unit 1 piece 7 x 2 terminals, terminal access to AUX1 bus, AUX1 interrupted to the left, spring-loaded terminals for PM-E F PROFIsafe	<b>6ES7 193-4CK30-0AA0</b>
<b>Terminal module TM-E for electronic modules <sup>1)</sup></b>	
<b>TM-E15S24-A1</b> Ordering unit 5 pieces 2 x 4 terminals, terminal access to AUX1 bus, AUX1 interconnected to the left, screw-type terminals	<b>6ES7 193-4CA20-0AA0</b>
<b>TM-E15C24-A1</b> Ordering unit 5 pieces 2 x 4 terminals, terminal access to AUX1 bus, AUX1 interconnected to the left, spring-loaded terminals	<b>6ES7 193-4CA30-0AA0</b>
<b>TM-E15S24-01</b> Ordering unit 5 pieces 2 x 4 terminals, terminal access to AUX1 bus, AUX1 interconnected to the left, screw-type terminals	<b>6ES7 193-4CB20-0AA0</b>

# ET 200 distributed I/Os

## ET 200S – Terminal Modules

Terminal modules for power and electronic modules

### Ordering data

### Order No.

*Terminal module TM-E for electronic modules*<sup>1)</sup>

<b>TM-E15C24-01</b> Ordering unit 5 pieces 2 x 4 terminals, terminal access to AUX1 bus, AUX1 interconnected to the left, spring-loaded terminals	<b>6ES7 193-4CB30-0AA0</b>
<b>TM-E15S23-01</b> Ordering unit 5 pieces 2 x 3 terminals, terminal access to AUX1 bus, AUX1 interconnected to the left, screw-type terminals	<b>6ES7 193-4CB00-0AA0</b>
<b>TM-E15C23-01</b> Ordering unit 5 pieces 2 x 3 terminals, terminal access to AUX1 bus, AUX1 interconnected to the left, spring-loaded terminals	<b>6ES7 193-4CB10-0AA0</b>
<b>TM-E15N23-01</b> Ordering unit 5 pieces 2 x 3 terminals, terminal access to AUX1 bus, AUX1 interconnected to the left, FastConnect	<b>6ES7 193-4CB60-0AA0</b>
<b>TM-E15N24-01</b> Ordering unit 5 pieces 2 x 4 terminals, terminal access to AUX1 bus, AUX1 interconnected to the left, FastConnect	<b>6ES7 193-4CB70-0AA0</b>
<b>TM-E15S26-A1</b> Ordering unit 5 pieces 2 x 6 terminals, terminal access to AUX1 bus, AUX1 interconnected to the left, screw-type terminals	<b>6ES7 193-4CA40-0AA0</b>
<b>TM-E15C26-A1</b> Ordering unit 5 pieces 2 x 6 terminals, terminal access to AUX1 bus, AUX1 interconnected to the left, spring-loaded terminals	<b>6ES7 193-4CA50-0AA0</b>
<b>TM-E15N24-A1</b> Ordering unit 5 pieces 2 x 4 terminals, terminal access to AUX1 bus, AUX1 interconnected to the left, FastConnect	<b>6ES7 193-4CA70-0AA0</b>
<b>TM-E15N26-A1</b> Ordering unit 5 pieces 2 x 6 terminals, terminal access to AUX1 bus, AUX1 interconnected to the left, FastConnect	<b>6ES7 193-4CA80-0AA0</b>
<b>TM-E30S44-01</b> Ordering unit 1 piece 4 x 4 terminals, terminal access to AUX1 bus, AUX1 interconnected to the left, screw-type terminals	<b>6ES7 193-4CG20-0AA0</b>
<b>TM-E30C44-01</b> Ordering unit 1 piece 4 x 4 terminals, terminal access to AUX1 bus, AUX1 interconnected to the left, spring-loaded terminals	<b>6ES7 193-4CG30-0AA0</b>

1) Observe project planning help for selecting the suitable TM-E and TM-P

### Order No.

<b>TM-E30S46-A1</b> Ordering unit 1 piece 4 x 6 terminals, terminal access to AUX1 bus, AUX1 interconnected to the left, screw-type terminals	<b>6ES7 193-4CF40-0AA0</b>
<b>TM-E30C46-A1</b> Ordering unit 1 piece 4 x 6 terminals, terminal access to AUX1 bus, AUX1 interconnected to the left, spring-loaded terminals	<b>6ES7 193-4CF50-0AA0</b>
<b>TM-E15S24-AT</b> Ordering unit 1 piece for internal temperature compen- sation with 2 AI TC High Feature, screw-type terminal	<b>6ES7 193-4CL20-0AA0</b>
<b>TM-E15C24-AT</b> Ordering unit 1 piece for internal temperature compen- sation with 2 AI TC High Feature, spring-loaded terminals	<b>6ES7 193-4CL30-0AA0</b>
<b>Accessories for shield connection</b>	
<b>Shield connection element</b> Ordering unit 5 pieces For plugging into TM-E and TM-P	<b>6ES7 193-4GA00-0AA0</b>
<b>Shield clamps</b> Ordering unit 5 pieces For busbar 3 x 10 mm	<b>6ES7 193-4GB00-0AA0</b>
<b>Grounding terminal</b> Ordering unit 1 item For cable cross-sections up to 25 mm <sup>2</sup>	<b>8WA2 868</b>
<b>3 x 10 mm busbars</b> Ordering unit 1 item	<b>8WA2 842</b>
<b>Accessories for coding</b>	
<b>Color coding plates</b> Ordering unit 200 pieces for TM-P, TM-E	
• white	<b>6ES7 193-4LA20-0AA0</b>
• yellow	<b>6ES7 193-4LB20-0AA0</b>
• yellow/green	<b>6ES7 193-4LC20-0AA0</b>
• red	<b>6ES7 193-4LD20-0AA0</b>
• blue	<b>6ES7 193-4LF20-0AA0</b>
• brown	<b>6ES7 193-4LG20-0AA0</b>
• turquoise	<b>6ES7 193-4LH20-0AA0</b>
<b>Labels, inscribed</b> Ordering unit 1 set	
200 items for slot numbering (1 to 20) 10 x	<b>8WA8 861-0AB</b>
200 items for slot numbering (1 to 40) 5 x	<b>8WA8 861-0AC</b>
200 items for slot numbering (1 to 64) 1 x, (1 to 68) 2 x	<b>8WA8 861-0DA</b>
<b>Labels, blank</b> 200 items for slot numbering	<b>8WA8 848-2AY</b>

#### Overview



Standard motor starters, DS1-x direct-on-line starter



High Feature motor starters, DS1e-x direct-on-line starter



ET 200S FC frequency converter

#### Motor starters

- Completely factory-wired motor starters for switching and protecting any three-phase loads
- Can be used as a direct-on-line, reversing or soft starter
- Standard motor starter with circuit-breaker contactor combination up to 5.5 kW
- High Feature motor starter with a combination comprising starter circuit-breaker, solid-state overload protection and contactor or soft starter up to 7.5 kW
- With self-assembling 40/50 A power bus, i.e. the load voltage is only supplied once for a group of motor starters
- Hot swapping is permissible
- Inputs and outputs for activating and signaling the statistics have been integrated
- Diagnostics capability for active monitoring of the switching and protection functions
- Can be combined with expansion modules: Brake Control Module for controlling electromechanical brakes in induction motors and with two optional inputs for special functions (for quick stop with the Standard motor starter and for parameterizable special functions with the High Feature motor starter)
- Can be combined with SIGUARD safety systems for use in safety-related subsystems (EN 954-1)

#### Frequency converter

- For stepless speed control of asynchronous motors
- Consisting of the modules for control module ICU24 and power supply IPM25 up to 4.0 kW
- Hot swapping of control module and power supply permitted
- Low line harmonic distortions
- Operation without line commutating reactor
- Active braking with line-commutated energy recovery
- Can be combined with brake control module for controlling an electromechanical holding brake
- With self-assembling 50 A power bus, i. e. the load voltage for a group of frequency converters has to be fed in just once
- For achieving EMC Class A (acc. to EN 55011)  
Connection of an EMC filter before the power bus

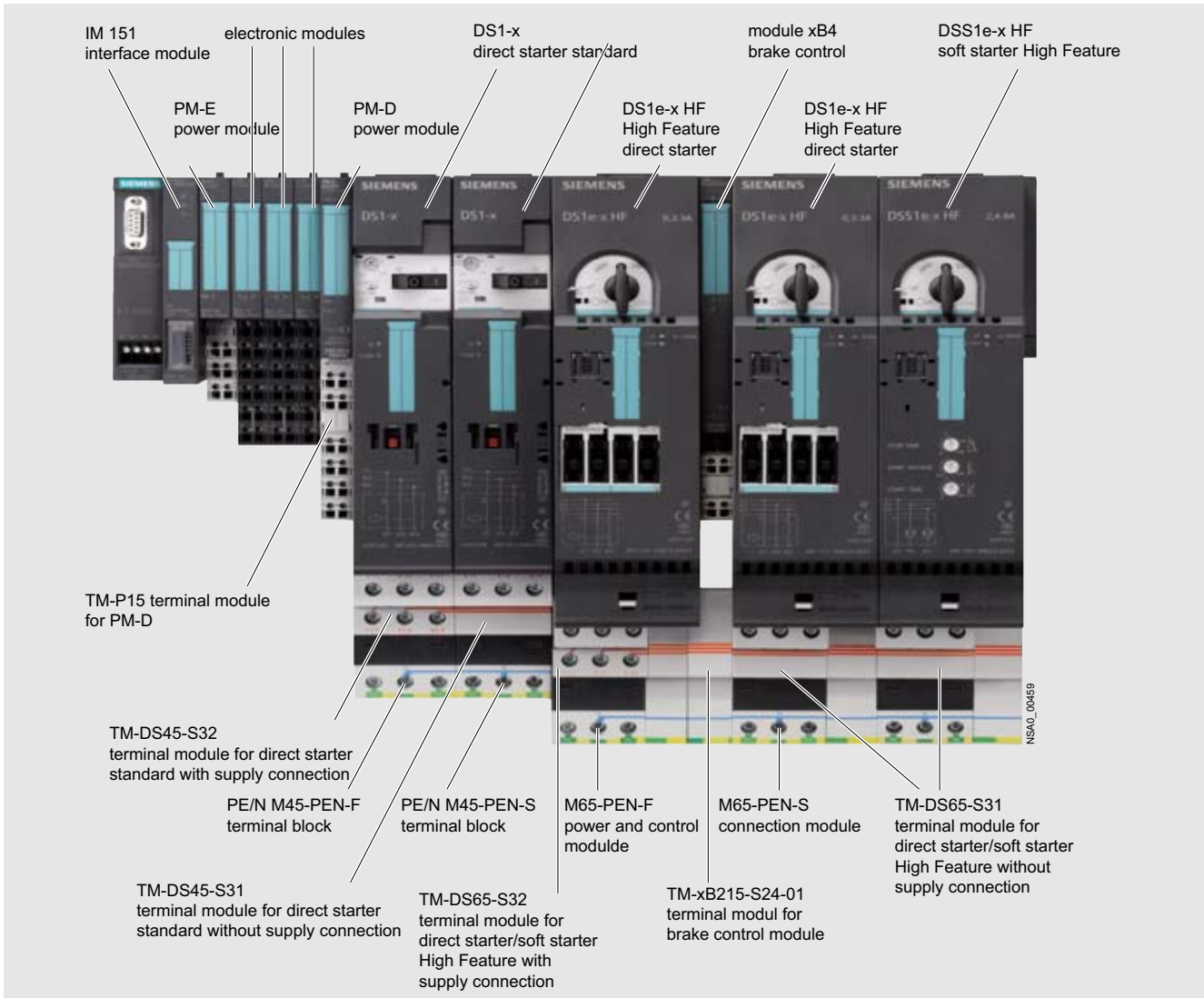
# ET 200 distributed I/Os

## ET 200S – Motor Starters and Frequency Converters

### ET 200S motor starters

#### Overview (continued)

5



Interplay of ET 200S motor starter components

#### Application

The ET 200S motor starters can be used to protect and switch any three-phase load. The communication interface makes them ideal for use in distributed switchgear cabinets or control boxes.

Since the motor starters are fully factory-wired, the installation of power switchgear cabinets requires far less time and space. The bit-modular design makes engineering much simpler. When the ET 200S is used, the parts list is reduced to two essential items per load feeder circuit: the passive terminal module and the motor starter. For this reason, ET 200S is also perfectly suited for modular machine concepts.

Expansions can be easily implemented by subsequent connection of additional terminal modules. The new terminal block design (10 mm<sup>2</sup>) also replaces the previously required distribution wiring. The permanent wiring and the hot-swapping function (connection and disconnection permitted when energized) makes it possible to replace a motor starter in a few seconds, if necessary. This makes the motor starters especially suitable for applications which require a high level of availability.

Since the motor starters can be expanded with xB1-xB4 brake control modules, they can be used for motors with 24 V DC brakes (xB1, xB3) and with -500 V DC brakes (xB2, xB4). The -24 V DC brakes are supplied externally and can be released independent of the switching status of the motor starter. The 500 V DC brakes, on the other hand, are generally supplied direct from the junction plate of the motor via a rectifier module and can therefore not be released if the motor starter is switched off. These brakes cannot be used in conjunction with the DSS1e-x motor starter (soft starter).

The outputs of the brake control modules can also be used for other purposes e.g. for controlling DC valves. Independent special functions can be implemented with the help of the two optional local inputs on the brake control modules (xB3, xB4) and two additional inputs on the control module of the High Feature motor starter. These operate independently of the bus and higher-level control, e.g. to implement rapid stop functions for slide controls. The status of these inputs is also signaled to the control.

#### Application (continued)

The selective protection concept with electronic overload evaluation and the use of the SIRIUS switchgear – size S0 – achieves a number of additional advantages for the High Feature motor starters which quickly pay off, especially for manufacturing processes that have high plant downtime costs:

- Only two variants up to 7.5 kW
- All settings can be configured via the bus
- Separate signals for overloads and short-circuits
- Overload can be acknowledged via remote reset
- Current asymmetry monitoring
- Rotor locking protection
- Emergency start function in the event of overload
- Current value transfer via bus
- Current limit value monitoring
- Class 10 or Class 20 configurable
- Type of coordination 2  
(remains functional after a short-circuit of 50 kA)
- Very long contract service life

#### Accessories for motor starters

The following accessories are available:

##### DM-V15 distance module

The distance module is available for applications with high motor currents or high ambient temperatures for standard motor starters. It can be used on the right and left side of a DS1-x direct starter or on the right side of a xB1-4 brake module to improve lateral heat dissipation. The distance module is a completely passive module and does not have to be taken into account when engineering the control. More details on the distance module can be found in the "SIMATIC ET 200S" manual. If you have further queries about the distance module, please contact Technical Support for Siemens low-voltage controlgear, switchgear and systems (fax: 09131/7-42899).

##### Jumper module PE/N

The PE/N jumper modules are used to bridge gaps in the PE/N bus e.g. caused by the use of a brake control module, PM-D(F) power module, or PM-X connection module. No additional power is required if jumper modules are used. They are available in 15 mm and 30 mm width.

##### Jumper module L1/L2/L3

The L1/L2/L3 jumper modules are used to bridge a gap in the energy bus (see above). They are available in 15 mm and 30 mm width.

#### Accessories for frequency converters

Following accessories are available:

##### XB1 and XB3 brake control modules

If required, the XB1 and XB3 brake control modules can be arranged on the right-hand side next to the IPM25 power section of the ET 200S FC frequency converter. Using the brake control module it is possible to connect a motor brake to the converter. Actuation takes place through the internal brake control of the converter.

##### EMC filter for frequency converters

EMC class A is achieved by installing an EMC filter upstream from the power bus of the converter. Shielded motor cables and EMC-compatible wiring are required in addition. The EMC filter is available in two sizes for 25 A and 50 A rated current. Both EMC filters have been designed for a maximum cable length of 350 m. This cable length includes the sum total of all the motor cables of the converters sharing one power bus.

##### MMC parameter memory

If required, an additional storage medium can be used for the parameterization of the frequency converter. The MMC parameter memory permits replacement of the ICU24/ICU24F control module with automatic downloading of parameters from the MMC into the internal parameter memory of the ICU24/ICU24F.

The MMC parameter memory fits in the MMC slot of the ICU24/ICU24F control module. Other memory cards are not accepted by the ICU24/ICU24F.

##### Connection cable from a PC to the ICU24/ICU24F control module



The cable creates a point-to-point connection from the PC to the ICU24/ICU24F control module for starting up the converter with the "STARTER" PC tool.

# ET 200 distributed I/Os


## ET 200S – Motor Starters and Frequency Converters

### ET 200S motor starters




#### Selection and Ordering data

	Version	Order No.	
<b>Standard motor starter</b> with diagnostics, electromechanical, fuseless, expandable with brake control module			
 DS1-x	<b>DS1-x direct-on-line starters</b>		
	<i>Motor rating, standard induction motor</i>	<i>Setting range of the overcurrent release</i>	
	<i>in kW</i>	<i>in A</i>	
	< 0.06	0.14 ... 0.20	3RK1 301-0BB00-0AA2
	0.06	0.18 ... 0.25	3RK1 301-0CB00-0AA2
	0.09	0.22 ... 0.32	3RK1 301-0DB00-0AA2
	0.10	0.28 ... 0.40	3RK1 301-0EB00-0AA2
	0.12	0.35 ... 0.50	3RK1 301-0FB00-0AA2
	0.18	0.45 ... 0.63	3RK1 301-0GB00-0AA2
	0.21	0.55 ... 0.80	3RK1 301-0HB00-0AA2
	0.35	0.70 ... 1.00	3RK1 301-0JB00-0AA2
	0.37	0.90 ... 1.25	3RK1 301-0KB00-0AA2
	0.55	1.1 ... 1.6	3RK1 301-1AB00-0AA2
	0.75	1.4 ... 2.0	3RK1 301-1BB00-0AA2
	0.90	1.8 ... 2.5	3RK1 301-1CB00-0AA2
	1.1	2.2 ... 3.2	3RK1 301-1DB00-0AA2
	1.5	2.8 ... 4.0	3RK1 301-1EB00-0AA2
	1.9	3.5 ... 5.0	3RK1 301-1FB00-0AA2
	2.2	4.5 ... 6.3	3RK1 301-1GB00-0AA2
3.0	5.5 ... 8.0	3RK1 301-1HB00-0AA2	
4.0	7 ... 10	3RK1 301-1JB00-0AA2	
5.5	9 ... 12	3RK1 301-1KB00-0AA2	
 RS1-x	<b>RS1-x reversing starters</b>		
	<i>in kW</i>	<i>in A</i>	
	< 0.06	0.14 ... 0.20	3RK1 301-0BB00-1AA2
	0.06	0.18 ... 0.25	3RK1 301-0CB00-1AA2
	0.09	0.22 ... 0.32	3RK1 301-0DB00-1AA2
	0.10	0.28 ... 0.40	3RK1 301-0EB00-1AA2
	0.12	0.35 ... 0.50	3RK1 301-0FB00-1AA2
	0.18	0.45 ... 0.63	3RK1 301-0GB00-1AA2
	0.21	0.55 ... 0.80	3RK1 301-0HB00-1AA2
	0.35	0.70 ... 1.00	3RK1 301-0JB00-1AA2
	0.37	0.90 ... 1.25	3RK1 301-0KB00-1AA2
	0.55	1.1 ... 1.6	3RK1 301-1AB00-1AA2
	0.75	1.4 ... 2.0	3RK1 301-1BB00-1AA2
	0.90	1.8 ... 2.5	3RK1 301-1CB00-1AA2
	1.1	2.2 ... 3.2	3RK1 301-1DB00-1AA2
	1.5	2.8 ... 4.0	3RK1 301-1EB00-1AA2
	1.9	3.5 ... 5.0	3RK1 301-1FB00-1AA2
	2.2	4.5 ... 6.3	3RK1 301-1GB00-1AA2
	3.0	5.5 ... 8.0	3RK1 301-1HB00-1AA2
4.0	7 ... 10	3RK1 301-1JB00-1AA2	
5.5	9 ... 12	3RK1 301-1KB00-1AA2	




#### Selection and Ordering data (continued)

	Version	Order No.
 DS1e-x	<b>DS1e-x direct on-line starter</b> with switch interface  <i>Setting range of the overcurrent release in A</i> 0.3 ... 3 2.4 ... 8 2.4 ... 16	<b>3RK1 301-0AB10-0AA4</b> <b>3RK1 301-0BB10-0AA4</b> <b>3RK1 301-0CB10-0AA4</b>
	<b>RS1e-x reversing starters</b>  <i>Setting range of the overcurrent release in A</i> 0.3 ... 3 2.4 ... 8 2.4 ... 16	<b>3RK1 301-0AB10-1AA4</b> <b>3RK1 301-0BB10-1AA4</b> <b>3RK1 301-0CB10-1AA4</b>
	<b>DSS1e-x soft starters</b>  <i>Setting range of the overcurrent release in A</i> 0.3 ... 3 2.4 ... 8 2.4 ... 16	<b>3RK1 301-0AB20-0AA4</b> <b>3RK1 301-0BB20-0AA4</b> <b>3RK1 301-0CB20-0AA4</b>

#### Accessories for Standard motor starters

 3RK1 903-0CA00	<b>Control kit</b> for manually operating the contactor contacts during start-up and servicing (one set contains five control kits)	<b>3RK1 903-0CA00</b>
 3RK1 903-0CG00	<b>Control unit</b> for direct control of contactor (manual control) 24 V DC	<b>3RK1 903-0CG00</b>
 3RK1 903-0CD00	<b>DM-V15 distance module</b> <b>for DS1-x direct-on-line starters</b> <b>with high temperature or current load</b> 15 mm wide	<b>3RK1 903-0CD00</b>

#### Accessories for High Feature motor starters






 3RK1 903-0CH20	<b>Control module 2DI DC 24 V COM</b> Digital input module with two inputs for local motor starter functions For mounting on front of motor starter Operating voltage 24 V DC (fed from V1), short-circuit-proof, floating contact with serial interface for connection of Switch ES Connection via LOGO! PC cable, max. permissible cable length (forward and return) 50	<b>3RK1 903-0CH20</b>
 3RK1 922-3BA00	<b>LOGO PC cable</b> For connecting the High Feature motor starter with Switch ES interface to a PC	<b>6ED1 057-1AA00-0BA0</b>
 3RK1 922-3BA00	<b>Hand-held device</b> for ET 200S motor starter ET 200S High Feature, ET 200 PRO and ECOFAST for local operation, serial interface cable must be ordered separately	<b>3RK1 922-3BA00</b>

# ET 200 distributed I/Os

## ET 200S – Motor Starters and Frequency Converters

### ET 200S motor starters

#### Selection and Ordering data (continued)

	Version	Order No.
<i>Accessories for Standard / High Feature motor starters and frequency converters</i>		
 <p>3RK1 903-0AH00</p>	<p><b>M15-PEN15 bridge block</b> 15 mm wide For bridging a 15 mm module</p>	<p><b>3RK1 903-0AH00</b></p>
 <p>3RK1 903-0AJ00</p>	<p><b>M30-PEN bridge block</b> 30 mm wide For bridging a 30 mm module</p>	<p><b>3RK1 903-0AJ00</b></p>
 <p>3RK1 903-0AE00</p>	<p><b>M15-L123 bridge block</b> 15 mm wide For bridging a 15 mm module</p>	<p><b>3RK1 903-0AE00</b></p>
 <p>3RK1 903-0AF00</p>	<p><b>M30-L123 bridge block</b> 30 mm wide For bridging a 30 mm module</p>	<p><b>3RK1 903-0AF00</b></p>
 <p>3RK1 903-0CB00</p>	<p><b>Brake control modules</b> For motors with a mechanical brake</p> <ul style="list-style-type: none"> <li>• <b>xB1 for motor starters and frequency converters</b> 24 V DC / 4 A</li> <li>• <b>xB2 for motor starters and frequency converters</b> 500 V DC / 0.7 A</li> <li>• <b>xB3 for motor starters</b> 24 V DC / 4 A / 2 DI DC 24 V local control With diagnostics; with two inputs</li> <li>• <b>xB4 for motor starters</b> 500 V DC / 0.7 A / 2 DI DC 24 V local control With diagnostics; with two inputs</li> </ul>	<p><b>3RK1 903-0CB00</b></p> <p><b>3RK1 903-0CC00</b></p> <p><b>3RK1 903-0CE00</b></p> <p><b>3RK1 903-0CF00</b></p>
<b>Terminal module for brake control modules</b>		
<ul style="list-style-type: none"> <li>• <b>TM-xB15 S24-01</b> for xB1 or xB2</li> </ul>		<p><b>3RK1 903-0AG00</b></p>
<ul style="list-style-type: none"> <li>• <b>TM-xB215 S24-01</b> for xB3 or xB4</li> </ul>		<p><b>3RK1 903-0AG01</b></p>
<b>EMC filter for frequency converter</b>		
<p>For achieving EMC Class A; is connected before shared power bus of frequency converters, installation must comply with EMC guidelines (shielded motor cables)</p> <ul style="list-style-type: none"> <li>• 25 A rated current</li> <li>• 50 A rated current</li> </ul>		<p><b>6SL3 203-0BE22-5AA0</b></p> <p><b>6SL3 203-0BE25-0AA0</b></p>
<b>MMC parameter memory for frequency converter</b>		
<p>Matches the MMC slot of the ICU24 / ICU24F closed-loop control module; other memory cards are not accepted</p>		<p><b>6SL3 254-0AM00-0AA0</b></p>
<b>RS 232/zero modem cable (5 m)</b>		
<p>Cable for commissioning the ET 200S FC frequency converter using the PC tool "STARTER"</p>		<p><b>6ES7 901-1BF00-0XA0</b></p>

#### Overview



Components of the ET 200S FC frequency converter

#### Benefits

- The frequency converter is completely integrated into the ET 200S system and offers all system advantages, such as high availability thanks to the hot swapping function, modular expansion, or reduction of the wiring overhead resulting from the self-assembling terminal module wiring.
- With self-assembling 50 A power bus, i.e. the load voltage is only supplied once for a group of frequency converters
- Comprehensive diagnostics facilities for high availability
- Input for motor encoder for precise speed control
- Input for PTC/KTY encoder for comprehensive motor protection
- Slot for optional memory card (MMC) to save the parameter settings for fast replacement of modules without tools
- All common control modes are available: Frequency control, sensor-less vector control or torque control, closed-loop control with motor encoder
- Parameterization takes place using STARTER, the graphical parameterization tool for Siemens drives
- Active braking is possible without additional overhead. The line-commutated energy recovery of the frequency converter for the power supply network means that brake chopper modules or pulsed resistors are superfluous.

#### Application

- New application possibilities are opened up for the ET 200S system where continuous control of the speed of asynchronous motors is required.
- The frequency converter handles frequency control and vector control for more complex drive tasks. In addition, the converter also supports torque control for conveyor applications, winding and unwinding drives, as well as hoisting gear. Together with a motor encoder, the range extends up to closed-loop controls for exact control of speeds and torques.
- The advantages of line-commutated power regeneration are primarily evident in continuous regenerative operation. Examples include unwinding units, lowering of loads with hoisting gear, or electric braking of large centrifugal masses.
- Together with an intelligent header module (IM 151 CPU) and the ET 200S FC frequency converter, the I/O station is expanded to become a complete automation solution for machine modules and plant sections.

# ET 200 distributed I/Os

## ET 200S – Motor Starters and Frequency Converters

### ET 200S FC frequency converter

#### Design



Design of an ET 200S station with two ET 200S FC frequency converters (only terminal modules on the right)

The ET 200S FC consists of the following components:

- ICU24 control unit
- IPM25 converter power module
- Terminal modules to accommodate control unit and converter power module

Following insertion of the modules, the control unit and the converter power module of the frequency converter are interconnected.

The PMD power module provides the power supply for one or more control units.

#### Accessories

The following accessories are available:

- The labeling strips and color coding labels of the ET 200S system can also be used for the frequency converter.
- **Jumper block L1/L2/L3**  
The jumper blocks L1/L2/L3 are used to bridge a gap in the power bus. 15 mm wide jumper blocks are used to bridge the control unit of the subsequent frequency converter. If a brake control module is connected, a 30 mm wide jumper block is required in order to pass on the power bus via the brake control module and ICU24 to the subsequent IPM25 converter power module.
- **Jumper block PE/N**  
The Jumper blocks PE/N are used to bridge a gap in the PE/N bus, e.g. caused by use of a brake control module, a PM-D(F) power module or the control unit of the frequency converter.
- **EMC filter**  
An EMC filter must be externally connected to the supply of the power bus in order to achieve EMC Class A (according to EN 55011). Shielded motor cables must be used in addition. It must be ensured that the shield is connected correctly. The terminal modules for the converter power module of the frequency converter are equipped for this with an integral shield connecting element. Within the ET 200S system, several frequency converters can be supplied with 400 V over a common power bus. The EMC filter is connected up-circuit of the power bus. The filters are designed for a maximum effective length of 350 m shielded cable. The effective cable length is the combined length of all motor cables of the frequency converter on the common 400 V power bus. The two EMC filters of the ET 200S FC are designed as group filters for more than one frequency converter and have the following properties:

EMC filter	Rated current	Maximum cable length	Conductor cross-section
Type			
6SL3203-0BE22-5AA0	25 A	350 m	4 mm <sup>2</sup>
6SL3203-0BE25-0AA0	50 A	350 m	10 mm <sup>2</sup>

The use of output reactors or LC filters on the converter output does not affect the maximum cable length for the EMC filter.

#### Design (continued)

- Output reactors and LC filters for longer cable lengths**  
 Without additional components on the converter output, the maximum length of motor cables on the SIMATIC ET 200S FC frequency converter is 50 m (shielded cable) or 100 m (unshielded). Longer cables are possible when output reactors or LC filters are used:  
 To reduce the capacitive equalizing currents and  $du/dt$  for motor cables, output reactors are provided. Consequently when output reactors are used, the maximum permissible cable lengths between the motor and converter are:

IPM25 converter power module	Output choke Type	Max. permissible motor cable lengths (shielded/unshielded) for a line voltage of	
		380 V -15% to 400 V	401 V to 480 V+10%
0.75 kW	6SE6400-3TC00-4AD2	150 m/ 225 m	100 m/ 150 m
2.2 kW and 4.0 kW	6SE6400-3TC01-0BD3	150 m/ 225 m	100 m/ 150 m

The LC filter limits the rate of rise of voltage and the capacitive charge/discharge currents which occur with converter operation. This means that considerably longer motor cables can be used for operation with LC filters. The service life of the motor is as long as for direct mains operation. It is therefore not necessary to use an output reactor. When LC filters are used, the maximum permissible cable lengths between the motor and converter are:

IPM25 converter power module	LC filter Type	Max. permissible motor cable lengths (shielded/unshielded) for a line voltage of 380 V to 480 V -15% +10%
0.75 kW	6SE6400-3TD00-4AD0	200 m/300 m
2.2 kW and 4.0 kW	6SE6400-3TD01-0BD0	200 m/300 m

When an output reactor or LC filter is used, it is important to note the following during assembly and start-up:  
 The output reactors and LC filters must be mounted alongside or below the ET 200S station. Vertical alignment is important to ensure adequate cooling. The connecting cable to the converter must be pre-assembled for all components and shortened to a length of approximately 30 cm - the shield of the motor cable must be attached to the output reactor or the LC filter.

The pulse frequency of the converter must be reduced to 4 kHz (the factory setting is 8 kHz). In addition, when an LC filter is used, the converter must be operated in  $V/f$  mode.

- Shield clamps**  
 To connect the shield of motor cables
- Grounding terminal**  
 To ground the 3 x 10 mm busbar for the shield connection
- Busbar 3 x 10 mm**  
 To accommodate the shield clamps and the grounding terminal
- Brake control module**  
 xB1 or xB2 to control an external electromechanical brake

#### Function

The ET 200S FC is capable of dynamic control procedures such as sensorless vector control or torque control. Where particular speed accuracy and dynamic response requirements exist, a motor encoder can be connected to the control module.

The ET 200S FC is operated without a line reactor.

A PTC or KTY encoder can be connected to the control module to evaluate the motor temperature.

#### Accessories

The following accessories are available:

- MMC parameter memory**  
 If required, the complete parameter settings of the frequency converter can be saved on a memory card (MMC). When servicing, the plant is immediately ready for use again after replacing the frequency converter and inserting the memory card.

# ET 200 distributed I/Os

## ET 200S – Motor Starters and Frequency Converters

### ET 200S FC frequency converter

#### Technical specifications

	Control unit	Converter power modules	
	ICU24	IPM25, FS A Frame size A	IPM25, FS B Frame size B
<b>Selection features</b>			
Integral safety functions according to Category 3 of EN 954-1 or according to SIL 2 of IEC 61508	-	-	-
Output	-	0.75 kW	2.2 kW   4.0 kW
Rated input current (at 50 °C ambient temperature)	-	1.9 A	5.7 A   9.6 A
Rated output current (at 50 °C ambient temperature)	-	2.1 A	5.9 A   10.2 A
Mounting dimensions (W x H x D) in mm (including terminal module)	15 x 220 x 156	65 x 290 x 156	130 x 290 x 156

#### Electrical data

Line voltage	3-ph. 380 V to 480 V AC +10%/-15%
Line frequency	47 Hz to 63 Hz
Overload capability	<ul style="list-style-type: none"> <li>Overload current 1.5 x rated output current (i.e. 150% overload capability) for 60s, cycle time 300s</li> <li>Overload current 2 x rated output current (i.e. 200% overload capability) for 3s, cycle time 300s</li> </ul>
Output frequency	0 Hz to 650 Hz
Pulse frequency	8 kHz (standard), 2 kHz to 16 kHz (in 2 kHz increments)
System perturbation	Low loading of power supply network by network harmonics (guide values: 5: 20%, 7: 14%, 11: 9%, 13: 8%)
Skipped frequency range	1, programmable
Converter efficiency	≥96 %
Interfaces	<ul style="list-style-type: none"> <li>Connection to PROFIBUS or PROFINET over the ET 200 S backplane bus</li> <li>RS232 interface with USS protocol for commissioning on the PC using the STARTER commissioning software</li> <li>Slot for an optional memory card (MMC) for uploading or downloading parameter settings</li> <li>PTC/KTY84 interface for motor temperature monitoring</li> <li>Speed sensor interface (Sub-D connector) for unipolar HTL incremental position encoder</li> </ul>

#### Functions

Control method	<ul style="list-style-type: none"> <li>V/f control – linear (<math>M-n</math>) with/without flux current control (FCC), quadratic (<math>M-r^2</math>) or parameterizable</li> <li>Vector control – with or without encoder</li> <li>Torque control</li> </ul>
Operating functions	Jogging mode, free function blocks (FFB), positioning deceleration ramp, automatic restart following interruption due to power failure, bumpless connection of converter to rotating motor
Braking functions	<ul style="list-style-type: none"> <li>Regenerative braking operation without brake chopper and pulsed resistor</li> <li>Control of an electrical holding brake via an optional brake control module</li> </ul>
Protection features for	Undervoltage, overvoltage, ground faults, short circuits, stall prevention, thermal motor protection $I^2t$ , converter overtemperature, motor blocking protection
Connectable motors	<ul style="list-style-type: none"> <li>Low-voltage asynchronous motors</li> <li>Motor cable lengths: max. 50 m (shielded) max. 100 m (unshielded)</li> <li>If an output reactor or an LC filter is used, longer cable lengths are possible</li> </ul>

#### Mechanical data

Degree of protection	IP20
Operating temperature	<ul style="list-style-type: none"> <li>With vertical design of station -10 °C to +40 °C</li> <li>With horizontal design of station -10 °C to +50 °C/to +60 °C with derating</li> </ul>

#### Standards

Compliance with standards	UL, cUL, CE, c-tick, according to low-voltage directive 73/23/EEC, EMC directive 89/336/EEC
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#### Derating data – Pulse frequency

Output kW	Rated output current in A at a pulse frequency of							
	2 kHz	4 kHz	6 kHz	8 kHz	10 kHz	12 kHz	14 kHz	16 kHz
0.75	2.1	2.1	2.1	2.1	1.05	1.05	1.05	1.05
2.2	5.9	5.9	5.9	5.9	5.3	5.3	5.3	5.3
4.0	10.2	10.2	10.2	10.2	5.1	5.1	5.1	5.1

The current data apply to an ambient temperature of 50°C unless specified otherwise.

#### Ordering data

	Version	Order No.
	<p><b>ICU24 control unit</b></p> <ul style="list-style-type: none"> <li>• Control modes: V/f, FCC, SLVC, VC with encoder, torque control</li> <li>• Motor encoder input: HTL unipolar</li> <li>• Motor temperature input: PTC/KTY</li> </ul>	<p><b>6SL3244-0SA00-1AA0</b></p>
	<p><b>IPM25 converter power module</b></p> <p>380 V – 480 V 3 AC +10/-15% 47 Hz - 63 Hz</p> <p>Overload: 150% 60 s 200% 3 s</p> <p>Power: 0.75 kW</p>	<p><b>6SL3225-0SE17-5UA0</b></p>
	<p><b>IPM25 converter power module</b></p> <p>380 V – 480 V 3 AC +10/-15% 47 Hz - 63 Hz</p> <p>Overload: 150% 60 s 200% 3 s</p> <p>Power: 2.2 kW 4.0 kW</p>	<p><b>6SL3225-0SE22-2UA0</b> <b>6SL3225-0SE24-0UA0</b></p>

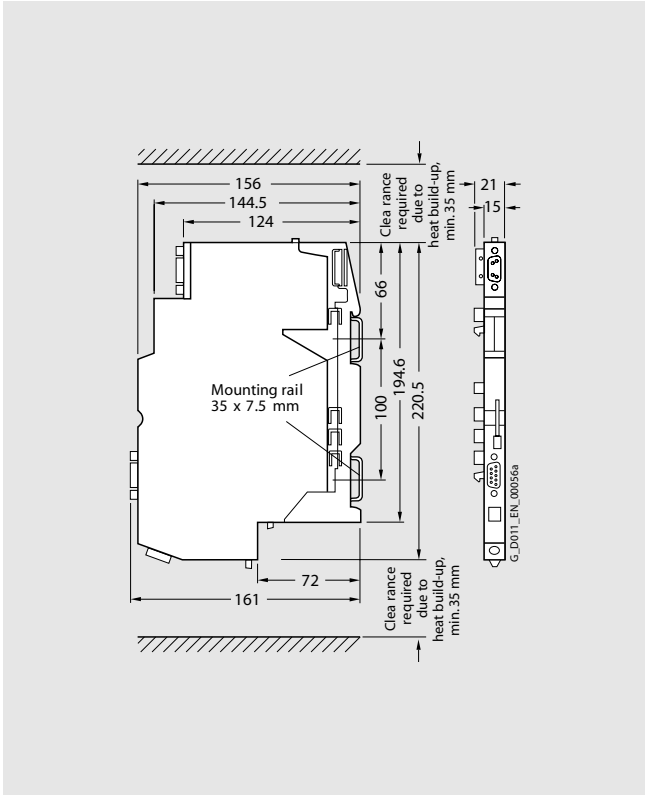
# ET 200 distributed I/Os

## ET 200S – Motor Starters and Frequency Converters

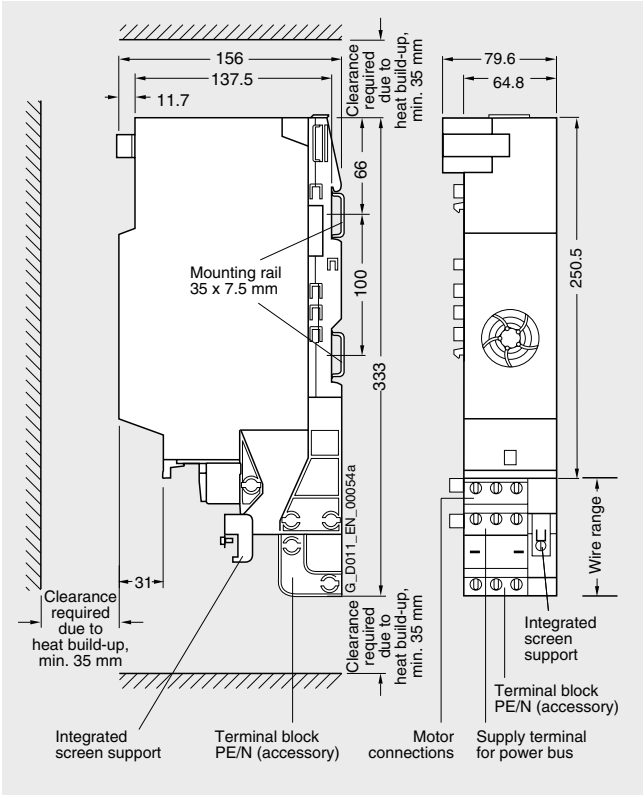
### ET 200S FC frequency converter

#### Dimension drawings

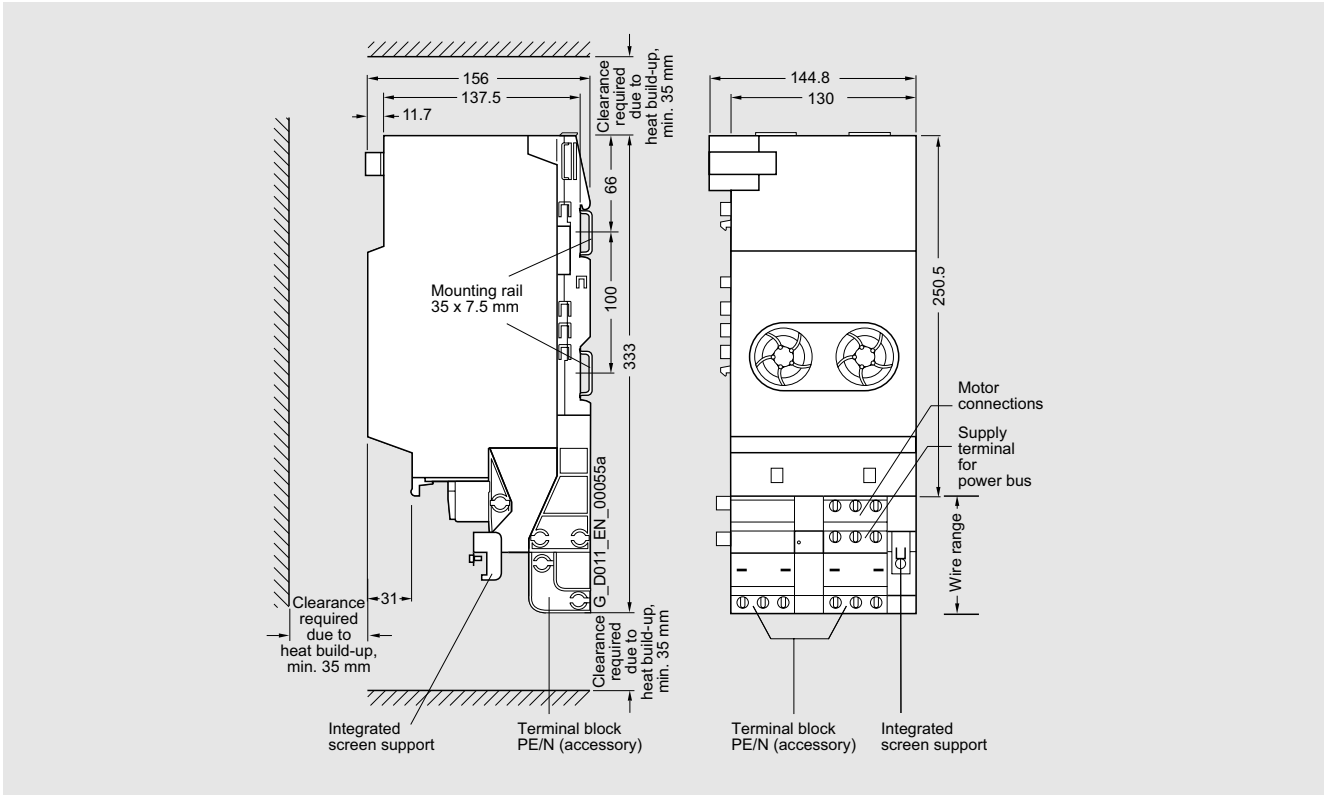
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ICU24 control unit

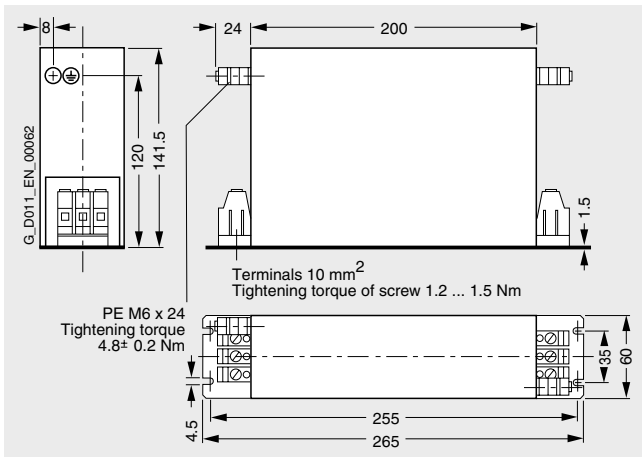


IPM25 converter power module, 0.75 kW

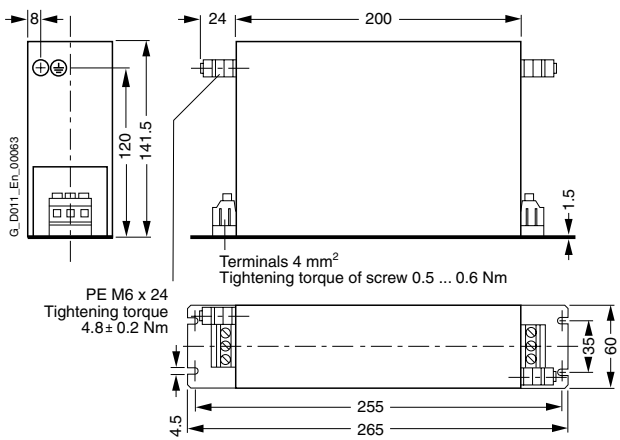


IPM25 converter power module, 2.2 kW and 4.0 kW

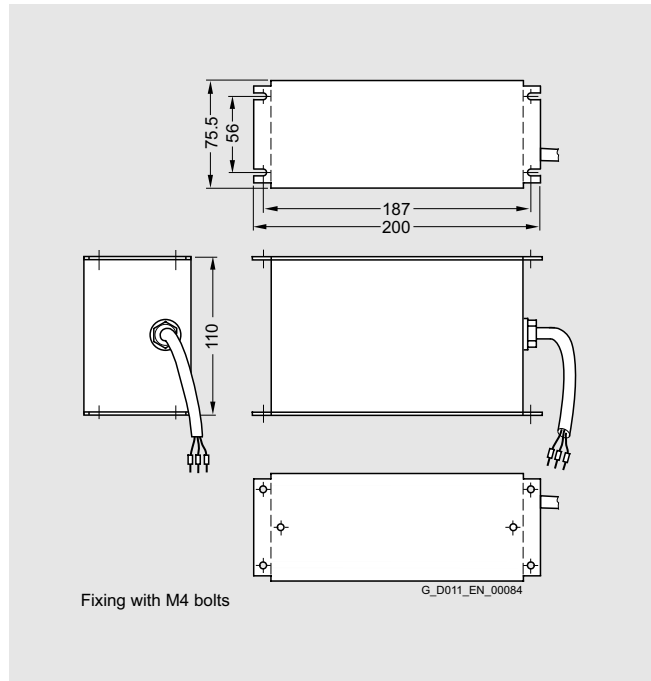
Dimension drawings (continued)



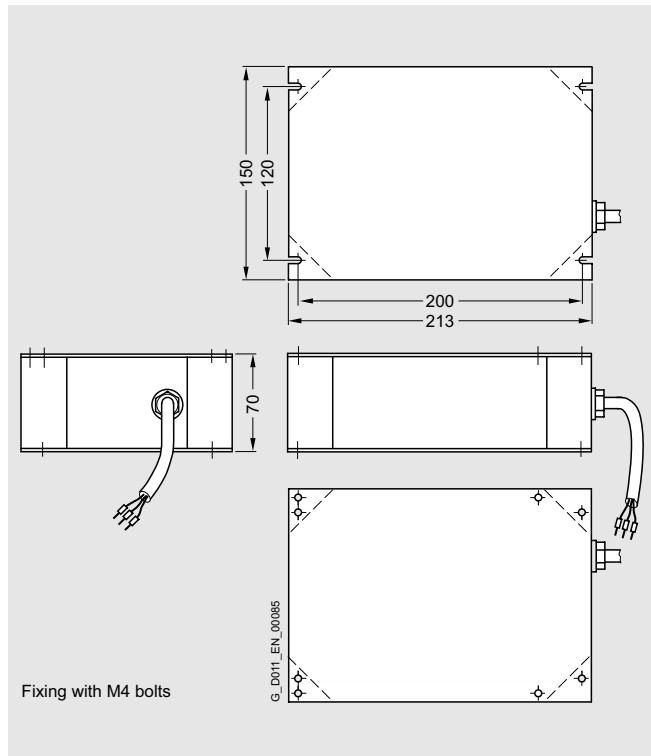
3-line filter, 50 A



3-line filter, 25 A



Output choke for IPM25 FS A



Output choke for IPM25 FS B

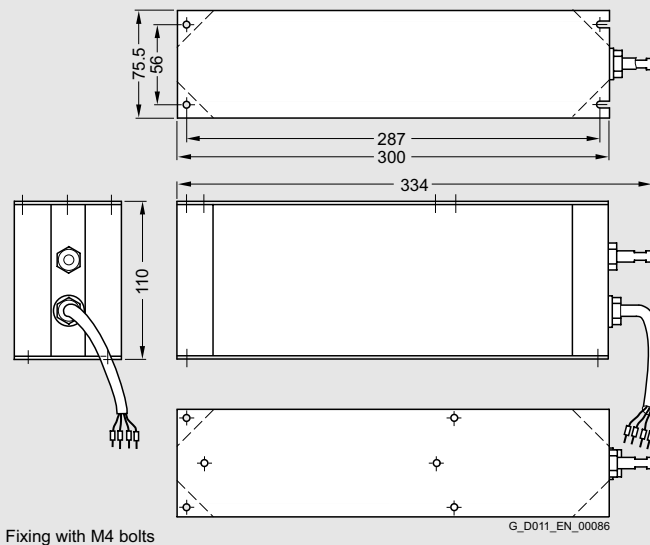
# ET 200 distributed I/Os

## ET 200S – Motor Starters and Frequency Converters

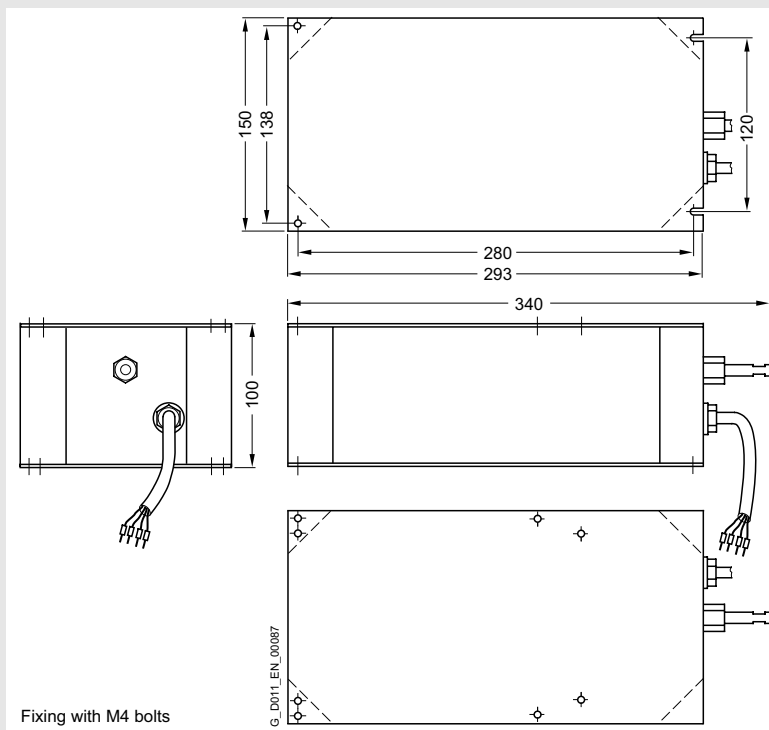
### ET 200S FC frequency converter

#### Dimension drawings (continued)

5



LC filter for IPM25 FS A




LC filter for IPM25 FS B

#### Overview

##### Accessories for Frequency Converters

- "Brake control modules XB1 and XB3  
If required, the XB1 and XB3 brake control modules can be arranged on the right-hand side next to the IPM25 power section of the ET 200S FC frequency converter. Using the brake control module it is possible to connect a motor brake to the converter. Actuation takes place through the internal brake control of the converter.
- "EMC filter for frequency converters  
EMC class A is achieved by installing an EMC filter upstream from the power bus of the converter. Shielded motor cables and EMC-compatible wiring are required in addition. The EMC filter is available in two sizes for 25 A and 50 A rated current. Both EMC filters have been designed for a maximum cable length of 350 m. This cable length includes the sum total of all the motor cables of the converters sharing one power bus.
- MMC parameter memory  
If required, an additional storage medium can be used for the parameterization of the frequency converter. The MMC permits replacement of the ICU24/ICU24F control module with automatic downloading of parameters from the MMC into the internal parameter memory of the ICU24/ICU24F. Suitable for the MMC slot of the ICU24/ICU24F control module. Other memory cards are not accepted by the ICU24/ICU24F.
- Connection cable from a PC to the ICU24/ICU24F control module  
The cable creates a point-to-point connection from the PC to the ICU24/ICU24F control module for starting up the converter with the "STARTER" PC tool.

#### Selection and Ordering data

	Version	Order No.
 3RK1 903-0CB00	<b>Brake control modules</b> For motors with a mechanical brake	
	<ul style="list-style-type: none"> <li>• <b>xB1 for motor starters and frequency converters</b> 24 V DC / 4 A</li> <li>• <b>xB2 for motor starters and frequency converters</b> 500 V DC / 0.7 A</li> <li>• <b>xB3 for motor starters</b> 24 V DC / 4 A / 2 DI DC 24 V local control With diagnostics; with two inputs</li> <li>• <b>xB4 for motor starters</b> 500 V DC / 0.7 A / 2 DI DC 24 V local control With diagnostics; with two inputs</li> </ul>	<b>3RK1 903-0CB00</b>  <b>3RK1 903-0CC00</b>  <b>3RK1 903-0CE00</b>  <b>3RK1 903-0CF00</b>
	<b>Terminal module for brake control modules</b>	
	<ul style="list-style-type: none"> <li>• <b>TM-xB15 S24-01</b> for xB1 or xB2</li> <li>• <b>TM-xB215 S24-01</b> for xB3 or xB4</li> </ul>	<b>3RK1 903-0AG00</b>  <b>3RK1 903-0AG01</b>
	<b>EMC filter for frequency converter</b> For achieving EMC Class A; is connected before shared power bus of frequency converters, installation must comply with EMC guidelines (shielded motor cables)	
	<ul style="list-style-type: none"> <li>• 25 A rated current</li> <li>• 50 A rated current</li> </ul>	<b>6SL3 203-0BE22-5AA0</b> <b>6SL3 203-0BE25-0AA0</b>
	<b>MMC parameter memory for frequency converter</b> Matches the MMC slot of the ICU24 / ICU24F closed-loop control module; other memory cards are not accepted	<b>6SL3 254-0AM00-0AA0</b>
	<b>RS 232/zero modem cable (5 m)</b> Cable for commissioning the ET 200S FC frequency converter using the PC tool "STARTER"	<b>6ES7 901-1BF00-0XA0</b>

#### ET 200S FC frequency converter documentation

<b>Instruction Manual + Lists Manual for ET 200S FC frequency converter</b>	
<ul style="list-style-type: none"> <li>• German</li> <li>• English</li> </ul>	<b>6SL3 298-0CA12-0AP0</b> <b>6SL3 298-0CA12-0BP0</b>
<b>Instruction Manual + Lists Manual for ET 200S FC frequency converter + ET 200S Manual</b>	
<ul style="list-style-type: none"> <li>• German</li> <li>• English</li> </ul>	<b>6SL3 298-0CA12-1AP0</b> <b>6SL3 298-0CA12-1BP0</b>
<b>CD-ROM with documentation (STARTER etc.) Multilanguage</b>	<b>6SL3 298-0CA11-1MG0</b>

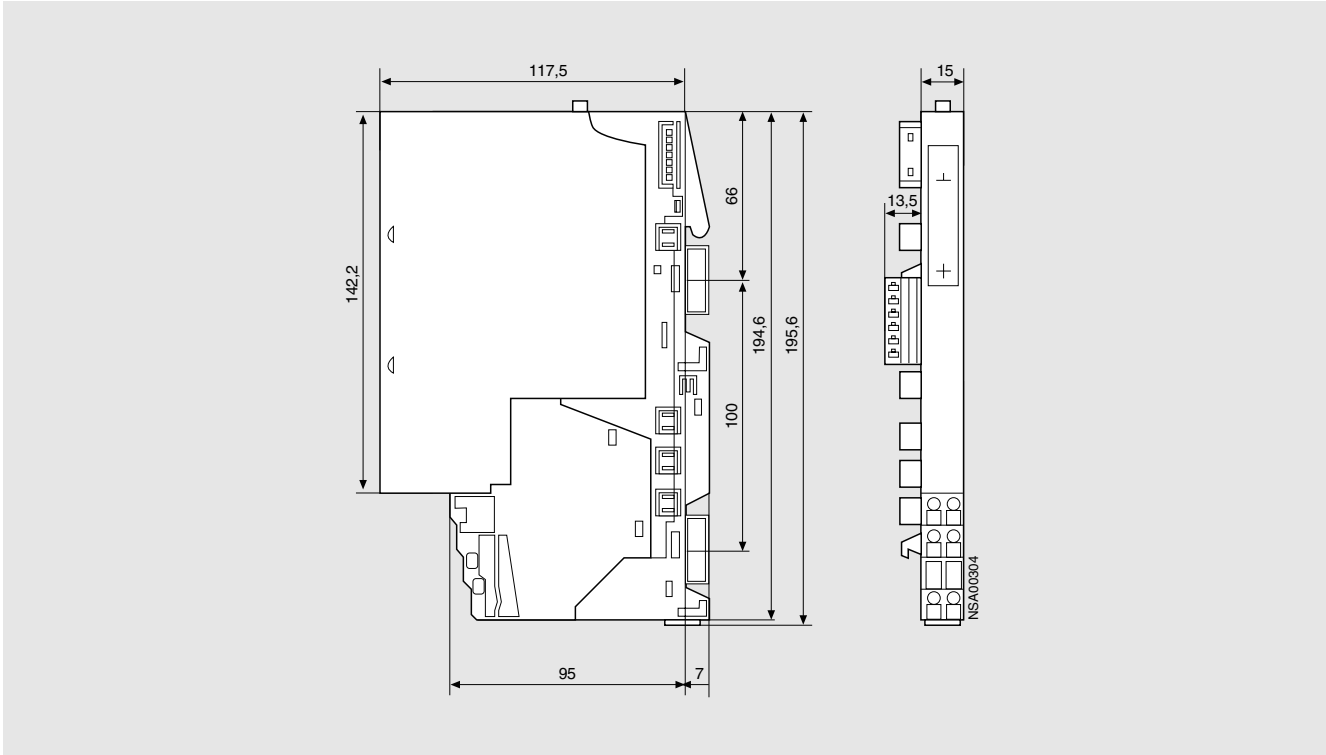
# ET 200 distributed I/Os

## ET 200S – Motor Starters and Frequency Converters

### Accessories for frequency converters

#### Dimension drawings

5



xB1 ... 4 brake control module with TM-xB215 terminal module

# ET 200 distributed I/Os

## ET 200S – Motor Starters and Frequency Converters

Power modules for  
ET 200S motor starters and frequency converters

### Overview



- For supplying and monitoring the auxiliary voltages for motor starters
- A whole group of motor starters can be shut down without additional overhead (Safety Category 1 acc. to EN 954-1).
- For plugging into TM-P15 terminal module
- For supplying and monitoring the power supply for the ET 200S FC frequency converter

### Application


PM-D power modules are used to monitor the two 24 V DC auxiliary voltages for the group of motor starters on the right-hand side or to supply the group of frequency converters on the right-hand side. The voltage is applied to the self-assembling voltage buses via TM-D terminal modules.

Voltage failures are signaled to the higher-level master via PROFIBUS diagnostics. Additional LEDs on site indicate the status of the auxiliary voltages.

Since the auxiliary voltages for signal feedback and power module control are separate, the whole group can be shutdown while diagnostics can still be performed.

5

### Selection and Ordering data

	Version	Order No.
	<b>PM-D power module</b> for 24 V DC with diagnostics	<b>3RK1 903-0BA00</b>

3RK1 903-0BA00

### Accessories

#### Color-coding plates

6 x 200 color-coding plates for terminal modules  
One set contains 10 strips per color with 20 color-coding plates each

- white
- yellow
- yellow/green
- red
- blue
- brown
- petrol

**6ES7 193-4LA10-0AA0**  
**6ES7 193-4LB10-0AA0**  
**6ES7 193-4LC10-0AA0**  
**6ES7 193-4LD10-0AA0**  
**6ES7 193-4LF10-0AA0**  
**6ES7 193-4LG10-0AA0**  
**6ES7 193-4LH10-0AA0**

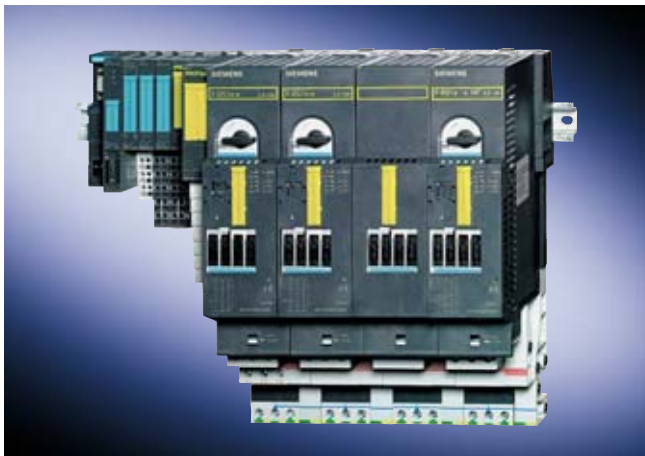
# ET 200 distributed I/Os

## ET 200S – Safety Motor Starter and Frequency Converter Solutions local / PROFIsafe

### General information

#### Overview

##### ET 200S Safety Motor Starter Solutions



The ET 200S safety motor starter solutions comprise:

- Safety modules
- Motor Starters, Standard
- Motor starters, High Feature
- Fail-safe motor starters

With the ET 200S safety motor starter solutions there is no complicated and hence cost-intensive configuring and wiring compared to the conventional safety systems. The ET 200S safety motor starter solutions are designed for Category 4 acc. to EN 954-1 or SIL 3 IEC 61508.

They enable the use of safety-oriented direct-on-line starters or reversing starters in the SIMATIC ET 200S distributed peripherals system on PROFINET or PROFIBUS. The fine modular architecture of the system enables optimum imaging of machine or plant applications.

Within an ET 200S station the safety motor starter solutions can also be combined with Standard motor starters or High Feature motor starters without safety functions or the SIMATIC ET 200S FC frequency converter up to max. 4 kW up to Category 3 acc. to EN 954-1 or SIL 2 acc. to IEC 61508.

The ET 200 Standard and High Feature motor starters can be found beginning on page 5/81.

The ET 200S Configurator software can be found in Catalog CA 01 on CD or DVD (Motor Starter Selection Aid). You can also download the ET 200S Configurator software from the Internet:

<http://www.siemens.com/sirius-starting>

<http://www.siemens.com/ET200S>

##### ET 200S FC Frequency Converter Fail-safe



- For stepless speed control of asynchronous motors
- Consisting of the modules for control module ICU24F and power section IPM25 up to 4.0 kW
- Hot swapping of control module and power supply permitted
- Low line harmonic distortions
- Operation without line commutating reactor
- Active braking with line-commutated energy recovery
- Can be combined with Brake Control Module for controlling an electromechanical holding brakee
- With self-assembling 50 A power bus, i. e. the load voltage for a group of frequency converters has to be fed in just once
- For achieving EMC Class A (acc. to EN 55011)  
Connection of an EMC filter before the power bus

The fail-safe ET 200S FC offers comprehensive integrated safety functions (certified acc. to EN 954-1, Category 3 or IEC 61508, SIL 2).

#### Safe standstill:

Startup of the drive is prevented.

#### Safely reduced speed:

A specified motor speed is monitored to make sure it is not exceeded. Can be used without motor encoder.

#### Safe brake ramp:

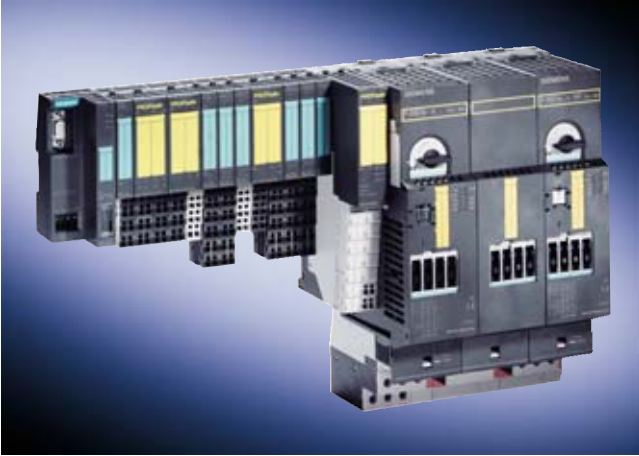
Braking to standstill or to safely reduced speed is monitored. Can be used without motor encoder.

#### Application

The ET 200S safety motor starter solutions are preferred in all production and process automation fields in which the enhancement of plant availability and flexibility plays a key role.

- **Safety motor starter solutions local** are preferred from the safety engineering point of view for locally restricted safety applications. These motor starters are not dependent on a safe control system.

- Safety motor starter solutions PROFIsafe are often found by contrast in safety applications of the more complex type that are interlinked. In this case a safe control system is used with the bus systems PROFINET or PROFIBUS with the PROFIsafe profile.

**Overview**

The Fail-safe motor starter has been developed on the basis of the High Feature motor starter. It differs in that, in addition to a circuit-breaker/contactor assembly, a safe solid-state evaluation circuit is installed for error detection purposes which makes the motor starter Fail-safe.

If the contactor to be switched fails in an EMERGENCY STOP case, the evaluation solid-states detects a fault and opens the circuit-breaker in the motor starter through a shunt release in a fail-safe manner. The second redundant shutdown components is therefore no longer a main contactor, as is generally the case, but the circuit-breaker installed in the motor.

***All functions of the High Feature starter are already integrated***

The new Fail-safe motor starters are characterized by easy, space-saving assembly as well as minimal wiring outlay. Like the High Feature starters, the Fail-safe motor starters have a switching capacity of up to 7.5 kW (16 A) which is achieved with just two motor starter versions. Another important feature is the high availability due to the high short-circuit withstand capability (type of coordination 2).

**Benefits**

***Advantages over conventional safety systems:***

- Significant savings in components (less hardware)
- Less mounting and installation work
- Motor starters are fail-safe and offer high availability

**Application**

***Application***

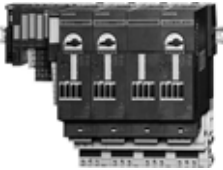
The Fail-safe motor starter is predestined for use in combination with PROFIsafe (see Figure *Fail-safe motor starter with ET 200S PROFIsafe*, page 5/115). Another field of application is in combination with ASIsafe or safety relays (see Safety Module local, Overview, Example 2 on page 5/110 *Motorstarter Fail-safe with ASIsafe and 3TK28*).

# ET 200 distributed I/Os

## ET 200S – Safety Motor Starter and Frequency Converter Solutions local / PROFIsafe

### ET 200S fail-safe motor starters

#### Selection and Ordering data

	Version	Order No.
<i>ET 200S fail-safe motor starters</i>		
 <p>F-DS1e-x direct starter</p>	<b>F-DS1e-x direct on-line starter</b> Fail-safe direct on-line starter for up to 7.5 kW Mechanical switching Electronic overload protection <ul style="list-style-type: none"> <li>• 0.3 to 3 A</li> <li>• 2.4 to 8 A</li> <li>• 2.4 to 16 A</li> </ul>	<b>3RK1 301-0AB13-0AA4</b> <b>3RK1 301-0BB13-0AA4</b> <b>3RK1 301-0CB13-0AA4</b>
	<b>F-DS1e-x reversing starter</b> Fail-safe reversing starter for up to 7.5 kW Mechanical switching Electronic overload protection Fuseless <ul style="list-style-type: none"> <li>• 0.3 to 3 A</li> <li>• 2.4 to 8 A</li> <li>• 2.4 to 16 A</li> </ul>	<b>3RK1 301-0AB13-1AA4</b> <b>3RK1 301-0BB13-1AA4</b> <b>3RK1 301-0CB13-1AA4</b>
<i>Components for fail-safe motor starters</i>		
	<b>TM-FDS65-S32/S31-01 terminal module</b> for F-DS1e-x direct on-line starter with coding <ul style="list-style-type: none"> <li>• With supply terminals for power bus (TM-FDS65-S32-01)</li> <li>• Without supply terminals for power bus (TM-FDS65-S31-01)</li> </ul>	<b>3RK1 903-3AC00</b> <b>3RK1 903-3AC10</b>
	<b>TM-FRS130-S32/S31-01 terminal module</b> for F-RS1e-x reversing starter with coding <ul style="list-style-type: none"> <li>• With supply terminals for power bus (TM-FRS130-S32-01)</li> <li>• Without supply terminals for power bus (TM-FRS130-S31-01)</li> </ul>	<b>3RK1 903-3AD00</b> <b>3RK1 903-3AD10</b>
	<b>M65-PEN-F PE/N terminal block</b> with supply terminals, with covers	<b>3RK1 903-2AC00</b>
	<b>M65-PEN-S terminal block</b> without supply terminals	<b>3RK1 903-2AC10</b>

## Overview



Components of the ET 200S FC fail-safe frequency converter

## Benefits

- The frequency converter is completely integrated into the ET 200S system and offers all system advantages, such as high availability thanks to the hot swapping function, modular expansion, or reduction of the wiring overhead resulting from the self-assembling terminal module wiring.
- With self-assembling 50 A power bus, i.e. the load voltage is only supplied once for a group of frequency converters
- Comprehensive diagnostics facilities for high availability
- Input for motor encoder for precise speed control
- Input for PTC/KTY encoder for comprehensive motor protection
- Slot for optional memory card (MMC) to save the parameter settings for fast replacement of modules without tools
- All common control modes are available: Frequency control, sensor-less vector control or torque control, closed-loop control with motor encoder
- Parameterization takes place using STARTER, the graphical parameterization tool for Siemens drives
- Active braking is possible without additional overhead. The line-commutated energy recovery of the frequency converter for the power supply network means that brake chopper modules or pulsed resistors are superfluous.
- The "safe standstill" is completely electronic and therefore without contacts. This provides reliable and extremely short response times.
- Unique is that the "safe reduced speed" and the "safe braking ramp" do not require a motor encoder or other encoder. These functions can therefore be implemented with minimum overhead.

## Application

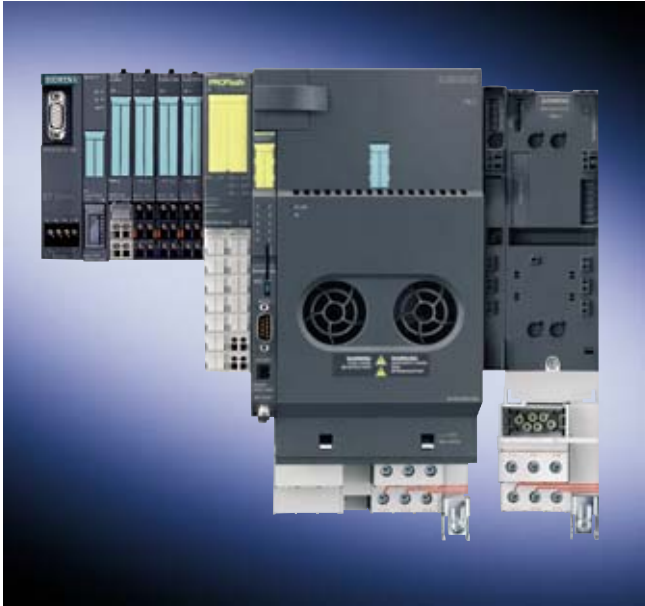
- New application possibilities are opened up for the ET 200S system where continuous control of the speed of asynchronous motors is required.
- The frequency converter handles frequency control and vector control for more complex drive tasks. In addition, the converter also supports torque control for conveyor applications, winding and unwinding drives, as well as hoisting gear. Together with a motor encoder, the range extends up to closed-loop controls for exact control of speeds and torques.
- The advantages of line-commutated power regeneration are primarily evident in continuous regenerative operation. Examples include unwinding units, lowering of loads with hoisting gear, or electric braking of large centrifugal masses.
- Together with an intelligent header module (IM 151 CPU) and the ET 200S FC frequency converter, the I/O station is expanded to become a complete automation solution for machine modules and plant sections.
- The integral safety functions significantly reduce the overhead for drive solutions in plant sections where there is a hazard potential. Monitoring of the safely reduced speed in sensor-less standard asynchronous motors is unique in drive engineering.

# ET 200 distributed I/Os

## ET 200S – Safety Motor Starter and Frequency Converter Solutions local / PROFIsafe

### ET 200S FC fail-safe frequency converter

#### Design



Design of an ET 200S station with two ET 200S FC fail-safe frequency converters (only terminal modules on the right)

The ET 200S FC consists of the following components:

- The ET 200S FC consists of the following components:
- ICU24F control unit (F = with integral safety technology)
- IPM25 converter power module
- Terminal modules to accommodate control unit and converter power module

Following insertion of the modules, the control unit and the converter power module of the frequency converter are interconnected.

The PM-D F PROFIsafe or PM-D F X1 power modules provide the power supply for one or more control units.

#### Accessories

The following accessories are available:

- The labeling strips and color coding labels of the ET 200S system can also be used for the frequency converter.
- **Jumper block L1/L2/L3**  
The jumper blocks L1/L2/L3 are used to bridge a gap in the power bus. 15 mm wide jumper blocks are used to bridge the control unit of the subsequent frequency converter. If a brake control module is connected, a 30mm wide jumper block is required in order to pass on the power bus via the brake control module and ICU24 to the subsequent IPM25 converter power module.
- **Jumper block PE/N**  
The Jumper blocks PE/N are used to bridge a gap in the PE/N bus, e.g. caused by use of a brake control module, a PM-D(F) power module or the control unit of the frequency converter.

- **EMC filter**  
An EMC filter must be externally connected to the supply of the power bus in order to achieve EMC Class A (according to EN 55011). Shielded motor cables must be used in addition. It must be ensured that the shield is connected correctly. The terminal modules for the converter power module of the frequency converter are equipped with an integral shield connection element. Within the ET 200S system, several frequency converters can be supplied over a common power bus with 400 V. The EMC filter is connected up-circuit of the power bus. The filters are designed for a maximum effective length of 350 m shielded cable. The effective cable length is the combined length of all motor cables of the frequency converter on the common 400 V power bus. The two EMC filters of the ET 200S FC are designed as group filters for more than one frequency converter and have the following properties:

EMC filter Type	Rated current	Maximum cable length	Conductor cross-section
6SL3203-0BE22-5AA0	25 A	350 m	4 mm <sup>2</sup>
6SL3203-0BE25-0AA0	50 A	350 m	10 mm <sup>2</sup>

The use of output reactors or LC filters on the converter output does not affect the maximum cable length for the EMC filter.

- **Output reactors and LC filters for longer cable lengths**  
Without additional components on the converter output, the maximum length of motor cables on the SIMATIC ET 200S FC frequency converter is 50 m (shielded cable) or 100 m (unshielded). Longer cables are possible when output reactors of LC filters are used:  
To reduce the capacitive equalizing currents and  $du/dt$  for motor cables, output reactors are provided. Consequently when output reactors are used, the maximum permissible cable lengths between the motor and converter are:

IPM25 converter power module	Output choke Type	Max. permissible motor cable lengths (shielded/unshielded) for a line voltage of	
		380 V -15% to 400 V	401 V to 480 V+10%
0.75 kW	6SE6400-3TC00-4AD2	150 m/ 225 m	100 m/ 150 m
2.2 kW and 4.0 kW	6SE6400-3TC01-0BD3	150 m/ 225 m	100 m/ 150 m

**Design** (continued)

The LC filter limits the rate of rise of voltage and the capacitive charge/discharge currents which occur with converter operation. This means that considerably longer motor cables can be used for operation with LC filters. The service life of the motor is as long as for direct mains operation. It is therefore not necessary to use an output reactor. When LC filters are used, the maximum permissible cable lengths between the motor and converter are:

IPM25 converter power module	LC filter Type	Max. permissible motor cable lengths (shielded/unshielded) for a line voltage of 380 V to 480 V -15% +10%
0.75 kW	6SE6400-3TD00-4AD0	200 m/300 m
2.2 kW and 4.0 kW	6SE6400-3TD01-0BD0	200 m/300 m

When an output reactor or LC filter is used, it is important to note the following during assembly and start-up:

The output reactors and LC filters must be mounted alongside or below the ET 200S station. Vertical alignment is important to ensure adequate cooling. The connecting cable to the converter must be pre-assembled for all components and shortened to a length of approximately 30 cm – the shield of the motor cable must be attached to the output reactor or the LC filter.

The pulse frequency of the converter must be reduced to 4 kHz (the factory setting is 8 kHz). In addition, when an LC filter is used, the converter must be operated in  $V/f$  mode.

- **Shield clamps**  
To connect the shield of motor cables
- **Grounding terminal**  
To ground the 3 x 10 mm busbar for the shield connection
- **Busbar 3 x 10 mm**  
To accommodate the shield clamps and the grounding terminal
- **Brake control module**  
xB1 or xB2 to control an external electromechanical brake

**Function**

The ET 200S FC is capable of dynamic control procedures such as sensorless vector control or torque control. Where particular speed accuracy and dynamic response requirements exist, a motor encoder can be connected to the control module.

The ET 200S FC is operated without a line reactor.

A PTC or KTY encoder in the motor can be evaluated by the control module to evaluate the motor temperature.

Integral safety functions are selected via the switch-off modules of a series-connected PM-D F:

- Safe standstill (the drive is prevented from starting up)
- Safely reduced speed (the preset motor speed is monitored for correct speed)
- Safe braking ramp (monitoring of braking to standstill or safe reduced speed)

The safety functions of the ET 200S FC are certified according to Category 3 of EN 954-1 and to SIL 2 of IEC 61508.

**Accessories**

The following accessories are available:

- **MMC parameter memory**  
If required, the complete parameter settings of the frequency converter can be saved on a memory card (MMC). When servicing, the plant is immediately ready for use again after replacing the frequency converter and inserting the memory card.

# ET 200 distributed I/Os

## ET 200S – Safety Motor Starter and Frequency Converter Solutions local / PROFIsafe

### ET 200S FC fail-safe frequency converter

#### Technical specifications

	Control unit	Converter power modules	
	ICU24	IPM25, FS A Frame size A	IPM25, FS B Frame size B
<b>Selection features</b>			
<ul style="list-style-type: none"> <li>Integral safety functions according to Category 3 of EN 954-1 or according to SIL 2 of IEC 61508</li> <li>Output</li> <li>Rated input current (at 50 °C ambient temperature)</li> <li>Rated output current (at 50 °C ambient temperature)</li> <li>Mounting dimensions (W x H x D) in mm (including terminal module)</li> </ul>	<ul style="list-style-type: none"> <li>Safe stop</li> <li>Safely-reduced-speed <sup>1)</sup></li> <li>Safe brake ramp <sup>1)</sup></li> </ul>	-	-
	-	0.75 kW	2.2 kW
	-	1.9 A	5.7 A
	-	2.1 A	5.9 A
	15 x 220 x 156	65 x 290 x 156	130 x 290 x 156
			4.0 kW
			9.6 A
			10.2 A
<b>Electrical data</b>			
Line voltage	3 AC 380 V to 480 V +10%/-15%		
Line frequency	47 Hz to 63 Hz		
Overload capability	<ul style="list-style-type: none"> <li>Overload current 1.5 x rated output current (i.e. 150% overload capability) for 60s, cycle time 300s</li> <li>Overload current 2 x rated output current (i.e. 200% overload capability) for 3s, cycle time 300s</li> </ul>		
Output frequency	0 Hz to 650 Hz		
Pulse frequency	8 kHz (standard), 2 kHz to 16 kHz (in 2 kHz increments)		
System perturbation	Low loading of power supply network by network harmonics (guide values: 5: 20%, 7: 14%, 11: 9%, 13: 8%)		
Skipped frequency range	1, programmable		
Converter efficiency	≥96 %		
Interfaces	<ul style="list-style-type: none"> <li>Connection to PROFIBUS or PROFINET over the ET 200S backplane bus</li> <li>RS232 interface with USS protocol for commissioning on the PC using the STARTER commissioning software</li> <li>Activation of the integrated safety functions via PROFIsafe (PM-DFPROFIsafe) or terminals (PM-DFX1)</li> <li>Slot for an optional memory card (MMC) for uploading or downloading parameter settings</li> <li>PTC/KTY84 interface (Sub-D connector) for motor temperature monitoring</li> <li>Speed sensor interface (Sub-D connector) for unipolar HTL incremental position encoder</li> </ul>		
<b>Functions</b>			
Open-loop/closed-loop control procedure	<ul style="list-style-type: none"> <li>V/f control – linear (<math>M\sim n</math>) with/without flux current control (FCC), quadratic (<math>M\sim n^2</math>) or parameterizable</li> <li>Vector control – with or without encoder</li> <li>Torque control</li> </ul>		
Operating functions	Jogging mode, free function blocks (FFB), positioning deceleration ramp, automatic restart following interruption due to power failure, bumpless connection of converter to rotating motor		
Braking functions	<ul style="list-style-type: none"> <li>Regenerative braking operation without brake chopper and pulsed resistor</li> <li>Control of an electromechanical holding brake via an optional brake control module</li> </ul>		
Protective functions	Undervoltage, overvoltage, ground faults, short circuits, stall prevention, motor thermal protection ( $I^2t$ , or sensor) inverter overtemperature, motor blocking protection		
Connectable motors	<ul style="list-style-type: none"> <li>Low-voltage asynchronous motors</li> <li>Motor cable lengths: max. 50 m (shielded) max. 100 m (unshielded)</li> <li>If an output reactor or an LC filter is used, longer cable lengths are possible</li> </ul>		
<b>Mechanical data</b>			
Degree of protection	IP20		
Operating temperature	<ul style="list-style-type: none"> <li>With vertical design of station</li> <li>With horizontal design of station</li> </ul>	-10 °C to +40 °C	-10 °C to +50 °C/to +60 °C with derating
<b>Standards</b>			
Compliance with standards	UL, cUL ,CE, c-tick, low-voltage directive 73/23/EEC, EMC directive 89/336/EEC		

1) The safety functions "Safely reduced speed" and "Safe braking ramp" are certified for asynchronous motors without encoders - these safety functions are not permitted for pull-through loads as in the case of lifting gear and winders.

Technical specifications (continued)

Derating data – Pulse frequency

Output kW	Rated output current in A at a pulse frequency of							
	2 kHz	4 kHz	6 kHz	8 kHz	10 kHz	12 kHz	14 kHz	16 kHz
0.75	2.1	2.1	2.1	2.1	1.05	1.05	1.05	1.05
2.2	5.9	5.9	5.9	5.9	5.3	5.3	5.3	5.3
4.0	10.2	10.2	10.2	10.2	5.1	5.1	5.1	5.1

The current data apply to an ambient temperature of 50°C unless specified otherwise.

Ordering data

	Version	Order No.
	<p><b>ICU24F control unit</b></p> <ul style="list-style-type: none"> <li>Control modes: V/f, FCC, SLVC, VC with encoder, torque control</li> <li>Motor encoder input: HTL unipolar</li> <li>Motor temperature input: PTC/KTY</li> <li>Integrated safety functions</li> </ul>	<b>6SL3244-0SA01-1AA0</b>
	<p><b>IPM25 converter power module</b></p> <p>380 V – 480 V 3 AC +10/-15% 47 Hz – 63 Hz</p> <p>Overload: 150% 60 s 200% 3 s</p> <p>Power: 0.75 kW</p>	<b>6SL3225-0SE17-5UA0</b>
	<p><b>IPM25 converter power module</b></p> <p>380 V – 480 V 3 AC +10/-15% 47 Hz – 63 Hz</p> <p>Overload: 150% 60 s 200% 3 s</p> <p>Power: 2.2 kW 4.0 kW</p>	<p><b>6SL3225-0SE22-2UA0</b> <b>6SL3225-0SE24-0UA0</b></p>

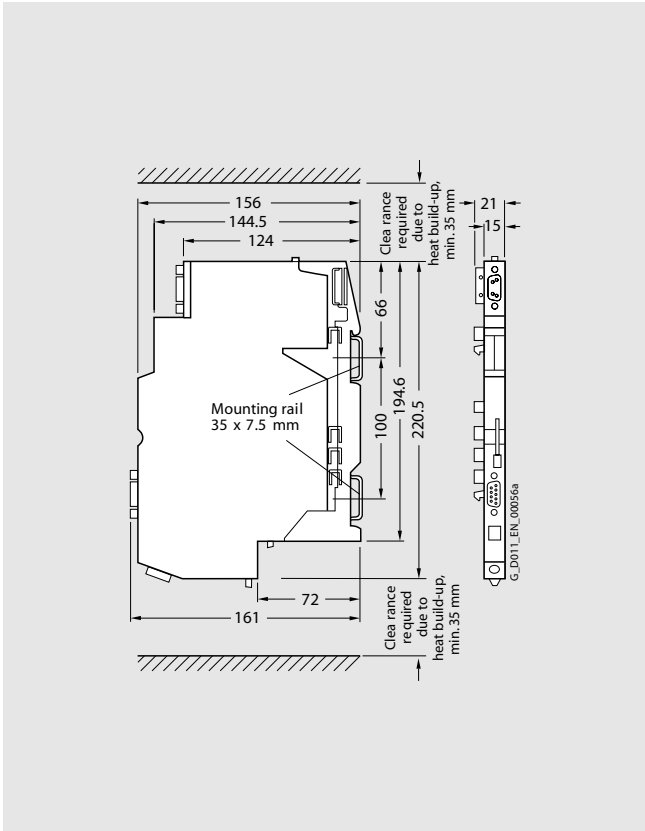
# ET 200 distributed I/Os

## ET 200S – Safety Motor Starter and Frequency Converter Solutions local / PROFIsafe

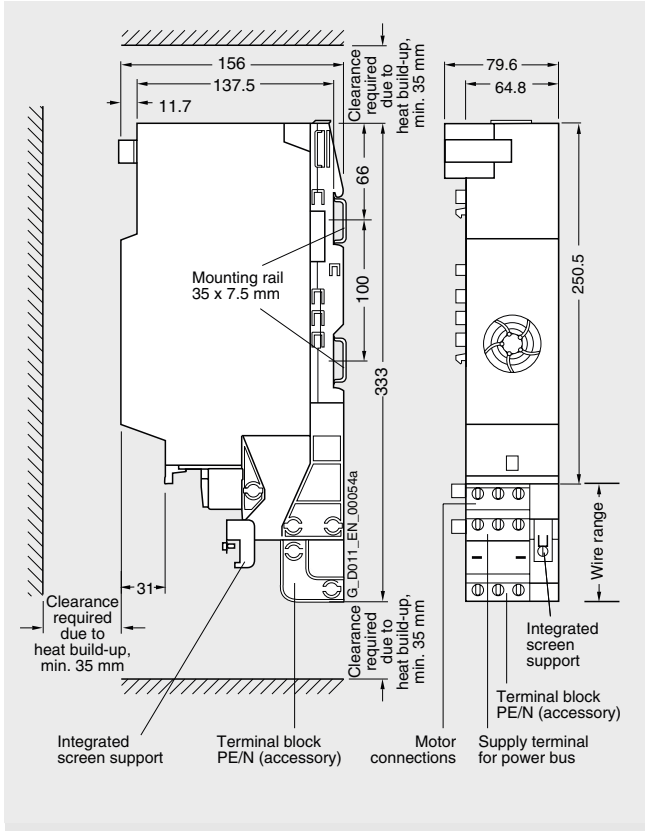
### ET 200S FC fail-safe frequency converter

#### Dimension drawings

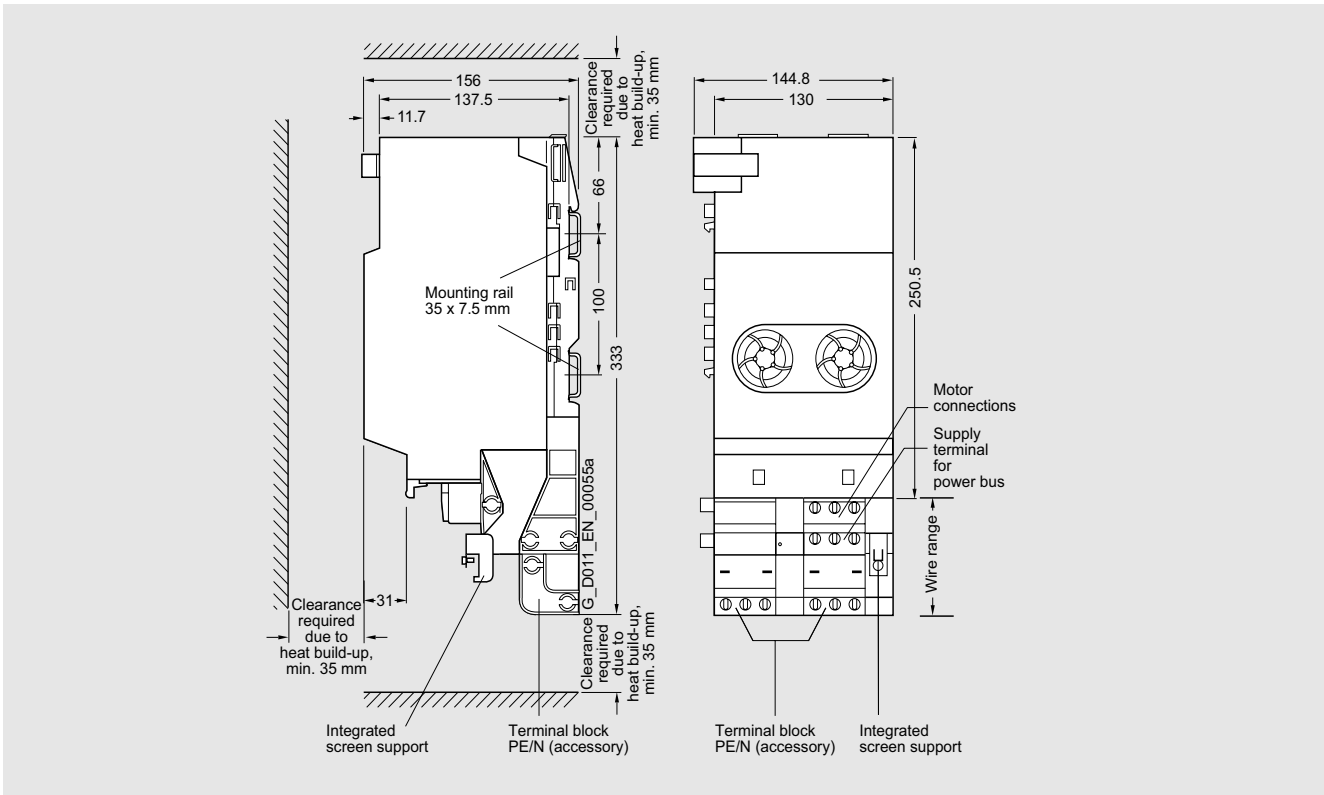
5



ICU24F control unit

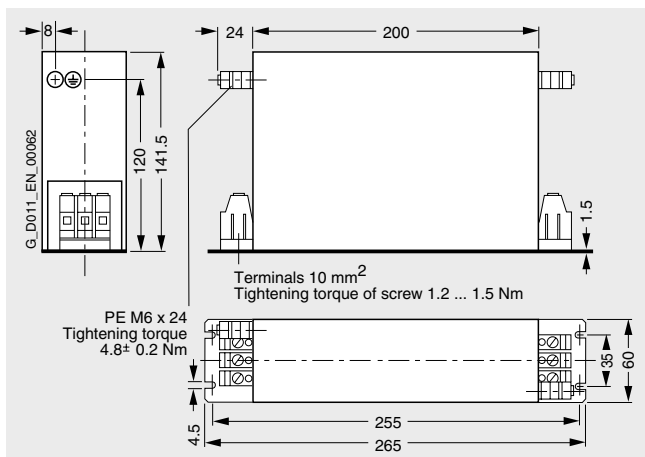


IPM25 converter power module, 0.75 kW

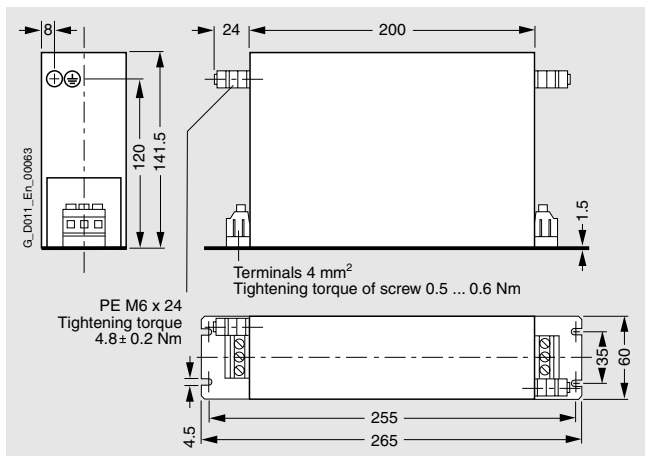


IPM25 converter power module, 2.2 kW and 4.0 kW

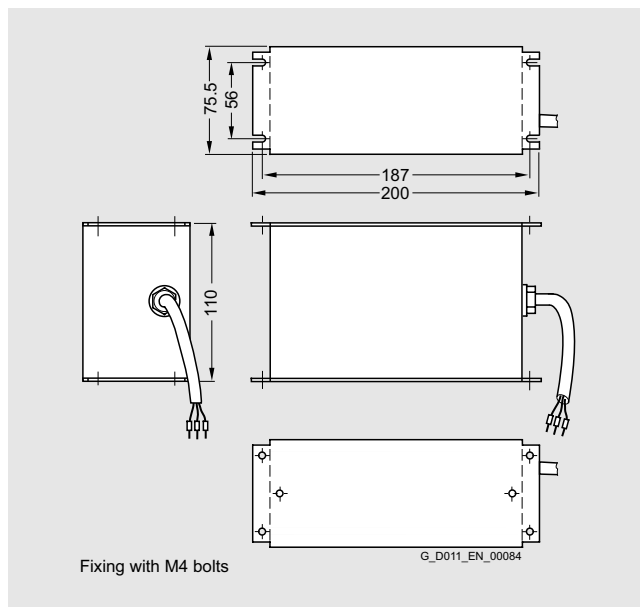
Dimension drawings (continued)



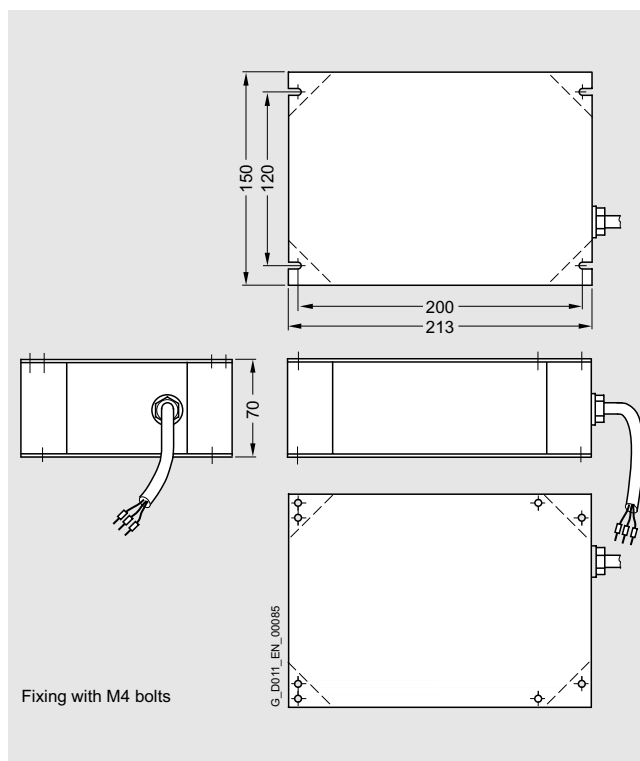
3-line filter, 50 A



3-line filter, 25 A



Output choke for IPM25 FS A



Output choke for IPM25 FS B

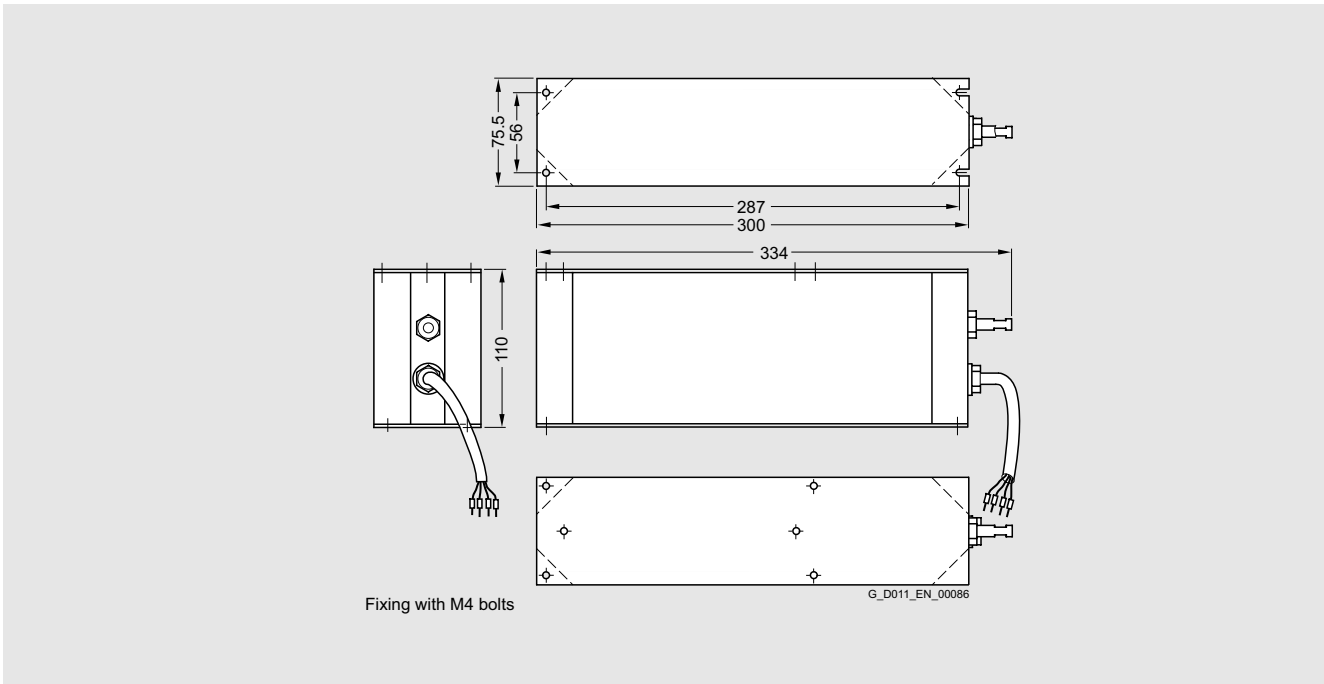
# ET 200 distributed I/Os

## ET 200S – Safety Motor Starter and Frequency Converter Solutions local / PROFIsafe

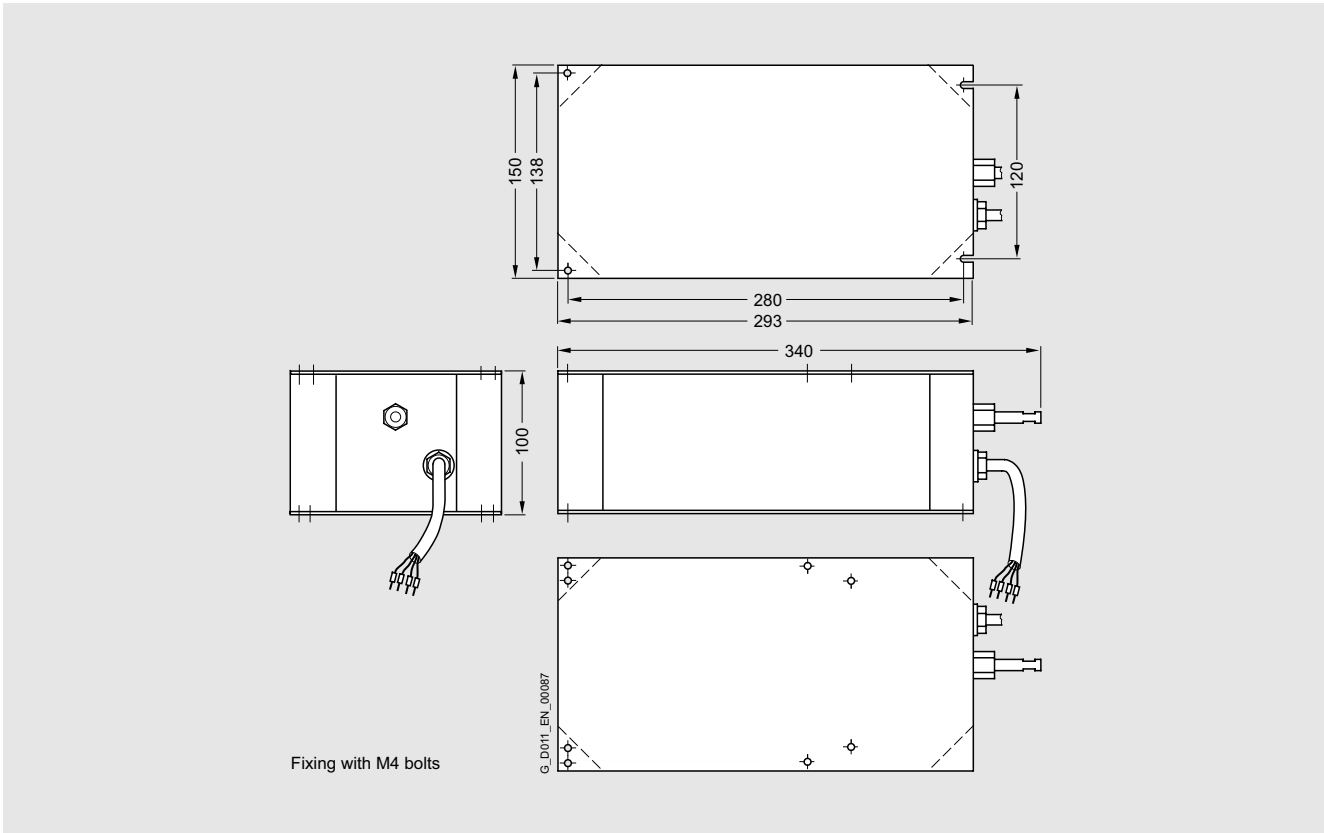
### ET 200S FC fail-safe frequency converter

#### Dimension drawings (continued)

5

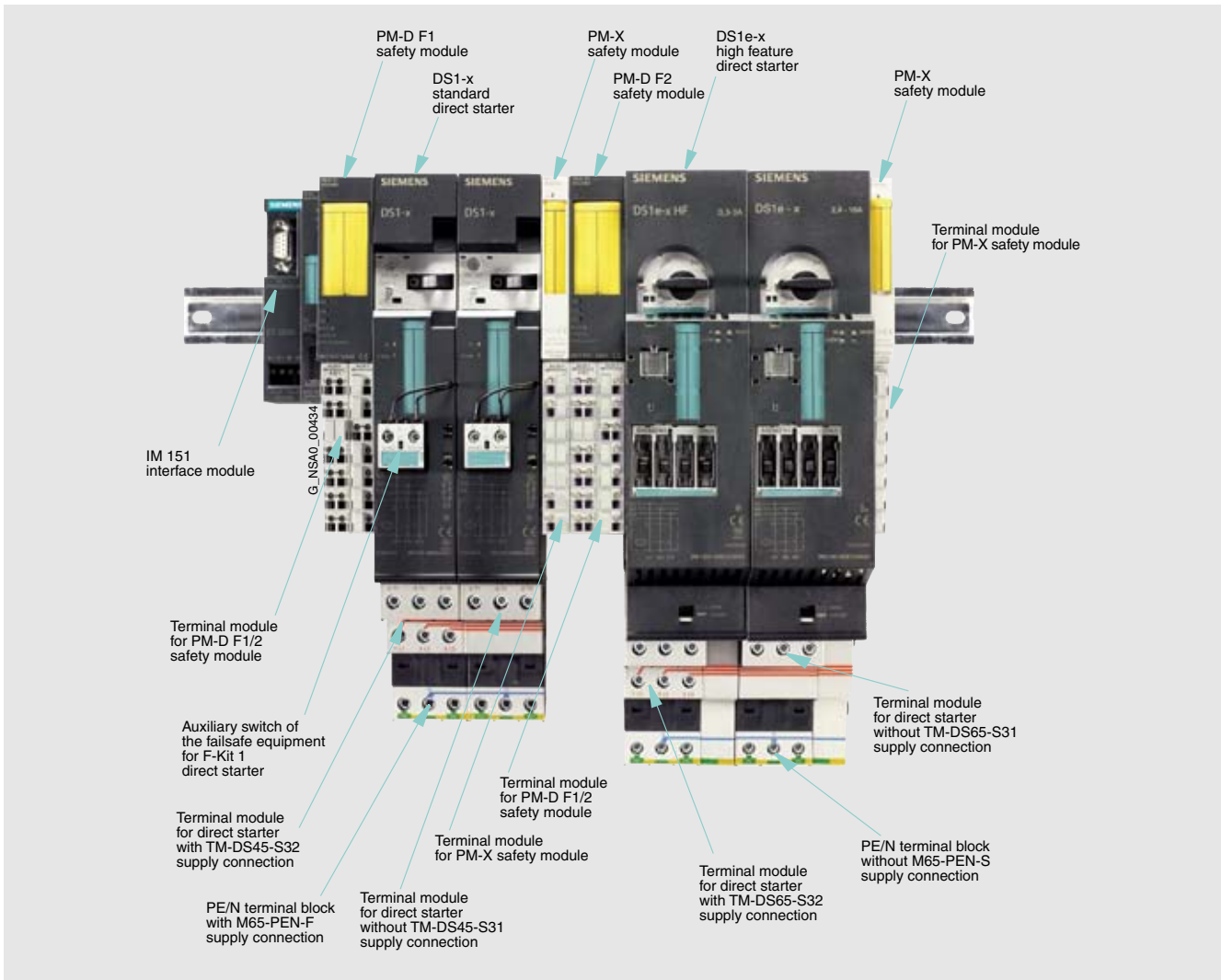


LC filter for IPM25 FS A



LC filter for IPM25 FS B

#### Overview



Interplay of ET 200S safety motor starters Solutions local components



Safety Modul PM-D F1

#### Safety Motor Starter Solutions local

- For use of Standard, High-feature or Fail-safe motor starters in systems with safety categories 2 to 4 (acc. to EN 954-1)
- No complex wiring for conventional safety systems
- Can also be used in combination with external safety relays
- Can also be used to activate external safety systems
- Safety module available for function-monitored and automatic starting
- Safety module available for Stop category 0 and 1
- Safety module for monitoring the auxiliary voltages for motor starters
- Safety modules can be plugged into the TM-PF30 terminal modules.

# ET 200 distributed I/Os

## ET 200S – Safety Motor Starter and Frequency Converter Solutions local / PROFIsafe

### Safety Module local

#### Overview (continued)

##### PM-D F1/F2/F3/F4/F5 safety modules

- PM-D F1/F2/F3/F4 safety modules monitor auxiliary voltages and contain the complete functionality of a safety relay:
  - PM-D F1  
For evaluation of EMERGENCY STOP circuits with the function "monitored start".
  - PM-D F2  
For evaluation of protective doors with the function "automatic start".
  - PM-D F3  
Expansion to PM-D F1/F2 for time-delayed shutdown.
  - PM-D F4  
For expansion of safety circuits with other ET 200S motor starters, e.g. in a different line Zeile.
  - PM-D F5  
Transmits the status from PM-D F1 ... 4 through four floating enabling circuits to external safety equipment (contact multipliers)
- The PM-D F1 and PM-D F2 modules can be combined with the PM-D F3 or PM-D F4 modules.
- A PM-D F5 can be positioned at any point between a PM-D F1 ... 4 and a PM-X.
- Safety modules monitor the U1 and U2 auxiliary voltages. A voltage failure is relayed as a diagnostics signal over the bus.
  - No additional PM-D safety module is required when the safety modules are used.
  - Each safety circuit, beginning with a PM-D F1 ... 4, must be terminated with one PM-X each.

##### Fail-safe Kit

The Fail-safe Kit (F-Kit) must be added to each Standard motor starter in a safety segment in order to monitor the switchin function.

F-Kit 1 supplements the DS1-x direct-on-line starter, F-Kit 2 the RS1-x reversing starter.

The F-Kits are comprised of:

- Contact supports for the terminal modules
- One or two auxiliary switch blocks for the contactor/contactors of the motor starter
- Connecting leads

High Feature motor starters and their terminal modules come as standard with the functionality of the F-Kits integrated.

##### Examples

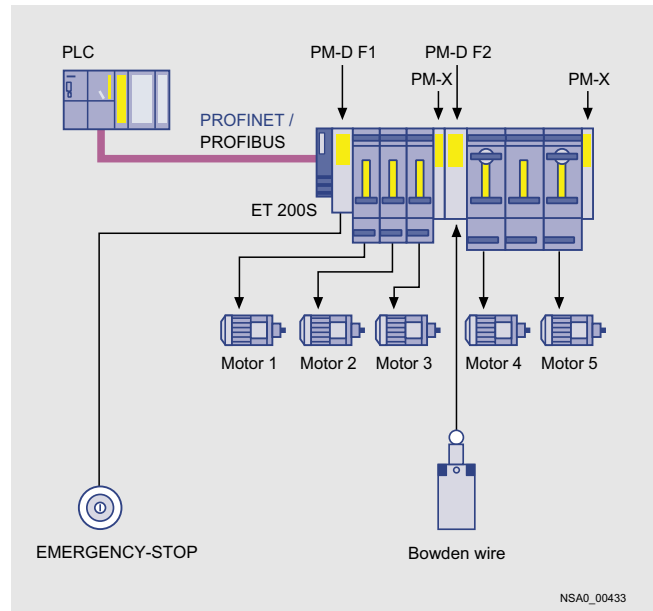
The diverse possible uses of the safety motor starter Solutions local are presented in the manual SIMATIC ET 200S Motor Starters in the context of typical sample applications.

Safety functional examples for easy, quick and low-cost implementations of applications with safety motor starters Solutions local are available in the Internet:

You can find more information in the Internet at:

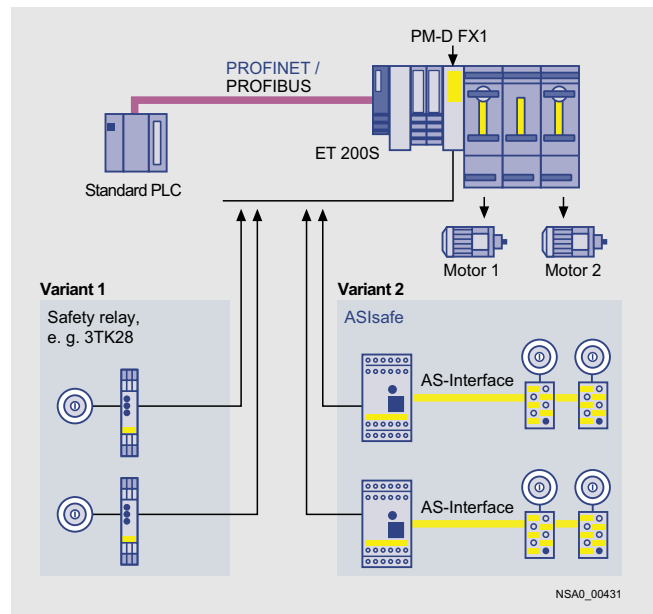
- <http://www.siemens.com/sirius-starting>
- <http://www.siemens.com/ET200S>

#### Example 1:



ET 200S safety motor starter Solutions local with 2 safety circuits (= shutdown groups), Standard motor starters and High Feature motor starters.

#### Example 2:



ET 200S safety motor starter Solutions local with 2 external safety assemblies (= safety relays or ASIsafe monitors) and with Fail-safe motor starters (PM-DFX-1 application). 2 of the 6 available safe shutdown groups are used.

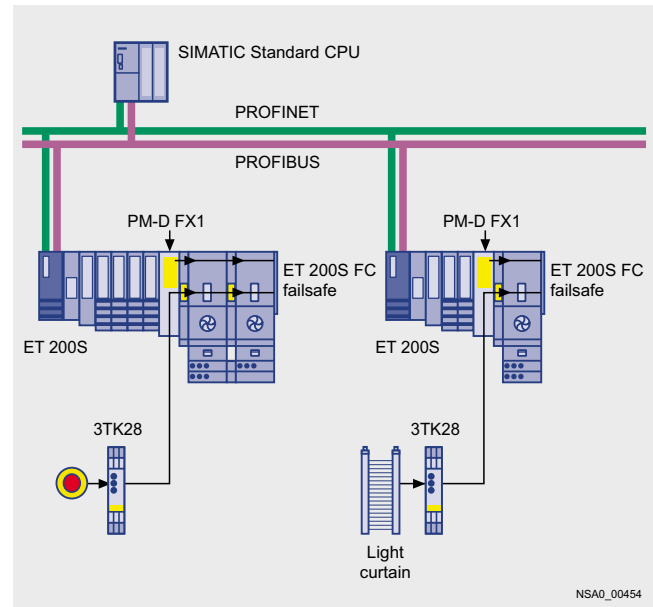
Signals with relevance for safety can be input to ET 200S through a PM-DFX1 infeed terminal module through the release circuits of the ASIsafe monitor or the safety relay to control the Fail-safe motor starters which then selectively switch off the downstream motors.

**Overview** (continued)**Fail-safe frequency converter Solution local**

Using the PM-D FX1 module, safety-oriented signals can be fed into the ET 200S to activate the fail-safe functions of the ET 200S FC fail-safe frequency converter.

The fail-safe functions of the ET 200S FC fail-safe frequency converter are assigned by parameter to two of the six shutdown groups. The shutdown groups are evaluated by the ICU24F control module.

Example:

**Application****Safety Motor Starter Solutions local**

With the Safety Motor Starter Solutions local it is easy to configure several safety circuits. The safety sensors are connected directly and locally to the safety modules. These safety modules perform the work of the otherwise obligatory safety relays and safely shut down the downstream motor starters in accordance with the function selected. The crosslinks required for this are already integrated in the system and need no additional wiring. All signals from the safety modules are automatically relayed as diagnostics signals, e.g. in the event of crossover in the EMERGENCY STOP circuit.

The highest safety category 4 acc. to EN 954-1 can be obtained with safety motor starters Solutions local. They can thus be used for evaluation of EMERGENCY STOP circuits or for monitoring protective doors and also for time-delayed shutdowns. With the contact multiplier the safety-relevant signals can also be made available to external systems.

All standard safety applications can be covered through combination of different TM-PF30 terminal modules. Needless to say, ET 200S motor starters can also be used in conjunction with external safety relays or with ASIsafe.

Use of the PM-DFX1 safety module: The PM-DFX1 safety module is used for feeding in 1 to 6 shutdown groups. The infeed voltage can be switched using 1 to 6 external safety shutdown devices (either ASIsafe monitors or 3TK28 safety relays). This safety module is used in applications with external safety shutdown devices where there is a need for the fully selective safety shutdown of Fail-safe motor starters/frequency converters.

With the Safety Motor Starter Solutions local, up to 80 % of wiring is saved compared to conventional safety systems with local safety applications.

**Local actuation of the fail-safe frequency converter**

The PM-DFX1 safety module is used for feeding in 1 to 6 shutdown groups. The infeed voltage can be switched using 1 to 6 external safety shutdown devices (either ASIsafe monitors or 3TK28 safety relays).

This safety module is used in applications with external safety shutdown devices where there is a need for actuating the fail-safe functions of the ET200S FC fail-safe frequency converter. The safety functions of the ET 200S FC frequency converter are compliant with Category 3 according to EN 954-1 and with SIL2 according to IEC 61508.

**Terminal modules for (TM-PF30) Safety Module**

For supplying load and sensor voltage to the potential bars of the motor starters, and for connection of the 2-channel sensor circuit (e.g. EMERGENCY STOP button) and a reset button. Different terminal modules are available for the configuring of separate safety circuits or for the cascading of safety circuits, and for applications with time-delayed shutdown.

**Terminal module for (TM-X) Safety Module**





For connection of an external infeed contactors (2nd shutdown possibility). With terminals for contactor coil and feedback contact. Is always required to terminate a group of safety-oriented motor starters.

# ET 200 distributed I/Os

## ET 200S – Safety Motor Starter and Frequency Converter Solutions local / PROFIsafe


### Safety Module local

#### Selection and Ordering data

	Version	Order No.
<i>SIGUARD power modules</i>		
 <p>3RK1 903-1BA00</p>	<b>PM-D F1 SIGUARD</b> with diagnostics Power module for emergency-off application Monitored start	3RK1 903-1BA00
	<b>PM-D F2 SIGUARD</b> with diagnostics Power module for protective door monitoring Automatic start	3RK1 903-1BB00
	<b>PM-D F3 SIGUARD</b> with diagnostics Power module for the expansion of PM-D F1/2 for an additional voltage group Time-delayed (0 to 15 s)	3RK1 903-1BD00
 <p>3RK1 903-3DA00</p>	<b>PM-D F4 SIGUARD</b> with diagnostics Power module for the expansion of PM-D F1/2 for an additional voltage group	3RK1 903-1BC00
	<b>PM-D F5 SIGUARD</b> with diagnostics Power module for the expansion of PM-D F1 ... 4 with four floating release circuits Contact multipliers	3RK1 903-1BE00
	<b>PM-D FX1</b> With diagnostics Infeed terminal module for feeding in 1 to 6 shutdown groups	3RK1 903-3DA00
	<b>F-CM contact multipliers</b> With 4 safe floating contacts	3RK1 903-3CA00
<i>Accessories</i>		
 <p>3RK1 903-1CA00</p>	<b>PM-X SIGUARD connection module</b> with diagnostics Module for connecting a safety group and for connecting an external infeed contactor or for connecting to an external safety circuit	3RK1 903-1CB00
	<b>F Kit 1</b> Fail-safe equipment for DS1-x Standard motor starter <sup>1)</sup>	3RK1 903-1CA00
	<b>F Kit 2</b> Fail-safe equipment for RS1-x standard motor starter <sup>1)</sup>	3RK1 903-1CA01
 <p>3RK1 903-1CA01</p>		

1) The function of the fail-safe kit is already integrated into High Feature motor starters.

## Selection and Ordering data (continued)

	Version	Order No.
<i>Components for safety modules</i>		
<b>Terminal modules</b>		
 <p>3RK1 903-1AA00</p>	<b>TM-PF30 S47-B1</b>	3RK1 903-1AA00
	For PM-D F1/2 Safety Modules With infeed $U_1/U_2$ and sensor connection	3RK1 903-1AA10
	<b>TM-PF30 S47-B0</b>	3RK1 903-1AC00
	For PM-D F1/2 Safety Modules With sensor connection	3RK1 903-1AC10
	<b>TM-PF30 S47-C1</b>	3RK1 903-1AD10
	For PM-D F3/4 Safety Modules With infeed $U_1/U_2$ and actuation input IN+/IN-	3RK1 903-1AB00
	<b>TM-PF30 S47-C0</b>	3RK1 903-0AA00
	For PM-D F3/4 Safety Modules With infeed $U_2$	3RK1 903-3AE10
	<b>TM-PF30 S47-D0</b>	3RK1 903-3AE00
	With PM-D F5 safety module	3RK1 903-3AB10
<b>TM-X15 S27-01</b>		
For PM-X safety module		
<b>TM-P15-S27-01 terminal module</b>		
For PM-D power module		
<b>TM-PFX30 S47-G0/G1 terminal module</b>		
For PM-D FX1 safety module (infeed terminal module)		
• Infeed left (TM-PFX30 S47-G0)		
• Infeed center (TM-PFX30 S47-G1)		
<b>TM-FCM30 S47-F01 terminal module</b>		
For F-CM contact multiplier		

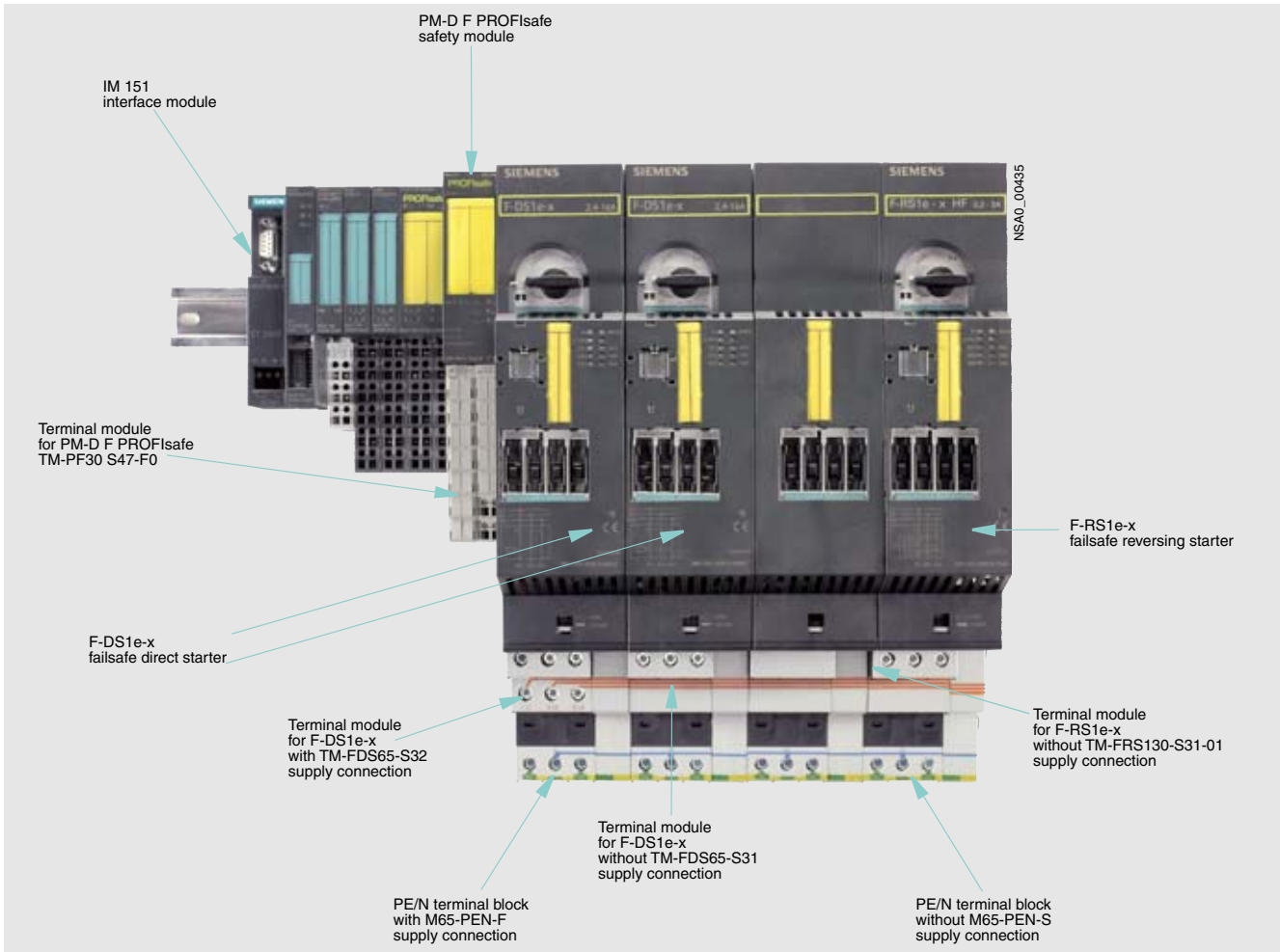
# ET 200 distributed I/Os

## ET 200S – Safety Motor Starter and Frequency Converter Solutions local / PROFIsafe

### PROFIsafe Safety Module

#### Overview

5



Interplay of ET 200S safety motor starter Solutions PROFIsafe components

#### Safety motor starters Solutions PROFIsafe



PM-D F PROFIsafe and Terminal module

Sensor and actuator assignment are freely configurable within the framework of the distributed safety concept:

The logic of the safety functions is implemented by software. Safety-oriented PROFIsafe communication and the use of a safety-oriented control system are required.

Integration of the safety system in the standard automation is realized through a single bus system (see Advantages of PROFIsafe), using PROFIBUS as well as PROFINET.

- For the use of Fail-safe motor starters in plants with safety category 2 to 4 acc. to EN 954-1 and SIL 2 and 3 acc. to IEC 61508. The use of Standard or High Feature motor starters is also possible with certain assemblies
- High flexibility (any assignment of sensors to motor starters using the PLC)
- Full selectivity of disconnection of the Fail-safe motor starters
- No complex wiring for conventional safety systems, e.g. no infeed contactors even in the highest safety category
- Can also be used in combination with external safety relays
- Can also be used to activate external safety systems
- Safety module available for any safety function
- Safety module available for Stop category 0 and 1
- Safety module for monitoring the auxiliary voltages for motor starters
- Safety modules can be plugged into the TM-PF30 terminal modules.

Overview (continued)

High degree of flexibility with safety engineering  
Fail-safe motor starter for PROFIsafe:

In EMERGENCY STOP applications, the Fail-safe motor starters are selectively switched off through the upstream safety module PM-D F PROFIsafe. For each safety module, six switch-off groups can be formed. In the first delivery stage, the Fail-safe freely-programmable logic of the SIMATIC controller is used to interface with the relevant Fail-safe sensors. The interface between PROFIsafe and installations that use conventional safety systems is implemented through the Fail-safe Contact Multiplier F-CM with four floating contacts.

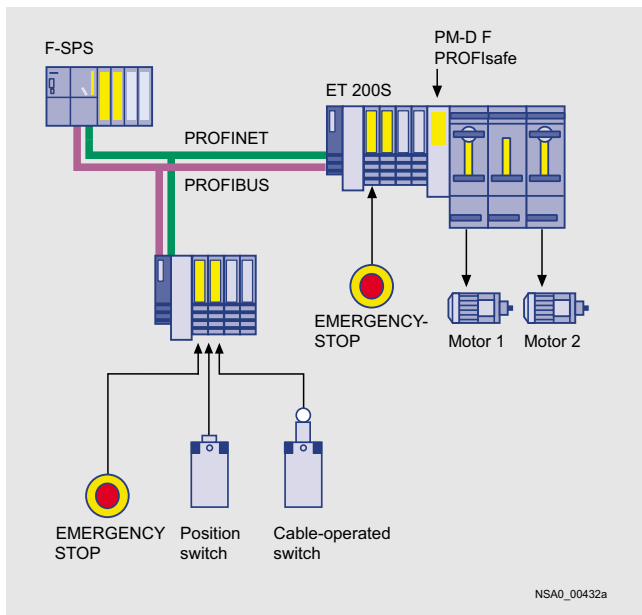
Example:

The diverse possible uses of the safety motor starter Solutions PROFIsafe are presented in the manual SIMATIC ET 200S Motor Starters in the context of typical sample applications.

Safety functional examples for easy, quick and low-cost implementations of applications with safety motor starters Solutions local are available on the Internet:

Additional information is available in the Internet under:

- <http://www.siemens.com/sirius-starting>
- <http://www.siemens.com/ET200S>

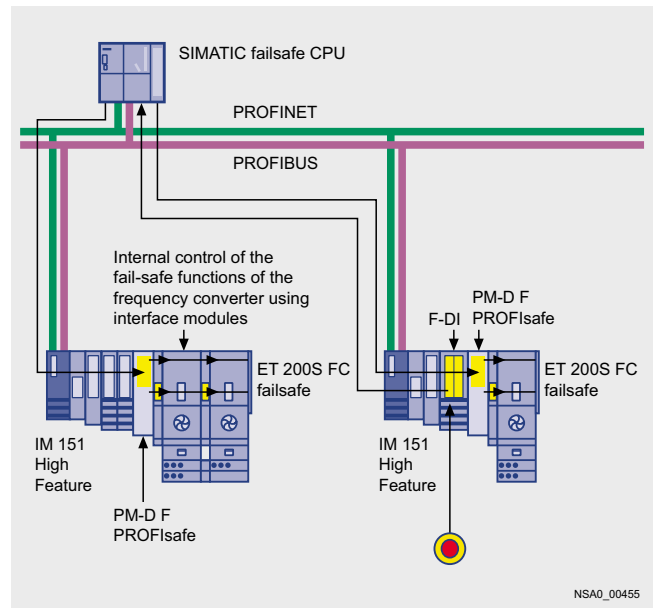


ET 200S safety motor starter Solutions PROFIsafe with Fail-safe motor starters and fully selective shutdown (PM-DF PROFIsafe application)

Within an ET 200S station the Fail-safe motor starters are assigned to one of 6 safety segments. For plants with distributed configuration the shutdown signals of these safety segments are preferably issued by a higher level, safety-oriented control system through PROFIsafe. This permits the greatest flexibility for assigning the motor starters to different safety circuits.

Alternatively, an ET 200S F-CPU can also be used for control purposes.

ET 200S FC Fail-safe frequency converter



Interplay of the ET 200S FC frequency converter with PROFIsafe components

Actuation of the ET 200S FC fail-safe frequency converter using PROFIsafe safety-oriented communication is realized with the PM-D F PROFIsafe module. Fail-safe motor starters and frequency converters can be operated together behind a PM-D F PROFIsafe module.

In safety-oriented applications, the fail-safe functions of the converter are selectively actuated through the upstream PM-D F PROFIsafe safety module. Each safety module supplies a total of six shutdown groups. The fail-safe converter always occupies the sixth switch-off group. One of the remaining shutdown groups 1 to 5 must also be assigned to the converter. The fail-safe freely-programmable logic of the SIMATIC controller is used to interface with the relevant fail-safe sensors.

For plants with distributed configuration the shutdown signals of these shutdown groups are preferably issued by a higher level, safety-oriented control system through PROFIsafe. This permits the greatest flexibility for assigning the frequency converters to different safety circuits.

Alternatively, the PM-D F PROFIsafe can also be actuated using an ET 200S F-CPU. Fastest response times through direct signal processing within the ET 200S are thus possible.

### PROFIsafe Safety Module

#### Application

##### Solution PROFIsafe safety motor starters

If a safety-oriented SIMATIC CPU is used, the ET 200S is available as a safety-oriented peripheral. Nevertheless, in such a station it is possible to configure conventional motor starters and input/output modules mixed with modules with safety functions.

Thanks to the PROFIsafe profile the safety functions are available in the complete network, which means that the Solution PROFIsafe safety motor starters enable the selective shutdown of a group of Standard, High Feature or Fail-safe motor starters regardless of where and on which peripheral station the safe control devices were connected. As such this solution provides an unprecedented level of flexibility and reduction of wiring for applications in wide-spread plants or with a sporadic demand for changes in the assignment of safety segments.

The Solution PROFIsafe safety motor starters are ideally suited for safety concepts with Cat. 2 to 4 acc. to EN 954-1- or up to SIL 3 acc. to IEC 61508.

Each safety module switches up to 6 shutdown groups for Fail-safe motor starters/frequency converters.

##### PM-D F safety module PROFIsafe

The PM-D F PROFIsafe safety module receives the shutdown signal from the interface module of the ET 200S and safely switches off 1 to 6 shutdown groups. This safety module is used in PROFIsafe applications where there is a need for the selective safety shutdown of Fail-safe motor starters/frequency converters.

#### Selection and Ordering data

Version	Order No.
<b>PM-D F PROFIsafe safety modules</b> For PROFIBUS and PROFINET For fail-safe motor starters For fail-safe contact multipliers Six switch-off groups (SG1 to SG6)	<b>3RK1 903-3BA01</b>
<b>F-CM contact multipliers</b> With 4 safe floating contacts	<b>3RK1 903-3CA00</b>
<b>Components for safety module PROFIsafe</b>	
<b>TM-PF30 S47-F0 terminal module</b> For PM-D F PROFIsafe safety module	<b>3RK1 903-3AA00</b>
<b>TM-FCM30 S47-F01 terminal module</b> For F-CM contact multiplier	<b>3RK1 903-3AB10</b>
<b>Components for frequency converters and fail-safe frequency converters</b>	
<b>TM-ICU15 terminal modules</b> For ICU24 / ICU24F control module of the frequency converter	<b>3RK1 903-3EA10</b>
<b>TM-IPM65 terminal modules</b> For IPM25 power section 0.75 kW, of the frequency converter <ul style="list-style-type: none"> <li>• With incoming energy bus connection (TM-IPM65-S32)</li> <li>• Without incoming energy bus connection (TM-IPM65-S31)</li> </ul>	<b>3RK1 903-3EC00</b>  <b>3RK1 903-3EC10</b>
<b>TM-IPM130 terminal modules</b> For IPM25 power section 2.2 kW and 4.0 kW of the frequency converter <ul style="list-style-type: none"> <li>• With incoming energy bus connection (TM-IPM130-S32)</li> <li>• Without incoming energy bus connection (TM-IPM130-S31)</li> </ul>	<b>3RK1 903-3ED00</b>  <b>3RK1 903-3ED10</b>
<b>PE/N terminal blocks</b> <b>M65-PEN-F</b> With supply terminals With caps	<b>3RK1 903-2AC00</b>
<b>Terminal block</b> <b>M65-PEN-S</b> Without incoming energy connection	<b>3RK1 903-2AC10</b>

#### Overview



#### Terminal modules for motor starters

- Mechanical modules in which the motor starter and expansion modules are inserted
- For constructing the permanent wiring and self-assembling voltage bus
- For connecting the motor connection cables
- Positive-locking connection to ensure enhanced vibration resistance

#### Terminal modules for frequency converters

- Mechanical modules in which the components of the frequency converter are inserted
- For constructing the permanent wiring and self-assembling voltage bus
- For connecting the motor cables
- Integral shield connecting elements for the 3 x 10 mm busbar

#### Terminal module for power module

- Connection via screw-type terminals
- Light-colored enclosure for visual distinction
- Always before the first TM-DS/TM-RS

#### Application

#### Terminal modules for motor starters and frequency converters

Terminal modules are purely mechanical components for accommodating the ET 200S peripherals. The self-assembling voltage buses integrated in the terminal modules reduce wiring work to the single infeed. All modules following on the right are automatically supplied upon plugging the terminal modules together. The robust design and keyed connection technology enables use in harsh industrial conditions.

The terminal modules for motor starters and frequency converters are available in different variants:

- Terminal modules for TM-DS and TM-RS motor starters
- Terminal modules for frequency converters:
  - TM-ICU for the control module
  - TM-IPM for the power section
- Terminal modules for connection modules (TM-xB)

#### Terminal modules for TM-DS and TM-RS motor starters

The TM-DS and TM-RS terminal modules are available in various versions for the Standard motor starters and the High Feature motor starters. The terminal modules with the suffix "-S32"; have connection terminals for feeding into the integrated 40A/50A power bus and connection terminals for the motor connection cable. They are mounted at the beginning (left) of a power bus segment.

The terminal modules with the suffix "-S31"; have only connection terminals for the motor connection cable. These terminal modules follow on the right after a "-S32"; terminal module. To configure a new load group, another "-S32"; terminal module is plugged in. All connection terminals of the terminal modules for motor starters are equipped with strong 10 mm<sup>2</sup> terminals. The "-S32"; terminal modules are delivered with three caps for closing the power bus contacts on the final terminal module of a segment.

#### Terminal modules for frequency converters

The TM-ICU terminal module is used for both versions of the ICU24 / ICU24F control module. A TM-IPM is then always plugged in after a TM-ICU. The TM-IPM with a width of 65 mm is used to accommodate the IPM25 power section with 0.75 kW. A terminal module with a width of 130 mm is needed for the power sections with 2.2 or 4.0 kW.

Each TM-IPM terminal module has a shield attachment for accommodating a shield bar. Hence shielded motor lines can be grounded using shield terminals. The terminal modules with the suffix "-S32"; have connection terminals for feeding into the integrated 50 A power bus and connection terminals for the motor connection cable. They are mounted at the beginning (left) of a power bus segment.

The terminal modules with the suffix "-S31"; have only connection terminals for the motor connection cable. These terminal modules follow on the right after a "-S32"; terminal module. To configure a new load group, another "-S32"; terminal module is plugged in. All connection terminals of the terminal modules for frequency converters are equipped with strong 10 mm<sup>2</sup> terminals. The "-S32"; terminal modules are delivered with three caps for closing the power bus contacts on the final terminal module of a segment.

# ET 200 distributed I/Os

## ET 200S – Components for Motor Starters and Frequency Converters

### Terminal modules for ET 200S motor starters and frequency converters

#### Application (continued)

##### Terminal modules for connection modules (TM-xB)

The TM-xB terminal modules are used to accommodate the xB1, xB2, xB3 and xB4 brake control modules. The TM-terminal module must always follow directly after a terminal module for Standard motor starters, High Feature motor starters or frequency converters as control of the solid-state braking switch is provided through an output of the motor starter/frequency converter. The xB215 terminal modules for the brake control modules have not only the terminals for connecting the line for the motor braking unit but also the terminals of the two local acting inputs. These local inputs are not evaluated by a frequency converter; for this reason the xB215 terminal module may be plugged in only downstream from a motor starter (Technical Specifications, Selection and Ordering Data, see the section "Accessories for Motor Starters and Frequency Converters").




##### PE/N terminal block

The PE/N terminal block is required for direct connection of the motor connection cables without intermediate terminals. It is plugged together with the terminal module for motor starters / frequency converters before the latter is mounted on the standard mounting rail. With two PE terminals and one N terminal the "-F"; variant is connected to the "-S32" terminal modules for motor starters / frequency converters. The "-S"; variant is combined with the "-S31"; terminal module. The "F"; terminal modules are delivered with two caps for closing the PE/N bus contacts on the final terminal module of a segment. The modules for the Standard motor starters have a width of 45 mm and the modules for the High Feature motors starters / frequency converters have a width of 65 mm.



There is no electrical connection between the terminals of the terminal block PE/N and the internal shielding of the frequency converter.

The terminal block PE/N must not be used for the shielding of the motor cable. When wiring the frequency converter according to EMC, the shielding of the motor cable has to be connected by a shielding busbar to the integrated shielding element in the terminal module of the converter. Additionally, when connecting the shielding busbar to the EMC filter, the distance between the two elements has to be as short as possible.


#### Selection and Ordering data

Version	Order No.
<i>Components for standard motor starters</i>	
<b>Terminal modules</b> <ul style="list-style-type: none"> <li> <b>TM-DS45-S32</b>  <b>for DS1-x direct on-line starter</b>                      with incoming-feeder connection for power bus                      incl. three caps for terminating the power bus.                 </li> </ul>	<b>3RK1 903-0AB00</b>
 3RK1 903-0AB00	
<ul style="list-style-type: none"> <li> <b>TM-DS45-S31</b>  <b>for DS1-x direct on-line starter,</b>                      without supply cable connection for power bus                 </li> </ul>	<b>3RK1 903-0AB10</b>
 3RK1 903-0AB10	
<ul style="list-style-type: none"> <li> <b>TM-RS90-S32</b>  <b>for RS1-x reversing starter</b>                      with supply cable connection for power bus                      incl. three caps for terminating the power bus                 </li> </ul>	<b>3RK1 903-0AC00</b>
 3RK1 903-0AC00	
<ul style="list-style-type: none"> <li> <b>TM-RS90-S31</b>  <b>for RS1-x reversing starter</b>                      without supply cable connection for power bus                 </li> </ul>	<b>3RK1 903-0AC10</b>


#### Selection and Ordering data (continued)

	Version	Order No.
	<b>PE/N M45-PEN-F terminal block</b> 45 mm wide incl. two caps in conjunction with TM-DS45-S32 / TM-RS90-S32	3RK1 903-2AA00
3RK1 903-2AA00		
	<b>PE/N M45-PEN-S terminal block</b> 45 mm wide in conjunction with TM-DS45-S31 / TM-RS90-S31	3RK1 903-2AA10
3RK1 903-2AA10		

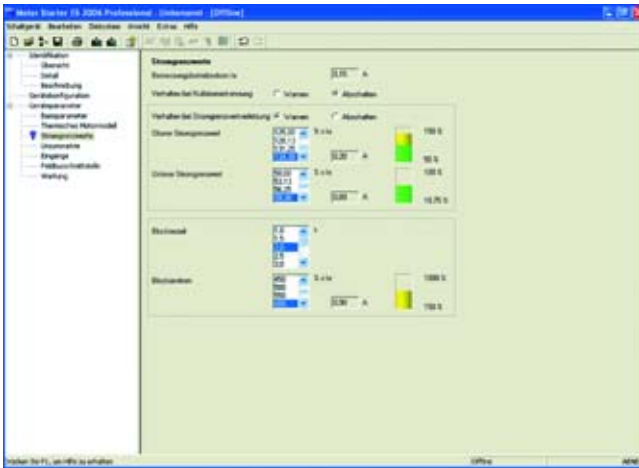
#### Components for High Feature motor starters

	<b>Terminal modules</b>	
	• <b>TM-DS65-S32</b> for direct on-line starters DS1e-x, DSS1e-x with supply cable connection for power bus incl. three caps for terminating the power bus	3RK1 903-0AK00
	• <b>TM-DS65-S31</b> for direct on-line starters DS1e-x, DSS1e-x without supply cable connection for power bus	3RK1 903-0AK10
	• <b>TM-RS130-S32</b> for RS1e-x reversing starter with supply cable connection for power bus incl. three caps for terminating the power bus	3RK1 903-0AL00
	• <b>TM-RS130-S31</b> for RS1e-x reversing starter without supply cable connection for power bus	3RK1 903-0AL10
3RK1 903-0AK00		
	<b>M65-PEN-F power &amp; control module</b> 65 mm wide incl. two caps in conjunction with TM-DS65-S32 / TM-RS130-S32	3RK1 903-2AC00
	<b>M65-PEN-S connection module</b> 65 mm wide in conjunction with TM-DS65-S31 / TM-RS130-S31	3RK1 903-2AC10

#### Components for power modules

	<b>TM-P15 S27-01 terminal module</b> for PM-D power module	3RK1 903-0AA00
	<b>TM-ICU15 terminal module</b> for ICU24 / ICU24F closed-loop control module of the frequency converter	3RK1 903-3EA10
	<b>TM-IPM65 terminal module</b> for IPM25 power section, 0.75 kW of frequency converter	
	• With supply terminals for power bus (TM-IPM65-S32)	3RK1 903-3EC00
	• Without supply terminals for power bus (TM-IPM65-S31)	3RK1 903-3EC10
	<b>TM-IPM130 terminal module</b> for IPM25 power section, 2.2 kW and 4.0 kW of frequency converter	
	• With supply terminal for power bus (TM-IPM130-S32)	3RK1 903-3ED00
	• Without supply terminal for power bus (TM-IPM130-S31)	3RK1 903-3ED10
3RK1 903-0AA00		
	<b>M65-PEN-F power &amp; control module</b>	3RK1 903-2AC00
	<b>M65-PEN-S connection module</b>	3RK1 903-2AC10

#### Overview



Motor Starter ES for parameterization, visualization, diagnostics and testing of ECOFAST motor starters

Motor Starter ES is used for start-up, parameterization, diagnostics, documentation and for preventative maintenance of the High Feature motor starters of the SIMATIC ET 200S and ECOFAST product families.

Interfacing is performed

- either via the serial device interface (applies to ET 200S / ECOFAST) or
- with PROFIBUS DP V1 capable motor starters from any point in PROFIBUS (for ECOFAST).

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. Preventative 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 V5.1 SP3 upwards via an object manager.

The following components are required for a **serial** connection:

ET200S High Feature motor starters:

- 2DI 24V COM control modul  
3RK1 903-0CH10
- LOGO! PC cable  
6ED1 057-1AA00-0BA0

ET 200pro motor starters:

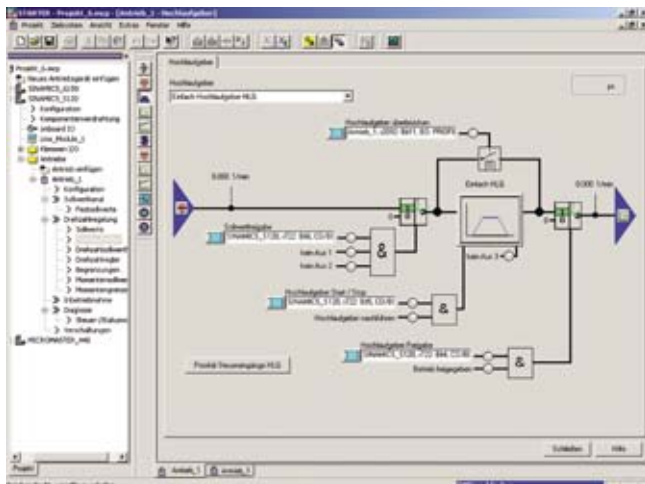
- RS 232 interface cable  
3RK1 922-2BP00

ECOFAST High Feature motor starters:

- PC cable  
3RK1 911-0BN20

Ordering data	Order No.	Order No.
<p><b>Motor Starter ES 2006 Smart</b> Single license, comprising</p> <ul style="list-style-type: none"> <li>• Motor Starter ES for parameterizing, monitoring, diagnosing and testing the ECOFAST motor starters, SIMATIC ET 200S High Feature Starters and SIMATIC ET 200pro motor starters over a serial connection                             <ul style="list-style-type: none"> <li>- With Online Help German/English selectable</li> <li>- Operating system: Windows 2000/XP</li> </ul> </li> <li>• System requirements:                             <ul style="list-style-type: none"> <li>- Cable for serial communication through a serial interface</li> <li>- CD-ROM drive</li> </ul> </li> </ul>	<p><b>3ZS1 310-1CC10-0YA0</b></p>	<p><i>Accessories for ET 200S High Feature motor starters</i></p> <p><b>Control module 2DI DC 24 V COM</b> Digital input module with 2 inputs for local motor starter functions for mounting onto the front of motor starters Operational voltage 24 V DC (supplied from U1), short-circuit proof, floating contact with serial interface for connecting to Motor Starter ES Connected using LOGO! PC cable, max. cable length (out and back) 50 m</p> <p><b>LOGO! PC cable</b> For connecting the high feature motor starter with Motor Starter ES interface to a PC</p> <p><i>Accessories for ET 200pro motor starters</i></p> <p><b>RS 232 interface cable</b> For serial data connection between an ET 200pro motor starter and a laptop/PC/PG</p> <p><i>Accessories for ECOFAST High Feature motor starters (interface cable)</i></p> <p><b>PC cable</b></p>
<p><b>Motor Starter ES 2006 Professional</b> Single license, comprising</p> <ul style="list-style-type: none"> <li>• Motor Starter ES for parameterizing, monitoring, diagnosing and testing the ECOFAST motor starters, SIMATIC ET 200S High Feature Starters and SIMATIC ET 200pro motor starters over PROFIBUS DP or a serial connection                             <ul style="list-style-type: none"> <li>- With Online Help German/English selectable</li> <li>- Operating system: Windows 2000/XP</li> </ul> </li> <li>• STEP 7 Object Manager (OM) For integrating the ECOFAST starter as S7 slave in SIMATIC S7 For calling Motor Starter ES from STEP 7</li> </ul>	<p><b>3ZS1 310-2CC10-0YA0</b></p>	<p><b>3RK1 903-0CH10</b></p> <hr/> <p><b>6ED1 057-1AA00-0BA0</b></p> <hr/> <p><b>3RK1 922-2BP00</b></p> <hr/> <p><b>3RK1 911-0BN20</b></p>
<p><b>Motor Starter ES 2006 Professional Upgrade</b> Single license, comprising</p> <ul style="list-style-type: none"> <li>• Upgrade from Switch Motor Starter ES 2004 or Motor Starter ES Smart 2005 to Motor Starter ES 2006 Professional</li> </ul>	<p><b>3ZS1 310-2CC10-0YE0</b></p>	

#### Overview



The easy-to-use STARTER drive/commissioning software can be used to:

- Start up
- Optimize and
- Diagnostics.

This software can be operated either as a standalone PC application or can be integrated into the SCOUT engineering system (on SIMOTION) or STEP 7 (with Drive ES Basic). The basic functions and handling are the same regardless.

In addition to the SINAMICS drives, the current version of STARTER also supports MICROMASTER 4 devices and inverters for the SIMATIC ET 200S FC distributed I/O system.

The project wizards can be used to create the drives within the structure of the project tree.

Beginners are supported by solution-based dialog guidance, whereby a standard graphics-based display maximizes clarity when setting the drive parameters.

First commissioning is guided by wizards, which make all the basic settings in the drive. This ensures that even though only a small number of parameter settings have been made, the drive configuration has already progressed far enough to permit axis movement.

The individual settings required are made using graphics-based parameterization screen forms, which also display the mode of operation.

Examples of individual settings that can be made include:

- terminals
- bus interface
- Setpoint channel (e.g. fixed setpoints)
- Closed-loop speed control (e.g. ramp-function generator, limits)
- BICO interconnections
- Diagnosis

Experts can gain rapid access to the individual parameters via the Expert List and do not have to navigate dialogs.

In addition, the following functions are available for optimization purposes:

- Self-optimization
- Trace (depending on drive)

Diagnostics functions provide information about:

- Control/Status Words
- Parameter status
- Operating conditions
- Communication states

#### Performance features

- Easy to use: Only a small number of settings need to be made for successful first commissioning: axis turning
- Solution-based dialog-based user guidance simplifies commissioning
- Self-optimization functions reduce manual effort for optimization
- The built-in trace function provides optimum support during commissioning, optimization and troubleshooting.

#### Minimum hardware and software requirements

Programming device or PC with Pentium™ II 400 MHz (Windows™ 2000), Pentium™ III 500 MHz (Windows™ XP)

256 MB RAM (512 MB recommended)

Monitor resolution, 1024x768 pixels

Windows™ 2000 SP3, XP Professional SP1

Microsoft Internet Explorer 5.01

#### Integration

A PROFIBUS communications module and a connecting cable are required to make the communication link between the PG/PC and a control unit.

For example, PROFIBUS communications module CP 5512 (PCMCIA type 2 card + adapter with 9-pin SUB-D socket for connection to PROFIBUS). For Windows 2000/XP Professional and PCMCIA 32)  
Order No.: 6GK1551-2AA00

and connecting cable between CP 5512 and PROFIBUS  
Order No.: 6ES7901-4BD00-0XA0

PC converter connecting sets are available for MICROMASTER 4, SINAMICS G110 and SINAMICS G120 for a safe point-to-point connection to the PC.

Order No. for MICROMASTER 4: 6SE6400-1PC00-0AA0 (the scope of supply includes a 9-pin Sub-D connector and an RS232 standard cable, 3 m)

Order No. for SINAMICS G110 and SINAMICS G120: 6SL3255-0AA00-2AA1

(the scope of supply includes a 9-pin Sub-D connector and an RS232 standard cable, 3 m, and the STARTER startup tool on CD-ROM)

#### Ordering data

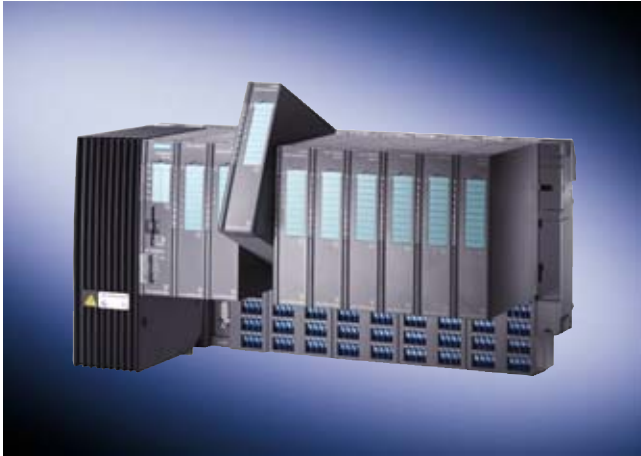
#### Order No.

**STARTER commissioning tool for SINAMICS and MICROMASTER**

German / English / French / Italian

**6SL3072-0AA00-0AG0**

#### Overview



- Fail-safe distributed I/O system to degree of protection IP30 for use in hazardous gaseous and dusty areas, i.e. in Zones 1 and 2 as well as 21 and 22
- Sensors and actuators can also be situated directly in Zone 0 or 20.
- Individual configuration and flexible expansion with the modular design for optimization to the respective automation task
- Independent wiring enables prewiring without the electronics connected
- Optimized for integration into process control systems (e.g. SIMATIC PCS 7)
- Parameters can be assigned using SIMATIC PDM
- Optimal integration of HART field devices (HART transparency)
- Connection to PROFIBUS DP via isolating transformers
- Module replacement (hot swapping) and configuration expansion (Configuration in Run) possible during operation
- Extensive diagnostics possibilities
- Condensation-proof modules in temperature range -20 °C ... +60 °C
- Full redundancy of PROFIBUS and power supply

#### Application

The ET 200iSP distributed I/O system has degree of protection IP30.

It is used wherever explosion protection for gases and dusts is required in compliance with CENELEC: II 2 G (1) GD EEx d e [ib/ia] IIC T4.

The ET 200iSP system has been designed in accordance with the 94/9/EG guideline which must be complied with when new devices for potentially explosive atmospheres are introduced onto the European market.

The design of the system allows it to be used under high mechanical loads i.e. on oil platforms.

The system consists of terminal modules to which the corresponding functional units such as the power supply, interface module and electronic modules are connected.

This modular design ensures optimal adaptation to the plant-specific installation requirements in potentially explosive atmospheres. This ensures fast hot-swapping of individual functional units. In the case of a fault, only small parts of the plant are affected since only a few channels are processed in a module.

Using an ET 200iSP station can save significant costs compared with a conventional design. Isolating stages and sub-distribution boards are no longer required and the cabling outlay is reduced since the station functions in a similar way to a local modular terminal. Commissioning and troubleshooting are simplified by the comprehensive diagnosis options.

In addition to the analog input modules and analog output modules with and without HART functionality, the existing product range of I/O modules also includes digital I/O modules whose functionalities are configurable.

The system has been designed to function optimally with SIMATIC S7 and SIMATIC PCS 7. It can also be used with other process control systems and SIMATIC S5 via an interface using a GSD file.

# ET 200 distributed I/Os

## ET 200iSP

### Introduction

#### Design

A distributed I/O station (= Remote I/O) ET 200iSP comprises:

- A terminal module for the power supply unit as well as the associated power supply module to the EX d degree of protection (flameproof enclosure)
- A terminal module for the PROFIBUS interface as well as the associated interface module IM 152  
In the case of a single PROFIBUS interface, another slot is available on the terminal module for an electronics module. If the PROFIBUS interface is implemented redundantly, a terminal module is available that can carry two IM 152 modules.
- Up to 32 terminal modules for the electronics modules as well as the digital and analog electronics modules that can be plugged into them. One terminal module can accept up to 2 electronics modules.
- One terminating module that is included in the scope of supply of the IM 152.

The stations are connected together on an S7-300 rail in accordance with the above list starting with the terminal module of the power supply unit, followed by the terminal module for the PROFIBUS interface followed by the required terminal modules for the electronics modules.

When the terminal modules are mounted, the wiring can be completed and tested without the need for electronics modules.

The appropriate electronics modules are plugged onto the terminal modules.

The inserted electronics modules are mechanically coded initially to prevent inadvertent swapping later.

No tools are required for mounting the terminal modules and electronics modules.

The maximum configuration is limited by the 32 electronics modules, which corresponds to a maximum station length of 107 cm.

The maximum possible number of modules can be limited as a result of the power consumption of the modules used. Up to 16 modules can be used without constraints, for a larger number, the planning rules must be taken into account.

PROFIBUS must be routed intrinsically safe into the hazardous area through a suitable fieldbus isolating transformer (RS 485IS coupler).

The 24 V connection to the power supply terminal is routed through EX e terminals. This connection is not permitted to be removed under Ex conditions. The feeder power supply must be installed in the safe area.

Installation in an EX e housing with at least degree of protection IP54 is a requirement for use in explosion-hazard areas.

#### Accessories:

The following accessories are available for the ET 200iSP:

- Pre-perforated DIN A4 labeling sheets for electronic modules in various colors, machine-printable
- Slot number plate for identification of terminal modules

#### Function

##### Operating mode

Through PROFIBUS DP (up to 1.5 Mbit/s), a central PLC can access the electronic modules of the ET 200iSP station just like a central I/O module. Communication is handled by the master interface in the central PLC and the interface module of the ET 200iSP (= IM 152-1). The diagnostics integrated in the system reduce startup and debugging times.

The physical bus setup for devices in hazardous areas requires special protective measures. The method of the intrinsically safe PROFIBUS has been selected for ET 200iSP. This demands segmentation and power limiting on the bus (PROFIBUS RS 485-IS).

A commercially available "Fieldbus isolating transformer" (RS 485IS coupler) is used for this purpose. It can be installed in areas up to Zone 2. This converts the PROFIBUS DP to an intrinsically safe PROFIBUS RS 485-IS, which allows modules to be plugged and pulled – even under potentially explosive conditions.

##### Configuration

An ET 200iSP station can be connected to higher level PLCs as a DP V0 or DP V1 slave.

In an S7/ PCS 7 environment, configuration and parameterization of an ET 200iSP station is executed using SIMATIC STEP 7 hardware manager. This defines the station design (which module where).

This software is opened by double-clicking one of the implemented modules/stations.

##### Software requirements

- SIMATIC STEP 7, Version 5.3 + SP1 incl. Hardware Support Package (HSP)
- SIMATIC PCS 7, Version V6.1
- For configuring HART field devices, the current version of the PDM configuring software is required.

##### Configuring in non-Siemens systems and older PCS 7/STEP 7 versions

In all other applications, the configuration of the station must be relayed to the PROFIBUS DP network through the GSD file.

In this case, parameterization is carried out through PDM, whereby a comparison of the configuration between PDM and GSD file is not possible. It is not possible to commission an ET 200iSP without the PDM configuration software.

The parameters of this module can then be defined in the PDM dialog fields, such as alarm limits for analog modules, sensor selection for digital modules, settings for the release of analog values and the output of HART commands for analog HART modules.

#### Technical specifications – general

Degree of protection	IP30
Ambient temperature	- 20 °C to + 70 °C
Vibration-proof	permanent: 0.5 g, intermittent: 1 g

##### Standards and approvals

• PROFIBUS	EN 50170, Volume 2
• EU directive	94/9/EG (ATEX 100a)
• CENELEC	II 2 G (1) GD EEx d e [ib/ia] IIC T4
• IEC	IEC 61131, Part 2
• CE	According to 89/336/EEC and 73/23/EEC

#### Overview



- The IM 152 interface module is plugged onto the corresponding terminal module TM-IM/EM (to be ordered separately). For redundant operation, two IM 152 are used. They are plugged onto the TM-IM/IM.
- The interface module IM 152 has the following properties:
  - connects the ET 200iSP to PROFIBUS DP
  - prepares data for the fitted electronic modules
  - the PROFIBUS address of ET 200iSP can be adjusted by switch
  - slot for MMC
  - firmware updating over PROFIBUS DP or MMC
- Shutting down the 24 V DC supply voltage at the terminal module TM-PS also shuts down the interface module IM 152.
- The maximum address size is 244 byte inputs and 244 byte outputs.

#### Technical specifications

	6ES7 152-1AA00-0AB0
<b>Current consumption</b>	
from supply voltage 1L+, max.	30 mA
Power loss, typ.	0.5 W
<b>interfaces</b>	
interface physics, RS 485	Yes
<b>Protocols</b>	
PROFIBUS DP protocol	Yes
<b>PROFIBUS DP</b>	
Transmission speed, max.	1.5 Mbit/s; 9.6; 19.2; 45.45; 93.75; 187.5; 500 kbauds
SYNC capability	Yes
FREECE capability	Yes
direct data exchange (cross traffic)	Yes; Slave to slave as publisher
<b>Isochronous mode</b>	
Isochronous mode	No
<b>Status information/alarms/diagnostics</b>	
Alarms	
• Alarms	Yes
• Acyclic function, interrupts	Yes
• Acyclic function, parameter	Yes
Diagnoses	
• Diagnostic functions	Yes
Diagnostics indication LED	
• Bus error BF (red)	Yes
• Collective error SF (red)	Yes
• Monitoring 24 V voltage supply ON (green)	Yes

	6ES7 152-1AA00-0AB0
<b>Time stamping</b>	
Description	per digital input per digital input module entire ET 200iSP
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 event entering or exiting state
<b>Isolation</b>	
between supply voltage and electronics	Yes
<b>Standards, approvals, certificates</b>	
CE symbol	Yes
Type of protection to EN 50020 (CENELEC)	II2 G EEx ib IIC T4
Type of protection to KEMA	04 ATEX 1243
<b>General information</b>	
Vendor identification (VendorID)	8110H
<b>Dimensions and weight</b>	
Width	30 mm
Height	129 mm
Depth	136.5 mm
<b>Weights</b>	
Weight, approx.	245 g

# ET 200 distributed I/Os

## ET 200iSP

### IM 152-1 interface module

#### Technical specifications (continued)

	6ES7 193-7AA00-0AA0	6ES7 193-7AA10-0AA0	6ES7 193-7AB00-0AA0
<b>Standards, approvals, certificates</b>			
CE symbol	No	No	No
Type of protection to EN 50020 (CENELEC)	no	no	no
Test number KEMA	04 ATEX 2242	04 ATEX 2242	04 ATEX 2242
<b>Dimensions and weight</b>			
Width	60 mm	60 mm	60 mm
Height	190 mm	190 mm	190 mm
Depth	52 mm	52 mm	52 mm
<b>Weights</b>			
Weight, approx.	235 g	235 g	195 g

#### Ordering data

	Order No.
<b>IM 152 including the terminating module</b>	
• ET 200iSP-IM 152-1	<b>6ES7 152-1AA00-0AB0</b>
<b>Terminal modules for IM 152</b>	
• TM-IM/EM60S	<b>6ES7 193-7AA00-0AA0</b>
• TM-IM/EM60C	<b>6ES7 193-7AA10-0AA0</b>
• TM-IM/IM	<b>6ES7 193-7AB00-0AA0</b>
<b>Accessories</b>	
<b>ET 200iSP product manual</b>	
• German	<b>6ES7 152-1AA00-8AA0</b>
• English	<b>6ES7 152-1AA00-8BA0</b>
<b>Plug connector</b>	<b>6ES7 972-0DA60-0XA0</b>
PROFIBUS connector with active terminating resistor For RS 485-IS circuit; 1.5 Mbit/s	
<b>RS 485-IS segment</b>	<b>6ES7 972-0AC80-0XA0</b>
Isolating transition for coupling PROFIBUS DP to PROFIBUS RS 485-IS	
<b>Sheet of labels</b>	
DIN A4, perforated, consisting of 10 sheets each with 30 labels for electronic modules and 20 labels for IM 152	
• petrol	<b>6ES7 193-7BH00-0AA0</b>
• red	<b>6ES7 193-7BD00-0AA0</b>
• yellow	<b>6ES7 193-7BB00-0AA0</b>
• light beige	<b>6ES7 193-7BA00-0AA0</b>
<b>Identification labels, inscribed</b>	
Order quantity 1 set of 200 of each color for slot numbering	
• 10 x slot 1 to 2	<b>8WA8 861-0AB</b>
• 5 x slot 1 to 40	<b>8WA8 861-0AC</b>
• 1 x slot 1 to 64 2 x slot 1 to 68	<b>8WA8 861-0DA</b>
<b>Identification labels, blank</b>	<b>8WA8 848-2AY</b>
Order quantity 1 set of 200 of each color for slot numbering	
<b>Standard rails S7-300</b>	
Standard rail 585 mm	<b>6ES7 390-1AF85-0AA0</b>
Standard rail 885 mm	<b>6ES7 390-1AJ85-0AA0</b>

#### Order No.

#### Accessories (continued)

##### Stainless steel housing IP66 for hazardous Zone 1 with safety class EEx e

Empty housing with no modules installed, for use in gaseous atmospheres, IP65 (IP54 if a breather gland is used)

- Wall housing 650 x 450 x 230 for the installation of up to 15 ET 200iSP modules, for use in gaseous atmospheres, with 3 rows of cable glands M16 (41 pieces) and 2 rows of cover plugs  
**6DL2 804-0AD30**
- Wall housing 650 x 450 x 230 for the installation of up to 15 ET 200iSP modules for use in gaseous atmospheres with 5 rows of cable glands M16 (66 pieces)  
**6DL2 804-0AD50**
- Wall housing 950 x 450 x 230 for the installation of up to 25 ET 200iSP modules, for use in gaseous atmospheres, with 3 rows of cable glands M16 (68 pieces) and 2 rows of cover plugs  
**6DL2 804-0AE30**
- Wall housing 950 x 450 x 230 for the installation of up to 25 ET 200iSP modules for use in gaseous atmospheres with 5 rows of cable glands M16 (111 pieces)  
**6DL2 804-0AE50**

Empty housing with no modules installed, for use in dusty atmospheres, IP65

- Wall housing 650 x 450 x 230 for the installation of up to 15 ET 200iSP modules, for use in dusty atmospheres, with 3 rows of cable glands M16 (41 pieces) and 2 rows of cover plugs  
**6DL2 804-0DD30**
- Wall housing 650 x 450 x 230 for the installation of up to 15 ET 200iSP modules for use in dusty atmospheres with 5 rows of cable glands M16 (66 pieces)  
**6DL2 804-0DD50**
- Wall housing 950 x 450 x 230 for the installation of up to 25 ET 200iSP modules, for use in dusty atmospheres, with 3 rows of cable glands M16 (68 pieces) and 2 rows of cover plugs  
**6DL2 804-0DE30**
- Wall housing 950 x 450 x 230 for the installation of up to 25 ET 200iSP modules for use in dusty atmospheres with 5 rows of cable glands M16 (111 pieces)  
**6DL2 804-0DE50**

Ordering data	Order No.		Order No.
<p><b>Accessories</b> (continued)</p> <p>Housing with ET 200iSP modules installed, for use in gaseous atmospheres, IP65 (IP54 when using a breather gland), the ET 200iSP components must be ordered separately</p> <ul style="list-style-type: none"> <li>• Wall housing 650 x 450 x 230 for the installation of up to 15 ET 200iSP modules, for use in gaseous atmospheres, with 3 rows of cable glands M16 (41 pieces) and 2 rows of cover plugs</li> <li>• Wall housing 650 x 450 x 230 for the installation of up to 15 ET 200iSP modules for use in gaseous atmospheres with 5 rows of cable glands M16 (66 pieces)</li> <li>• Wall housing 950 x 450 x 230 for the installation of up to 25 ET 200iSP modules, for use in gaseous atmospheres, with 3 rows of cable glands M16 (68 pieces) and 2 rows of cover plugs</li> <li>• Wall housing 950 x 450 x 230 for the installation of up to 25 ET 200iSP modules for use in gaseous atmospheres with 5 rows of cable glands M16 (111 pieces)</li> </ul>	<p><b>6DL2 804-1AD30</b></p> <p><b>6DL2 804-1AD50</b></p> <p><b>6DL2 804-1AE30</b></p> <p><b>6DL2 804-1AE50</b></p>	<p><b>Accessories</b> (continued)</p> <p>Housing with modules installed, for use in dusty atmospheres, IP65, the ET 200iSP components must be ordered separately</p> <ul style="list-style-type: none"> <li>• Wall housing 650 x 450 x 230 for the installation of up to 15 ET 200iSP modules, for use in dusty atmospheres, with 3 rows of cable glands M16 (41 pieces) and 2 rows of cover plugs</li> <li>• Wall housing 650 x 450 x 230 for the installation of up to 15 ET 200iSP modules for use in dusty atmospheres with 5 rows of cable glands M16 (66 pieces)</li> <li>• Wall housing 950 x 450 x 230 for the installation of up to 25 ET 200iSP modules, for use in dusty atmospheres, with 3 rows of cable glands M16 (68 pieces) and 2 rows of cover plugs</li> <li>• Wall housing 950 x 450 x 230 for the installation of up to 25 ET 200iSP modules for use in dusty atmospheres with 5 rows of cable glands M16 (111 pieces)</li> </ul>	<p><b>6DL2 804-1DD30</b></p> <p><b>6DL2 804-1DD50</b></p> <p><b>6DL2 804-1DE30</b></p> <p><b>6DL2 804-1DE50</b></p>

# ET 200 distributed I/Os

## ET 200iSP

### ET 200iSP digital electronic modules and terminal modules

#### Overview



- The electronic modules are plugged into the associated terminal modules that must be ordered separately (with screw-type or spring-loaded terminals).
- When plugged in, the modules are automatically uniquely coded mechanically.
- Modules can be replaced under potentially explosive conditions during runtime.

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#### Technical specifications

	6ES7 131-7RF00-0AB0
<b>Digital inputs</b>	
Number of NAMUR inputs	8
Cable length	
• cable length, shielded, max.	200 m
Input delay (for rated value of input voltage)	
• for standard inputs	
- at "0" to "1", min.	2.8 µs
- at "0" to "1", max.	3.5 µs
- at "1" to "0", min.	2.8 ms
- at "1" to "0", max.	3.5 µs
<b>Encoder</b>	
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
<b>Integrated Functions</b>	
Frequency meter	Yes
Frequency measurement	Yes; (GATE time) 50 ms; 200 ms; 1 s
Number of frequency meters	2
<b>Counters</b>	
Number of counter inputs	2; normal and periodic count function
Input frequency, max.	5 kHz; at cable length 20 m 5 kHz; cable length 100 m 1 kHz; cable length 200 m 500 Hz

	6ES7 131-7RF00-0AB0
<b>Status information/alarms/diagnostics</b>	
Alarms	
• Diagnostic alarm	Yes; parameterizable
• Process alarm	No
Diagnoses	
• Diagnostic functions	Yes
• 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	
• Collective error SF (red)	Yes
<b>Isolation</b>	
Galvanic isolation, digital inputs	
• between the channels	No
• between the channels and the backplane bus	Yes
<b>Permissible potential difference</b>	
between different circuits	60 V DC, 30 V AC
<b>Standards, approvals, certificates</b>	
CE symbol	Yes
Type of protection to EN 50020 (CENELEC)	II2 G (1) GD EEx ib[ia] IIC T4
Type of protection to KEMA	04 ATEX 1248
<b>Dimensions and weight</b>	
Width	30 mm
Height	129 mm
Depth	136.5 mm
<b>Weights</b>	
Weight, approx.	255 g

**Technical specifications (continued)**

	6ES7 132-7RD01-0AB0	6ES7 132-7RD11-0AB0	6ES7 132-7RD21-0AB0
<b>Current consumption</b>			
from load voltage L+ (without load), max.	340 mA	300 mA	400 mA
from backplane bus DC 3.3 V, max.	10 mA	10 mA	10 mA
Power loss, typ.	2.5 W	2.1 W	2.8 W
<b>Address area</b>			
Address space per module			
• without packing	2 Byte	2 Byte	2 Byte
<b>Digital outputs</b>			
Number of digital outputs	4	4	4
cable length, shielded, max.	200 m	200 m	200 m
Cable length unshielded, max.	200 m	200 m	200 m
Short-circuit protection of the output	Yes	Yes	Yes
No-load voltage U <sub>ao</sub> (DC)	23.1 V	17.4 V	17.4 V
Internal resistor R <sub>i</sub>	275 Ω	150 Ω	
Trend key points E			
• Voltage U <sub>e</sub> (DC)	17.1 V	13.2 V	11 V
• Current I <sub>e</sub>	20 mA	27 mA	40 mA; 80 mA when outputs connected in parallel
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 2 outputs			
• for increased power	No	Yes	Yes
Switching frequency			
• with resistive load, max.	100 Hz	100 Hz	100 Hz
• with inductive load, max.	2 Hz	2 Hz	2 Hz
<b>Ex(i) characteristics</b>			
Max. values of output circuits (per channel)			
• T <sub>a</sub> (permissible ambient temperature), max.	70 °C	70 °C	70 °C
<b>Status information/alarms/diagnostics</b>			
Alarms			
• Alarms		No	
• Diagnostic alarm	Yes	Yes	Yes
Diagnoses			
• Diagnostic functions	Yes	Yes	Yes
• Diagnostic information readable	Yes	Yes	Yes
• Wire break	Yes	Yes	Yes
• Short circuit	Yes; R < 800 ohms (one output), R < 40 ohms (outputs connected in parallel)	Yes	Yes; R < 800 ohms (one output), R < 40 ohms (outputs connected in parallel)
Diagnostics indication LED			
• Collective error SF (red)	Yes	Yes	Yes
• Status indicator digital output (green)	Yes	Yes	Yes
<b>Standards, approvals, certificates</b>			
CE symbol	Yes	Yes	Yes
Type of protection to EN 50020 (CENELEC)	II2 G (1) GD EEx ib[ia] IIC T4	II2 G (1) GD EEx ib[ia] IIC T4	II2 G (1) GD EEx ib[ia] IIC T4
<b>Dimensions and weight</b>			
Width	30 mm	30 mm	30 mm
Height	129 mm	129 mm	129 mm
Depth	136.5 mm	136.5 mm	136.5 mm
<b>Weights</b>			
Weight, approx.	255 g	255 g	255 g

# ET 200 distributed I/Os

## ET 200iSP

### ET 200iSP digital electronic modules and terminal modules

#### Technical specifications (continued)

	6ES7 132-7GD00-0AB0	6ES7 132-7GD10-0AB0	6ES7 132-7GD20-0AB0
<b>Current consumption</b>			
from load voltage L+ (without load), max.	340 mA	300 mA	400 mA
from backplane bus DC 3.3 V, max.	10 mA	10 mA	10 mA
Power loss, typ.	2.5 W	2.1 W	2.8 W
<b>Address area</b>			
Address space per module			
• without packing	2 Byte	2 Byte	2 Byte
<b>Digital outputs</b>			
Number of digital outputs	4	4	4
cable length, shielded, max.	200 m	200 m	200 m
Cable length unshielded, max.	200 m	200 m	200 m
Short-circuit protection of the output	Yes	Yes	Yes
No-load voltage U <sub>ao</sub> (DC)	23.1 V	17.4 V	17.4 V
Internal resistor R <sub>i</sub>		150 Ω	150 Ω
<b>Trend key points E</b>			
• Voltage U <sub>e</sub> (DC)	17.1 V	13.2 V	
• Current I <sub>e</sub>	20 mA	27 mA; 54 mA when outputs connected in parallel	40 mA; 80 mA when outputs connected in parallel
<b>Output delay with resistive load</b>			
• "0" to "1", max.	2 ms	2 ms	2 ms
• "1" to "0", max.	1.5 ms	1.5 ms	1.5 ms
<b>Parallel switching of 2 outputs</b>			
• for increased power	No	Yes	Yes
<b>Switching frequency</b>			
• with resistive load, max.	100 Hz	100 Hz	100 Hz
• with inductive load, max.	2 Hz	2 Hz	2 Hz
<b>Ex(i) characteristics</b>			
Max. values of output circuits (per channel)			
• T <sub>a</sub> (permissible ambient temperature), max.	70 °C	70 °C	70 °C
<b>Status information/alarms/diagnostics</b>			
<b>Alarms</b>			
• Diagnostic alarm	Yes	Yes	Yes
<b>Diagnoses</b>			
• Diagnostic functions	Yes	Yes	Yes
• Diagnostic information readable	Yes	Yes	Yes
• Wire break	Yes	Yes	Yes
• Short circuit	Yes	Yes; R < 800 ohms (one output), R < 40 ohms (outputs connected in parallel)	Yes; R < 800 ohms (one output), R < 40 ohms (outputs connected in parallel)
<b>Diagnostics indication LED</b>			
• Collective error SF (red)	Yes	Yes	Yes
• Status indicator digital output (green)	Yes	Yes	Yes
<b>Standards, approvals, certificates</b>			
CE symbol	Yes	Yes	Yes
Type of protection to EN 50020 (CENELEC)	II2 G (1) GD EEx ib[ia] IIC T4	II2 G (1) GD EEx ib[ia] IIC T4	II2 G (1) GD EEx ib[ia] IIC T4
<b>Dimensions and weight</b>			
Width	30 mm	30 mm	30 mm
Height	129 mm	129 mm	129 mm
Depth	136.5 mm	136.5 mm	136.5 mm
<b>Weights</b>			
Weight, approx.	255 g	255 g	255 g

#### Technical specifications (continued)

	6ES7 193-7CA00-0AA0	6ES7 193-7CA10-0AA0
<b>Standards, approvals, certificates</b>		
CE symbol	No	No
Type of protection to EN 50020 (CENELEC)	no	no
Test number KEMA	04 ATEX 2242	04 ATEX 2242
<b>Dimensions and weight</b>		
Width	60 mm	60 mm
Height	190 mm	190 mm
Depth	52 mm	52 mm
<b>Weights</b>		
Weight, approx.	275 g	275 g

#### Ordering data

	Order No.
<b>Digital input module 8 DI NAMUR</b> 8 x DI NAMUR	<b>6ES7 131-7RF00-0AB0</b>
<b>Digital output module 4 DO 23.1 V DC /20 mA</b>	<b>6ES7 132-7RD01-0AB0</b>
<b>Digital output module 4 DO 17.4 V DC /27 mA</b>	<b>6ES7 132-7RD11-0AB0</b>
<b>Digital output module 4 DO 17.4 V DC /40 mA</b> 4 x DO; 1 additional intrinsically safe input for "H" shut-off	<b>6ES7 132-7RD21-0AB0</b>
<b>Digital output module 4 DO 23.1 V DC /20 mA</b>	<b>6ES7 132-7GD00-0AB0</b>
<b>Digital output module 4 DO 17.4 V DC /27 mA</b>	<b>6ES7 132-7GD10-0AB0</b>
<b>Digital output module 4 DO 17.4 V DC /40 mA</b> 4 x DO; 1 additional intrinsically safe input for "L" shut-off	<b>6ES7 132-7GD20-0AB0</b>
<b>TM-EM/EM60S</b> Terminal module E60S (screw-type terminal)	<b>6ES7 193-7CA00-0AA0</b>
<b>TM-EM/EM60C</b> Terminal module E60S (spring-loaded terminal)	<b>6ES7 193-7CA10-0AA0</b>

#### Accessories

##### ET 200iSP product manual

- German
- English

**6ES7 152-1AA00-8AA0**

**6ES7 152-1AA00-8BA0**

##### Connectors

PROFIBUS connector with active termination resistor  
For RS 485-IS circuit; 1.5 Mbit/s

**6ES7 972-0DA60-0XA0**

##### RS 485-IS Coupler

Isolating transformer for coupling from PROFIBUS DP and PROFIBUS RS 485-IS

**6ES7 972-0AC80-0XA0**

##### Labeling sheet

DIN A4, perforated, each consisting of 10 sheets of 30 strips each, used for electronic modules and 20 strips, used for IM 151

- petrol
- red
- yellow
- light beige

**6ES7 193-7BH00-0AA0**

**6ES7 193-7BD00-0AA0**

**6ES7 193-7BB00-0AA0**

**6ES7 193-7BA00-0AA0**

##### Labels, inscribed

Ordering unit 1 set with 200 pieces each for slot numbering

- 10 x slots 1 to 2
- 5 x slots 1 to 40

**8WA8 861-0AB**

**8WA8 861-0AC**

##### Labels, blank

Ordering unit 1 set with 200 pieces each for slot numbering

**8WA8 848-2AY**

##### S7-300 rail

Standard rail 585 mm

**6ES7 390-1AF85-0AA0**

Standard rail 885 mm

**6ES7 390-1AJ85-0AA0**

# ET 200 distributed I/Os

## ET 200iSP

### ET 200iSP digital electronic modules and terminal modules

#### Ordering data (continued)

#### Order No.

##### Accessories (continued)

##### Stainless steel enclosure IP66 for Ex-Zone 1 in protection class EEx e,

Empty housing without installation of modules, for use in gaseous area, IP65 (IP54 when using an air-conditioning nozzle)

- Wall housing 650 x 450 x 230, for installation of max. 15 ET 200iSP modules, for use in gaseous area, with 3 rows of M16 cable glands (41 pieces) and 2 rows of blanking plugs
- Wall housing 650 x 450 x 230, for installation of max. 15 ET 200iSP modules, for use in gaseous area, with 5 rows of M16 cable glands (66 pieces)
- Wall housing 950 x 450 x 230, for installation of max. 25 ET 200iSP modules, for use in gaseous area, with 3 rows of M16 cable glands (68 pieces) and 2 rows of blanking plugs
- Wall housing 950 x 450 x 230, for installation of max. 25 ET 200iSP modules, for use in gaseous area, with 5 rows of M16 cable glands (111 pieces)

**6DL2 804-0AD30**

**6DL2 804-0AD50**

**6DL2 804-0AE30**

**6DL2 804-0AE50**

Empty housing without installation of modules, for use in dusty area, IP65

- Wall housing 650 x 450 x 230, for installation of max. 15 ET 200iSP modules, for use in dusty area, with 3 rows of M16 cable glands (41 pieces) and 2 rows of blanking plugs
- Wall housing 650 x 450 x 230, for installation of max. 15 ET 200iSP modules, for use in dusty area, with 5 rows of M16 cable glands (66 pieces)
- Wall housing 950 x 450 x 230, for installation of max. 25 ET 200iSP modules, for use in dusty area, with 3 rows of M16 cable glands (total 68 pieces) and 2 rows of blanking plugs
- Wall housing 950 x 450 x 230, for installation of max. 25 ET 200iSP modules, for use in dusty area, with 5 rows of M16 cable glands (111 pieces)

**6DL2 804-0DD30**

**6DL2 804-0DD50**

**6DL2 804-0DE30**

**6DL2 804-0DE50**

#### Order No.

##### Accessories (continued)

Enclosure with installation of ET 200iSP modules for use in gaseous area, IP65 (IP54 when using an air-conditioning nozzle), ET 200iSP components must be ordered separately

- Wall housing 650 x 450 x 230, for installation of max. 15 ET 200iSP modules, for use in gaseous area, with 3 rows of M16 cable glands (41 pieces) and 2 rows of blanking plugs
- Wall housing 650 x 450 x 230, for installation of max. 15 ET 200iSP modules, for use in gaseous area, with 5 rows of M16 cable glands (66 pieces)
- Wall housing 950 x 450 x 230, for installation of max. 25 ET 200iSP modules, for use in gaseous area, with 3 rows of M16 cable glands (68 pieces) and 2 rows of blanking plugs
- Wall housing 950 x 450 x 230, for installation of max. 25 ET 200iSP modules, for use in gaseous area, with 5 rows of M16 cable glands (111 pieces)

**6DL2 804-1AD30**

**6DL2 804-1AD50**

**6DL2 804-1AE30**

**6DL2 804-1AE50**

Enclosure with installation of modules, for use in dusty area, IP65, the ET 200iSP components must be ordered separately

- Wall housing 650 x 450 x 230, for installation of max. 15 ET 200iSP modules, for use in dusty area, with 3 rows of M16 cable glands (41 pieces) and 2 rows of blanking plugs
- Wall housing 650 x 450 x 230, for installation of max. 15 ET 200iSP modules, for use in dusty area, with 5 rows of M16 cable glands (66 pieces)
- Wall housing 950 x 450 x 230, for installation of max. 25 ET 200iSP modules, for use in dusty area, with 3 rows of M16 cable glands (68 pieces) and 2 rows of blanking plugs
- Wall housing 950 x 450 x 230, for installation of max. 25 ET 200iSP modules, for use in dusty area, with 5 rows of M16 cable glands (111 pieces)

**6DL2 804-1DD30**

**6DL2 804-1DD50**

**6DL2 804-1DE30**

**6DL2 804-1DE50**

#### Overview



- The electronic modules are plugged into the associated terminal modules that must be ordered separately (with screw-type or spring-loaded terminals).
- When plugged in, the modules are automatically uniquely coded mechanically.
- Modules can be replaced under potentially explosive conditions during runtime.

#### Technical specifications

	6ES7 134-7SD00-0AB0	6ES7 134-7SD50-0AB0	6ES7 134-7TD00-0AB0	6ES7 134-7TD50-0AB0
<b>Voltages and currents</b>				
Voltage supply to the transducers			Yes	
• short-circuit proof			23 mA; per channel	
• Feed current, max.				
<b>Current consumption</b>				
from supply voltage L+, max.	30 mA	22 mA	320 mA	30 mA
Power loss, typ.	0.4 W	0.4 W	2.7 W	0.4 W
<b>Analog inputs</b>				
Number of analog inputs	4	4	4	4
cable length, shielded, max.	50 m	200 m	200 m	200 m
permissible input current for current input (destruction limit), max.			90 mA	50 mA
technical unit for temperature measurement, adjustable	Yes	Yes	Yes	Yes
Input ranges (rated values), voltages				
• Voltage	Yes			
• -80 mV to +80 mV	Yes			
• Input resistance (-80 mV to +80 mV)	1,000 k $\Omega$			
Input ranges (rated values), currents				
• Current			Yes	Yes
• 4 to 20 mA			Yes	Yes; min. 295 ohms

# ET 200 distributed I/Os

## ET 200iSP

### ET 200iSP analog electronic modules and terminal modules

#### Technical specifications (continued)

	6ES7 134-7SD00-0AB0	6ES7 134-7SD50-0AB0	6ES7 134-7TD00-0AB0	6ES7 134-7TD50-0AB0
Input ranges (rated values), thermoelements				
• thermocouple	Yes			
• 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			
Input ranges (rated values), resistors				
• Impedance		Yes		
• Input resistance (0 to 600 Ohm)		0.6 kΩ		
Input ranges (rated values), resistance thermometers				
• Resistance thermometer		Yes		
• Ni 100		Yes		
• Input resistance (Ni 100)		2,000 kΩ		
• Pt 100		Yes		
• Input resistance (Pt 100)		2,000 kΩ		
Characteristic linearization				
• programmable	Yes	Yes		
• for thermoelements	Yes			
• for thermoresistor		Yes		
Temperature compensation				
• external temperature compensation with compensations socket	Yes; via temperature value, acquired by an analog module of the same ET 200iSP-station			
• internal temperature compensation	Yes; via supplied TC sensor module			
<b>Analog value creation</b>				
Measurement principle	integrating (Sigma-Delta)	integrating (Sigma-Delta)	integrating (Sigma-Delta)	integrating (Sigma-Delta)
Integrations and conversion time/resolution per channel				
• Resolution with overload area (bit including sign), max.	16 Bit	16 Bit	13 Bit	12 Bit; + sign
• Integration time, parameterizable	Yes	Yes	No	Yes
• Basic conversion time, including integration time, ms	80 ms at 50 Hz; 66 ms at 60 Hz	80 ms at 50 Hz; 66 ms at 60 Hz		30
• additional conversion time for wire break monitoring	5	5		
• Interference voltage suppression for interference frequency f1 in Hz	50 Hz and 60 Hz	50 and 60 Hz	50 and 60 Hz	50 and 60 Hz

#### Technical specifications (continued)

	6ES7 134-7SD00-0AB0	6ES7 134-7SD50-0AB0	6ES7 134-7TD00-0AB0	6ES7 134-7TD50-0AB0
Smoothing of measured values				
• parameterizable	Yes; in 4 stages	Yes; in 4 stages	Yes; in 4 stages	Yes; in 4 stages
• Level: none	Yes; 1 x cycle time	Yes; 1 x cycle time	Yes; 1 x cycle time	Yes; 1 x cycle time
• Level: weak	Yes; 4x cycle time	Yes; 4 x cycle time	Yes; 4x cycle time	Yes; 4x cycle time
• Level: middle	Yes; 32 x cycle time	Yes; 32 x cycle time	Yes; 32 x cycle time	Yes; 32 x cycle time
• Level: strong	Yes; 64 x cycle time	Yes; 64 x cycle time	Yes; 64 x cycle time	Yes; 64 x cycle time
<b>Encoder</b>				
Connection of signal encoders				
• for current measurement as 2-wire transducer			Yes	
• for current measurement as 4-wire transducer				Yes
• for resistance measurement with 2-conductor connection		Yes		
• for resistance measurement with 3-conductor connection		Yes		
• for resistance measurement with 4-conductor connection		Yes		
• Burden of 2-wire transmitter, max.			750 Ω	
<b>Errors/accuracies</b>				
Linearity error (relative to input area)	+/- 0.015 %	+/- 0.015 %	+/- 0.015 %	+/- 0.015 %
Temperature error (relative to input areas)	+/- 0.02 %	+/- 0.02 %	+/- 0.005 %/K	+/- 0.005 %/K
Crosstalk between the inputs, min.	-50 dB	-50 dB	-50 dB	-50 dB
Repeat accuracy in settled status at 25 °C (relative to input area)	+/- 0.01 %	+/- 0.01 %	+/- 0.01 %	+/- 0.01 %
Operational limit in overall temperature range				
• Voltage, relative to input area	+/- 0.15 %			
• Current, relative to input area			+/- 0.15 %	+/- 0.15 %
• Resistance-type thermometer, relative to input area		+/- 0.15 %		
Basic error limit (operational limit at 25 °C)				
• Voltage, relative to input area	+/- 0.1 %			
• Current, relative to input area			+/- 0.1 %	+/- 0.1 %
• Resistance-type thermometer, relative to input area		+/- 0.1 %		
Interference voltage suppression for $f = n \times (f_l \pm 1 \%)$ , $f_l$ = 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 voltage, min.	90 dB	90 dB		
<b>Status information/alarms/diagnostics</b>				
Alarms				
• Diagnostic alarm	Yes; parameterizable	Yes; parameterizable	Yes; parameterizable	Yes; parameterizable
• Limit value alarm	Yes; parameterizable	Yes; parameterizable	Yes; parameterizable	Yes; parameterizable
Diagnoses				
• Diagnostic information readable	Yes	Yes	Yes	Yes
• Wire break		Yes	Yes	Yes
• Short circuit			Yes	
Diagnostics indication LED				
• Collective error SF (red)	Yes	Yes	Yes	Yes

# ET 200 distributed I/Os

## ET 200iSP

### ET 200iSP analog electronic modules and terminal modules

#### Technical specifications (continued)

	6ES7 134-7SD00-0AB0	6ES7 134-7SD50-0AB0	6ES7 134-7TD00-0AB0	6ES7 134-7TD50-0AB0
<b>Isolation</b>				
Isolation, analog inputs				
• between the channels	Yes; functional	Yes	No	No
• between the channels and the backplane bus	Yes	Yes	Yes	Yes
<b>Standards, approvals, certificates</b>				
CE symbol	Yes	Yes	Yes	Yes
Type of protection to EN 50020 (CENELEC)	II2 G (1) GD EEx ib[ia] IIC T4	II2 G (1) GD Eex ib[ia] IIC T4	II2 G (1) GD EEx ib[ia] IIC T4	II2 G (1) GD EEx ib[ia] IIC T4
Type of protection to KEMA	04 ATEX 1246	04 ATEX 1247	04 ATEX 1244	04 ATEX 1245
<b>Dimensions and weight</b>				
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
<b>Weights</b>				
Weight, approx.	230 g	230 g	230 g	230 g

	6ES7 135-7TD00-0AB0
<b>Current consumption</b>	
from load voltage 1L+, max.	330 mA
Power loss, max.	2.7 W
<b>Analog outputs</b>	
Number of analog outputs	4
cable length, shielded, max.	200 m
• 4 to 20 mA	Yes
• for current output 2-conductor connection	Yes
• with current outputs, max.	750 Ω
<b>Analog value creation</b>	
Integrations and conversion time/resolution per channel	
• Resolution with overload area (bit including sign), max.	14 Bit
• for resistive load	4 ms
• for capacitive load	40 ms
• for inductive load	40 ms
<b>Errors/accuracies</b>	
Linearity error (relative to output area)	+/- 0.015 %
Temperature error (relative to output area)	+/- 0.005 %/K
Crosstalk between the outputs, min.	-50 dB
Repeat accuracy in settled status at 25 °C (relative to output area)	+/- 0.01 %
<b>Operational limit in overall temperature range</b>	
• Current, relative to output area	+/- 0.15 %
<b>Basic error limit (operational limit at 25 °C)</b>	
• Current, relative to output area	+/- 0.1 %

	6ES7 135-7TD00-0AB0
<b>Status information/alarms/diagnostics</b>	
Substitute values connectable	Yes
<b>Alarms</b>	
• Diagnostic alarm	Yes
<b>Diagnoses</b>	
• Diagnostic information readable	Yes
• Wire break	Yes
• Short circuit	Yes
<b>Diagnostics indication LED</b>	
• Collective error SF (red)	Yes
<b>Isolation</b>	
• between the channels	No
• between the channels and the backplane bus	Yes
<b>Standards, approvals, certificates</b>	
Type of protection to KEMA	04 ATEX 1250
<b>Dimensions and weight</b>	
Width	30 mm
Height	129 mm
Depth	136.5 mm
<b>Weights</b>	
Weight, approx.	265 g

	6ES7 193-7CA00-0AA0	6ES7 193-7CA10-0AA0
<b>Standards, approvals, certificates</b>		
CE symbol	No	No
Type of protection to EN 50020 (CENELEC)	no	no
Test number KEMA	04 ATEX 2242	04 ATEX 2242
<b>Dimensions and weight</b>		
Width	60 mm	60 mm
Height	190 mm	190 mm
Depth	52 mm	52 mm
<b>Weights</b>		
Weight, approx.	275 g	275 g

Ordering data	Order No.	Order No.
<b>Analog input modules</b>		
4 AI   2WIRE HART	6ES7 134-7TD00-0AB0	
4 AI   4WIRE HART	6ES7 134-7TD50-0AB0	
4 AI RTD	6ES7 134-7SD50-0AB0	
4 AI TC	6ES7 134-7SD00-0AB0	
<b>Analog output modules</b>		
4 AO   HART	6ES7 135-7TD00-0AB0	
<b>Terminal modules</b>		
<b>TM-EM/EM60S</b> Terminal module E60S (screw-type terminals)	6ES7 193-7CA00-0AA0	
<b>TM-EM/EM60C</b> Terminal module E60C (spring-loaded terminals)	6ES7 193-7CA10-0AA0	
<b>Accessories</b>		
<b>ET 200iSP product manual</b>		
• German	6ES7 152-1AA00-8AA0	
• English	6ES7 152-1AA00-8BA0	
<b>Plug connector</b> PROFIBUS connector with active terminating resistor For RS 485-IS circuit; 1.5 Mbit/s	6ES7 972-0DA60-0XA0	
<b>RS 485-IS segment</b> Isolating transition for coupling PROFIBUS DP to PROFIBUS RS 485-IS	6ES7 972-0AC80-0XA0	
<b>Sheet of labels</b> DIN A4, perforated, consisting of 10 sheets each with 30 labels for electronic modules and 20 labels for IM 151		
• petrol	6ES7 193-7BH00-0AA0	
• red	6ES7 193-7BD00-0AA0	
• yellow	6ES7 193-7BB00-0AA0	
• light beige	6ES7 193-7BA00-0AA0	
<b>Identification labels, inscribed</b> Order quantity 1 set of 200 of each color for slot numbering		
• 10 x slot 1 to 2	8WA8 861-0AB	
• 5 x slot 1 to 40	8WA8 861-0AC	
<b>Identification labels, blank</b> Order quantity 1 set of 200 of each color for slot numbering	8WA8 848-2AY	
<b>Standard rails S7-300</b> Standard rail 585 mm	6ES7 390-1AF85-0AA0	
Standard rail 885 mm	6ES7 390-1AJ85-0AA0	
<b>Accessories (continued)</b>		
<b>Stainless steel housing IP66 for hazardous Zone 1 with safety class EEx e</b>		
Empty housing with no modules installed, for use in gaseous atmospheres, IP65 (IP54 if a breather gland is used)		
• Wall housing 650 x 450 x 230 for the installation of up to 15 ET 200iSP modules, for use in gaseous atmospheres, with 3 rows of cable glands M16 (41 pieces) and 2 rows of cover plugs		6DL2 804-0AD30
• Wall housing 650 x 450 x 230 for the installation of up to 15 ET 200iSP modules for use in gaseous atmospheres with 5 rows of cable glands M16 (66 pieces)		6DL2 804-0AD50
• Wall housing 950 x 450 x 230 for the installation of up to 25 ET 200iSP modules, for use in gaseous atmospheres, with 3 rows of cable glands M16 (68 pieces) and 2 rows of cover plugs		6DL2 804-0AE30
• Wall housing 950 x 450 x 230 for the installation of up to 25 ET 200iSP modules for use in gaseous atmospheres with 5 rows of cable glands M16 (111 pieces)		6DL2 804-0AE50
Empty housing with no modules installed, for use in dusty atmo- spheres, IP65		
• Wall housing 650 x 450 x 230 for the installation of up to 15 ET 200iSP modules, for use in dusty atmospheres, with 3 rows of cable glands M16 (41 pieces) and 2 rows of cover plugs		6DL2 804-0DD30
• Wall housing 650 x 450 x 230 for the installation of up to 15 ET 200iSP modules for use in dusty atmospheres with 5 rows of cable glands M16 (66 pieces)		6DL2 804-0DD50
• Wall housing 950 x 450 x 230 for the installation of up to 25 ET 200iSP modules, for use in dusty atmospheres, with 3 rows of cable glands M16 (68 pieces) and 2 rows of cover plugs		6DL2 804-0DE30
• Wall housing 950 x 450 x 230 for the installation of up to 25 ET 200iSP modules for use in dusty atmospheres with 5 rows of cable glands M16 (111 pieces)		6DL2 804-0DE50

# ET 200 distributed I/Os

## ET 200iSP

### ET 200iSP analog electronic modules and terminal modules

#### Ordering data

#### Order No.

##### Accessories (continued)

Housing with ET 200iSP modules installed, for use in gaseous atmospheres, IP65 (IP54 when using a breather gland), the ET 200iSP components must be ordered separately

- Wall housing 650 x 450 x 230 for the installation of up to 15 ET 200iSP modules, for use in gaseous atmospheres, with 3 rows of cable glands M16 (41 pieces) and 2 rows of cover plugs
- Wall housing 650 x 450 x 230 for the installation of up to 15 ET 200iSP modules for use in gaseous atmospheres with 5 rows of cable glands M16 (66 pieces)
- Wall housing 950 x 450 x 230 for the installation of up to 25 ET 200iSP modules, for use in gaseous atmospheres, with 3 rows of cable glands M16 (68 pieces) and 2 rows of cover plugs
- Wall housing 950 x 450 x 230 for the installation of up to 25 ET 200iSP modules for use in gaseous atmospheres with 5 rows of cable glands M16 (111 pieces)

**6DL2 804-1AD30**

**6DL2 804-1AD50**

**6DL2 804-1AE30**

**6DL2 804-1AE50**

#### Order No.

##### Accessories (continued)

Housing with modules installed, for use in dusty atmospheres, IP65, the ET 200iSP components must be ordered separately

- Wall housing 650 x 450 x 230 for the installation of up to 15 ET 200iSP modules, for use in dusty atmospheres, with 3 rows of cable glands M16 (41 pieces) and 2 rows of cover plugs
- Wall housing 650 x 450 x 230 for the installation of up to 15 ET 200iSP modules for use in dusty atmospheres with 5 rows of cable glands M16 (66 pieces)
- Wall housing 950 x 450 x 230 for the installation of up to 25 ET 200iSP modules, for use in dusty atmospheres, with 3 rows of cable glands M16 (68 pieces) and 2 rows of cover plugs
- Wall housing 950 x 450 x 230 for the installation of up to 25 ET 200iSP modules for use in dusty atmospheres with 5 rows of cable glands M16 (111 pieces)

**6DL2 804-1DD30**

**6DL2 804-1DD50**

**6DL2 804-1DE30**

**6DL2 804-1DE50**

### ET 200iSP reserve module and terminal modules

#### Overview



- The reserve module is plugged onto the relevant terminal module (to be ordered separately; screw-type or spring-loaded connection).
- Modules can be replaced under potentially explosive conditions during runtime.

#### Technical specifications

6ES7 138-7AA00-0AA0	
<b>Standards, approvals, certificates</b>	
CE symbol	Yes
Type of protection to EN 50020 (CENELEC)	II2 G EEx ib IIC T4
Test number KEMA	04 ATEX1251
<b>Dimensions and weight</b>	
Width	30 mm
Height	129 mm
Depth	136.5 mm
<b>Weights</b>	
Weight, approx.	180 g

	6ES7 193-7CA00-0AA0	6ES7 193-7CA10-0AA0
<b>Standards, approvals, certificates</b>		
CE symbol	No	No
Type of protection to EN 50020 (CENELEC)	no	no
Test number KEMA	04 ATEX 2242	04 ATEX 2242
<b>Dimensions and weight</b>		
Width	60 mm	60 mm
Height	190 mm	190 mm
Depth	52 mm	52 mm
<b>Weights</b>		
Weight, approx.	275 g	275 g

Ordering data	Order No.
<b>Reserve module</b>	<b>6ES7 138-7AA00-0AA0</b>
<i>Terminal modules</i>	
<b>TM-EM/EM60S</b> Terminal module E60S (screw-type terminals)	<b>6ES7 193-7CA00-0AA0</b>
<b>TM-EM/EM60C</b> Terminal module E60C (spring-loaded terminals)	<b>6ES7 193-7CA10-0AA0</b>
<i>Accessories</i>	
<b>ET 200iSP product manual</b>	
• German	<b>6ES7 152-1AA00-8AA0</b>
• English	<b>6ES7 152-1AA00-8BA0</b>
<b>Plug connector</b> PROFIBUS connector with active terminating resistor For RS 485-IS circuit; 1.5 Mbit/s	<b>6ES7 972-0DA60-0XA0</b>
<b>RS 485-IS segment</b> Isolating transition for coupling PROFIBUS DP to PROFIBUS RS 485-IS	<b>6ES7 972-0AC80-0XA0</b>

	Order No.
<i>Accessories</i> (continued)	
<b>Sheet of labels</b> DIN A4, perforated, consisting of 10 sheets each with 30 labels for electronic modules and 20 labels for IM 151	
• petrol	<b>6ES7 193-7BH00-0AA0</b>
• red	<b>6ES7 193-7BD00-0AA0</b>
• yellow	<b>6ES7 193-7BB00-0AA0</b>
• light beige	<b>6ES7 193-7BA00-0AA0</b>
<b>Identification labels, inscribed</b> Order quantity 1 set of 200 of each color for slot numbering	
• 10 x slot 1 to 2	<b>8WA8 861-0AB</b>
• 5 x slot 1 to 40	<b>8WA8 861-0AC</b>
<b>Identification labels, blank</b> Order quantity 1 set of 200 of each color for slot numbering	<b>8WA8 848-2AY</b>
<b>Standard rails S7-300</b>	
Standard rail 585 mm	<b>6ES7 390-1AF85-0AA0</b>
Standard rail 885 mm	<b>6ES7 390-1AJ85-0AA0</b>

# ET 200 distributed I/Os

## ET 200iSP

### ET 200iSP reserve module and terminal modules

#### Ordering data

#### Order No.

##### Accessories (continued)

#### Stainless steel housing IP66 for hazardous Zone 1 with safety class EEx e

Empty housing with no modules installed, for use in gaseous atmospheres, IP65 (IP54 if a breather gland is used)

- Wall housing 650 x 450 x 230 for the installation of up to 15 ET 200iSP modules, for use in gaseous atmospheres, with 3 rows of cable glands M16 (41 pieces) and 2 rows of cover plugs
- Wall housing 650 x 450 x 230 for the installation of up to 15 ET 200iSP modules for use in gaseous atmospheres with 5 rows of cable glands M16 (66 pieces)
- Wall housing 950 x 450 x 230 for the installation of up to 25 ET 200iSP modules, for use in gaseous atmospheres, with 3 rows of cable glands M16 (68 pieces) and 2 rows of cover plugs
- Wall housing 950 x 450 x 230 for the installation of up to 25 ET 200iSP modules for use in gaseous atmospheres with 5 rows of cable glands M16 (111 pieces)

**6DL2 804-0AD30**

**6DL2 804-0AD50**

**6DL2 804-0AE30**

**6DL2 804-0AE50**

Empty housing with no modules installed, for use in dusty atmospheres, IP65

- Wall housing 650 x 450 x 230 for the installation of up to 15 ET 200iSP modules, for use in dusty atmospheres, with 3 rows of cable glands M16 (41 pieces) and 2 rows of cover plugs
- Wall housing 650 x 450 x 230 for the installation of up to 15 ET 200iSP modules for use in dusty atmospheres with 5 rows of cable glands M16 (66 pieces)
- Wall housing 950 x 450 x 230 for the installation of up to 25 ET 200iSP modules, for use in dusty atmospheres, with 3 rows of cable glands M16 (68 pieces) and 2 rows of cover plugs
- Wall housing 950 x 450 x 230 for the installation of up to 25 ET 200iSP modules for use in dusty atmospheres with 5 rows of cable glands M16 (111 pieces)

**6DL2 804-0DD30**

**6DL2 804-0DD50**

**6DL2 804-0DE30**

**6DL2 804-0DE50**

#### Order No.

##### Accessories (continued)

Housing with ET 200iSP modules installed, for use in gaseous atmospheres, IP65 (IP54 when using a breather gland), the ET 200iSP components must be ordered separately

- Wall housing 650 x 450 x 230 for the installation of up to 15 ET 200iSP modules, for use in gaseous atmospheres, with 3 rows of cable glands M16 (41 pieces) and 2 rows of cover plugs
- Wall housing 650 x 450 x 230 for the installation of up to 15 ET 200iSP modules for use in gaseous atmospheres with 5 rows of cable glands M16 (66 pieces)
- Wall housing 950 x 450 x 230 for the installation of up to 25 ET 200iSP modules, for use in gaseous atmospheres, with 3 rows of cable glands M16 (68 pieces) and 2 rows of cover plugs
- Wall housing 950 x 450 x 230 for the installation of up to 25 ET 200iSP modules for use in gaseous atmospheres with 5 rows of cable glands M16 (111 pieces)

**6DL2 804-1AD30**

**6DL2 804-1AD50**

**6DL2 804-1AE30**

**6DL2 804-1AE50**

Housing with modules installed, for use in dusty atmospheres, IP65, the ET 200iSP components must be ordered separately

- Wall housing 650 x 450 x 230 for the installation of up to 15 ET 200iSP modules, for use in dusty atmospheres, with 3 rows of cable glands M16 (41 pieces) and 2 rows of cover plugs
- Wall housing 650 x 450 x 230 for the installation of up to 15 ET 200iSP modules for use in dusty atmospheres with 5 rows of cable glands M16 (66 pieces)
- Wall housing 950 x 450 x 230 for the installation of up to 25 ET 200iSP modules, for use in dusty atmospheres, with 3 rows of cable glands M16 (68 pieces) and 2 rows of cover plugs
- Wall housing 950 x 450 x 230 for the installation of up to 25 ET 200iSP modules for use in dusty atmospheres with 5 rows of cable glands M16 (111 pieces)

**6DL2 804-1DD30**

**6DL2 804-1DD50**

**6DL2 804-1DE30**

**6DL2 804-1DE50**

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#### Overview



The power supply (PS) is plugged into the associated terminal module TM-PS-A or TM-PS-B (with redundancy; to be ordered separately).

The power supply unit fulfills the following functions:

- It provides reliable isolated power supply for the ET 200iSP with the necessary operating voltages for
  - logic (through the backplane bus)
  - PROFIBUS DP interface of IM 152-1
  - powerbus (for supplying the electronic modules)
- Takes over the safety limit of the output voltage
- Has an explosion-proof metal enclosure (explosion protection EEx d)
- Can be redundantly configured

#### Technical specifications

6ES7 138-7EA01-0AA0	
<b>Voltages and currents</b>	
Mains/voltage failure jumpering, min.	0.25 ms; for powerbus and backplane bus 15ms for IM 152
Load voltage L+	
• Rated value (DC)	24 V
• reverse polarity protection	Yes
<b>Current consumption</b>	
from supply voltage L+, max.	4 A
Power loss, typ.	20 W
<b>Ex(i) characteristics</b>	
Max. values of input circuits (per channel)	
• Um (fault voltage), max.	250 V; AC
<b>Status information/alarms/diagnostics</b>	
Status indicator	Yes
Alarms	
• Alarms	No
Diagnoses	
• Diagnostic information readable	Yes; via IM 152
Diagnostics indication LED	
• Collective error SF (red)	No
<b>Isolation</b>	
tested with	
• between all secondary voltages	no electrical isolation
• between supply voltage and all secondary voltages	600V DC
<b>Isolation</b>	
primary/secondary	Yes
between supply voltage and electronics	No
<b>Standards, approvals, certificates</b>	
CE symbol	Yes
Type of protection to EN 50020 (CENELEC)	Ex de [ib]IIC T4
Type of protection to KEMA	04 ATEX 2263
<b>Dimensions and weight</b>	
Width	60 mm
Height	190 mm
Depth	136.5 mm
<b>Weights</b>	
Weight, approx.	2,700 g

# ET 200 distributed I/Os

## ET 200iSP

### ET 200iSP power supply unit

#### Technical specifications (continued)

	6ES7 193-7DA10-0AA0	6ES7 193-7DB10-0AA0
<b>Standards, approvals, certificates</b>		
CE symbol	Yes	Yes
Type of protection to EN 50020 (CENELEC)	II2 G (1) GD EEx de[ia/ib] IIC T4	II2 G (1) GD EEx de[ia/ib] IIC T4
Test number KEMA	04 ATEX 2242	04 ATEX 2242
<b>Dimensions and weight</b>		
Width	60 mm	60 mm
Height	190 mm	90 mm
Depth	52 mm	52 mm
<b>Weights</b>		
Weight, approx.	235 g	235 g

#### Ordering data

#### Order No.

Power supply module PS	6ES7 138-7EA01-0AA0
Terminal module TM-PS-A Standard	6ES7 193-7DA10-0AA0
Terminal module TM-PS-B for redundant operation	6ES7 193-7DB10-0AA0

### Overview

- Coupler for conversion from PROFIBUS DP to PROFIBUS RS 485-IS intrinsically safe (Intrinsically Safe i type of protection)
- Required to connect intrinsically safe PROFIBUS DP stations (e.g. ET 200iS, ET 200iSP) and all third party devices which have an Ex i DP interface
- Can also be implemented as a repeater in hazardous areas
- Acts as a safety barrier
- Passive bus stations, configuration is not necessary

### Technical specifications

<b>Dimensions and weight</b>	
Dimensions W x H x D (mm)	80 x 125 x 130
Weight	approx. 500 g
<b>Technical specifications – General</b>	
Degree of protection	IP20
Ambient temperature	-20 °C ... +60 °C
<b>Standards and approvals</b>	
• PROFIBUS	IEC 61784-1:2002 Ed1 CP 3/1
• EU directive	94/9/EG (ATEX 100a)
• CENELEC	II 3 (2) G EEx nA[ib] IIC T4
• UL und CSA	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
• FM	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
• IEC	IEC 61131-2, Part 2
• CE	Conforming with 89/336/EWG Conforming with 73/23/EWG
• Ship-building certification	Classification companies <ul style="list-style-type: none"> <li>• ABS (American Bureau of Shipping)</li> <li>• BV (Bureau Veritas)</li> <li>• DNV (Det Norske Veritas)</li> <li>• GL (Germanischer Lloyd)</li> <li>• LRD (Lloyds Register of Shipping)</li> <li>• Class NK (Nippon Kaiji Kyokai)</li> </ul>
<b>Module-specific specifications</b>	
Data transmission rate on PROFIBUS DP, PROFIBUS RS 485-IS	9.6; 19.2; 45.45; 93.75; 187.5; 500 kbit/s 1.5 Mbit/s
Bus protocol	PROFIBUS DP
<b>Voltages, currents, potentials</b>	
Nominal supply voltage for RS 485-IS coupler	24 V DC (20.4 ... 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	500 V AC
Current consumption RS 485-IS coupler (24 V DC), max.	150 mA
Power loss of the module, typically	3 Watts

<b>Status, alarms, diagnostics</b>		
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"	
<b>Technical safety notice</b>		
• $V_{DC}$	±4.2 V	
• $I_{SC}$	±93 mA	
• $P_0$	0.1 W	
• $V_{max}$	±4.2 V	
• $L_i$	0	
• $C_i$	0	
• $U_m$	250 V AC	
• $T_a$	-25 ... +60 °C	
<b>RS 485-IS- segment</b>		
Permitted cable length on a single line	<i>RS 485-IS</i>	<i>DP Ex i</i>
• 9,6 ... 187.5 kbit/s	1,000 m	200 m
• 500 kbit/s	400 m	200 m
• 1.5 Mbit/s	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	

# ET 200 distributed I/Os

## ET 200iSP

### RS 485-IS coupler

Ordering data	Order No.
<b>RS 485-IS segment</b> Isolating transition for coupling PROFIBUS DP to PROFIBUS RS 485-IS	<b>6ES7 972-0AC80-0XA0</b>
<b>Accessories</b>	
<b>PROFIBUS connector with passive terminating resistance</b>	<b>6ES7 972-0DA30-0XA0</b>
<b>PROFIBUS connector with active terminating resistor</b> For RS 485-IS circuit; 1.5 Mbit/s	<b>6ES7 972-0DA60-0XA0</b>
<b>PROFIBUS plug connector</b> For the intrinsically safe PROFIBUS, 1.5 Mbit/s	<b>6ES7 972-0BA30-0XA0</b>
<b>Sectional rail</b> <ul style="list-style-type: none"><li>• 160 mm</li><li>• 482 mm</li><li>• 530 mm</li><li>• 830 mm</li><li>• 2000 mm</li></ul>	<b>6ES7 390-1AB60-0AA0</b> <b>6ES7 390-1AE80-0AA0</b> <b>6ES7 390-1AF30-0AA0</b> <b>6ES7 390-1AJ30-0AA0</b> <b>6ES7 390-1BC00-0AA0</b>
<b>PROFIBUS Fast Connect bus line</b> Standard type specially designed for snap-on mounting, 2-core, shielded, sold by the meter; maximum length supplied 1000 m, minimum order 20 m	<b>6XV1 830-0EH10</b>

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#### Overview



- Distributed I/O system with degree of protection IP65/67 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
- Data transmission rates of up to 12 Mbit/s
- 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 modules with safety-related signal processing according to PROFIsafe

#### Application

SIMATIC ET 200pro is the new modular I/O system with high degree of protection IP65/66/67 for local, cabinetless applications. ET 200pro distinguishes itself through a small frame size and an innovative installation concept. ET 200pro can be optimized and very flexibly adapted to the requirements of the corresponding automation task with respect to the connection method, required I/Os and fieldbus connection. New features such as the integrated PROFIsafe safety technology, the PROFINET interface and the ability to hotswap modules permit it to be used for a wide range of applications.

With the integrated motor starters, conveyor applications can be implemented optimally, or drives of up to 5.5 kW can be controlled without control cabinet.

#### Design

The tried and tested separation of module and bus/power connection technology, which has already been used for the ET 200eco, is now also used for the digital and analog expansion modules of the ET 200pro. For the interface module this allows use of the T-functionality for the bus and 24 V power supply, and for the expansion modules it permits pre-wiring of sensor/actuator connections. This permanent wiring allows exactly one electronics module to be hot-swapped in the event of a fault without having to switch off the whole station. It can continue to operate fault-free while the module is being replaced. This ensures very high plant availability. When an electronics component is replaced, the whole I/O wiring can remain on the connecting module and does not have to be marked or removed.

#### Modules

The modules of the ET 200pro usually have two or three components. Interface and power modules as well as digital and analog expansion modules comprise:

- One bus connector which constitutes the backplane bus of the system
- One electronics module or interface module
- One connecting module

A backplane bus module is required for operation of motor starters.

A station is constructed from:

- One rack
- One interface module for PROFIBUS DP
- One connecting module for the interface module for PROFIBUS DP
  - CM IM DP direct with up to 6 M20 screwed cable glands
  - CM IM DP ECOFAST Cu (available soon)
  - CM IM DP M12, 7/8" (available soon)

Or optionally

- One interface module for PROFINET IO (available soon) with integrated M12 7/8" connection system
- Max. 16 expansion modules that can be mounted in stations up to 1 m in width

#### Expansion modules

The following expansion modules are available:

- Digital I/Os
- Analog inputs
- Analog outputs (available soon)
- Connecting modules IO
  - CM IO 4x M12 for digital or analog electronic modules
  - CM IO 8x M12 for digital electronic modules
- Electronic power modules (available soon)
- Connecting modules for power modules
  - CM PM-E directly with up to 2 M20 screwed cable glands
  - CM PM-E ECOFAST Cu
  - CM PM-E 7/8"
- Motor starter

# ET 200 distributed I/Os

## ET 200pro

### Introduction

#### Design (continued)

##### Rack

Two different racks are available for mounting the ET 200pro:

- **Narrow rack**  
The narrow rack supports complete pre-assembly on the workbench by means of two mounting flanges outside of the ET 200pro station.



- **Compact rack**  
When the compact rack is used, the small footprint of the ET 200pro system can be used to best advantage.



#### Function

The SIMATIC ET 200pro is easily configured with STEP 7. A GSD file is available for interfacing with systems of other manufacturers.

#### Technical specifications – General

Electronics modules	<ul style="list-style-type: none"> <li>• Digital inputs/outputs</li> <li>• Analog inputs</li> <li>• Analog outputs (available soon)</li> </ul>
Motor starter	
Cables and connections	M12 circular 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.	≤5A
Current consumption of one ET 200pro per infeed (IM, PM, switched voltage, up to 55 °C, max.)	10 A
For overall configuration with I looping through (several ET 200pro), 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)
<b>Ambient conditions</b>	
Temperature	from 0 ... 55 °C (-25 °C on request)
Relative humidity	from 5 to 100%
Atmospheric pressure	from 795 to 1080 hPa
<b>Mechanical stress</b>	
• Vibrations	Vibration test conforming to IEC 60068, Part 2-6 (sinusoidal) <ul style="list-style-type: none"> <li>• Constant acceleration 5 g, occasionally 10 g for interface, digital and analog modules</li> <li>• 2 g motor starters</li> </ul>
• Shock	<ul style="list-style-type: none"> <li>• Shock test according to IEC 680068 Part 2 - 27, half-sine, 30 g, 18 ms duration for interface, digital and analog modules</li> <li>• 15 g, 11 ms duration for motor starters</li> </ul>
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

	6ES7 154-1AA00-0AB0	6ES7 154-2AA00-0AB0
<b>Supply voltages</b>		
Supply voltage of electronics 1L+		
• Rated value (DC)	24 V	24 V
• Short-circuit protection	Yes; over exchangeable fuses	Yes; over exchangeable fuses
• reverse polarity protection	Yes; against destruction	Yes; against destruction
Rated value		
• DC 24 V	Yes	Yes
• permissible range, lower limit (DC)	20.4 V	20.4 V
• permissible range, upper limit (DC)	28.8 V	28.8 V
<b>Current consumption</b>		
from supply voltage 1L+, max.	200 mA	200 mA
<b>Address area</b>		
Addressing volume		
• Outputs	244 Byte	244 Byte
• Inputs	244 Byte	244 Byte
<b>PROFIBUS DP</b>		
automatic detection of transmission speed	Yes	Yes
<b>1st interface</b>		
Type of interface	PROFIBUS DP	PROFIBUS DP
Physics	RS 485	RS 485
Functionality		
• DP slave	Yes	Yes
DP slave		
• Services		
- SYNC/FREEZE	Yes	Yes
- direct data exchange (cross traffic)	Yes	Yes
• Transmission speeds, min.	9.6 kBit/s	9.6 kBit/s
• Transmission speeds, max.	12 Mbit/s	12 Mbit/s
<b>Parameter</b>		
DPV1 operation	possible	possible
Diagnostic alarm	parameterizable	parameterizable

	6ES7 154-1AA00-0AB0	6ES7 154-2AA00-0AB0
Process alarm	parameterizable	parameterizable
Swapping interrupt	parameterizable	parameterizable
Hot swapping of modules	possible	possible
<b>Status information/alarms/diagnostics</b>		
Diagnostics indication LED		
• Bus error BF (red)	Yes	Yes
• Collective error SF (red)	Yes	Yes
• Monitoring 24 V voltage supply ON (green)	Yes	Yes
• Load voltage monitoring DC 24 V (green)	Yes; integrated power module	Yes
<b>Isolation</b>		
Isolation checked with	500 V DC	500 V DC
<b>Isolation</b>		
between backplane bus and electronics	No	No
between supply voltage and electronics	Yes	Yes
<b>Environmental requirements</b>		
Operating temperature		
• min.	-25 °C	-25 °C
• max.	55 °C	55 °C
Storage/transport temperature		
• min.	-40 °C	-40 °C
• max.	70 °C	70 °C
Degree and class of protection		
• IP 65	Yes	Yes
• IP 66	Yes	Yes
• IP 67	Yes	Yes
<b>Dimensions and weight</b>		
Width	90 mm	90 mm
Height	130 mm	130 mm
Depth	59.3 mm	59.3 mm
<b>Weights</b>		
Weight, approx.	395 g	415 g

# ET 200 distributed I/Os

## ET 200pro

### IM 154-1 and IM 154-2 interface modules

#### Ordering data

#### Order No.

**IM 154-1 interface module**  
For ET 200pro; for communication between ET 200pro and higher-level masters over PROFIBUS DP

**6ES7 154-1AA00-0AB0**

**IM 154-2 High Feature interface module**  
For ET 200pro; for communication between ET 200pro and higher-level masters over PROFIBUS DP; support of PROFIsafe

**6ES7 154-2AA00-0AB0**

#### Accessories

**CM IM DP ECOFAST connecting module**  
For connecting PROFIBUS DP and the 24 V power supply to PROFIBUS interface modules, 2 ECOFAST Cu connections

**6ES7 194-4AA00-0AA0**

**CM IM DP direct connecting module**  
For connecting PROFIBUS DP and the 24 V power supply directly to the PROFIBUS interface modules, up to six M20 screwed cable glands

**6ES7 194-4AC00-0AA0**

**CM IM DP M12, 7/8" connecting module**  
For connecting PROFIBUS DP and the 24 V power supply to PROFIBUS interface modules, 2 x M12 and 2 x 7/8"

**6ES7 194-4AD00-0AA0**

#### Accessories for CM IM DP ECOFAST

**PROFIBUS ECOFAST hybrid cable, pre-assembled**  
With 2 ECOFAST connectors, trailing-type cable 2 x CU 0.64 mm<sup>2</sup> and 4 x Cu 1.5 mm<sup>2</sup>

- 1.5 m long
- 3 m long
- 5 m long
- 10 m long
- 15 m long
- 20 m long
- 25 m long
- 30 m long
- 35 m long
- 40 m long
- 45 m long
- 50 m long

**6XV1 830-7BH15**  
**6XV1 830-7BH30**  
**6XV1 830-7BH50**  
**6XV1 830-7BN10**  
**6XV1 830-7BN15**  
**6XV1 830-7BN20**  
**6XV1 830-7BN25**  
**6XV1 830-7BN30**  
**6XV1 830-7BN35**  
**6XV1 830-7BN40**  
**6XV1 830-7BN45**  
**6XV1 830-7BN50**

#### PROFIBUS ECOFAST hybrid cable GP, pre-assembled

With 2 ECOFAST connectors, trailing-type cable 2 x CU 0.64 mm<sup>2</sup> and 4 x Cu 1.5 mm<sup>2</sup>

- 1.5 m long
- 3 m long
- 5 m long
- 10 m long
- 15 m long
- 20 m long
- 25 m long
- 30 m long
- 35 m long
- 40 m long
- 45 m long
- 50 m long

**6XV1 860-3PH15**  
**6XV1 860-3PH30**  
**6XV1 860-3PH50**  
**6XV1 860-3PN10**  
**6XV1 860-3PN15**  
**6XV1 860-3PN20**  
**6XV1 860-3PN25**  
**6XV1 860-3PN30**  
**6XV1 860-3PN35**  
**6XV1 860-3PN40**  
**6XV1 860-3PN45**  
**6XV1 860-3PN50**

#### PROFIBUS ECOFAST hybrid cable, non-assembled

Trailing-type cable 2 x CU 0.64 mm<sup>2</sup> and 4 x Cu 1.5 mm<sup>2</sup>

- 50 m long
- 100 m long

**6XV1 830-7AN50**  
**6XV1 830-7AT10**

#### PROFIBUS ECOFAST hybrid cable GP, non-assembled

Trailing-type cable 2 x CU 0.64 mm<sup>2</sup> and 4 x Cu 1.5 mm<sup>2</sup>

- 50 m long
- 100 m long

**6XV1 860-4PN50**  
**6XV1 860-4PT10**

#### PROFIBUS ECOFAST hybrid connector 180

ECOFAST Cu, 2 x Cu, 4 x 1.5 mm<sup>2</sup>, HANBRID connector

- with male insert, 5 per pack
- with female insert, 5 per pack

**6GK1 905-0CA00**  
**6GK1 905-0CB00**

#### PROFIBUS ECOFAST hybrid connector angular

ECOFAST Cu, 2 x Cu, 4 x 1.5 mm<sup>2</sup>, HANBRID connector

- with male insert, 5 per pack
- with female insert, 5 per pack

**6GK1 905-0CC00**  
**6GK1 905-0CD00**

#### ECOFAST covering cap

For protecting unused bus connections for ET 200pro; 10 items per pack

**6ES7 194-1JB10-0XA0**

#### Accessories for CM IM DP direct

#### PROFIBUS trailing cable

Max. acceleration 4 m/s<sup>2</sup>, at least 3000000 bending cycles, bending radius 60 mm, 2-core shielded, sold by the meter, minimum order quantity 20 m, maximum order quantity 1000 m

**6XV1 830-3EH10**

#### 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 1000 m

**6XV1 830-0GH10**

Ordering data	Order No.	Order No.
<b>PROFIBUS FC Robust bus cable</b> With PUR sheath for use under conditions of extreme mechanical stress and aggressive chemicals, 2-core, shielded, sold by the meter, minimum order quantity 20 m, maximum order quantity 1000 m	6XV1 830-0JH10	
<b>PROFIBUS Hybrid standard cable</b> 5-core, 5 x 1.5 mm <sup>2</sup> , trailing type, sold by the meter, minimum order quantity 20 m, maximum order quantity 1000 m	6XV1 860-2R	
<b>PROFIBUS FC Robust bus cable</b> With PUR sheath for use under conditions of extreme mechanical stress and aggressive chemicals, 2-core, shielded, sold by the meter, minimum order quantity 20 m, maximum order quantity 1000 m	6XV1 860-2S	
<b>Power cable</b> 5-core, 5 x 1.5 mm <sup>2</sup> , trailing type, sold by the meter, minimum order quantity 20 m, maximum order quantity 1000 m	6XV1 830-8AH10	
<b>Accessories for CM IM DP M12 7/8"</b>		
<b>PROFIBUS M12 connecting cable</b> Pre-assembled with two M12 connectors, 5-pin	• 1.5 m long • 2 m long • 3 m long • 5 m long • 10 m long • 15 m long	6XV1 830-3DH15 6XV1 830-3DH20 6XV1 830-3DH30 6XV1 830-3DH50 6XV1 830-3DN10 6XV1 830-3DN15
<b>7/8" connecting cable to power supply</b> 5-core, 5 x 1.5 mm <sup>2</sup> , trailing type, pre-assembled with two 7/8" connectors, 5-pin	• 1.5 m long • 2 m long • 3 m long • 5 m long • 10 m long • 15 m long	6XV1 822-5BH15 6XV1 822-5BH20 6XV1 822-5BH30 6XV1 822-5BH50 6XV1 822-5BN10 6XV1 822-5BN15
<b>M12 cable connector</b> For ET 200eco, with axial cable outlet	• with male insert, 5 per pack • with female insert, 5 per pack	6GK1 905-0EA00 6GK1 905-0EB00
<b>7/8" cable connector</b> For ET 200eco, with axial cable outlet	• with male insert, 5 per pack • with female insert, 5 per pack	6GK1 905-0FA00 6GK1 905-0FB00
<b>M12 covering cap</b> For protection of unused M12 connections with ET 200pro	3RX9 802-0AA00	
<b>Sealing cap 7/8"</b> For protecting unused 7/8" connections for ET 200pro; 10 items per pack	6ES7 194-3JA00-0AA0	
<b>General accessories</b>		
<b>ET 200pro rack</b>		
<ul style="list-style-type: none"> <li>Narrow, for interface, electronics and power modules                             <ul style="list-style-type: none"> <li>500 mm</li> <li>1000 mm</li> <li>2000 mm, can be cut to length</li> </ul> </li> <li>Compact, for interface, electronics and power modules                             <ul style="list-style-type: none"> <li>500 mm</li> <li>1000 mm</li> <li>2000 mm, can be cut to length</li> </ul> </li> <li>Wide, for interface, electronics, power modules and motor starters                             <ul style="list-style-type: none"> <li>500 mm</li> <li>1000 mm</li> <li>2000 mm, can be cut to length</li> </ul> </li> </ul>	6ES7 194-4GA00-0AA0 6ES7 194-4GA10-0AA0 6ES7 194-4GA20-0AA0 6ES7 194-4GC00-0AA0 6ES7 194-4GC10-0AA0 6ES7 194-4GC20-0AA0 6ES7 194-4GB00-0AA0 6ES7 194-4GB10-0AA0 6ES7 194-4GB20-0AA0	
<b>Spare fuse</b> 12.5 A quick-response, for interface and power modules, 10 items per package unit		6ES7 194-4HB00-0AA0
<b>Technical product data</b> For CAX applications, one-off license		6ES7 991-0CC00-0YX0
<b>Technical product data</b> For CAX applications, one-off license, update service		6ES7 991-0CC00-0YX2
<b>SIMATIC Manual Collection</b> Electronic manuals on CD, multilingual: 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)		6ES7 998-8XC01-8YE0
<b>SIMATIC Manual Collection – Update service for 1 year</b> Scope of delivery: Current CD "S7 Manual Collection" and the three subsequent updates		6ES7 998-8XC01-8YE2

# ET 200 distributed I/Os

## ET 200pro

### IM 154-4 PN interface modules

#### Overview



Interface module for processing the communication between ET 200pro and a higher-level controller over PROFINET IO.

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#### Technical specifications

	6ES7 154-4AB00-0AB0
<b>Supply voltages</b>	
Supply voltage of electronics 1L+	
• Rated value (DC)	24 V
• Short-circuit protection	Yes; over exchangeable fuses
• reverse polarity protection	Yes; against destruction
Rated value	
• DC 24 V	Yes
• permissible range, lower limit (DC)	20.4 V
• permissible range, upper limit (DC)	28.8 V
<b>Current consumption</b>	
from supply voltage 1L+, max.	250 mA
Power loss, typ.	4.5 W
<b>Memory</b>	
Memory	
• Micro Memory Card	Yes
<b>Address area</b>	
Addressing volume	
• Outputs	256 Byte
• Inputs	256 Byte
<b>Protocols</b>	
PROFINET IO	Yes
<b>PROFINET IO</b>	
Transmission speed, max.	100 Mbit/s; full duplex
automatic detection of transmission speed	Yes
Services	Network management functions, network diagnostics (SNMP), ping, arp

	6ES7 154-4AB00-0AB0
<b>Status information/alarms/diagnostics</b>	
Diagnostics indication LED	
• Bus error BF (red)	Yes
• Collective error SF (red)	Yes
• Monitoring 24 V voltage supply ON (green)	Yes
• Load voltage monitoring DC 24 V (green)	Yes
<b>Isolation</b>	
Isolation checked with	500 V DC
<b>Isolation</b>	
between backplane bus and electronics	Yes
between supply voltage and electronics	Yes
<b>Environmental requirements</b>	
Operating temperature	
• min.	-25 °C
• max.	55 °C
Storage/transport temperature	
• min.	-40 °C
• max.	70 °C
Degree and class of protection	
• IP 65	Yes
• IP 66	Yes
• IP 67	Yes
<b>Dimensions and weight</b>	
Width	90 mm
Height	130 mm
Depth	71 mm
<b>Weights</b>	
Weight, approx.	480 g

Ordering data	Order No.	Order No.
<b>IM 154-4 PN High Feature interface module</b> For communication between ET 200pro and higher-level controllers over PROFINET IO; support of PROFIsafe	6ES7 154-4AB00-0AB0	
<b>Accessories</b>		
<b>M12 covering cap</b> For protection of unused M12 connections with ET 200pro	3RX9 802-0AA00	
<b>Micro Memory Card, 3.3 V, NFLASH</b> <ul style="list-style-type: none"> <li>• 64 KB</li> <li>• 128 KB</li> <li>• 512 KB</li> <li>• 2 MB</li> <li>• 4 MB</li> <li>• 8 MB</li> </ul>	6ES7953-8LF11-0AA0 6ES7953-8LG11-0AA0 6ES7953-8LJ11-0AA0 6ES7953-8LL11-0AA0 6ES7953-8LM11-0AA0 6ES7953-8LP11-0AA0	
<b>IE M12 connecting cables</b> Pre-assembled with two M12 connectors <ul style="list-style-type: none"> <li>• 0.3 m long</li> <li>• 0.5 m long</li> <li>• 1 m long</li> <li>• 1.5 m long</li> <li>• 2 m long</li> <li>• 3 m long</li> <li>• 5 m long</li> <li>• 10 m long</li> <li>• 15 m long</li> </ul>	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	
<b>7/8" connecting cable to power supply</b> 5-core, 5 x 1.5 mm <sup>2</sup> , trailing type, pre-assembled with two 7/8" connectors, 5-pin <ul style="list-style-type: none"> <li>• 1.5 m long</li> <li>• 2 m long</li> <li>• 3 m long</li> <li>• 5 m long</li> <li>• 10 m long</li> <li>• 15 m long</li> </ul>	6XV1 822-5BH15 6XV1 822-5BH20 6XV1 822-5BH30 6XV1 822-5BH50 6XV1 822-5BN10 6XV1 822-5BN15	
<b>Power cables</b> 5-core, 5 x 1.5 mm <sup>2</sup> , trailing type, sold by the meter, minimum order quantity 20 m, maximum order quantity 1000 m	6XV1 830-8AH10	
<b>Accessories</b> (continued)		
<b>7/8" cable connector</b> For ET 200eco, with axial cable outlet <ul style="list-style-type: none"> <li>• with male insert, 5 per pack</li> <li>• with female insert, 5 per pack</li> </ul>		6GK1 905-0FA00 6GK1 905-0FB00
<b>7/8"-Power T-Tap PRO</b> energy-t-connector for ET200 with 2 7/8"socket inserts and one 7/8"pin insert, 5 pieces per packaging unit		6GK1 905-0FC00
<b>Industrial Ethernet Fast Connect installation cables</b>		
<ul style="list-style-type: none"> <li>• IE FC TP Standard Cable GP 2 x 2 sold by the meter, max. quantity 1000 m minimum order 20 m</li> <li>• IE FC TP Trailing Cable 2 x 2 sold by the meter, max. quantity 1000 m minimum order 20 m</li> <li>• IE FC TP Trailing Cable GP 2 x 2 sold by the meter; max. quantity 1000 m, minimum order 20 m</li> <li>• IE TP Torsion Cable GP 2 x 2 sold by the meter; max. quantity 1000 m, minimum order 20 m</li> <li>• IE FC TP Marine Cable 2 x 2 sold by the meter, max. quantity 1000 m minimum order 20 m</li> </ul>		6XV1 840-2AH10 6XV1 840-3AH10 6XV1 870-2D 6XV1 870-2F 6XV1 840-4AH10
<b>IE M12 Plug PRO</b>		
Cabinet bushing for transfer of M12 connection method (d coded, IP65) to RJ45 connection method (IP20) <ul style="list-style-type: none"> <li>• 1 piece</li> <li>• 8 pieces</li> </ul>		6GK1 901-0DB10-6AA0 6GK1 901-0DB10-6AA8
<b>IE Panel Feedthrough</b>		
M12 plug connector suitable for on-site assembly (d coded), metal housing, rapid connection method for SCALANCE X208PRO and IM 154-4 PN <ul style="list-style-type: none"> <li>• 1 package = 5 pieces</li> </ul>		6GK1 901-0DM20-2AA5

# ET 200 distributed I/Os

## ET 200pro

### IM 154-4 PN interface modules

#### Ordering data

#### Order No.

#### Order No.

##### 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

**6ES7 194-4GA00-0AA0**

**6ES7 194-4GA10-0AA0**

**6ES7 194-4GA20-0AA0**

**6ES7 194-4GC00-0AA0**

**6ES7 194-4GC10-0AA0**

**6ES7 194-4GC20-0AA0**

**6ES7 194-4GB00-0AA0**

**6ES7 194-4GB10-0AA0**

**6ES7 194-4GB20-0AA0**

##### Spare fuse

12.5 A quick-response, for interface and power modules, 10 items per package unit

**6ES7 194-4HB00-0AA0**

##### SIMATIC Manual Collection

Electronic manuals on CD, multilingual: 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)

**6ES7 998-8XC01-8YE0**

##### SIMATIC Manual Collection – Update service for 1 year

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

**6ES7 998-8XC01-8YE2**

#### Overview



- Expansion modules with digital inputs/outputs for connection of actuators/sensors
- With scalable diagnostics
  - standard modules with module-specific diagnostics
  - high Feature modules with channel-specific diagnostics and parameterizable input delay or process interrupts (DI, up to 6 channels)
- Double or single assignment can be implemented for each M12 in the case of the 8DI and 8DO module by selecting CM IO 4 x M12 or CM IO 8 x M12

#### Technical specifications

	6ES7 141-4BF00-0AA0	6ES7 141-4BF00-0AB0
<b>Supply voltages</b>		
Rated value		
• DC 24 V	Yes	Yes
• permissible range, lower limit (DC)	20.4 V	20.4 V
• permissible range, upper limit (DC)	28.8 V	28.8 V
• Reverse polarity protection	Yes; against destruction; encoder power supply outputs applied with reversed polarity	Yes; against destruction; load increasing
<b>Current consumption</b>		
from backplane bus DC 3.3 V, max.	20 mA	40 mA
from supply voltage 1L+, max.	20 mA	20 mA
Power loss, typ.	2.5 W	2.5 W
<b>Address area</b>		
Occupied address area		
• Inputs	1 Byte	1 Byte
<b>FH technology</b>		
Module for fail-safe applications	No	No
<b>Isochronous mode</b>		
Isochronous mode	No	No
<b>Digital inputs</b>		
Number of digital inputs	8	8
Number of simultaneously controllable inputs		
• all mounting positions - up to 55 °C, max.	8	8
Cable length		
• cable length, shielded, max.	30 m	30 m
• Cable length unshielded, max.	30 m	30 m
Input characteristic curve to IEC 1131, Typ 1	Yes	No
Input characteristic curve to IEC 1131, Typ 2	No	Yes

	6ES7 141-4BF00-0AA0	6ES7 141-4BF00-0AB0
<b>Input voltage</b>		
• Rated value, DC	24 V	24 V
• for signal "0"	-3 to +5 V	-3 to +5 V
• for signal "1"	13 to 30 V	11 to 30 V
<b>Input current</b>		
• for signal "1", typ.	7 mA	7 mA
<b>Input delay (for rated value of input voltage)</b>		
• for standard inputs		
- programmable	No	Yes
- at "0" to "1", min.	1.2 ms	0.5 ms; 0.5 ms/ 3 ms/ 15 ms/ 20 ms
- at "0" to "1", max.	4.8 ms	20 ms
- at "1" to "0", min.	1.2 ms	0.5 ms; 0.5 ms/ 3 ms/ 15 ms/ 20 ms
- at "1" to "0", max.	4.8 ms	20 ms
<b>Encoder supply</b>		
Number of outputs	8	8
<b>Output current</b>		
• up to 55 °C, max.	1 A	1 A
<b>Encoder</b>		
Connectable encoders		
• 2-wire BEROs	Yes	Yes
• permissible quiescent current (2-wire BEROs), max.	1.5 mA	1.5 mA
<b>Parameter</b>		
Diagnostic alarm		Yes
Process alarm		for 6 channels
Diagnosis: wire break		channel by channel
Diagnosis: short circuit	Sensor supply to M; module by module	channel by channel

# ET 200 distributed I/Os

## ET 200pro

### EM 141 and EM 142 digital expansion modules

#### Technical specifications (continued)

	6ES7 141-4BF00-0AA0	6ES7 141-4BF00-0AB0		6ES7 141-4BF00-0AA0	6ES7 141-4BF00-0AB0
<b>Status information/alarms/diagnostics</b>			<b>Isolation</b>		
Diagnoses			Galvanic isolation, digital inputs		
• Diagnostic functions	Yes	Yes; channel by channel, parameterizable	• between the channels	No	No
• Diagnostic information readable	Yes	Yes	• between the channels and the backplane bus	Yes	Yes
• Wire break		Yes; Monitoring, I < 0.3 mA	<b>Permissible potential difference</b>		
• Short circuit	Yes; Sensor supply to M; module by module	Yes	between different circuits	75 V DC/ 60 V AC	75 V DC/ 60 V AC
Diagnostics indication LED			<b>Environmental requirements</b>		
• Collective error SF (red)	Yes	Yes	Degree and class of protection		
• Status indicator digital input (green)	Yes; per channel	Yes; per channel	• IP 65	Yes	Yes
<b>Isolation</b>			• IP 66	Yes	Yes
Isolation checked with	500 V DC	500 V DC	• IP 67	Yes	Yes
			<b>Dimensions and weight</b>		
			Width	45 mm	45 mm
			Height	130 mm	130 mm
			Depth	35 mm	35 mm; without terminal module
			<b>Weights</b>		
			Weight, approx.	140 g	140 g

	6ES7 142-4BD00-0AA0	6ES7 142-4BD00-0AB0	6ES7 142-4BF00-0AA0
<b>Voltages and currents</b>			
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
<b>Current consumption</b>			
from load voltage 2L+ (without load), max.	20 mA	40 mA	30 mA
from backplane bus DC 3.3 V, max.	20 mA	40 mA	30 mA
Power loss, typ.	2 W	2.5 W	2 W
<b>Address area</b>			
Address space per module			
• with packing	4 Bit	4 Bit	8 Bit
• without packing	1 Byte	1 Byte	1 Byte
<b>FH technology</b>			
Module for fail-safe applications	No	No	No
<b>Digital outputs</b>			
Number of digital outputs	4	4	8
cable length, shielded, max.	30 m	30 m	30 m
Cable length unshielded, max.	30 m	30 m	30 m
Short-circuit protection of the output	Yes; per channel, electronic	Yes; per channel, electronic	Yes; per channel, electronic
• Response threshold, typ.	3	3	0.7
Limitation of inductive shutdown voltage to	2L+ (- 47 V)	2L+ (- 47 V)	2L+ (- 47 V)
Lamp load, max.	10 W	10 W	5 W
Controlling a digital input	Yes	Yes	Yes; Isolation between 1L+ and 2L+ is no longer provided, as 1M and 2M are jumpered
Output voltage			
• for signal "1", min.	2L+ (- 0.8 V)	2L+ (- 0.8 V)	2L+ (- 0.8 V)

Technical specifications (continued)

	6ES7 142-4BD00-0AA0	6ES7 142-4BD00-0AB0	6ES7 142-4BF00-0AA0
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 2 outputs			
• for increased power	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
Aggregate current of the outputs (per group)			
• up to 55 °C, max.	4 A	4 A	4 A
Load impedance range			
• lower limit	12 Ω	12 Ω	48 Ω
• upper limit	4 kΩ	4 kΩ	4 kΩ
<b>Parameter</b>			
Diagnosis: wire break		channel by channel	
Diagnosis: short circuit		channel by channel	
Behavior on CPU/Master STOP		channel by channel	
<b>Status information/alarms/diagnostics</b>			
Substitute values connectable		Yes	
Alarms			
• Diagnostic alarm		Yes	
Diagnoses			
• Diagnostic functions	Yes	Yes	Yes
• Diagnostic information readable	Yes	Yes	Yes
• Wire break		Yes	
• Short circuit	Yes; short-circuit of outputs to M; module by module	Yes	Yes; short-circuit of outputs to M; module by module
Diagnostics indication LED			
• Collective error SF (red)	Yes	Yes	Yes
• Status indicator digital output (green)	Yes	Yes	Yes
• Channel error indicator F (red)		Yes	
<b>Isolation</b>			
Isolation checked with	500 V DC	500 V DC	500 V DC
<b>Isolation</b>			
between backplane bus and all other circuit parts		Yes	
between the channels and backplane bus		Yes	
Isolation, digital outputs			
• between the channels	No	No	No
• between the channels and the backplane bus	Yes	Yes	Yes
<b>Permissible potential difference</b>			
between different circuits		75 V DC/60 V AC	
<b>Dimensions and weight</b>			
Width	45 mm	45 mm	45 mm
Height	130 mm	130 mm	130 mm
Depth	35 mm	35 mm; without terminal module	35 mm
<b>Weights</b>			
Weight, approx.	140 g	140 g	140 g

# ET 200 distributed I/Os

## ET 200pro

### EM 141 and EM 142 digital expansion modules

#### Ordering data

**8 DI digital input module**  
24 V DC, with module-specific diagnostics, including bus module. Connecting module must be ordered separately

**Order No.**  
**6ES7 141-4BF00-0AA0**

**8 DI High Feature digital input module**  
24 V DC, with channel-specific diagnostics, including bus module. Connecting module must be ordered separately

**Order No.**  
**6ES7 141-4BF00-0AB0**

**4 DO digital output module**  
24 V DC, 2 A, with module-specific diagnostics, including bus module. Connecting module must be ordered separately

**Order No.**  
**6ES7 142-4BD00-0AA0**

**4 DO High Feature digital output module**  
24 V DC, 2 A, with channel-specific diagnostics, including bus module. Connecting module must be ordered separately

**Order No.**  
**6ES7 142-4BD00-0AB0**

**8 DO digital output module**  
24 V DC, 0,5 A, with module-specific diagnostics, including bus module. Connecting module must be ordered separately

**Order No.**  
**6ES7 142-4BF00-0AA0**

#### Accessories

**CM IO 4 x M12 connecting module**  
4 M12 sockets for connecting digital or analog sensors or actuators to ET 200pro

**Order No.**  
**6ES7 194-4CA00-0AA0**

**CM IO 8 x M12 connecting module**  
8 M12 sockets for connecting digital sensors or actuators to ET 200pro

**Order No.**  
**6ES7 194-4CB00-0AA0**

**Module identification labels**  
For color coding of the CM IOs in the colors of white, red, blue and green; pack with 100 units each

**Order No.**  
**6ES7 194-4HA00-0AA0**

**M12 covering cap**  
For protection of unused M12 connections with ET 200pro

**Order No.**  
**3RX9 802-0AA00**

**Inscription labels**  
20 x 7, pale turquoise, 340 items per pack

**Order No.**  
**3RT1 900-1SB20**

**M12 connector, can be assembled in the field**  
5-pin, for connecting digital sensors and actuators, 1 unit

**Order No.**  
On request

**M12 connecting cable**  
With PUR sheath, for connecting digital sensors and actuators, pre-assembled, with connector and socket at each end

- 3 x 0.34 mm<sup>2</sup>, fixed lengths, 1 unit
  - 0.6 m
  - 1 m
  - 1.5 m
- 4 x 0.34 mm<sup>2</sup>, fixed lengths, 1 unit
  - 0.6 m
  - 1 m
  - 1.5 m

**Order No.**  
On request  
On request  
On request

**Order No.**  
On request  
On request  
On request

5

#### Overview



- Expansion modules with analog inputs and outputs for connecting sensors/actuators
- With diagnostics functionality, limit values and substitute values

#### Technical specifications

	6ES7 144-4FF00-0AB0	6ES7 144-4GF00-0AB0	6ES7 144-4JF00-0AB0
<b>Voltages and currents</b>			
Load voltage L+			
• Rated value (DC)	24 V	24 V	24 V
• reverse polarity protection	Yes; against destruction	Yes; against destruction	Yes; against destruction
<b>Current consumption</b>			
from backplane bus DC 3.3 V, max.	10 mA	10 mA	10 mA; typically
Power loss, typ.	1.1 W	1.1 W	0.7 W
<b>Address area</b>			
Address space per module			
• Address space per module, max.	8 Byte	8 Byte	8 Byte
<b>Analog inputs</b>			
Number of analog inputs	4	4	4
cable length, shielded, max.	30 m	30 m	30 m
permissible input frequency for voltage input (destruction limit), max.	35 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.	267 ms	267 ms	83 ms; 83ms at 50Hz; 69ms at 60 Hz
technical unit for temperature measurement, adjustable			Yes
<b>Input ranges (rated values), voltages</b>			
• Voltage	Yes		
• 1 to 5 V	Yes		
• -10 V to +10 V	Yes		
• Input resistance (-10 V to +10 V)	100 k $\Omega$		
• -5 V to +5 V	Yes		
<b>Input ranges (rated values), currents</b>			
• Current		Yes	
• -20 to +20 mA		Yes	
• Input resistance (-20 to +20 mA)		50 $\Omega$	
• 4 to 20 mA		Yes	
• Input resistance (4 to 20 mA)		50 $\Omega$	

# ET 200 distributed I/Os

## ET 200pro

### EM 144 and EM 145 analog expansion modules

#### Technical specifications (continued)

	6ES7 144-4FF00-0AB0	6ES7 144-4GF00-0AB0	6ES7 144-4JF00-0AB0
Input ranges (rated values), resistors			
• Impedance			Yes
• 0 to 150 Ohm			Yes
• Input resistance (0 to 150 Ohm)			10,000 kΩ
• 0 to 300 Ohm			Yes
• Input resistance (0 to 300 Ohm)			10,000 kΩ
• 0 to 600 Ohm			Yes
• Input resistance (0 to 600 Ohm)			10,000 kΩ
• 0 to 3000 Ohm			Yes
• Input resistance (0 to 3000 Ohm)			10,000 kΩ
Input ranges (rated values), resistance thermometers			
• Ni 100			Yes
• Input resistance (Ni 100)			10,000 kΩ
• Ni 1000			Yes
• Input resistance (Ni 1000)			10,000 kΩ
• Ni 120			Yes
• Input resistance (Ni 120)			10,000 kΩ
• Ni 200			Yes
• Input resistance (Ni 200)			10,000 kΩ
• Ni 500			Yes
• Input resistance (Ni 500)			10,000 kΩ
• Pt 100			Yes
• Input resistance (Pt 100)			10,000 kΩ
• Pt 1000			Yes
• Input resistance (Pt 1000)			10,000 kΩ
• Pt 200			Yes
• Input resistance (Pt 200)			10,000 kΩ
• Pt 500			Yes
• Input resistance (Pt 500)			10,000 kΩ
Characteristic linearization			
• programmable			Yes
• for thermoresistor			Ptxxx, Nixxx
<b>Analog value creation</b>			
Measurement principle	integrating	integrating	integrating
Integrations and conversion time/resolution per channel			
• Resolution with overload area (bit including sign), max.	15 Bit; at +/- 10 V, at +/- 5 V 14 bits at 0 to 10, at 1 to 5 V	15 Bit; at +/- 20 mA 14 bits at 0 to 20 mA, 4 to 20 mA	15 Bit; at 150, 300, 600 and 3000 Ohm; otherwise 15 bit + sign
• Integration time, ms	20/ 16.667	20/ 16.667	20/ 16.667
• Interference voltage suppression for interference frequency f1 in Hz	50/ 60	50/ 60	50/ 60
• Conversion time (per channel)	67 ms	67 ms	20.625 ms; 20.625ms at 50Hz; 17.25ms at 60Hz
Smoothing of measured values			
• parameterizable	Yes	Yes	Yes
• Level: none	Yes; 1 x cycle time	Yes; 1 x cycle time	Yes; 1 x cycle time
• Level: weak	Yes; 4x cycle time	Yes; 4x cycle time	Yes; 4x cycle time
• Level: middle	Yes; 16 x cycle time	Yes; 16 x cycle time	Yes; 16 x cycle time
• Level: strong	Yes; 64 x cycle time	Yes; 64 x cycle time	Yes; 64 x cycle time

Technical specifications (continued)

	6ES7 144-4FF00-0AB0	6ES7 144-4GF00-0AB0	6ES7 144-4JF00-0AB0
<b>Encoder supply</b>			
Short-circuit protection	Yes; per module; electronic to chassis	Yes; per module, electronic to chassis	
<b>Encoder</b>			
Connection of signal encoders			
• for current measurement as 2-wire transducer		Yes	
• for current measurement as 4-wire transducer		Yes	
• for resistance measurement with 2-conductor connection			Yes; Line resistances are also measured
• for resistance measurement with 3-conductor connection			Yes
• for resistance measurement with 4-conductor connection			Yes
<b>Errors/accuracies</b>			
Linearity error (relative to input area)	+/- 0.01 %	+/- 0.01 %	+/- 0.05 %
Temperature error (relative to input areas)	+/- 0.002 %/K	+/- 0.002 %/K	+/- 0.002 %/K
Crosstalk between the inputs, min.	-50 dB	-50 dB	-50 dB
Repeat accuracy in settled status at 25 °C (relative to input area)	+/- 0.025 %	+/- 0.025 %	+/- 0.015 %
Operational limit in overall temperature range			
• Voltage, relative to input area	+/- 0.15 %		
• Current, relative to input area		+/- 0.15 %	
• Resistance-type thermometer, relative to input area			+/- 0.175 %
Basic error limit (operational limit at 25 °C)			
• Voltage, relative to input area	+/- 0.1 %		
• Current, relative to input area		+/- 0.1 %	
• Resistance-type thermometer, relative to input area			+/- 0.125 %
Interference voltage suppression for $f = n \times (f_l \pm 1 \%)$ , $f_l =$ interference frequency			
• Series mode interference (peak value of interference < rated value of input range), min.	50 dB	50 dB	
• common mode voltage (USS < 2.5 V), min.	70 dB; Interference voltage < 5 V	70 dB; Interference voltage < 5 V	
<b>Parameter</b>			
Diagnosis: wire break			Yes
Measurement type/range			R4L / R3L / R2L/ TR4L / TR3L / TR2L
Interference frequency suppression			50 Hz / 60 Hz
Collective diagnostics			Yes
Overflow/underflow			Yes
Unit			Degrees C / Degrees F

# ET 200 distributed I/Os

## ET 200pro

### EM 144 and EM 145 analog expansion modules

#### Technical specifications (continued)

	6ES7 144-4FF00-0AB0	6ES7 144-4GF00-0AB0	6ES7 144-4JF00-0AB0
<b>Status information/alarms/diagnostics</b>			
Alarms			
• Diagnostic alarm	Yes; parameterizable	Yes; parameterizable	Yes; parameterizable
• Limit value alarm		Yes	
• Process alarm	Yes; (limit value alarm), can be set for channel 0	Yes; (limit value alarm), can be set for channel 0	
Diagnoses			
• Diagnostics		Yes	
• Wire break	Yes; at 1 to 5 V	Yes; at 4 to 20 mA	Yes
• Short circuit	Yes; at 1 to 5 V	Yes; at 4 to 20 mA	
• Group error		Yes	Yes
• Overflow/underflow			Yes
Diagnostics indication LED			
• Collective error SF (red)	Yes	Yes	Yes
<b>Isolation</b>			
Isolation checked with	500 V DC	500 V DC	500 V DC
<b>Isolation</b>			
Isolation, analog inputs			
• between the channels	No	No	
• between the channels and the backplane bus	Yes	Yes	Yes
<b>Permissible potential difference</b>			
between inputs and MANA (UCM)	5 V <sub>pp</sub> AC	5 V <sub>pp</sub> AC	
between MANA and M internal (UISO)	500 V DC	500 V DC	500 V DC
<b>Dimensions and weight</b>			
Width	45 mm	45 mm	45 mm
Height	130 mm	130 mm	130 mm
Depth	35 mm	35 mm	35 mm
<b>Weights</b>			
Weight, approx.	150 g	150 g	150 g

	6ES7 145-4FF00-0AB0	6ES7 145-4GF00-0AB0	6ES7 145-4FF00-0AB0	6ES7 145-4GF00-0AB0
<b>Voltagess and currents</b>				
Load voltage L+				
• Rated value (DC)	24 V	24 V		
• reverse polarity protection	Yes; against destruction	Yes; against destruction		
<b>Current consumption</b>				
from backplane bus DC 3.3 V, max.	10 mA	10 mA		
<b>Address area</b>				
Address space per module				
• Address space per module, max.	8 Byte	8 Byte		
<b>Analog outputs</b>				
Number of analog outputs	4	4		
cable length, shielded, max.	30 m	30 m		
Voltage output, Short-circuit protection	Yes; per channel, electronic to chassis	Yes; per module, electronic to chassis		
Voltage output, short-circuit current, max..	50 mA			
Current output, no-load voltage, max.		16 V		
			Cycle time (all channels) max.	3 ms
			Output ranges, voltage	
			• 0 to 10 V	Yes
			• 1 to 5 V	Yes
			• -10 to +10 V	Yes
			Output ranges, current	
			• 0 to 20 mA	
			• -20 to +20 mA	Yes
			• 4 to 20 mA	Yes
			Connection of actuators	
			• for voltage output 2-conductor connection	Yes
			• for voltage output 4-conductor connection	Yes
			• for current output 2-conductor connection	
			• for current output 4-conductor connection	Yes

Technical specifications (continued)

	6ES7 145-4FF00-0AB0	6ES7 145-4GF00-0AB0
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
<b>Analog value creation</b>		
Integrations and conversion time/resolution per channel		
• Resolution with overload area (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
<b>Errors/accuracies</b>		
Output ripple (relative to output area, bandwidth 0 to 50 kHz)	+/- 0.02 %	+/- 0.02 %
Linearity error (relative to output area)	+/- 0.1 %	+/- 0.1 %
Temperature error (relative to output area)	+/- 0.01 %	+/- 0.01 %
Repeat accuracy in settled status at 25 °C (relative to output area)	+/- 0.05 %	+/- 0.05 %
Operational limit in overall temperature range		
• Voltage, relative to output area	+/- 0.2 %	
• Current, relative to output area		+/- 0.2 %
Basic error limit (operational limit at 25 °C)		
• Voltage, relative to output area	+/- 0.15 %	
• Current, relative to output area		+/- 0.15 %

Parameter	6ES7 145-4FF00-0AB0	6ES7 145-4GF00-0AB0
Output type/range	Yes	Yes
Diagnosis: wire break		Yes
Diagnosis: short circuit	Outputs; sensor supply to M	Sensor supply to M
Collective diagnostics	Yes	Yes
Behavior on CPU/Master STOP	Yes	Yes
<b>Status information/alarms/diagnostics</b>		
Substitute values connectable	Yes	Yes
<b>Alarms</b>		
• Diagnostic alarm	Yes; parameterizable	Yes; parameterizable
• Process alarm	No	No
<b>Diagnoses</b>		
• Diagnostic functions		Yes
• Diagnostic information readable	Yes	
• Wire break	No	Yes; per channel, not in zero range
• Short circuit	Yes; per channel; not in zero range	
• Short circuit encoder supply	Yes; per module	Yes; per module
<b>Diagnostics indication LED</b>		
• Collective error SF (red)	Yes	Yes
<b>Isolation</b>		
Isolation, analog outputs		
• between the channels	No	No
• between the channels and the backplane bus	Yes	Yes
<b>Dimensions and weight</b>		
Width	45 mm	45 mm
Height	130 mm	130 mm
Depth	35 mm	35 mm
<b>Weights</b>		
Weight, approx.	150 g	150 g

# ET 200 distributed I/Os

## ET 200pro

### EM 144 and EM 145 analog expansion modules

#### Ordering data

**4AI U analog input module** **6ES7 144-4FF00-0AB0**

High Feature,  $\pm 10$  V;  $\pm 5$  V;  
0 to 10 V; 1 to 5 V,  
channel-specific diagnostics,  
including bus module.  
Connecting module must be  
ordered separately

**4AI I analog input module** **6ES7 144-4GF00-0AB0**

High Feature,  $\pm 20$  mA;  
0 to 20 mA; 4 to 20 mA,  
channel-specific diagnostics,  
including bus module.  
Connecting module must be  
ordered separately

**4AI RTD analog input module** **6ES7 144-4JF00-0AB0**

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.  
Connecting module must be  
ordered separately

**4AO U analog output module** **6ES7 145-4FF00-0AB0**

High Feature,  $\pm 10$  V; 0 to 10 V;  
1 to 5 V, channel-specific diag-  
nostics, including bus module.  
Connecting module must be  
ordered separately

**4AO I analog output module** **6ES7 145-4GF00-0AB0**

High Feature,  $\pm 20$  mA;  
0 to 20 mA; 4 to 20 mA,  
channel-specific diagnostics,  
including bus module.  
Connecting module must be  
ordered separately

#### Order No.

#### Accessories

**CM IO 4 x M12  
connecting module**

4 M12 sockets  
for connecting digital or analog  
sensors or actuators to ET 200pro

**6ES7 194-4CA00-0AA0**

**Module identification labels**

For color coding of the CM IOs  
in the colors of white, red, blue  
and green;  
pack with 100 units each

**6ES7 194-4HA00-0AA0**

**M12 covering cap**

For protection of unused M12  
connections with ET 200pro

**3RX9 802-0AA00**

#### Overview



Fail-safe digital inputs/outputs with degree of protection IP65/66/67 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 Cat. 4 (EN 954-1) and 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 IM 151-7 F-CPU, CPU 31xF-2 DP, CPU 31xF-2 PN/DP and CPU 416F-2.

#### Application

The fail-safe modules of ET200pro can be used to implement the safety-related application requirements as an integral part of the overall automation. The safety functions required for fail-safe operation are integrated in the modules. The modules can be used for safety circuits up to Cat. 4/ SIL 3.

Communication to fail-safe SIMATIC S7 CPUs is performed by means of PROFIsafe.

The modules can be operated in a distributed configuration down-circuit of the IM 154-2 High Feature and IM 154-4 PROFINET High Feature interface modules.

A standard power module is required to supply the modules.

#### Ordering data

#### Order No.

##### Fail-safe digital input module 8/16 F-DI PROFIsafe

6ES7 148-4FA00-0AB0

24 V DC, including bus module  
Connecting module must be ordered separately

##### Fail-safe digital input/output module 4/8 F-DI, 4 F-DO 2 A

6ES7 148-4FC00-0AB0

24 V DC, including bus module  
Connecting module must be ordered separately

#### Accessories

##### Connection module

6ES7 194-4DC00-0AA0

For the fail-safe electronic module 4/8 F-DI/4 F-DO, 24 V DC/2 A

##### Connection module

6ES7 194-4DD00-0AA0

For the fail-safe electronic module 8/16 F-DI, 24 V DC/2 A

##### IM 154-2 High Feature interface module

6ES7 154-2AA00-0AB0

For ET 200pro, incl. termination module

##### PROFINET interface module IM 154-4 PN

6ES7 154-4AB00-0AB0

Including termination module

##### M12 covering cap

3RX9 802-0AA00

For protection of unused M12 connections with ET 200pro

##### M12 connector, can be assembled in the field

3RX1 667

5-pin, for connecting digital sensors and actuators, 1 unit

##### M12 connecting cable

With PUR sheath, for connecting digital sensors and actuators, pre-assembled, with connector and socket at each end

- 3 x 0.34 mm<sup>2</sup>, fixed lengths, 1 unit

- 0.6 m
- 1 m
- 1.5 m

3RX1 633  
3RX1 634  
3RX1 635

- 4 x 0.34 mm<sup>2</sup>, fixed lengths, 1 unit

- 0.6 m
- 1 m
- 1.5 m

3RX1 640  
3RX1 641  
3RX1 642

# ET 200 distributed I/Os

## ET 200pro

### PM-E power module

#### Overview



- PM-E 24 V DC power module

#### Application

The PM-E 24 V DC power module is used for supplementary supply or grouping of the 24 V load voltage for electronic modules within an ET 200pro station.

The following module is available:

- PM-E 24 V DC

PM-E connection module (must be ordered separately):

- CM PM-E directly (with up to two M20 screwed cable glands)
- CM PM-E ECOFAST Cu (with one ECOFAST Cu connection)
- CM PM-E 7/8" (with one 7/8" socket)

Technical specifications	
	6ES7 148-4CA00-0AA0
<b>Power supply</b>	
Input voltage	
• Rated value, DC 24 V	Yes
Current carrying capacity	
• Current carrying capacity, max.	10 A; up to 55 °C; on an internal power rail of the ET 200pro
<b>Voltages and currents</b>	
Load voltage 2L+	
• Short-circuit protection	Yes; via an exchangeable fuse in the power module
• Reverse polarity protection	Yes; against destruction
<b>Parameter</b>	
missing load voltage	Potential group of the power module
<b>Status information/alarms/ diagnostics</b>	
Diagnoses	
• Diagnostic functions	Yes
• Diagnostic information readable	Yes
• missing load voltage	Yes
Diagnostics indication LED	
• Collective error SF (red)	Yes
• Load voltage monitoring DC 24 V (green)	Yes
<b>Isolation</b>	
Isolation checked with	500 V DC
<b>Environmental requirements</b>	
Degree and class of protection	
• IP 65	Yes
• IP 66	Yes
• IP 67	Yes
<b>Dimensions and weight</b>	
Width	15 mm
Height	81 mm
Depth	52 mm
<b>Weights</b>	
Weight, approx.	35 g

Ordering data	Order No.
<b>PM-E 24 V DC power module</b> For backfeed and group formation of the 24 V DC load supply for electronic modules within an ET 200pro station.	6ES7148-4CA00-0AA0
<b>Accessories</b>	
<b>CM PM-E ECOFAST connecting module</b> For backfeed of 24 V load voltage, 1 ECOFAST Cu connection	6ES7 194-4BA00-0AA0
<b>CM PM-E direct connecting module</b> For backfeed of 24 V load voltage, up to 2 M20 screwed cable glands	6ES7 194-4BC00-0AA0
<b>CM PM-E 7/8" connecting module</b> For backfeed of 24 V load voltage, 1 x 7/8"	6ES7 194-4BD00-0AA0
<b>Spare fuse</b> 12.5 A quick-response, for interface and power modules, 10 items per package unit	6ES7 194-4HB00-0AA0
<b>PROFIBUS FC Food bus cable</b> With PE sheath for use in the food and beverages industry, 2-core, shielded, sold by the meter, minimum order quantity 20 m, maximum cable length 1000 m	6XV1 830-0GH10
<b>PROFIBUS FC Robust bus cable</b> With PUR sheath for use in environ- ments in which aggressive chemi- cals and mechanical loads are encountered, 2-core, shielded, sold by the meter, minimum order quantity 20 m, maximum cable length 1000 m	6XV1 830-0JH10
<b>PROFIBUS FC trailing cable</b> Minimum bending radius approx. 60 mm, 2-core, shielded, sold by the meter, minimum order quantity 20 m, max. cable length 1000 m	6XV1 830-3EH10
<b>Accessories for CM PM-E direct</b>	
<b>Power cable</b> 5-core, 5 x 1.5 mm <sup>2</sup> , trailing type, sold by the meter, minimum order quantity 20 m, maximum order quantity 1,000 m	6XV1 830-8AH10
<b>Accessories for CM PM-E 7/8"</b>	
<b>7/8" connecting cable to power supply</b> 5-core, 5 x 1.5 mm <sup>2</sup> , trailing type, pre-assembled with two 7/8" connectors, 5-pin	
• 1.5 m long	6XV1 822-5BH15
• 2.0 m long	6XV1 822-5BH20
• 3.0 m long	6XV1 822-5BH30
• 5.0 m long	6XV1 822-5BH50
• 10 m long	6XV1 822-5BN10
• 15 m long	6XV1 822-5BN15
<b>7/8" cable connector</b> With axial cable outlet	
• with male insert, 5 per pack	6GK1 905-0FA00
• with female insert, 5 per pack	6GK1 905-0FB00

# ET 200 distributed I/Os

## ET 200pro – RFID systems

### SIMATIC RF170C

#### Overview



The RF170C is a communications module for connecting the Siemens RFID systems to the ET 200pro distributed I/O system. The readers (SLGs) of all RFID systems can be operated on the RF170C.

Thanks to its 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 them to be used in all applications. The system-wide, plug-in connection technique ensures rapid start-up.

#### Benefits

- Two parallel MOBY channels ensure real-time mode at dynamic read points.
- By selecting the relevant header module, the RFID systems can be connected via PROFIBUS or PROFINET.
- The modular design with interface modules for PROFIBUS and PROFINET supports universal implementation.
- Reader connection using an 8-pin M12 connector for fast installation of all components.
- Easy changeover from ET 200X with ASM 473 to ET 200pro with RF170C thanks to 100% software compatibility.
- High-performance hardware ensures fast data exchange with the SLG (reader). Consequently the data are available for the application even faster.
- Easy downloading of firmware via SIMATIC Manager for function expansions and error rectification ensure high-availability of the RFID system.
- The parameterizable RFID-specific diagnostics support start-up and troubleshooting.
- A wide selection of pre-assembled connecting cables can be ordered for ET 200pro and RF170C. This saves time and money during installation and assures better quality.

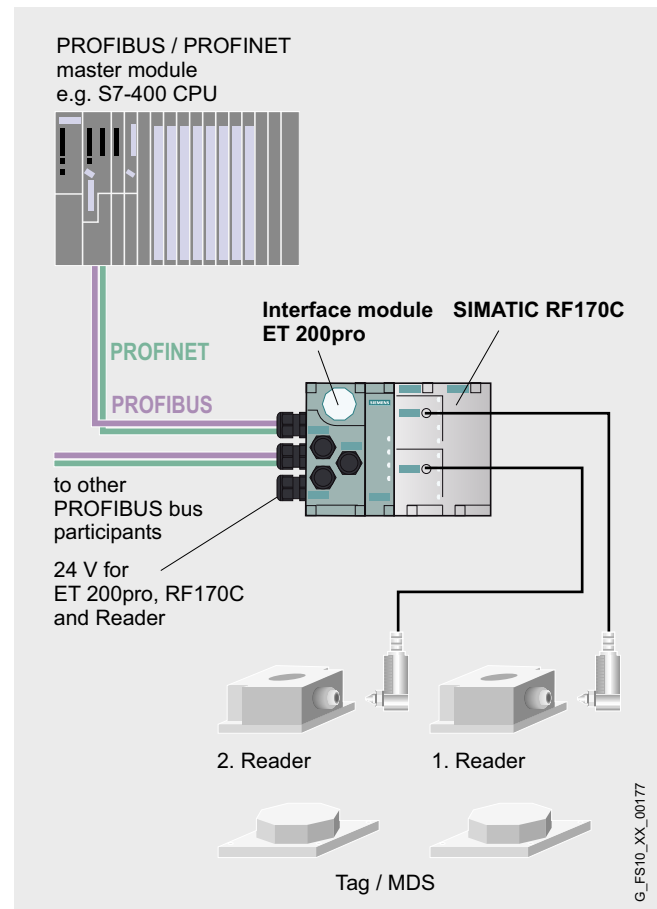
#### Application

The ET 200pro distributed I/O system with the RF170C communication module has been specially designed for a wide range of applications in industrial automation and logistics. Thanks to the high degree of protection of IP67, the RF170C can be installed without a control cabinet.

Used primarily for the RF170C:

- Mechanical engineering, automation systems, conveyor systems
- Ancillary assembly lines in the automobile industry/suppliers
- Small assembly lines

#### Design



#### Function

The RF170C comprises an electronics module and a connection block that must be ordered separately. The interface module is available in the PROFIBUS or PROFINET variants. For the PROFIBUS connection, you can choose from the connection systems of ECOFAST, M12, 7/8", or screwed cable gland. For the PROFINET interface module, M12, 7/8" connection is available.

Integration of RF170C into SIMATIC STEP 7 is achieved by means of an object manager (OM). The GSD file of the ET 200pro system is available for integration into non-Siemens systems. Then the RF170C can be configured by means of the software tool HW\_Config of the SIMATIC Manager or another PROFIBUS/PROFINET tool.

One or two readers are connected to the interface module using an off-the-shelf reader cable. The standard length of the cable is 2 m. If other cable lengths to the reader are required, an extension cable measuring between 2 m and 50 m can be used. The cable can also be assembled by the customer as required.

In principle, access to the data in the transponder can take place as follows:

- Direct addressing via absolute addresses
- Conveniently via the MOBY file handler (MOBY I/U only) using file names

Error messages and operating states (tag in the field, transmission, etc.) are indicated additionally by means of LEDs and simplify commissioning and service.

The RF170C has two reader interfaces from which the readers are also supplied with power. In the RF170C, the power supply for the readers has an electronic fuse. The maximum permissible current per RF170C for the readers is 0.8 A. It is of no importance here whether the current is drawn by one or more readers.

The data in the MDS can be directly accessed by means of absolute addresses (FB/FC45, FC55) or more conveniently using the MOBY file handler (FB, FC 56) by means of the file names. When the ET 200pro is operated with a PROFINET interface, use of the FB (FB45, FB56) is mandatory.

Communication between the RF170C and the controller is acyclic. Consequently, a very large amount of data can be transferred to/from the RF170C without overloading the bus cycle. This has advantages when transferring large volumes of data. In addition, the RF170C can process concatenated tag commands very quickly in this mode.

#### Technical specifications

Communication module	RF170C
Ambient temperature	
• During operation	-25 to +55 °C
• During storage	-40 to +70 °C 20 K/h
Relative humidity	5 to max. 100%
Atmospheric pressure	from 795 to 1080 hPa
Resistance to shock	as for ET 200pro
Vibration	as for ET 200pro
Power supply	
• Rated value	24 V DC
• Permitted range	20.4 V to 28.8 V DC
Current consumption	
• Without reader	typ. 130 mA
• With 2 readers	Max. 1000 mA
Casing	
• Degree of protection	IP67
• Enclosure material	Thermoplastic (reinforced with glass fiber)
• Housing color	IP Basic 714
Dimensions (W x H x D) in mm	
• RF170C without connection block	60 x 210 x 30
• RF170C with connection block	60 x 210 x 60
Weight	
• Without connection block	Approx. 270 g
• With connection block	Approx. 770 g
Serial reader interface (gross transmission rate)	MOBY I/E: 19200 baud MOBY U/D, RF300: 19200, 57600, 115200 baud
Connectors	2 x M12 coupler plug, 7-pole
Cable length to reader	
• Standard length	2 m
• Optional preassembled cables	5 m, 10 m, 20 m, 50 m
• Cable for self-assembly	According to write/read device. Up to 1000 m
Supply voltage to reader	24 V
Max. current; 2 readers connected	0.4 A per reader
Max. current; 1 readers connected	0.8 A per reader

#### Ordering data

Ordering data	Order No.
<b>RF170C communications module</b> For connecting to the distributed I/O system ET 200pro	<b>6GT2002-0HD00</b>
<i>Accessories MOBY</i>	
<b>SLG cable for MOBY I/E/U</b> 2 m	<b>6GT2091-0FH20</b>
<b>SLG cable for MOBY I/E/U</b> 5 m	<b>6GT2091-0FH50</b>
<b>SLG cable for MOBY D</b> 2 m	<b>6GT2691-0FH20</b>
<b>SLG cable RF300 extension cable MOBY I/E/U/D and SIMATIC RF300</b> 2 m	<b>6GT2891-0FH20</b>

Ordering data	Order No.
<b>SLG cable RF300 extension cable MOBY I/E/U/D and SIMATIC RF300</b> 5 m	<b>6GT2891-0FH50</b>
<b>SLG cable RF300 extension cable MOBY I/E/U/D and SIMATIC RF300</b> 10 m	<b>6GT2891-0FN10</b>
<b>SLG cable RF300 extension cable MOBY I/E/U/D and SIMATIC RF300</b> 20 m	<b>6GT2891-0FN20</b>
<b>SLG cable RF300 extension cable MOBY I/E/U/D and SIMATIC RF300</b> 50 m	<b>6GT2891-0FN50</b>

# ET 200 distributed I/Os

## ET 200pro – Motor starters

### Standard and High Feature

#### Overview



#### Motor starters

- Only two variants up to 5.5 kW
- All settings can be parameterized by bus
- Comprehensive diagnostics signals
- Overload can be acknowledged by remote reset
- Current unbalance monitoring
- Stall protection
- Emergency start function in the event of overload
- Current value transmission by bus
- Current limit monitoring
- Direct-on-line or reversing starters
- Power bus can be plugged in using the new HAN Q4/2 plug-in connectors
- Conductor cross-sections up to 6 x 4 mm<sup>2</sup>
- 25 A per segment (power looped through using jumper plug)
- Supplied with 400 V AC brake contact as an option

#### Isolator module

The isolator module with switch disconnecter function is used for safe disconnection of the 400 V operating 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.

#### Safety Local Isolator Module

With the Safety Modules local

- Safety Local Isolator Module and
- 400 V disconnecting module

it is possible to achieve safety Category 4 with an appropriate circuit.

The Safety local isolator module is a maintenance switch with integrated safety evaluation functions that can be parameterized over DIP switch.

It is used for:

- Connection of a 1 or 2-channel EMERGENCY STOP circuit up to Cat. 3-4/Sil3 (protective door or EMERGENCY STOP buttons) and parameterizable start behavior
- Control of the 400 V disconnecting module by means of a safety rail signal

#### Benefits

ET 200pro motor starters provide the following advantages:

- High flexibility thanks to a modular and compact design
- Little variance among all motor starter versions (2 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 local control functions (High Feature)
- Cabinet-free construction thanks to high degree of protection IP65

#### Application

With the ET 200pro motor starters, any three-phase loads can be protected and switched. They are an integral part of ET 200pro and have a high degree of protection IP65. This makes them ideal for use in modular, distributed peripherals without control cabinets or control enclosures.



As the 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 which soon make themselves positively felt particularly in manufacturing processes with high plant stoppage costs:

- Configuring is made easier by the fine modular structure. When using the ET 200pro motor starters, the list of parts 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 in 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 optimized in addition by the low level of variance (2 units up to 5.5 kW).

The ordering option for motor starters with a 400 V AC brake output provides the possibility of controlling motors with 400 V AC brakes. With four locally acting inputs available on the High Feature motor starter it is possible to realize autonomous special functions which 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.

When using the optional isolator module with switch disconnecter and group fusing function for the ET 200pro, the 400 V supply of the motor starters can be switched on and off directly in the field, i.e. locally.

#### Selection and Ordering data

Version	Order No.
<b>Motor starter Standard</b> mechanical, Motor protection: Thermal model	
 <p>DSe Standard</p> <p><b>Direct starter Dse</b> <sup>1)</sup></p> <ul style="list-style-type: none"> <li>• without brake output</li> <li>• with brake output 400 V AC</li> </ul> <p><b>Reversing starter RSe</b> <sup>1)</sup></p> <ul style="list-style-type: none"> <li>• without brake output</li> <li>• with brake output 400 V AC</li> </ul>	<p>3RK1 304-5 S40-4AA0</p> <p>3RK1 304-5 S40-4AA3</p> <hr/> <p>3RK1 304-5 S40-5AA0</p> <p>3RK1 304-5 S40-5AA3</p>
<b>Motor starter High Feature</b> mechanical, Motor protection: Thermal model	
 <p>RSe High Feature</p> <p><b>Direct starter DSe</b> <sup>1)</sup></p> <ul style="list-style-type: none"> <li>• without brake output</li> <li>• with brake output 400 V AC</li> </ul> <p><b>Reversing starter RSe</b> <sup>1)</sup></p> <ul style="list-style-type: none"> <li>• without brake output</li> <li>• with brake output 400 V AC</li> </ul>	<p>3RK1 304-5 S40-2AA0</p> <p>3RK1 304-5 S40-2AA3</p> <hr/> <p>3RK1 304-5 S40-3AA0</p> <p>3RK1 304-5 S40-3AA3</p>
Setting range for rated operating current	
<ul style="list-style-type: none"> <li>• 0.15 ... 2.0 A</li> <li>• 1.5 ... 12.0 A</li> </ul>	<p>K</p> <p>L</p>

1) Functions only in combination with the backplane bus module and the wide rack. The backplane bus module and the wide rack must be ordered separately (see accessories for the ET 200pro motor starters).

# ET 200 distributed I/Os

## ET 200pro – Motor starters

### ET 200pro isolator modules

#### 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 operating voltage in the plant.

Depending on the power distribution concept, all stations can be equipped with an isolator module as an option.



The isolator module is available in addition in a safety version. See Safety Local Isolator Module.

#### Benefits

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 construction thanks to high degree of protection IP65

#### Selection and Ordering data

	Version	Order No.
<i>ET 200pro isolator modules, mechanical</i>		
	<b>Isolator module</b> <sup>1)</sup> Rated operating current 25 A	<b>3RK1 304-0HS00-6AA0</b>
	<b>Safety local isolator module</b> <sup>2) 3)</sup> Rated operating current 25 A	<b>3RK1 304-0HS00-7AA0</b>

1) Functions only in combination with the backplane bus module and the wide rack.

The backplane bus module and the wide rack must be ordered separately (see Accessories for the ET 200pro motor starters).

2) The safety local maintenance isolator module only operates when combined with the 400 V shutdown module.

3) Only in connection with the special backplane bus module for Safety local RSM (see Accessories for ET 200pro motor starters).

#### Overview



#### Safety Local Isolator Module

The Safety Local Isolator Module is a maintenance switch with integrated safety evaluation functions that can be parameterized using DIP switches.

It is used for:

- Connection of a single-channel or 2-channel EMERGENCY STOP circuit up to Cat. 3-4/Sil3 (protective door or EMERGENCY STOP buttons) and parameterizable start behavior
- Control of the 400 V disconnecting module by means of a safety rail signal

#### The 400 V disconnecting module

The 400 V disconnecting module enables the safe disconnection of the operating voltage of 400 V up to Cat. 3-4/Sil3. It only functions in combination with the Safety Local Isolator Module.

#### Application

##### 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 3TK28 41 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 2 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 isolates the 400 V circuit up to CAT 4



In combination with the 400 V disconnecting module, the Safety Local Isolator Module can be used for safety applications up to Category 4 to EN 954-1.

##### 400 V disconnecting module

The 400 V disconnecting module can be used together with the Safety Local Isolator Module for local safety applications. It contains two contactors connected in series for safety-oriented tripping of the main circuit. The auxiliary circuit supply of the device is over a safety power rail in the backplane bus module.

In combination with the Safety Local Isolator Module, the 400 V disconnecting module can be used for safety applications up to Category 4 to EN 954-1.

#### Selection and Ordering data

	Version	Order No.
<b>ET 200pro Safety Local Isolator Modules, mechanical</b>		
	<b>Safety local isolator module</b> <sup>2) 4)</sup> Rated operating current 25 A	<b>3RK1 304-0HS00-7AA0</b>
	<b>400 V disconnecting module</b> <sup>1) 3)</sup> Rated operating current 16 A	<b>3RK1 304-0HS00-8AA0</b>


- 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 starter").
- 2) The safety local isolator module only functions when used together with the 400 V disconnecting module.
- 3) The 400 V disconnecting module only functions when used together with the safety local isolator module.
- 4) Only in connection with the special backplane bus module for Safety local RSM (see Accessories for ET 200pro motor starters).

# ET 200 distributed I/Os

## ET 200pro – Motor starters

### Accessories for ET 200pro motor starters

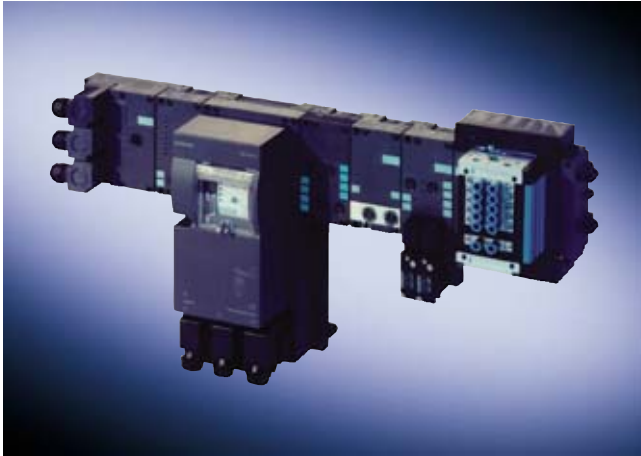
#### Selection and Ordering Data

	Version	Order No.
<i>ET 200pro accessories</i>		
 <p>Hand-held device 3RK1 922-3BA0</p>	<b>Wide module rack<sup>1)</sup></b> <ul style="list-style-type: none"> <li>• Length 500 mm</li> <li>• Length 1000 mm</li> <li>• Length 2000 mm</li> </ul>	<b>6ES7 194-4GB00-0AA0</b> <b>6ES7 194-4GB10-0AA0</b> <b>6ES7 194-4GB20-0AA0</b>
	<b>Backplane bus module 110 mm<sup>2)</sup></b>	<b>3RK1 922-2BA00</b>
	<b>Backplane bus module for Safety local RSM</b>	<b>3RK1 922-2BA01</b>
	<b>RS 232 interface cable</b>	<b>3RK1 922-2BQ00</b>
	<b>Hand-held device</b> for ET 200 pro motor starter, ET 200S High Feature and ECOFAST for local operation, serial interface cable must be ordered separately	<b>3RK1 922-3BA00</b>
	<b>Power jumper plug</b>	<b>3RK1 922-2BP00</b>
	<b>Plug set for incoming energy supply (HAN Q4/2)</b> <ul style="list-style-type: none"> <li>• 2.5 mm<sup>2</sup></li> <li>• 4.0 mm<sup>2</sup></li> <li>• 6.0 mm<sup>2</sup></li> </ul>	<b>3RK1 911-2BE50</b> <b>3RK1 911-2BE10</b> <b>3RK1 911-2BE30</b>
	<b>Plug set for motor connection (HAN Q8/0)</b> <ul style="list-style-type: none"> <li>• 1.5 mm<sup>2</sup></li> <li>• 2.5 mm<sup>2</sup></li> </ul>	<b>3RK1 902-0CE00</b> <b>3RK1 902-0CC00</b>
	<b>Sealing cap (for power supply)</b>	<b>3RK1 902-0CJ00</b>
	<b>Plug set for power transmission (Han Q4/2) Han Q4/2-pin (angled)</b> <ul style="list-style-type: none"> <li>• 2.5 mm<sup>2</sup></li> <li>• 4.0 mm<sup>2</sup></li> </ul>	<b>3RK1 911-2BF60</b> <b>3RK1 911-2BF20</b>
	<b>Crimping tool for contact pins and sockets up to 4.0 mm<sup>2</sup> (HAN Q8/0)</b>	<b>3RK1 902-0CT00</b>
	<b>Dismantling tool for contact pins and sockets (HAN Q8/0)</b>	<b>3RK1 902-0AJ00</b>
	<b>M12 sealing cap</b>	<b>3RX8 000-0JA00</b>

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 modules (isolator module, safety local isolator module and 400 V disconnecting module).

#### Overview



- Distributed I/O station with degree of protection IP65/67 for use in cabinet-less applications in the machine environment
- Modular design adapts to the automation task
- I/O modules, motor starters, pneumatic modules and signal processing modules (CPU), frequency converters
- Can also be used for extremely time-critical tasks
- Separate auxiliary power supply for easy implementation of load groups
- DESINA-compliant modules

#### Application

The SIMATIC ET 200X is a distributed I/O station with degree of protection IP65/IP67.

Due to the high degree of protection and its rugged design, the ET 200X is particularly suitable for implementation in the machine environment.

Its modular design, high degree of protection, sole use of plug-in wiring and integration of pneumatic and drive components permit fast and optimum adaptation to a machine's technological function units.

Even when requirements change frequently, replacement or combining of different basic and expansion modules can noticeably reduce setting-up times.

With a data signalling rate of up to 12 Mbit/s on the PROFIBUS DP, the ET 200S is also eminently suitable for extremely time-critical applications.

By supplying separate auxiliary voltages (load supplies) from the power module it is possible to selectively deactivate individual modules or module groups.

#### Design

The ET 200X distributed I/O station comprises:

- One basic module, alternatively
  - digital inputs
  - digital outputs
  - PLC functionality
  - ECOFAST-conform
  - DESINA-compliant with parameterizable inputs and outputs
- Up to 7 expansion modules.

The following expansion modules are available:

- Digital inputs/ outputs
- Digital input/ output modules, DESINA-compliant
- Analog input/ output modules
- Modules with and without channel diagnostics
- CP 142-2 communications processors for connection to AS-Interface
- Moby Ident System
- Pneumatic module with integrated valves
- Pneumatic interface for adapting a CPV valve terminal from FESTO; up to 6 interfaces per ET 200X station
- Motor starters (electromechanical or electronic) to drive any 3-phase AC load (up to 5.5 kW at 400 V AC); up to 6 motor starters per ET 200X station
- Frequency converter (max. 1.5 kW, 400 V AC)
- Up to 6 motor starters or frequency inverters per ET 200X station
- SITOP power current supply (24 V DC optional)

The expansion modules are installed side by side using integrated connectors. This means that all the signal leads and auxiliary voltages for the inputs and outputs are connected through. The modules can be replaced for service purposes without the need to disassemble the entire station.

#### Connection to PROFIBUS DP

An ET 200X occupies only one node address on the PROFIBUS DP installed on the basic module. A separate I/O address can be assigned to each basic and expansion module.

In the basic module with PLC functionality, the addresses of the expansion modules are already determined by the slot.

The ET 200X is compliant with EN 50170 for PROFIBUS DP and can be used with all standardized master stations. The fast data transfer rate of 12 Mbit/s also allows implementation of fast machine functions.

# ET 200 distributed I/Os

## ET 200X

### Introduction

#### Function

##### Operating mode

The addressing of the inputs and outputs of the ET 200X differs depending on the type of the basic module:

- Basic module without PLC functionality:  
Access via the user program in the central programmable controller, in the same way as central I/Os
- Basic module with PLC functionality:  
Access via the user program of the basic module

The slave interface in the basic module is entirely responsible for communications through PROFIBUS DP.

There are diagnostics functions to monitor the functionality of the ET 200X. The ET 200X diagnoses:

- Internal station/ configuration fault
- Short-circuit, wire breakage (for specific modules)
- Bus error (erroneous data transmission)
- Module fault, 24 V DC load power supply

The diagnostic data is analyzed as follows:

- Decentrally with diagnostic LEDs on the basic module
- With programming devices or PC with the COM PROFIBUS or STEP 7 parameterization software
- Centrally through the CPU in the automation system

##### Parameter assignment

When the station is connected to master modules which were not parameterized with COM PROFIBUS or STEP 7 (operation on third-party master modules), a fixed preassigned GSD file can be created with COM PROFIBUS from Version 3.1. This file is then loaded into the configuration tool of the third-party manufacturer and can be used for simple parameter assignment of the station. This allows the use of the user-friendly plain-text parameterization feature of COM PROFIBUS; there is no need for hexadecimal code inputs in the third-party configuring tool.

#### Technical specifications – General

Plug-in electronic modules	<ul style="list-style-type: none"> <li>• AS-Interface CP</li> <li>• Digital inputs/outputs</li> <li>• Analog inputs/outputs</li> <li>• Motor starters/Frequency converters</li> <li>• Pneumatic module/interface</li> </ul>
Connection method	M12 round connector with standard pinout or DESINA assignment for actuators/sensors HAN Q8 for power supply, forwarding and motor feeder in motor starters and frequency converters
Data transmission rate, max.	12 Mbit/s
Galvanic isolation	Yes, between PROFIBUS DP and internal electronics and partly between outputs and internal electronics
Supply voltage	24 V DC
Supply current (internal electronics and encoder supply) for overall configuration	
• Up to 40 °C, max.	6 A
• Up to 55 °C, max.	4 A
Current consumption of an ET 200X (internal and sensor supply, non-switched voltage)	
• Up to 40 °C, max.	≤ 1 A
• Up to 55 °C, max.	≤ 0.8 A
with DESINA	
• Up to 40 °C, max.	10 A
• Up to 55 °C, max.	8 A
Load current for ET 200X per incoming supply (BM, PM, switched voltage)	
• Up to 40 °C, max.	10 A
• Up to 55 °C, max.	8 A
For overall configuration with further looping (several ET 200Xs)	
• Up to 40 °C, max.	16 A
• Up to 55 °C, max.	12 A

Supply voltage for loads for total assembly (several motor starters or frequency converters)	
• For core cross-section of 1.5 mm <sup>2</sup> , max.	12 A
• For core cross-section of 2.5 mm <sup>2</sup> , max.	20 A
Degree of protection	IP65 for ET 200X with motor starters, frequency converters or pneumatic modules; IP66/IP67 for digital and analog modules
Material	Thermoplastic (fiber-glass reinforced)
<b>Ambient conditions</b>	
Temperature	From 0 to 55 °C
Temperature gradient	From 15 to 95%
Relative humidity	RH severity level 2 in accordance with IEC 1131-2
Atmospheric pressure	From 795 to 1080 hPa
<b>Mechanical strength</b>	
• Vibration	Vibration tested in acc. with IEC 68 Part 2-6 (sine) <ul style="list-style-type: none"> <li>• 10 Hz ≤ f ≤ 58 Hz (const. amplitude 0.075 mm);</li> <li>• 58 Hz ≤ f ≤ 150 Hz (const. acceleration 5 g, tested with 10 g) motor starters (const. acceleration 2 g)</li> </ul>
• Shock	Shock tested in acc. with IEC 68 Part 2- 27, half-sine, 15 g, 11 ms
Approvals	UL, CSA

#### Overview



- Basic modules for exchanging preprocessed I/O data between an ET 200X and a higher level master through PROFIBUS DP
- Two versions:
  - BM147-1 with DP slave functionality and
  - BM147-2 with additional DP master functionality
- CPU for PLC functionality equivalent to S7-314, in other words, distributed intelligence for preprocessing
- For reducing the overhead on the central PLC and PROFIBUS
- With greatly reduced response times to critical signals locally
- Standalone operation, for example it is still possible to operate even if the DP master fails
- Fast, simple and integrated programming of a system with modular programs through STEP 7

#### Technical specifications

	6ES7 147-1AA11-0XB0	6ES7 147-2AA01-0XB0	6ES7 147-2AB01-0XB0
<b>Supply voltages</b>			
Supply voltage of electronics 1L+			
• Rated value (DC)	24 V; permitted range 20.4 to 28.8 V	24 V; permitted range 20.4 to 28.8 V	24 V; permitted range 20.4 to 28.8 V
• Short-circuit protection	Yes	Yes; internal (thermally reversible); no for looping through	Yes; internal (thermally reversible); no for looping through
• reverse polarity protection	No	No	No
<b>Voltages and currents</b>			
Load voltage 2L+			
• Rated value (DC)	24 V; permitted range 20.4 to 28.8 V	24 V; permitted range 20.4 to 28.8 V	24 V; permitted range 20.4 to 28.8 V
• Reverse polarity protection	No	No	No
<b>Current consumption</b>			
Power loss, typ.	3 W	3 W	3 W
<b>Memory</b>			
Memory			
• RAM			
- integrated	64 KByte; 21 K instructions	64 KByte; 21 K instructions	128 KByte; 42 K instructions
- expandable	No	No	No
• Load memory			
- expandable FEPR0M, max.	8 MByte; can be plugged in as MMC	8 MByte; can be plugged in as MMC	8 MByte; can be plugged in as MMC
Backup			
• present	Yes; Guaranteed by MMC (maintenance-free)	Yes; Guaranteed by MMC (maintenance-free)	Yes; Guaranteed by MMC (maintenance-free)
<b>CPU/blocks</b>			
Number of blocks (total)	1,024; DBs, FCs, FBs	1,024; DBs, FCs, FBs	1,024; DBs, FCs, FBs
DB			
• Number, max.	511	511	511
• Size, max.	16 KByte	16 KByte	16 KByte
FB			
• Number, max.	512; In number band of FB0 to FB2047	512; In number band of FB0 to FB2047	512; In number band of FB0 to FB2047
• Size, max.	16 KByte	16 KByte	16 KByte

# ET 200 distributed I/Os

## ET 200X

### BM 147/CPU intelligent basic modules

#### Technical specifications (continued)

	6ES7 147-1AA11-0XB0	6ES7 147-2AA01-0XB0	6ES7 147-2AB01-0XB0
<b>FC</b>			
• Number, max.	512; In number band of FC0 to FC2047	512; In number band of FC0 to FC2047	512; In number band of FC0 to FC2047
• Size, max.	16 KByte	16 KByte	16 KByte
<b>OB</b>			
• Description	see Instruction List	see Instruction List	see Instruction List
• Size, max.	16 KByte	16 KByte	16 KByte
<b>Nesting depth</b>			
• per priority class	8	8	8
• additional within an error OB	4	4	4
<b>CPU/processing times</b>			
for bit operations, min.	0.1 µs	0.1 µs	0.1 µs
for word operations, min.	0.2 µs	0.2 µs	0.2 µs
for fixed point arithmetic, min.	2 µs	2 µs	2 µs
for floating point arithmetic, min.	3 µs	3 µs	3 µs
<b>Times/counters and their remanence</b>			
<b>S7 counter</b>			
• Number	256	256	256
• Remanence			
- adjustable	Yes	Yes	Yes
- preset	From Z 0 to Z 7	From Z 0 to Z 7	From Z 0 to Z 7
• Counting range			
- lower limit	0	0	0
- upper limit	999	999	999
<b>IEC counter</b>			
• present	Yes; Number unlimited (limited only by work memory)	Yes; Number unlimited (limited only by work memory)	Yes; Number unlimited (limited only by work memory)
• Type	SFB	SFB	SFB
<b>S7 times</b>			
• Number	256	256	256
• Remanence			
- adjustable	Yes	Yes	Yes
- preset	no retentivity	no retentivity	no retentivity
• Time range			
- lower limit	10 ms	10 ms	10 ms
- upper limit	9,990 s	9,990 s	9,990 s
<b>IEC timer</b>			
• present	Yes; Number unlimited (limited only by work memory)	Yes; Number unlimited (limited only by work memory)	Yes; Number unlimited (limited only by work memory)
• Type	SFB	SFB	SFB
<b>Data areas and their remanence</b>			
<b>Flag</b>			
• Number, max.	256 Byte	256 Byte	256 Byte
• Remanence available	Yes	Yes	Yes
• Remanence preset	MB 0 to MB 15	MB 0 to MB 15	MB 0 to MB 15
• Number of clock memories	8; 1 memory byte	8; 1 memory byte	8; 1 memory byte
<b>Local data</b>			
• per priority class, max.	510 Byte	510 Byte	510 Byte

#### Technical specifications (continued)

	6ES7 147-1AA11-0XB0	6ES7 147-2AA01-0XB0	6ES7 147-2AB01-0XB0
<b>Address area</b>			
I/O address area			
• Inputs	1 KByte	1 KByte	1 KByte
• Outputs	1 KByte	1 KByte	1 KByte
<b>Process image</b>			
• Inputs	128 Byte	128 Byte	128 Byte
• Outputs	128 Byte	128 Byte	128 Byte
<b>Hardware config.</b>			
Expansion modules			
• Number of expansion modules, max.		7	7
• of which motor starters/frequency converters, max.		6	6
• of which, pneumatic interfaces, max.		6	6
<b>Time</b>			
Clock			
• Hardware clock (real-time clock)	Yes	Yes	Yes
• Battery backed and synchronized	Yes; Backup time typically 6 weeks (at 40°C ambient temperature)	Yes; Backup time typically 6 weeks (at 40°C ambient temperature)	Yes; Backup time typically 6 weeks (at 40°C ambient temperature)
• Deviation per day, max.	10 s	10 s	10 s
Operating hours counter			
• Number	1	1	1
• Number/Number range	0	0	0
• Range of values	0 to 2 <sup>31</sup> hours (when using SFC101)	0 to 2 <sup>31</sup> hours (when using SFC101)	0 to 2 <sup>31</sup> hours (when using SFC101)
• Granularity	1 hour	1 hour	1 hour
• remanent	Yes; must be restarted at each warm restart	Yes; must be restarted at each warm restart	Yes; must be restarted at each warm restart
Clock synchronization			
• supports	Yes	Yes	Yes
• to MPI, Slave	Yes	Yes	Yes
• in AS, Master	Yes	Yes	Yes
• in AS, Slave	Yes	Yes	Yes
<b>S7 message functions</b>			
Number of login stations for message functions, max.	12; depending on the configured connections for PG/OP and S7 basic communication	12; depending on the configured connections for PG/OP and S7 basic communication	12; depending on the configured connections for PG/OP and S7 basic communication
Process diagnostic messages	Yes	Yes	Yes
simultaneously active Alarm-S blocks, max.	40	40	40
<b>Test commissioning functions</b>			
Status/control			
• Status/control variable	Yes	Yes	Yes
• Variables	Inputs, outputs, memory bits, DB, times, counters	Inputs, outputs, memory bits, DB, times, counters	Inputs, outputs, memory bits, DB, times, counters
<b>Monitoring functions</b>			
• Number of variables, max.	30	30	30
• of which status variable, max.	30	30	30
• of which control variable, max.	14	14	14
Forcing			
• Forcing	Yes	Yes	Yes
• Force, variables	Inputs, outputs	Inputs, outputs	Inputs, outputs
• Forcing, number of variables, max.	10	10	10

# ET 200 distributed I/Os

## ET 200X

### BM 147/CPU intelligent basic modules

#### Technical specifications (continued)

	6ES7 147-1AA11-0XB0	6ES7 147-2AA01-0XB0	6ES7 147-2AB01-0XB0
Status block	Yes	Yes	Yes
Single step	Yes	Yes	Yes
Number of breakpoints	2	2	2
Diagnostic buffer			
• present	Yes	Yes	Yes
• Number of entries, max.	100	100	100
• adjustable	No	No	No
<b>Communication functions</b>			
PG/OP communication	Yes	Yes	Yes
Global data communication			
• supported	Yes	Yes	Yes
• Number of GD packets, max.	4	4	4
• Number of GD packets, transmitter, max.	4	4	4
• Number of GD packets, receiver, max.	4	4	4
• Size of GD packets, max.	22 Byte	22 Byte	22 Byte
• Size of GD packet (of which consistent), max.	22 Byte	22 Byte	22 Byte
S7 basic communication			
• supported	Yes	Yes	Yes
• Useful data per job, max.	76 Byte	76 Byte	76 Byte
• Useful data per job (of which consistent) max.	76 Byte; 76 bytes (for X_SEND or X_RCV), 64 bytes (for X_PUT or X_GET as server)	76 Byte; 76 bytes (for X_SEND or X_RCV), 64 bytes (for X_PUT or X_GET as server)	76 Byte; 76 bytes (for X_SEND or X_RCV), 64 bytes (for X_PUT or X_GET as server)
S7 communication			
• supported	Yes	Yes	Yes
• as server	Yes	Yes	Yes
• as client	No	No	No
• Useful data per job, max.	180 Byte; bei PUT/GET	180 Byte; bei PUT/GET	180 Byte; bei PUT/GET
• Useful data per job, of which consistent, max.	64 Byte	64 Byte	64 Byte
S5-compatible communication			
• supported	No	No	No
Number of connections			
• overall	12	12	12
• reserved for PG communication	1	1	1
• adjustable for PG communication, max.	11	11	11
• reserved for OP communication	1	1	1
• adjustable for OP communication, max.	11	11	11
• reserved for S7-Basic communication	10	10	10
• adjustable for S7-Basic communication, max.	11	11	11
<b>1st interface</b>			
Type of interface	Coexistent, integrated RS 485 interface	Coexistent, integrated RS 485 interface	Coexistent, integrated RS 485 interface
Physics	RS 485	RS 485	RS 485
isolated	Yes	Yes	Yes
Functionality			
• MPI	Yes	Yes	Yes
• DP master	No	Yes	Yes
• DP slave	Yes; active / passive	Yes; active / passive	Yes; active / passive
• Point-to-point coupling	No	No	No

### Technical specifications (continued)

	6ES7 147-1AA11-0XB0	6ES7 147-2AA01-0XB0	6ES7 147-2AB01-0XB0
<b>MPI</b>			
• Services			
- PG/OP communication	Yes	Yes	Yes
- Routing	No	Yes	Yes
- Global data communication	Yes	Yes	Yes
- S7 basic communication	Yes	Yes	Yes
- S7 communication	Yes	Yes	Yes
- S7 communication, as server	Yes	Yes	Yes
• Transmission speeds, max.	12 Mbit/s	12 Mbit/s	12 Mbit/s
<b>DP master</b>			
• Services			
- PG/OP communication		Yes	Yes
- Routing		Yes	Yes
- Global data communication		No	No
- S7 basic communication		No	No
- S7 communication		Yes	Yes
- S7 communication, as server		Yes	Yes
- equidistance support		Yes	Yes
- SYNC/FREEZE		Yes	Yes
- Activation/deactivation of DP slaves		Yes	Yes
- direct data exchange (cross traffic)		Yes	Yes
- DPV1		Yes	Yes
• Address area			
- Inputs, max.		1 KByte	1 KByte
- Outputs, max.		1 KByte	1 KByte
• Useful data per DP slave			
- Useful data per DP slave, max.		244 Byte; 244 bytes/244 bytes	244 Byte; 244 bytes/244 bytes
<b>DP slave</b>			
• Number of connections	12	12	12
• Services			
- PG/OP communication	Yes	Yes	Yes
- Routing	No	Yes; when interface active	Yes; when interface active
- S7 communication, as client	No	No	No
- S7 communication, as server	No	No	No
• Transmission speeds, max.	12 Mbit/s	12 Mbit/s	12 Mbit/s
• Transfer memory			
- Inputs	244 Byte	244 Byte	244 Byte
- Outputs	244 Byte	244 Byte	244 Byte
• Address area, max.	32	32	32
• Useful data per address area, max.	32 Byte	32 Byte	32 Byte
<b>CPU/programming</b>			
Programming language			
• STEP 7	Yes; V5.2 SP1	Yes; V5.2 SP1	Yes; V5.2 SP1
<b>Dimensions and weight</b>			
Width	175 mm	175 mm	175 mm
Height	110 mm	110 mm	110 mm
Depth	90 mm	90 mm	90 mm

# ET 200 distributed I/Os

## ET 200X

### BM 147/CPU intelligent basic modules

#### Ordering data

**BM 147-1 CPU basic module** **6ES7 147-1AA11-0XB0**

With integrated PLC functionality, with 64 KB main memory

**BM 147-2 CPU basic module**

With integrated PLC functionality and additional PROFIBUS master interface

- With 64 KB main memory **6ES7 147-2AA01-0XB0**
- With 128 KB main memory **6ES7 147-2AB01-0XB0**

#### Accessories

**Manual for ET 200X distributed I/O station**

- German **6ES7 198-8FA01-8AA0**
- English **6ES7 198-8FA01-8BA0**
- French **6ES7 198-8FA01-8CA0**

**Cover plates for ET 200X basic modules** **6ES7 194-1JB00-0XA0**

Protective cover for bus and power supply connections (pack of 10)

**Simple mounting rails for SIMATIC ET 200X (narrow)**

- 400 mm long for basic module + 3 expansion modules (60 mm) **6ES7 194-1GA00-0XA0**
- 640 mm long for basic module + 7 expansion modules (60 mm) **6ES7 194-1GA10-0XA0**
- 2000 mm long for customized lengths **6ES7 194-1GA20-0XA0**

**Double mounting rails for SIMATIC ET 200X (wide)**

- 520 mm long for basic module + 1 expansion module (60 mm) + 2 motor starters/frequency converters/pneumatic interfaces **6ES7 194-1GB00-0XA0**
- 1000 mm long for basic module + 1 expansion module (60 mm) + 6 motor starters/frequency converters **6ES7 194-1GB10-0XA0**

#### Order No.

#### Accessories (continued)

**Fixing screws** **6ES7 194-1KC00-0XA0**  
M5 x 20, 1 pack = 100 pieces

**Connecting cable for PROFIBUS** **6ES7 901-4BD00-0XA0**  
12 Mbaud, for PG connection to PROFIBUS DP, pre-assembled with 2 x 9-pole Sub-D connector, 3.0 m

**ECOFAST hybrid cable**  
Pre-assembled with ECOFAST plug connectors

- 1.5 **6XV1 830-7BH15**
- 3 **6XV1 830-7BH30**
- 5 **6XV1 830-7BH50**
- 10 **6XV1 830-7BN10**
- 15 **6XV1 830-7BN15**

**ECOFAST terminating resistor**

- Ordering unit 1 piece **6GK1 905-0DA10**
- Ordering unit 5 pieces **6GK1 905-0DA00**

**ECOFAST plug connector, can be pre-assembled** **6GK1 905-0CA00**  
Male contacts; Ordering unit 5 pieces

**ECOFAST plug connector, can be pre-assembled** **6GK1 905-0CB00**  
Female contacts; Ordering unit 5 pieces  
MMC memory cards up to 8 MB (as for S7-314)

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#### Overview



- Basic modules to process communications between ET 200X and higher level masters through PROFIBUS DP
- With additional integrated inputs or outputs

#### Technical specifications

	6ES7 141-1BF12-0XB0	6ES7 142-1BD22-0XB0
<b>Supply voltages</b>		
Supply voltage of electronics 1L+		
• Rated value (DC)	24 V	24 V
• Short-circuit protection	Yes; electronic	Yes; electronic
• reverse polarity protection	Yes	Yes
<b>Voltages and currents</b>		
Load voltage 2L+		
• Rated value (DC)	24 V	24 V
• Reverse polarity protection	No	No
<b>Current consumption</b>		
from load voltage 1L+, max.	180 mA	
from load voltage 2L+ (without load), max.		12 mA
from supply voltage 1L+, max.		180 mA
Power loss, typ.	3.5 W	4 W
<b>Hardware config.</b>		
Expansion modules		
• Number of expansion modules, max.	7	7
• of which, motor starters, max.		6
• of which motor starters/frequency converters, max.	6	
• of which, pneumatic interfaces, max.	6	6
<b>1st interface</b>		
Functionality		
• DP slave	Yes	Yes
DP slave		
• Services		
- direct data exchange (cross traffic)	Yes	Yes; Sender
• Transmission speeds, min.	9.6 kBit/s	9.6 kBit/s
• Transmission speeds, max.	12 Mbit/s	12 Mbit/s; 9.6 / 19.2 / 93.75 / 187.5 / 500 Kbps; 1.5 / 3 / 6 / 12 Mbps

	6ES7 141-1BF12-0XB0	6ES7 142-1BD22-0XB0
<b>Digital inputs</b>		
Number of digital inputs	8	
Cable length		
• Cable length unshielded, max.	30 m	30 m; Signal cables
Input characteristic curve to IEC 1131, Typ 1	Yes	
Input voltage		
• Rated value, DC	24 V	
• for signal "0"	-3 to 5 V	
• for signal "1"	13 to 30 V	
Input current		
• for signal "1", typ.	7 mA	
Input delay (for rated value of input voltage)		
• for standard inputs		
- at "0" to "1", min.	1.2 ms	
- at "0" to "1", max.	4.8 ms	
<b>Digital outputs</b>		
Number of digital outputs		4
Cable length unshielded, max.		30 m
Short-circuit protection of the output		Yes; electronic
• Response threshold, typ.		3 A
Lamp load, max.		10 W
Output current		
• for signal "1" rated value		2 A; at 24 V DC
• for signal "0" residual current, max.		0.5 mA
Switching frequency		
• with resistive load, max.		100 Hz
• with inductive load, max.		0.5 Hz
• on lamp load, max.		1 Hz
Aggregate current of the outputs (per group)		
• up to 20 °C, max.		6 A
• up to 55 °C, max.		4 A

# ET 200 distributed I/Os

## ET 200X

### BM 141 and BM 142 basic modules

#### Technical specifications (continued)

	6ES7 141-1BF12-0XB0	6ES7 142-1BD22-0XB0
<b>Encoder</b>		
Connectable encoders		
• 2-wire BEROS	Yes	
• permissible quiescent current (2-wire BEROS), max.	1.5 mA	
<b>Status information/alarms/diagnostics</b>		
<b>Alarms</b>		
• Diagnostic alarm	Yes	Yes
<b>Diagnostics indication LED</b>		
• Bus error BF (red)	Yes	Yes
• Collective error SF (red)	Yes	Yes
• Monitoring 24 V voltage supply ON (green)	Yes	Yes

	6ES7 141-1BF12-0XB0	6ES7 142-1BD22-0XB0
<b>Isolation</b>		
between PROFIBUS DP all other circuits	Yes	Yes
Galvanic isolation, digital inputs		
• between the channels	No	No
• between the channels and the backplane bus		Yes
<b>Dimensions and weight</b>		
Width	134 mm	134 mm; Panel width 107 mm
Height	110 mm	110 mm
Depth	55 mm	55 mm

Ordering data	Order No.
<b>BM 141 basic module</b> DI 8 × 24 V DC	<b>6ES7 141-1BF12-0XB0</b>
<b>BM 142 basic module</b> DO 4 × 24 V DC/2 A	<b>6ES7 142-1BD22-0XB0</b>
<b>Accessories</b>	
<b>Manual for ET 200X distributed I/O station</b>	
• German	<b>6ES7 198-8FA01-8AA0</b>
• English	<b>6ES7 198-8FA01-8BA0</b>
• French	<b>6ES7 198-8FA01-8CA0</b>
<b>Simple mounting rails for SIMATIC ET 200X (narrow)</b>	
• 400 mm long for basic module + 3 expansion modules (60 mm)	<b>6ES7 194-1GA00-0XA0</b>
• 640 mm long for basic module + 7 expansion modules (60 mm)	<b>6ES7 194-1GA10-0XA0</b>
• 2000 mm long for customized lengths	<b>6ES7 194-1GA20-0XA0</b>
<b>Double mounting rails for SIMATIC ET 200X (wide)</b>	
• 520 mm long for basic module + 1 expansion module (60 mm) + 2 motor starter/frequency converter/pneumatic interfaces	<b>6ES7 194-1GB00-0XA0</b>
• 1000 mm long for basic module + 1 expansion module (60 mm) + 6 motor starters/frequency converters	<b>6ES7 194-1GB10-0XA0</b>
<b>Fixing screws</b> M5 x 20, 1 pack = 100 pieces	<b>6ES7 194-1KC00-0XA0</b>
<b>Connector plate for BM 141, BM 142</b> T functionality for PROFIBUS DP (spare part)	<b>6ES7 194-1FC00-0XA0</b>
<b>Plug connector for PROFIBUS DP</b> Control and auxiliary voltage (incl. 2 PG cable glands and 1 blanking plug); 3 connectors are required per basic module	<b>6ES7 194-1AA01-0XA0</b>

	Order No.
<b>Cable</b> 5-core for bus signals, power supply, sold by the meter, minimum order quantity: 10 m	
• PVC sheath (Standard)	<b>6ES7 194-1LY00-0AA0</b> Length must be specified in m (minimum length 10 m)
• PUR sheath (can be trailed, oil-resistant, partially weld-resistant)	<b>6ES7 194-1LY10-0AA0</b> Length must be specified in m (minimum length 10 m)
<b>Cover plates</b> For protection of the bus and power supply connections on BM 141, BM 142, BM 147 (10 pieces per package unit)	<b>6ES7 194-1JB00-0XA0</b>
<b>M12 coupler plug</b> For connecting actuators and sensors, 5-pole	<b>3RX1 667</b>
<b>M12 angular coupler plug</b> For connecting actuators and sensors, 5-pole	<b>3RX1 668</b>
<b>M12 Y-coupler plug</b> For dual connection of sensors using single cable, 5-pole	<b>6ES7 194-1KA01-0XA0</b>
<b>Pre-assembled Y-cable</b> For actuators/sensors	Available from: Franz Binder GmbH & Co. P.O. Box 1152 D-74148 Neckarsulm, Germany Plug connector catalog
<b>M12 sealing caps</b> For sealing unused input or output sockets	<b>3RX9 802-0AA00</b>
<b>S7 Manual Collection</b> Electronic manuals on CD, 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)	<b>6ES7 998-8XC01-8YE0</b>
<b>S7 Manual Collection – Update service for one year</b> Scope of supply: Current S7 Manual Collection CD as well as the subsequent three updates	<b>6ES7 998-8XC01-8YE2</b>

#### Overview



- BM 141 and BM 143 basic modules handle communication between ET 200X and higher level master through PROFIBUS DP
- ECOFAST-compatible connection method
- Can be combined with all available expansion modules of the ET 200X

#### Technical specifications

	6ES7 141-1BF01-0AB0	6ES7 141-1BF40-0AB0	6ES7 143-1BF00-0AB0	6ES7 143-1BF00-0XB0
<b>Supply voltages</b>				
Supply voltage of electronics 1L+				
• Rated value (DC)	24 V	24 V	24 V	24 V
• reverse polarity protection	No	No	No	No
<b>Voltages and currents</b>				
Load voltage 2L+				
• Rated value (DC)	24 V	24 V	24 V	24 V
• Reverse polarity protection	No	No	No	No
<b>Current consumption</b>				
from load circuit 1 (unswitched voltage/supply voltage) to 40 °C	10 A	10 A	10 A	10 A
from load voltage 1 (unswitched voltage/power supply) to 55 °C	8 A	8 A	8 A	8 A
from load voltage 2 (unswitched voltage/power supply) to 40 °C	10 A	10 A	10 A	10 A
from load circuit 2 (unswitched voltage/power supply) to 55 °C	8 A	8 A	8 A	8 A
from load voltage 1L+ (unswitched voltage)	180 mA	180 mA	180 mA	180 mA
Power loss, typ.	3.5 W	3.5 W	3.5 W	3.5 W
<b>Hardware config.</b>				
Expansion modules				
• Number of expansion modules, max.	7	7	7	7
• of which motor starters/frequency converters, max.	6	6	6	6
• of which, pneumatic interfaces, max.	6	6	6	6
<b>1st interface</b>				
Functionality				
• DP slave	Yes	Yes	Yes	Yes
DP slave				
• Services				
- direct data exchange (cross traffic)	Yes; Sender	Yes; Sender	Yes; Sender	Yes; Sender
• Transmission speeds, min.	9.6 kBit/s	9.6 kBit/s	9.6 kBit/s	9.6 kBit/s
• Transmission speeds, max.	12 Mbit/s; 9.6 / 19.2 / 45.45 / 93.75 / 187.5 / 500 Kbps; 1.5 / 12 Mbps	12 Mbit/s; 9.6 / 19.2 / 45.45 / 93.75 / 187.5 / 500 Kbps; 1.5 / 12 Mbps	12 Mbit/s; 9.6 / 19.2 / 45.45 / 93.75 / 187.5 / 500 Kbps; 1.5 / 12 Mbps	12 Mbit/s; 9.6 / 19.2 / 45.45 / 93.75 / 187.5 / 500 Kbps; 1.5 / 12 Mbps

# ET 200 distributed I/Os

## ET 200X

### ECOFAST basic modules

#### Technical specifications (continued)

	6ES7 141-1BF01-0AB0	6ES7 141-1BF40-0AB0	6ES7 143-1BF00-0AB0	6ES7 143-1BF00-0XB0
<b>Digital inputs</b>				
Number of digital inputs	8; 8 process channels DI, single channel connector	8; 8 process channels DI, single channel connector	8; 8 process channels; parameter assignment as DI/DO 8 function channels, parameter assignment as diagnostic/NC input	8; 8 process channels; parameter assignment as DI/DO 8 function channels, parameter assignment as diagnostic/NC input
Number of simultaneously controllable inputs				8
• Number of simultaneously controllable inputs, up to 60 °C				
Cable length				
• Cable length unshielded, max.	30 m; for signal lines	30 m; for signal lines	30 m; for signal lines	30 m; for signal lines
Input characteristic curve to IEC 1131, Typ 1	Yes			
Input characteristic curve to IEC 1131, Typ 2		Yes	Yes	Yes
Input voltage				
• Rated value, DC	24 V	24 V	24 V; Input voltage for DI (Pin 4) set in parameters;; rated value 24 V DC; for signal "1" 13 to 30 V; for signal "0" -30 to 5 V; Input voltage for function input (pin 2);; rated value 24 V DC; for signal "1" 13 to 30 V; for signal "0" -30 to 2 V	24 V; Input voltage for DI (Pin 4) set in parameters;; rated value: 24 V DC; for signal "1": 13 to 30 V; for signal "0": -30 to 5 V; ; Input voltage for function input (pin 2);; rated value: 24 V DC; for signal "1": 13 to 30 V; for signal "0": -30 to 2 V
• for signal "0"	-3 to 5 V	-3 to 5 V	-3 to 5 V	-3 to 5 V
• for signal "1"	13 to 30 V	13 to 30 V	13 to 30 V	13 to 30 V
Input current				
• for signal "1", typ.	7 mA	10 mA	5 mA	5 mA
Input delay (for rated value of input voltage)				
• for standard inputs		Yes; 0.5 / 3 / 15 / 20 ms		
- programmable				
- 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
<b>Digital outputs</b>				
Number of digital outputs			8; 8 process channels, parameter assignment as DI/DO, 8 function channels, parameter assignment as diagnostic/NC input	8; 8 process channels, parameter assignment as DI/DO, 8 function channels, parameter assignment as diagnostic/NC input
Cable length unshielded, max.			30 m	30 m
Short-circuit protection of the output			Yes; electronic	Yes; electronic
• Response threshold, typ.			1.8 A	1.8 A
Lamp load, max.			10 W	10 W
Output current				
• for signal "1" rated value			1.2 A	1.2 A
• for signal "1" permissible range for 0 to 60 °C, min.			5 mA	5 mA
• for signal "1" permissible range for 0 to 60 °C, max.			1.3 A	1.3 A
• for signal "0" residual current, max.			0.5 mA	0.5 mA
Switching frequency				
• with resistive load, max.			100 Hz	100 Hz
• with inductive load, max.			2 Hz	2 Hz
• on lamp load, max.			1 Hz	1 Hz

Technical specifications (continued)

	6ES7 141-1BF01-0AB0	6ES7 141-1BF40-0AB0	6ES7 143-1BF00-0AB0	6ES7 143-1BF00-0XB0
<b>Encoder</b>				
Connectable encoders				
• 2-wire BEROS	Yes	Yes	Yes	Yes
• permissible quiescent current (2-wire BEROS), max.	1.5 mA	1.5 mA	1.5 mA	1.5 mA
<b>Status information/alarms/diagnostics</b>				
Alarms				
• Diagnostic alarm	Yes	Yes; parameterizable	Yes	Yes
Diagnoses				
• Diagnostics			Yes; complying with DESINA	Yes; complying with DESINA
• Wire break		Yes; channel by channel		
• Short circuit		Yes; channel by channel		
Diagnostics indication LED				
• Collective error SF (red)	Yes	Yes	Yes	Yes
<b>Isolation</b>				
Galvanic isolation	no electrical isolation between the load voltages and between the load voltages and all the other circuit components	no electrical isolation between the load voltages and between the load voltages and all the other circuit components	no electrical isolation between the load voltages and between the load voltages and all the other circuit components	no electrical isolation between the load voltages and between the load voltages and all the other circuit components
between PROFIBUS DP all all other circuits	Yes	Yes	Yes	Yes
Galvanic isolation, digital inputs				
• between the channels	No	No	No	No
• between the channels and the backplane bus	No	No	No	No
<b>Environmental requirements</b>				
Degree and class of protection				
• IP 67	Yes	Yes	Yes	Yes
<b>Dimensions and weight</b>				
Width	175 mm; 180 when screw mounted	175 mm; 180 when screw mounted	175 mm; 180 when screw mounted	175 mm; 180 when screw mounted
Height	180 mm; 174 when screw mounted	180 mm; 174 when screw mounted	180 mm; 174 when screw mounted	180 mm; 174 when screw mounted
Depth	110 mm; 90 when screw mounted	110 mm; 90 when screw mounted	110 mm; 90 when screw mounted	110 mm; 90 when screw mounted

# ET 200 distributed I/Os

## ET 200X

### ECOFAST basic modules

#### Ordering data

#### Order No.

<b>BM 141/ECOFAST basic module</b> 8 DI, 24 V DC, 5-pole, M12 with single-channel connection hybrid fieldbus connection (copper), identification plug, IP67	<b>6ES7 141-1BF01-0AB0</b>
<b>BM 141/ECOFAST RS 485 basic module</b> 8 DI, 24 V DC, 5-pole, M12 channel diagnostics, short-circuit and wire-break, process interrupts, input delay: 0.5 ms/3 ms/15 ms/20 ms	<b>6ES7 141-1BF40-0AB0</b>
<b>BM 143/DESINA basic module</b> 8 DI/DO, parameterizable, additional diagnostic inputs, hybrid fieldbus interface (copper), identification plug, IP67	<b>6ES7 143-1BF00-0AB0</b>
<b>BM 143/DESINA basic module</b> 8 DI/DO, parameterizable, additional diagnostic inputs, hybrid fieldbus interface (fiber-optic cable), identification plug, IP67	<b>6ES7 143-1BF00-0XB0</b>

#### Accessories

#### Manual for ET 200X distributed I/O station

• German	<b>6ES7 198-8FA01-8AA0</b>
• English	<b>6ES7 198-8FA01-8BA0</b>
• French	<b>6ES7 198-8FA01-8CA0</b>

#### Cover plates for ET 200X basic modules

Protective cover for bus and power supply connections (pack of 10)

**6ES7 194-1JB00-0XA0**

#### Simple mounting rails for SIMATIC ET 200X (narrow)

• 400 mm long for basic module + 3 expansion modules (60 mm)	<b>6ES7 194-1GA00-0XA0</b>
• 640 mm long for basic module + 7 expansion modules (60 mm)	<b>6ES7 194-1GA10-0XA0</b>
• 2000 mm long for customized lengths	<b>6ES7 194-1GA20-0XA0</b>

#### Double mounting rails for SIMATIC ET 200X (wide)

• 520 mm long for basic module + 1 expansion module (60 mm) + 2 motor starter/frequency converter/pneumatic interfaces	<b>6ES7 194-1GB00-0XA0</b>
• 1000 mm long for basic module + 1 expansion module (60 mm) + 6 motor starters/frequency converters	<b>6ES7 194-1GB10-0XA0</b>

#### Fixing screws

M5 x 20, 1 pack = 100 pieces

**6ES7 194-1KC00-0XA0**

#### Order No.

#### Accessories (continued)

#### PROFIBUS ECOFAST Hybrid Cable – Cu

Cable suitable for trailing with 4 copper cores, 1.5 mm<sup>2</sup> and 2 copper cores, shielded

See page 4/38

#### PROFIBUS ECOFAST Hybrid Cable – FOC

Cable suitable for trailing with two plastic fiber-optic conductors for PROFIBUS DP and four copper cores of 1.5 mm<sup>2</sup> cross-section exclusively for use in devices compatible with DESINA

See page 4/38

#### Identification plug

For setting the PROFIBUS station address (already included in scope of supply of BM 143/DESINA)

**6ES7 194-1KB00-0XA0**

#### M12 coupler plug

For connecting actuators and sensors, 5-pole

**3RX1 667**

#### M12 angular coupler plug

For connecting actuators and sensors, 5-pole

**3RX1 668**

#### Pre-assembled Y-cable

For actuators/sensors

Available from:  
Franz Binder GmbH & Co.  
Plug connector catalog  
P.O. Box 1152  
74148 Neckarsulm, Germany

#### M12 sealing caps

For sealing unused input or output sockets

**3RX9 802-0AA00**

#### Crimping tool

For male and female contacts

• 1.5 to 2.5 mm <sup>2</sup>	<b>3RK1 902-0AH00</b>
• 1.5 to 4 mm <sup>2</sup>	<b>3RK1 902-0CT00</b>

#### Deinstallation tool

For male and female contacts for 9-pole inserts for copper conductors

**3RK1 902-0AJ00**

#### S7 Manual Collection

Electronic manuals on CD, 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)

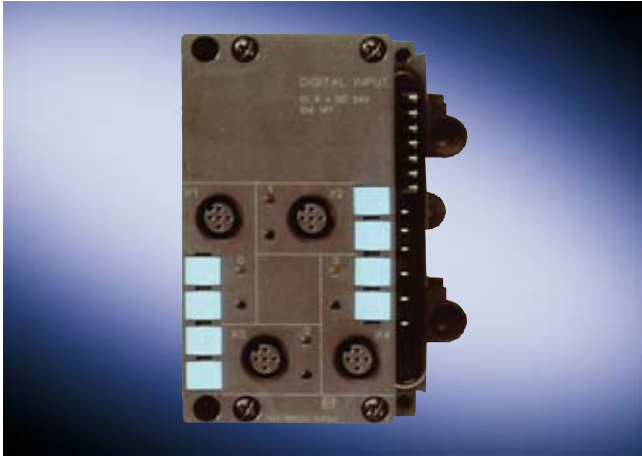
**6ES7 998-8XC01-8YE0**

#### S7 Manual Collection – Update service for one year

Scope of supply:  
Current S7 Manual Collection CD as well as the subsequent three updates

**6ES7 998-8XC01-8YE2**

#### Overview



- Expansion modules with digital inputs/ outputs for connection of actuators/ sensors
- Optionally with diagnostic functions (single-channel diagnostics)
  - parameterizable input delay
  - process alarms (available soon)
  - short and long designs
  - double or single assignment for each M12
- Optional additional auxiliary voltage supply (load supply)

#### Technical specifications

	6ES7 141-1BD31-0XA0	6ES7 141-1BF31-0XA0	6ES7 141-1BF30-0XB0	6ES7 141-1BF40-0XB0	6ES7 141-1BF41-0XA0
<b>Current consumption</b>					
from backplane bus DC 5 V, max.	16 mA	16 mA	30 mA	30 mA	10 mA
Power loss, typ.	1.5 W	1.5 W	1.5 W	1.5 W	1.5 W
<b>Digital inputs</b>					
Number of digital inputs	4	8	8	8	8
Cable length					
• Cable length unshielded, max.	30 m	30 m	30 m	30 m	30 m
Input characteristic curve to IEC 1131, Typ 1	Yes	Yes			Yes
Input characteristic curve to IEC 1131, Typ 2			Yes	Yes	
Input voltage					
• Rated value, DC	24 V	24 V	24 V	24 V	24 V
• for signal "0"	-3 to 5 V	-3 to 5 V	-3 to 5 V	-3 to 5 V	-3 to 5 V
• for signal "1"	13 to 30 V	13 to 30 V	13 to 30 V	13 to 30 V	13 to 30 V
Input delay (for rated value of input voltage)					
• for standard inputs					
- programmable			Yes; 0.5 / 3 / 15 / 20 ms	Yes; 0.5 / 3 / 15 / 20 ms	
- 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
<b>Digital outputs</b>					
Aggregate current of the outputs (per group)					
• up to 40 °C, max.	900 mA				
• up to 55 °C, max.	400 mA				
<b>Encoder</b>					
Connectable encoders					
• 2-wire BEROS	Yes	Yes	Yes	Yes	Yes
• permissible quiescent current (2-wire BEROS), max.	1.5 mA	1.5 mA	1.5 mA	1.5 mA	1.5 mA

# ET 200 distributed I/Os

## ET 200X

### EM 141 and EM 142 digital expansion modules

#### Technical specifications (continued)

	6ES7 141-1BD31-0XA0	6ES7 141-1BF31-0XA0	6ES7 141-1BF30-0XB0	6ES7 141-1BF40-0XB0	6ES7 141-1BF41-0XA0
<b>Status information/alarms/diagnostics</b>					
Diagnoses					
• Wire break			Yes; channel by channel	Yes; channel by channel	
• Short circuit			Yes; channel by channel	Yes; channel by channel	
<b>Dimensions and weight</b>					
Width	87 mm; Spacing 60 mm	87 mm; Spacing 60 mm	87 mm; Spacing 60 mm	87 mm; Spacing 60 mm	87 mm; Spacing 60 mm
Height	110 mm	110 mm	110 mm	180 mm	180 mm
Depth	55 mm	55 mm	55 mm	55 mm	55 mm

	6ES7 142-1BD40-0XB0	6ES7 142-1BD40-0XA0	6ES7 142-1BD30-0XA0	6ES7 142-1BF30-0XA0
<b>Voltages and currents</b>				
Load voltage 2L+				
• Short-circuit protection				Yes; clocked electronically
<b>Current consumption</b>				
from backplane bus DC 5 V, max.	40 mA	28.5 mA	28.5 mA	35 mA
Power loss, typ.	2.5 W	2.1 W	1.2 W	1.5 W
<b>Digital outputs</b>				
Number of digital outputs	4	4	4	8
Cable length unshielded, max.	30 m	30 m	30 m	30 m
Short-circuit protection of the output	Yes; electronic	Yes; electronic	Yes; electronic	Yes; electronic
Output current				
• for signal "1" rated value	2 A; at 24 V DC	2 A; at 24 V DC	0.5 A; at 24 V DC	1.2 A; at 24 V DC
• for signal "0" residual current, max.	0.5 mA	0.5 mA	0.1 mA	0.5 mA
Switching frequency				
• with resistive load, max.	100 Hz	100 Hz	100 Hz	100 Hz
• with inductive load, max.	0.5 Hz	0.5 Hz	0.5 Hz	0.5 Hz
• on lamp load, max.	1 Hz	1 Hz	1 Hz	1 Hz
Aggregate current of the outputs (per group)				
• up to 20 °C, max.	6 mA	6 A	2 A	6 A
• up to 55 °C, max.	4 mA	4 A	2 A	4 A
<b>Status information/alarms/diagnostics</b>				
Diagnoses				
• Wire break	Yes; channel by channel			
• Short circuit	Yes; channel by channel			
<b>Dimensions and weight</b>				
Width	87 mm; Spacing 60 mm	87 mm; Spacing 60 mm	87 mm; Spacing 60 mm	87 mm; Spacing 60 mm
Height	110 mm	110 mm	110 mm	180 mm
Depth	55 mm	55 mm	55 mm	55 mm

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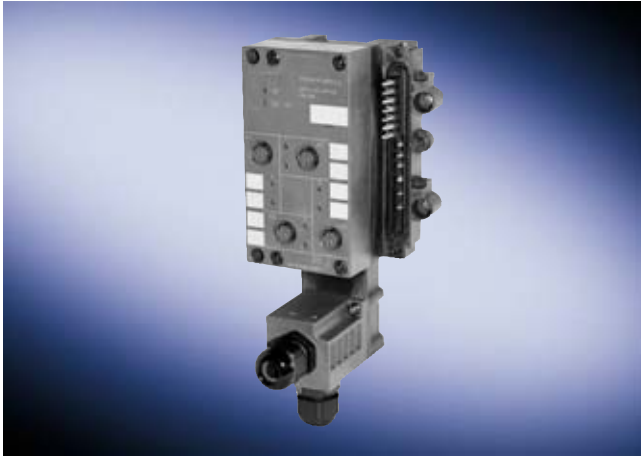
Ordering data	Order No.	Order No.
<b>EM 141 expansion modules</b>		
• 8 DI × 24 V DC, dual assignment	<b>6ES7 141-1BF31-0XA0</b>	
• 8 DI × 24 V DC, dual assignment with single-channel diagnostics	<b>6ES7 141-1BF30-0XB0</b>	
• 4 DI × 24 V DC	<b>6ES7 141-1BD31-0XA0</b>	
• 8 DI × 24 V DC, single assignment	<b>6ES7 141-1BF41-0XA0</b>	
• 8 DI × 24 V DC, single assignment with single-channel diagnostics	<b>6ES7 141-1BF40-0XB0</b>	
<b>EM 142 expansion modules</b>		
• 4 DO × 24 V DC, 2 A without diagnosis	<b>6ES7 142-1BD40-0XA0</b>	
• 4 DO × 24 V DC, 2 A with diagnosis	<b>6ES7 142-1BD40-0XB0</b>	
• 4 DO × 24 V DC; 0.5 A	<b>6ES7 142-1BD30-0XA0</b>	
• 8 DO × 24 V DC /1.2 A single assignment	<b>6ES7 142-1BF30-0XA0</b>	
<b>Accessories</b>		
<b>Manual for ET 200X distributed I/O station</b>		
• German		<b>6ES7 198-8FA01-8AA0</b>
• English		<b>6ES7 198-8FA01-8BA0</b>
• French		<b>6ES7 198-8FA01-8CA0</b>
<b>M12 connector</b>		<b>3RX1 667</b>
For connecting actuators or sensors, 5-pin		
<b>M12 angular circular connector</b>		<b>3RX1 668</b>
For connecting actuators or sensors, 5-pin		
<b>M12 Y circular connector</b>		<b>6ES7 194-1KA01-0XA0</b>
For the double connection of sensors by means of single cable, 5-pin		
<b>Pre-assembled Y-cable</b>		Available from: Franz Binder GmbH & Co. Plug connector catalog P.O. Box 1152 74148 Neckarsulm, Germany
For actuators/sensors		
<b>M12 sealing caps</b>		<b>3RX9 802-0AA00</b>
For sealing unused input or output sockets		
<b>S7 Manual Collection</b>		<b>6ES7 998-8XC01-8YE0</b>
Electronic manuals on CD, 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)		
<b>S7 Manual Collection update service for 1 year</b>		<b>6ES7 998-8XC01-8YE2</b>
Scope of supply: Up-to-date CD S7 Manual Collection as well as the three subsequent updates		

# ET 200 distributed I/Os

## ET 200X

### PM 148 power module

#### Overview



- Expansion module with digital outputs for connecting actuators
- With diagnostics functionality
- With additional auxiliary voltage supply (load supply)

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#### Technical specifications

	6ES7 148-1CA00-0XB0
<b>Voltages and currents</b>	
Load voltage 2L+	
• Rated value (DC)	24 V
• Short-circuit protection	Yes
• Reverse polarity protection	No
<b>Current consumption</b>	
from load voltage 2L+ (without load), max.	60 mA
from backplane bus DC 5 V, max.	40 mA
Power loss, typ.	2.5 W
<b>Digital outputs</b>	
Number of digital outputs	4
Cable length unshielded, max.	30 m
Short-circuit protection of the output	Yes; electronic
Output current	
• for signal "1" rated value	2 A; at 24 V DC
• for signal "0" residual current, max.	0.5 mA
Switching frequency	
• with resistive load, max.	100 Hz
• with inductive load, max.	0.5 Hz
• on lamp load, max.	1 Hz
Aggregate current of the outputs (per group)	
• up to 20 °C, max.	6 A
• up to 55 °C, max.	4 A
<b>Status information/alarms/diagnostics</b>	
Diagnoses	
• Wire break	Yes; channel by channel
• Short circuit	Yes; channel by channel
<b>Isolation</b>	
between backplane bus and all other circuit parts	Yes
<b>Dimensions and weight</b>	
Width	87 mm; Spacing 60 mm
Height	165 mm
Depth	67 mm; incl. connector

#### Ordering data

#### Order No.

<b>PM 148 power module</b> DO 4 x 24 V DC/2A, with diagnostics and supply for auxiliary voltage (load)	<b>6ES7 148-1CA00-0XB0</b>
<b>Accessories</b>	
<b>Manual ET 200X distributed I/O device</b>	
• German	<b>6ES7 198-8FA01-8AA0</b>
• English	<b>6ES7 198-8FA01-8BA0</b>
• French	<b>6ES7 198-8FA01-8CA0</b>
<b>Circular connector M12</b> For connecting actuators or sensors, 5-pin	<b>3RX1 667</b>
<b>Angular circular connector M12</b> For connecting actuators or sensors, 5-pin	<b>3RX1 668</b>
<b>Pre-assembled Y-cable</b> For actuators/sensors	Available from: Franz Binder GmbH & Co. Plug connector catalog P.O. Box 1152 74148 Neckarsulm, Germany
<b>M12 covers</b> For covering unused input or output sockets	<b>3RX9 802-0AA00</b>
<b>Connector for PROFIBUS DP</b> Control and auxiliary power (incl. 2 heavy gauge threaded joints and 1 blanking plug); 3 connectors required per basic module	<b>6ES7 194-1AA01-0XA0</b>
<b>S7 Manual Collection</b> Electronic manuals on CD, multilingual: 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)	<b>6ES7 998-8XC01-8YE0</b>
<b>S7 Manual Collection - Maintenance service for 1 year</b> Scope of supply: CD containing the current S7 Manual Collection and the three subsequent updates	<b>6ES7 998-8XC01-8YE2</b>

#### Overview



- Desina-compliant expansion module with user-parameterizable digital inputs/outputs for the connection of actuators/sensors
- Also with diagnostics input/ NC input per channel
- Can be connected to BM 143/DESINA

#### Technical specifications

	6ES7 143-1BF30-0XB0
<b>Current consumption</b>	
from backplane bus DC 5 V, max.	40 mA
Power loss, typ.	1.5 W
<b>Digital inputs</b>	
Number of digital inputs	8; 8 function inputs (diagnostic inputs or inputs with opener function)
Number of simultaneously controllable inputs	8
Cable length	
• Cable length unshielded, max.	30 m; for signal lines
Input characteristic curve to IEC 1131, Typ 2	Yes
Input voltage	
• Rated value, DC	24 V; Input voltage for parameterized DI (Pin 4) / Input voltage for function input (Pin 2)
• for signal "0"	-30 V to 5 V
• for signal "1"	13 to 30 V
Input current	
• for signal "1", typ.	5 mA
Input delay (for rated value of input voltage)	
• for standard inputs	
- at "0" to "1", min.	1.2 ms
- at "0" to "1", max.	4.8 ms
<b>Digital outputs</b>	
Number of digital outputs	8; 8 process channels, parameter assignment as DI/DO, 8 function channels, parameter assignment as diagnostic/NC input
Cable length unshielded, max.	30 m; for signal lines
Short-circuit protection of the output	Yes; electronic
• Response threshold, typ.	1.8 A

	6ES7 143-1BF30-0XB0
<b>Output current</b>	
• for signal "1" rated value	1.2 A
• for signal "1" permissible range for 0 to 60 °C, min.	5 mA
• for signal "1" permissible range for 0 to 60 °C, max.	1.3 A
• for signal "0" residual current, max.	0.5 mA
<b>Switching frequency</b>	
• with resistive load, max.	100 Hz
• with inductive load, max.	2 Hz
• on lamp load, max.	1 Hz
<b>Encoder supply</b>	
Output current	
• up to 40 °C, max.	1 A
• up to 55 °C, max.	0.8 A
<b>Encoder</b>	
Connectable encoders	
• 2-wire BEROs	Yes
• permissible quiescent current (2-wire BEROs), max.	1.5 mA
<b>Status information/alarms/diagnostics</b>	
Diagnostics indication LED	
• Status indicator per channel (yellow)	Yes
• Indicator function input per channel (yellow/red)	Yes
<b>Isolation</b>	
Isolation, digital outputs	
• between the channels and the backplane bus	No
Galvanic isolation, digital inputs	
• between the channels and the backplane bus	No
<b>Dimensions and weight</b>	
Width	87 mm; Spacing 60 mm
Height	180 mm
Depth	55 mm

# ET 200 distributed I/Os

## ET 200X

### EM 143/DESINA digital expansion module

#### Ordering data

**EM 143/DESINA expansion module**  
8 I/O DESINA

#### Order No.

**6ES7 143-1BF30-0XB0**

#### Accessories

##### Manual ET 200X distributed I/O device

- German
- English
- French

**6ES7 198-8FA01-8AA0**

**6ES7 198-8FA01-8BA0**

**6ES7 198-8FA01-8CA0**

##### Circular connector M12

For connecting actuators or sensors, 5-pin

**3RX1 667**

##### Angular circular connector M12

For connecting actuators or sensors, 5-pin

**3RX1 668**

##### Pre-assembled Y-cable

For actuators/sensors

Available from:  
Franz Binder GmbH & Co.  
Plug connector catalog  
P.O. Box 1152  
74148 Neckarsulm, Germany

#### Order No.

#### Accessories (continued)

##### M12 covers

For covering unused input or output sockets

**3RX9 802-0AA00**

##### S7 Manual Collection

Electronic manuals on CD, multilingual:  
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)

**6ES7 998-8XC01-8YE0**

##### S7 Manual Collection - Maintenance service for 1 year

Scope of supply:  
CD containing the current S7 Manual Collection and the three subsequent updates

**6ES7 998-8XC01-8YE2**

#### Overview



- Expansion modules with analog inputs/ outputs for connection of actuators/ sensors
- With diagnostics functionality, limit values and substitute values

#### Technical specifications

	6ES7 144-1FB31-0XB0	6ES7 144-1GB31-0XB0	6ES7 144-1GB41-0XB0	6ES7 144-1JB31-0XB0
<b>Current consumption</b>				
from backplane bus DC 5 V, max.	40 mA	40 mA	80 mA	40 mA
Power loss, max.	0.9 W	0.9 W	1 W	0.9 W
<b>Connection point</b>				
Inputs/outputs	4/5-pin M12 round connectors	4/5-pin M12 round connectors	4/5-pin M12 round connectors	4/5-pin M12 round connectors
<b>Analog inputs</b>				
Number of analog inputs	2	2	2	2
cable length, shielded, max.	30 m	30 m	30 m	30 m
permissible input frequency for voltage input (destruction limit), max.	30 V			30 V
permissible input current for current input (destruction limit), max.		40 mA	40 mA	
Constant measurement current for resistance-type transmitter, typ.				1.5 mA
Input ranges (rated values), voltages				
• Voltage	Yes			
• -10 V to +10 V	Yes			
• Input resistance (-10 V to +10 V)	100 kΩ			
Input ranges (rated values), currents				
• Current		Yes	Yes; 4 to 20 mA	
• -20 to +20 mA		Yes		
• Input resistance (-20 to +20 mA)		25 Ω		
• 4 to 20 mA		Yes	Yes	
• Input resistance (4 to 20 mA)		25 Ω	25 Ω	
Input ranges (rated values), resistance thermometers				
• Resistance thermometer				Yes
• Pt 100				Yes; Standard
• Input resistance (Pt 100)				10 MΩ
Characteristic linearization				
• programmable				Yes
<b>Analog outputs</b>				
Voltage output, short-circuit current, max..			65 mA	

# ET 200 distributed I/Os

## ET 200X

### EM 144 and EM 145 analog expansion modules

#### Technical specifications (continued)

	6ES7 144-1FB31-0XB0	6ES7 144-1GB31-0XB0	6ES7 144-1GB41-0XB0	6ES7 144-1JB31-0XB0
<b>Analog value creation</b>				
Analog value display (parameterizable)	Yes	Yes	Yes	Yes
Measurement principle	integrating	integrating	integrating	integrating
Integrations and conversion time/resolution per channel				
• Resolution with overload area (bit including sign), max.	12 Bit; + sign; overrange 17.5%	12 Bit; + sign; overrange 17.5%	12 Bit; + sign; overrange 17.5%	12 Bit; + sign; overrange 17.5%
• Integration time, parameterizable	Yes	Yes	Yes	Yes
• Integration time, ms	16.7 / 20 ms	16.7 / 20 ms	16.7 / 20 ms	16.7 / 20 ms
<b>Encoder supply</b>				
Short-circuit protection	Yes; electronic	Yes; electronic	Yes	
<b>Encoder</b>				
Connection of signal encoders				
• for current measurement as 2-wire transducer		No	Yes	
• for current measurement as 4-wire transducer		Yes	Yes	
• for resistance measurement with 2-conductor connection				Yes
• for resistance measurement with 3-conductor connection				Yes
• for resistance measurement with 4-conductor connection				Yes
• Burden of 2-wire transmitter, max.			750 Ω	
<b>Errors/accuracies</b>				
Operational limit in overall temperature range				
• Voltage, relative to input area	+/- 1,2 %	+/- 1,2 %	+/- 1,2 %	+/- 1,2 %
• Current, relative to input area	+/- 1,2 %	+/- 1,2 %	+/- 1,2 %	+/- 1,2 %
• Resistance-type thermometer, relative to input area				+/- 1,2 %
<b>Status information/alarms/diagnostics</b>				
Alarms				
• Diagnostic alarm	Yes	Yes	Yes	Yes
• Limit value alarm	Yes; upper limit, channel by channel/ lower limit channel by channel	Yes; upper limit, channel by channel/ lower limit channel by channel	Yes; upper limit, channel by channel/ lower limit channel by channel	Yes; upper limit, channel by channel/ lower limit channel by channel
• Process alarm	Yes	Yes	Yes	Yes
Diagnoses				
• Diagnostics	Yes; Diagnostic LED	Yes	Yes	Yes
• Wire break		Yes; channel by channel		Yes; channel by channel
• Short circuit		Yes; channel by channel	Yes; channel by channel	
• Overflow/underflow	Yes; channel by channel	Yes; channel by channel	Yes; channel by channel	Yes; channel by channel
Diagnostics indication LED				
• Collective error SF (red)	Yes	Yes	Yes	Yes
<b>Isolation</b>				
Isolation, analog inputs				
• Isolation, analog inputs	No	No	No	No
<b>Dimensions and weight</b>				
Width	87 mm; Spacing 60 mm	87 mm; Spacing 60 mm	87 mm; Spacing 60 mm	87 mm; Spacing 60 mm
Height	110 mm	110 mm	110 mm	110 mm
Depth	55 mm	55 mm	55 mm	55 mm
<b>Weights</b>				
Weight, approx.	250 g	250 g	250 g	250 g

Technical specifications (continued)

	6ES7 145-1FB31-0XB0	6ES7 145-1GB31-0XB0
<b>Current consumption</b>		
from backplane bus DC 5 V, max.	75 mA	110 mA
Power loss, max.	1.5 W	2.3 W
<b>Connection point</b>		
Inputs/outputs	4/5-pin M12 round connectors	4/5-pin M12 round connectors
<b>Analog outputs</b>		
Number of analog outputs	2	2
cable length, shielded, max.	30 m	30 m
Voltage output, Short-circuit protection	Yes	
Voltage output, short-circuit current, max..	30 mA	
Current output, no-load voltage, max.		15 V
Output ranges, voltage		
• -10 to +10 V	Yes	
Output ranges, current		
• -20 to +20 mA		Yes
• 4 to 20 mA		Yes
Connection of actuators		
• for voltage output 2-conductor connection	Yes	Yes
• for voltage output 4-conductor connection	Yes	
• for current output 2-conductor connection		Yes
Load impedance (in rated range of output)		
• with voltage outputs, min.	1 kΩ	
• with voltage outputs, capacitive load, max.	0.1 μF	
• with current outputs, max.		500 Ω
• with current outputs, inductive load, max.		0.1 mH
Destruction limits against externally applied voltages and currents		
• Voltages at the outputs towards MANA	15 V	
• Current, max.		40 mA

	6ES7 145-1FB31-0XB0	6ES7 145-1GB31-0XB0
<b>Analog value creation</b>		
Analog value display (parameterizable)	Yes	Yes
Integrations and conversion time/resolution per channel		
• Resolution with overload area (bit including sign), max.	11 Bit; + sign	11 Bit; + sign
• Conversion time (per channel)	1 ms	1 ms
Settling time		
• for resistive load	0.6 ms	0.6 ms
• for capacitive load	6 ms	6 ms
<b>Errors/accuracies</b>		
Operational limit in overall temperature range		
• Voltage, relative to output area	+/- 1 %	+/- 1 %
• Current, relative to output area	+/- 1 %	+/- 1 %
<b>Status information/alarms/diagnostics</b>		
Substitute values connectable	No; channel by channel	No; channel by channel
<b>Alarms</b>		
• Diagnostic alarm	Yes	Yes
<b>Diagnoses</b>		
• Wire break		Yes; channel by channel
• Short circuit	Yes; channel by channel	Yes
<b>Diagnostics indication LED</b>		
• Collective error SF (red)	Yes	Yes
<b>Isolation</b>		
Isolation, analog outputs		
• Galvanic isolation, analog outputs	No	No
<b>Dimensions and weight</b>		
Width	87 mm; Spacing 60 mm	87 mm; Spacing 60 mm
Height	110 mm	110 mm
Depth	55 mm	55 mm
<b>Weights</b>		
Weight, approx.	250 g	250 g

# ET 200 distributed I/Os

## ET 200X

### EM 144 and EM 145 analog expansion modules

Ordering data	Order No.	Ordering data	Order No.
<b>EM 144 expansion modules</b> With diagnostics / limit values <ul style="list-style-type: none"> <li>AI 2 × ±10 V</li> <li>AI 2 × ±20 mA, 4DMU</li> <li>AI 2 × 4 to 20 mA, 2DMU</li> <li>AI 2 × RTD (Pt100)10 V</li> </ul>	<b>6ES7 144-1FB31-0XB0</b> <b>6ES7 144-1GB31-0XB0</b> <b>6ES7 144-1GB41-0XB0</b> <b>6ES7 144-1JB31-0XB0</b>	<b>Accessories</b> <b>Manual ET 200X distributed I/O device</b> <ul style="list-style-type: none"> <li>German</li> <li>English</li> <li>French</li> </ul>	<b>6ES7 198-8FA01-8AA0</b> <b>6ES7 198-8FA01-8BA0</b> <b>6ES7 198-8FA01-8CA0</b>
<b>EM 145 expansion modules</b> With diagnostics / replacement values <ul style="list-style-type: none"> <li>AO 2 × ±10 V</li> <li>AO 2 × ± 20 mA, 4 to 20 mA</li> </ul>	<b>6ES7 145-1FB31-0XB0</b> <b>6ES7 145-1GB31-0XB0</b>	<b>S7 Manual Collection</b> Electronic manuals on CD, multilingual: 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)	<b>6ES7 998-8XC01-8YE0</b>
		<b>S7 Manual Collection - Maintenance service for 1 year</b> Scope of supply: CD containing the current S7 Manual Collection and the three subsequent updates	<b>6ES7 998-8XC01-8YE2</b>

#### Overview



- Master connection for the ET 200X distributed I/O station to AS-Interface over a 12-pin connector
- Easy operation in the I/O address area of SIMATIC ET 200X
- No CP configuration required for AS-Interface
- Activation of up to 31 AS-Interface slaves in accordance with the AS-Interface specification V2.0
- Monitoring of the supply voltage on the AS-Interface shaped cable
- Significant increase in the number of inputs and outputs of ET 200X

#### Benefits



- In connection with the BM 147, the ET 200X enables PLC functionality in degree of protection IP65
- Can also be used in a rugged industrial environment without additional casing due to the high degree of protection IP67
- More flexible and extended application options of the ET 200X thanks to considerable increase in available inputs/outputs
- Shorter startup times due to easy configuration at the press of a button
- Reduction of standstill or service times in the event of a fault through LED displays:
  - status of the AS-Interface network
  - connected slaves and their operational readiness
  - monitoring of the AS-Interface voltage level

#### Application

The CP 142-2 enables the connection of the distributed I/O system ET 200X to AS-Interface.

This module can be used to activate up to 31 AS-Interface slaves and, if bi-directional slaves are implemented, up to 248 binary components.

Up to 6 CP 142-2 can be operated on the ET 200X.

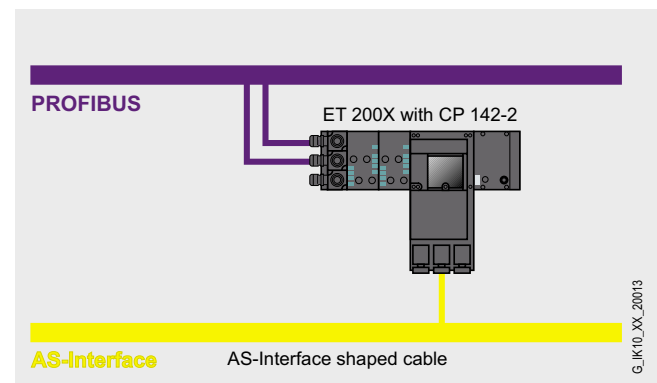
#### Design

- 16 byte inputs and 16 byte outputs are used in the address space of the ET 200X
- Operating statuses displayed by LEDs in the frontplate
- Display of the connected and activated slaves and their operational readiness by LEDs
- One pushbutton for switching the operating status, entering the existing configuration and switching the display
- Connection of the AS-Interface cable to M12 connector
- Monitoring of the supply voltage on the AS-Interface cable

#### Function

The CP 142-2 can be used in two operating modes:

- Standard mode with BM 141/BM 142/BM 147
- A maximum of 124 input bits and output bits of the AS-Interface slaves can be addressed.
- Extended mode with BM 147  
An FC (Function Call) enables master calls to be used in accordance with the AS-Interface specification V2.0 (e.g. write parameters). The calls are described in the manual. Program examples are supplied with the manual.



Example configuration

#### Configuration

Parameterization of the CP 142-2 is performed with the STEP® 7 basic package V2.1 and higher. No additional configuration is required for AS-Interface.

# ET 200 distributed I/Os

## ET 200X

### CP 142-2

#### Technical specifications

Bus cycle time	5 ms with 31 slaves
Configuration	<ul style="list-style-type: none"> <li>AS-Interface</li> <li>PROFIBUS</li> </ul>
AS-Interface Specification	V 2.0
<ul style="list-style-type: none"> <li>With BM 141/BM 142</li> <li>With BM 147 and FC, ASI-3422</li> </ul>	Using pushbutton on front plate The CP 142-2 occupies 16 byte inputs and 16 byte outputs in the PROFIBUS configuration of the ET200X Only IO transmission All functions
Connection of the AS-Interface cable	Through M12 connector on the front plate
Address range	16 input byte 16 output byte
Supply voltage	24 V DC
<ul style="list-style-type: none"> <li>Through backplane bus</li> <li>From the AS-Interface shaped cable</li> </ul>	According to the AS-Interface Specification V2.0
Power loss	2 W
Current consumption	Typ. 50 mA at 24 V DC
<ul style="list-style-type: none"> <li>Through backplane bus</li> <li>Through AS-Interface from the AS-Interface shaped cables</li> </ul>	According to the AS-Interface specification V 2.0
Perm. environmental conditions	<ul style="list-style-type: none"> <li>Operating temperature</li> <li>Transport/storage temperature</li> <li>Relative humidity</li> </ul>
<ul style="list-style-type: none"> <li>Operating temperature</li> <li>Transport/storage temperature</li> <li>Relative humidity</li> </ul>	0 °C ... +55 °C -40 °C ... +70 °C 95% at +25 °C
Design	ET 200X design
<ul style="list-style-type: none"> <li>Module format</li> <li>Dimensions (W x H x D) in mm</li> <li>Weight</li> <li>Space required</li> </ul>	Expansion module 87 x 110 x 63 Approx. 310 g 1 slot
Degree of protection	IP66/67

#### Ordering data

#### Order No.

<b>CP 142-2 communications processor</b> For connecting SIMATIC ET 200X to AS-Interface	<b>6GK7 142-2AH00-0XA0</b>
<b>CP 142-2 manual</b> <ul style="list-style-type: none"> <li>German</li> </ul>	<b>6GK7 142-2AH00-8AA0</b>
<b>Electronic manuals</b> Communications systems, protocols, products on CD-ROM German/English	<b>6GK1 975-1AA00-3AA0</b>

#### Overview



- The module for standard applications in pneumatics
- For controlling two simple or double-action pneumatic cylinders
- Electronics and pneumatics on one module
- With integrated digital inputs for recording the cylinder positions



**Note:**  
Cannot be used with DESINA/ECOFAS basic modules

#### Technical specifications

	6ES7 148-1DA00-0XA0
<b>Current consumption</b>	
from load voltage L2+ (including valve), max.	130 mA
from backplane bus DC 5 V, max.	40 mA
per valve, max.	50 mA
Power loss, typ.	3 W
<b>Digital inputs</b>	
Number of digital inputs	4; electrical
Cable length	
• Cable length unshielded, max.	30 m
Input voltage	
• Rated value, DC	24 V
• for signal "0"	-3 to 5 V
• for signal "1"	13 to 30 V
Input current	
• for signal "1", typ.	7 mA
Input delay (for rated value of input voltage)	
• for standard inputs	
- at "0" to "1", min.	1.2 ms
- at "0" to "1", max.	4.8 ms
<b>Encoder</b>	
Connectable encoders	
• 2-wire BERS	Yes
• permissible quiescent current (2-wire BERS), max.	1.5 mA

	6ES7 148-1DA00-0XA0
<b>Pneumatics</b>	
Connection point, pneumatic connect.	
• Number of outputs for valve control	2
• Switching outputs	Quickstar QS 6
• Air supply/exhaust	Quickstar QS 8, jointly recorded for both valves
• Controllable pneumatic cylinders, dual action cylinders	Yes
• Controllable pneumatic cylinders, single action cylinders	Yes
Valve type	2 x monostable 4/2-way valve with spring reset
Print area	3 to 8 bar
Rated flow	300 l/min
Valve switching times	20 ms; On, about: 20 ms; Off: 20 ms
Manual operation	Yes, momentary contact
Medium	Compressed air filtered (40 µm), oiled (oil: VG 32), unooled
<b>Dimensions and weight</b>	
Width	87 mm; Spacing 60 mm
Height	173 mm
Depth	88 mm

#### Ordering data

	Order No.
<b>EM 148-P pneumatic module</b> <b>DI 4 x 24 V DC/DO 2 x P</b> With 2 integrated 4/2-way valves	6ES7 148-1DA00-0XA0

#### Accessories

<b>Silencer for pneumatic module</b>	6ES7 194-1EA00-0XA0
<b>Sealing plugs for pneumatic module</b> For using 4/2-way valves as 3/2-way valves, to protect the connections	6ES7 194-1JA00-0XA0

# ET 200 distributed I/Os

## ET 200X

### EM 148-P pneumatic interface

#### Overview



- Interface to accept an original FESTO valve terminal CPV 10 compact performance valve terminal or CPV 14
- For use of the ET 200X for applications with flexible pneumatics
- High level of flexibility in pneumatics thanks to the different valve functions and different flow rate volumes

#### Technical specifications

	6ES7 148-1EH01-0XA0	6ES7 148-1EH11-0XA0
<b>Current consumption</b>		
from load voltage L2+ (including valve), max.	370 mA	520 mA
from backplane bus DC 5 V, max.	35 mA	45 mA
per valve, max.	20 mA	32 mA
Power loss, typ.	6 W	9 W
<b>Pneumatics</b>		
Connection point, pneumatic connect.		
• Number of outputs for valve control	16	16
Print area	3 to 8 bar	3 to 8 bar
Rated flow	400 l/min	800 l/min
Connectable valves	CPV 10 standard spectrum	CPV 14 standard spectrum
Number of connectable valves, max.	8; 8 valve disks (up to 16 valve functions)	8; 8 valve disks (up to 16 valve functions)
Medium	Compressed air, filtered (40 µm), oiled (oil: VG 32), unoiled/vacuum	Compressed air, filtered (40 µm), oiled (oil: VG 32), unoiled/vacuum
<b>Isolation</b>		
Isolation, valve outputs		
• between the channels	Yes	Yes
• between the channels, in groups of	16	16
• between the channels and the backplane bus	Yes; Optocoupler	Yes; Optocoupler
<b>Dimensions and weight</b>		
Width	147 mm; Width module 120 mm	147 mm; Width module 120 mm
Height	152 mm	152 mm
Depth	53 mm	53 mm

#### Ordering data

#### Order No.

##### EM 148-P pneumatic interface

- DO 16 × P/CPV 10 for directly adapting the FESTO valve terminal CPV 10 16 DO × P
- DO 16 × P/CPV 14 for directly adapting the FESTO valve terminal CPV 14 16 DO × P

**6ES7 148-1EH01-0XA0**

**6ES7 148-1EH11-0XA0**

##### FESTO CPV 10 valve terminal

Available from Fa. FESTO

##### FESTO CPV 14 valve terminal

Available from Fa. FESTO  
 FESTO AG & Co  
 Ruitersstr. 82  
 D-73732 Esslingen, Germany  
 Further addresses can be found in the Internet at  
<http://www.festo.de>

#### Overview



- Expansion module with integrated frequency converter for ET 200X
- For driving three-phase AC motors (380 ... 500 V AC) up to 1.5 kW
- Integral component of ECOFAST within the framework of ET 200X DESINA
- Degree of protection IP65
- Can be combined with all ET 200X modules without any restrictions
- Simple configuring and parameterization through PROFIBUS DP using STEP 7 and configuring tools in compliance with standards

#### Technical specifications

	6ES7 148-1FA10-0XB0
<b>Voltages and currents</b>	
Input voltage to VDE	
• permissible range, lower limit (AC)	340 V
• permissible range, upper limit (AC)	500 V
Input voltage to UL	
• permissible range, upper limit (AC)	340 V
• permissible range, lower limit (AC)	480 V
Mains frequency	
• permissible range, lower limit	47 Hz
• permissible range, upper limit	63 Hz
Mains filter	
• integrated	Yes; Type A (to EN 55011)
- Class A	Yes; to EN 55011
Degree of efficiency of the converter, typ.	97%
Operations for power failure bridging time (20 ms)	
• Max. current for $U_e < 380$ V	1.85 A; at 3.8 A approx. 8 ms
• Max. current for $U_e \geq 380$ V	2.1 A; at 3.8 A approx. 8 ms
Continuous current on continued looping of the supply voltage, max.	16 A
Continuous output current at 40 °C	
• at 2 kHz and 4 kHz, max.	3.8 A; Continuous currents > 1.9 A are only permissible if at least one of the following conditions is met: - Ambient temperature < 50 °C; - Continuous input current when the load supply voltage is looped through < 8 A
• at 8 kHz, max.	3 A; Continuous currents > 1.9 A are only permissible if at least one of the following conditions is met: - Ambient temperature < 50 °C ; - Continuous input current when the load supply voltage is looped through < 8 A
• at 16 kHz, max.	1.45 A

	6ES7 148-1FA10-0XB0
Continuous output current at 55 °C	
• at 2 kHz and 4 kHz, max.	2.1 A; Continuous currents > 1.9 A are only permissible if at least one of the following conditions is met: - Ambient temperature < 50 °C; - Continuous input current when the load supply voltage is looped through < 8 A
• at 8 kHz, max.	1.7 A
• at 16 kHz, max.	1.05 A
<b>Current consumption</b>	
from load voltage L+ (without load), max.	125 mA
from backplane bus DC 5 V, typ.	50 mA
Module power loss	
• in intermittent operation, max.	70 W
• in continuous operation, max.	42 W
<b>Drive technology</b>	
Control/mode	
• U/f characteristic	Yes
• four quadrants	Yes
Motor output, Cable length max.	10 m
Overload capability	150%; for 60 s, relative to rated current
Output frequency, min.	0 Hz
Output frequency, max.	300 Hz
Output frequency, resolution	0.01 Hz
<b>Motor</b>	
Rated motor power at 3 x 400 V AC	
• to VDE, max.	1.5 kW
• to UL, max.	2 hp
Power factor (cos phi), min.	0.7
No. of pins	2, 4 or 6
Motor brake	AC (rated voltage according to infeed supply voltage) / max. 1 A
• short-circuit proof	No; internal fuse 4 A provided
Thermistor	Response range about 4 to 5 kOhm; channel related error message: overload

# ET 200 distributed I/Os

## ET 200X

### EM 148-FC frequency converter

#### Technical specifications (continued)

	6ES7 148-1FA10-0XB0
<b>Status information/alarms/diagnostics</b>	
Alarms	
• Diagnostic alarm	Yes
Diagnoses	
• Diagnostics	Yes
Diagnostics indication LED	
• Collective error SF (red)	Yes
• Status indicator STAT (yellow)	Yes
• Monitoring the power supply, power module PWR (green)	Yes
<b>Isolation</b>	
Isolation checked with	2830 V DC
<b>Isolation</b>	
between the load voltages	Yes
between load voltage and all other switching components	Yes

	6ES7 148-1FA10-0XB0
<b>Permissible potential difference</b>	
between different circuits	1500 V AC
<b>Environmental requirements</b>	
Degree and class of protection	
• Protection against	Excess temperature in the converter; Excess temperature in the motor; Overvoltage and undervoltage; Short circuit (motor) and ground fault; No-load protection (interrupt)
<b>Dimensions and weight</b>	
Width	120 mm
Height	265 mm
Depth	181 mm
<b>Weights</b>	
Weight, approx.	3 kg

#### Ordering data

	Order No.
<b>EM 148-FC frequency converter</b>	<b>6ES7 148-1FA10-0XB0</b>
For driving three-phase AC motors (380 V ... 500 V AC) up to 1.5 kW; with integrated mains filter	
<b>Accessories</b>	
<b>Connector for motor outgoing feeder</b>	<b>6ES7 194-1AB01-0XA0</b>
HAN Q8 shielded, assignment to DESINA specification	
<b>Connector set HAN Q8</b>	
for power supply	
• 2.5 mm <sup>2</sup> , 9-pin	<b>3RK1 902-0CA00</b>
• 4 mm <sup>2</sup> , 9-pin	<b>3RK1 902-0CB00</b>
for power transmission	
• 2.5 mm <sup>2</sup> , 9-pin	<b>3RK1 902-0CC00</b>
• 4 mm <sup>2</sup> , 9-pin	<b>3RK1 902-0CD00</b>
<b>Motor cable</b>	
Pre-assembled, shielded, HAN Q8 open end	
• 1.5 m	<b>6ES7 194-1LA01-0AA0</b>
• 3 m	<b>6ES7 194-1LB01-0AA0</b>
• 5 m	<b>6ES7 194-1LC01-0AA0</b>
• 10 m	<b>6ES7 194-1LD01-0AA0</b>
<b>Sealing cap</b>	<b>3RK1 902-0CJ00</b>
for 9-pin power socket, 1 pack = 10 pieces	
<b>Dismantling tool</b>	<b>3RK1 902-0AJ00</b>
for loosening contact pins and contact sockets in 6-pin units	

#### Order No.

	Order No.
<b>Accessories (continued)</b>	
<b>Handheld operator panel</b>	<b>3RK1 902-0AM00</b>
with 0.5 m connecting cable and connector	
<b>Identification plate</b>	<b>6ES7 194-1BA00-0XA0</b>
for identification of inputs and outputs, as item code; 20 frames with 40 nameplates each, 8 x 10 mm, petrol color	
<b>Manual for ET 200X distributed I/O station</b>	
• German	<b>6ES7 198-8FA01-8AA0</b>
• English	<b>6ES7 198-8FA01-8BA0</b>
• French	<b>6ES7 198-8FA01-8CA0</b>
<b>S7 manual collection</b>	<b>6ES7 998-8XC01-8YE0</b>
Electronic manuals on CD, 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)	
<b>S7 Manual Collection update service for 1 year</b>	<b>6ES7 998-8XC01-8YE2</b>
Scope of supply: Up-to-date CD S7 manual collection as well as the three subsequent updates	

#### Overview



- For switching and protecting any three-phase load
- Direct-on-line or reversing starters
- Electromechanical or solid-state
- Power bus can be plugged in using the new HAN Q8 plug-in connectors
- Conductor cross-sections up to 4 mm<sup>2</sup>
- 35 A per segment
- Supplied with different brake contacts as an option

#### Application

Any three-phase load, e.g. three-phase motors, can be switched and protected with the ET 200X via motor starters.

Motor starters are available in two variants:

- *Electromechanical motor starters*  
for electrical isolation of loads from the supply
- *Electronic motor starters*
  - can be used for high starting frequency
  - The response in the event of overload can be specifically configured, e.g. emergency operation on overload, remote reset via bus following overload tripping


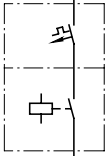


Motor starters can be operated with a handheld operator panel which makes start-up easier.

# ET 200 distributed I/Os



## ET 200X

### ET 200X motor starter

#### Selection and Ordering data

	Version	Order No.
<b>Expansion modules for electromechanical motor starters</b>		
 	<b>Expansion module EM 300 DS</b> Electromechanical direct-on-line starter	3RK1 300- <span style="color: blue;">■</span> <span style="color: blue;">■</span> S01-0AA <span style="color: blue;">■</span>
	<b>Expansion module EM 300 RS</b> Electromechanical reversing starter	3RK1 300- <span style="color: blue;">■</span> <span style="color: blue;">■</span> S01-1AA <span style="color: blue;">■</span>
	<i>Three-phase motor</i> <i>4-pole at 400 V AC standard output P in kW</i>	<i>Setting range of the overcurrent release in A</i>
	< 0.06	0.14 up to 0.20
	0.06	0.18 up to 0.25
	0.09	0.22 up to 0.32
	0.10	0.28 up to 0.40
	0.12	0.35 up to 0.50
	0.18	0.45 up to 0.63
	0.21	0.55 up to 0.80
	0.25	0.70 up to 1.00
	0.37	0.90 up to 1.25
	0.55	1.1 up to 1.6
	0.75	1.4 up to 2.0
	0.90	1.8 up to 2.5
	1.1	2.2 up to 3.2
	1.5	2.8 up to 4.0
	1.9	3.5 up to 5.0
	2.2	4.5 up to 6.3
	3.0	5.5 up to 8.0
	4.0	7 up to 10
	5.5	9 up to 12
	<ul style="list-style-type: none"> <li>• Standard version</li> <li>• Version with brake contact for 24 V DC/3 A externally-fed brakes</li> <li>• Design with brake contact for 400 V AC/0.5 A infeed for brake rectifier</li> <li>• Version with brake contact for DC-side switching of the brake with 500 V DC/0.2 A</li> </ul>	0 B 0 C 0 D 0 E 0 F 0 G 0 H 0 J 0 K 1 A 1 B 1 C 1 D 1 E 1 F 1 G 1 H 1 J 1 K 0 1 3 4
<b>Expansion module for solid-state motor starter</b>		
 	<b>Expansion module EM 300 EDS</b> Solid-state direct-on-line starter	3RK1 300- <span style="color: blue;">■</span> <span style="color: blue;">■</span> S10-0AA <span style="color: blue;">■</span>
	<b>Expansion module EM 300 ERS</b> Solid-state reversing starter	3RK1 300- <span style="color: blue;">■</span> <span style="color: blue;">■</span> S10-1AA <span style="color: blue;">■</span>
	<i>Three-phase motor</i> <i>4-pole at 400 V AC standard output P in kW</i>	<i>Setting range of the overcurrent release in A</i>
	0.18 up to 0.80	0.60 up to 2.18
	0.75 up to 2.20	2.00 up to 5.95
	<ul style="list-style-type: none"> <li>• Standard version</li> <li>• Version with brake contact for 24 V DC/3 A externally-fed brakes</li> <li>• Design with brake contact for 400 V AC/0.5 A infeed for brake rectifier</li> <li>• Version with brake contact for DC-side switching of the brake with 500 V DC/0.2 A</li> </ul>	0 A 0 B 0 1 3 4

Selection and Ordering data (continued)




	Version	Order No.
<i>Accessories for DC 24 V</i>		
 <p>6ES7 194-1AA00-0XA0</p>	<b>Manual</b> <ul style="list-style-type: none"> <li>• German</li> <li>• English</li> <li>• French</li> </ul>	<b>6ES7 198-8FA01-8AA0</b> <b>6ES7 198-8FA01-8BA0</b> <b>6ES7 198-8FA01-8CA0</b>
	<b>Connecting plug</b> for PROFIBUS DP, control and auxiliary voltage (including two conduit threads)	<b>6ES7 194-1AA00-0XA0</b>
 <p>6ES7 194-1KA01-0XA0</p>	<b>Cable</b> for bus and control voltage 5-core Unprepared Any length <sup>1)</sup> <ul style="list-style-type: none"> <li>• PVC</li> <li>• PUR                              Can be trailed                              Oil-resistant                              Partially weld-resistant</li> </ul>	<b>6ES7 194-1LY00-0AA0</b> <b>6ES7 194-1LY10-0AA0</b>
	<b>M12 coupler plug</b> <ul style="list-style-type: none"> <li>• 5-pole                              for connecting actuators and sensors</li> <li>• 4-pole                              shielded                              for connecting the analog expansion modules</li> </ul>	<b>3RX8 000-0CD55</b>  Available from: Franz Binder GmbH & Co, PO BOX 11 52D, 74148 Neckarsulm, Germany
<b>M12 angular coupler plug</b> <ul style="list-style-type: none"> <li>• 5-pole                              for connecting actuators and sensors</li> <li>• 4-pole                              shielded                              for connecting the analog expansion modules</li> </ul>	<b>3RX8 000-0CE55</b>  Available from: Franz Binder GmbH & Co, PO BOX 11 52D, 74148 Neckarsulm, Germany	
<b>M12 Y-coupling connector</b> 5-pole for connecting two sensors with a single cable	<b>6ES7 194-1KA01-0XA0</b>	
<b>M12 sealing caps</b> for closing unused input or output sockets (each set contains ten sealing caps)	<b>3RK1 901-1KA00</b>	

# ET 200 distributed I/Os





## ET 200X

### ET 200X motor starter

#### Selection and Ordering data (continued)

	Version	Order No.
<i>Accessories for motor starter EM 300, 9-pole connector (Han Q8/0)</i>		
 <p>3RK1 902-0CA00</p>	<b>Connector set for power supply</b> 9-pole Comprising: one connector housing with Pg 16 screw connection one socket holder, 9-pole six contact sockets, suitable for cable <ul style="list-style-type: none"> <li>• 4 x 2.5 mm<sup>2</sup>, 6 x 2.5 mm<sup>2</sup></li> <li>• 4 x 4 mm<sup>2</sup>, 6 x 4 mm<sup>2</sup></li> </ul>	<b>3RK1 902-0CA00</b> <b>3RK1 902-0CB00</b>
	 <p>3RK1 902-0CC00</p>	<b>Connector set for power transmission</b> 9-pole Comprising: one connector housing with Pg 16 screw connection one pin holder, 9-pole six contact pins, suitable for cable <ul style="list-style-type: none"> <li>• 6 x 2.5 mm<sup>2</sup></li> <li>• 4 x 4 mm<sup>2</sup>, 6 x 4 mm<sup>2</sup></li> </ul>
 <p>3RK1 902-0CH00</p>	<b>Connector set for motor connection</b> 1.5 mm <sup>2</sup> 9-pole Comprising: one connector housing with Pg 16 screw connection one pin holder, 9-pole eight contact pins 1.5 mm <sup>2</sup>	<b>3RK1 902-0CE00</b>
	<b>Sealing cap</b> for 9-pole power socket (-X3) <ul style="list-style-type: none"> <li>• One set comprises ten sealing caps</li> <li>• One set comprises one sealing cap</li> </ul>	<b>3RK1 902-0CJ00</b> <b>3RK1 902-0CK00</b>
	<b>Power connecting cable</b> 0.12 m long <ul style="list-style-type: none"> <li>• From the motor starter to the frequency converter, DESINA               <ul style="list-style-type: none"> <li>- 5 x 4 mm<sup>2</sup>, without brake lead</li> <li>- 7 x 4 mm<sup>2</sup>, with brake lead</li> </ul> </li> <li>• From motor starter to motor starter               <ul style="list-style-type: none"> <li>- 4 x 4 mm<sup>2</sup></li> <li>- 6 x 4 mm<sup>2</sup></li> </ul> </li> </ul>	<b>3RK1 902-0CF00</b> <b>3RK1 902-0CU00</b> <b>3RK1 902-0CG00</b> <b>3RK1 902-0CH00</b>
	<b>Motor connection cable, 4 x 1.5 mm<sup>2</sup></b> with power connector 9-pole <ul style="list-style-type: none"> <li>• 1.5 m</li> <li>• 3 m</li> <li>• 5 m</li> <li>• 10 m</li> </ul>	<b>3RK1 902-0CL00</b> <b>3RK1 902-0CM00</b> <b>3RK1 902-0CP00</b> <b>3RK1 902-0CQ00</b>
	<b>Motor connection cable, 6 x 1.5 mm<sup>2</sup></b> with power connector 9-pole <ul style="list-style-type: none"> <li>• 3 m</li> <li>• 5 m</li> <li>• 10 m</li> </ul>	<b>3RK1 902-0CN00</b> <b>3RK1 902-0CR00</b> <b>3RK1 902-0CS00</b>

#### Selection and Ordering data (continued)

	Version	Order No.
<b>Mounting accessories</b>		
 3RK1 194-1GA.0-0XA0	<b>Single mounting rails for SIMATIC ET 200X (narrow)</b> <ul style="list-style-type: none"> <li>• 400 mm long for basic module + three expansion modules (60 mm)</li> <li>• 640 mm long for basic module + seven expansion modules (60 mm)</li> <li>• 2000 mm long for customer-specific lengths</li> </ul>	<b>6ES7 194-1GA00-0XA0</b>  <b>6ES7 194-1GA10-0XA0</b>  <b>6ES7 194-1GA20-0XA0</b>
	 3RK1 902-0AH00	<b>Double mounting rails for SIMATIC ET 200X (wide)</b> <ul style="list-style-type: none"> <li>• 520 mm long for basic module + one expansion module (60 mm) + two motor starters/frequency converters</li> <li>• 1,000 mm long for basic module + one expansion module (60 mm) + six motor starters/frequency converters</li> </ul>
	<b>Fastening screws</b> M5 x 20 One set contains 100 fastening screws	<b>6ES7 194-1KC00-0XA0</b>
	<b>Crimping tool</b> for contact pins and contact sockets in one size from <ul style="list-style-type: none"> <li>• 1.5 to 2.5 mm<sup>2</sup></li> <li>• 1.5 to 4 mm<sup>2</sup></li> </ul>	<b>3RK1 902-0AH00</b> <b>3RK1 902-0CT00</b>
	<b>Disassembly tool</b> for disassembling male and female contacts in 9-pole inserts	<b>3RK1 902-0AJ00</b>
<b>Miscellaneous accessories</b>		
 3RK1 902-0AM00	<b>Handheld operator panel for startup</b> with 0.5 m connecting cable and plug connector	<b>3RK1 902-0AM00</b>
 6ES7 194-1BA00-0XA0	<b>Identification plate</b> for labeling the inputs and outputs as well as item code One set contains 20 frames with 40 labels each, 8 x 10 mm, petrol color	<b>6ES7 194-1BA00-0XA0</b>

1) The suffix "-Z" must be appended to the order number and the length must be specified in plain text. Example of a cable with a PVC sheath and a length of 35 m:  
**6ES7 194-1LY00-0AA0-Z**  
**Y01 35 m**

# ET 200 distributed I/Os

## ET 200X

### SITOP power, 24 V/10 A power supply

#### Overview



- Primary clocked power supply for the ET 200X
- Adapted in terms of design and functionality
- Can be installed without expensive wiring
- The separate screw terminals to tap voltage mean that it can also be used for other applications



Note:  
For further information on SITOP power supplies  
see Catalog KT 10.1

#### Application

Power supply unit with degree of protection IP65, design and functionality optimally matched to ET 200X distributed I/O devices. When using without ET 200X, the connector seal accessory is required.

#### Technical specifications

<b>Power supply, type</b>	<b>10 A</b>
<b>Order No.</b>	6EP1 334-2CA00
<b>Input</b>	Single-phase AC
Rated voltage $V_{in \text{ rated}}$	120/230 V AC Settable using wire jumper
Voltage range	93 to 132/187 to 264 V AC
Overvoltage strength	$2.3 \times V_{in \text{ rated}}$ , 1.3 ms
Mains buffering at $I_{out \text{ rated}}$	> 20 ms at $V_{in} = 93/187 \text{ V}$
Rated line frequency; range	50/60 Hz; 47 to 63 Hz
Rated current $I_{in \text{ rated}}$	4.3/2.6 A
Inrush current limitation (+25 °C)	< 65 A, typ. 3 ms
$I^2t$	< 2.5 A <sup>2</sup> s
Integrated line-side fuse	T 6.3 A/250 V (not accessible)
Recommended circuit-breaker (IEC 898) in mains supply line	From 16 A, Characteristic C
<b>Output</b>	Stabilized, floating direct voltage
Rated voltage $V_{out \text{ rated}}$	<b>24 V DC</b>
Total tolerance	± 3 %
• Stat. mains compensation	Approx. 0.2 %
• Stat. load compensation	Approx. 1 %
Residual ripple (clock frequency: approx. 50 kHz)	< 150 mV <sub>pp</sub>
Spikes (bandwidth: 20 MHz)	< 240 mV <sub>pp</sub>
Setting range	22.8 to 25.2 V
Status display	Green LED for 24 V O.K.
Power ON/OFF behavior	No overshoot of $V_{out}$ (soft start)
Starting delay/voltage rise	< 3 s/typ. 80 ms
Rated current $I_{out \text{ rated}}$	<b>10 A</b>
Current range	
• Up to +45 °C	0 to 10 A (up to +40 °C)
• Up to +60 °C	0 to 8 A (up to +55 °C)
Dyn. $V/I$ with	
• Starting on short circuit	-
• Short-circuit in operation	typ. 38 A for 200 ms
Parallel connection for increased output	Yes, 2
<b>Efficiency</b>	
Efficiency at $V_{out \text{ rated}}$ , $I_{out \text{ rated}}$	Approx. 87 %
Power loss at $V_{out \text{ rated}}$ , $I_{out \text{ rated}}$	Approx. 36 W
<b>Control</b>	
Dyn. mains compensation ( $V_{in \text{ rated}} \pm 15 \%$ )	± 0.3 % $V_{out}$
Dyn. load compensation ( $I_{out}$ : 50/100/50 %)	± 5 % $V_{out}$
Settling time	
• Load step from 50 to 100 %	typ. 0.2 ms
• Load step from 100 to 50 %	typ. 0.2 ms

<b>Power supply, type</b>	<b>10 A</b>
<b>Protection and monitoring</b>	
Output overvoltage protection	Yes, acc. to EN 60950
Current limitation type	typ. 9 to 11 A
Short-circuit protection	Choice of automatic restart or latching shutdown
RMS sustained short-circuit current	< 21 A
Overload/short-circuit indicator	Red LED for overtemperature switch-off
<b>Safety</b>	
Galvanic isolation primary/secondary	Yes, SELV output voltage $V_{out}$ acc. to EN 60950
Protective class	Class I
Discharge current	< 3.5 mA (typ. 0.9 mA)
TÜV test	Yes
CE marking	Yes
UL/cUL (CSA) approval	Yes, UL listed (UL 508), File E143289, CSA (CSA 22.2 No. 14-95)
FM approval	-
Appr. for use in marine vessels	-
Degree of protection (EN 60529)	IP65
<b>EMC</b>	
Interference emission	EN 55011 Class A
Line harmonics limitation	-
Interference immunity	EN 61000-6-2
<b>Operating specifications</b>	
Ambient temperature range	-25 to +55 °C (power derating above +40 °C)
Transportation and storage temperature range	-40 to +70 °C
Humidity rating	Climatic class 3K3 acc. to EN 60721, no condensation
<b>Mechanical specifications</b>	
Connections	
• Mains input L, N, PE	Screw-type terminals 0.5 to 2.5 mm <sup>2</sup> (PG11 screwed gland)
• Output L+	Screw terminals, or connection via expansion interface on the back-plane bus of the ET 200X
• Output M	Screw terminals, or connection via expansion interface on the back-plane bus of the ET 200X
Dimensions (W x H x D) in mm	140 x 270 x 126
Weight approx.	1.7 kg
Mounting	Wall mounting, any mounting position
<b>Accessories</b>	IP65 connector seal

#### Ordering data

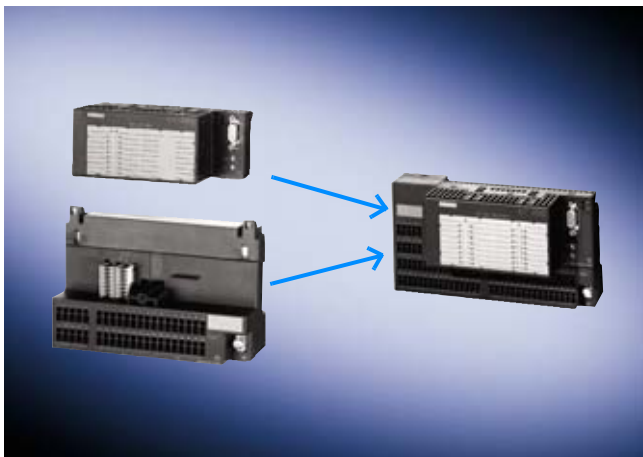
Ordering data	Order No.
<b>SITOP power 24 V/10 A power supply for ET 200X</b> 120/230 V AC; 24 V DC, 10 A	<b>6EP1 334-2CA00</b>
<b>SITOP power accessories connector seal IP65</b> required for the power supply to operate in standalone mode	<b>6EP1 971-2CA00</b>

# ET 200 distributed I/Os

## ET 200L

### ET 200L block I/O

#### Design



ET 200L block I/O (with 16 channels)

The SIMATIC ET 200L compact I/O station comprises

- one terminal block and
- one electronic module

Connection to the PROFIBUS DP field bus is through the interface integrated in the electronic module.

The ET 200L block I/O is not expandable.

#### Terminal block

The terminal block accommodates the electronic module. It carries the wiring, so that no cables need to be separated when the electronic module is replaced. The terminal block can be mounted on a standard rail.

In addition to horizontal mounting all other mounting positions are permissible.

A total of 4 terminal blocks are available for SIMATIC ET 200L:

- 16 channels with screw-type terminals or spring-type terminals
- 32 channels with screw-type terminals or spring-type terminals

#### Electronic module

The electronic modules contain the digital input and output channels.

The following digital electronic modules are available for 24 V DC:

- 16 DI; with 16 digital inputs
- 16 DO; with 16 digital outputs, 0.5 A
- 32 DI; with 32 digital inputs
- 32 DO; with 32 digital outputs, 0.5 A
- 16 DI/16 DO; with 16 digital inputs and outputs, 0.5 A.

Blocks for AC:

- 16 DO/1 A
- 16 DO/ 2 A
- 16 DI
- 8 DI/8 RO/2 A

#### PROFIBUS DP station address

The address of the compact ET 200L I/O station is set on the electronic module by way of a rotary coding switch.

Bus line termination:

If the ET 200L is used at the end of a bus segment, it requires a bus connector with terminating resistance.

#### Accessories

Perforated labeling sheets (DIN A4) suitable for machine printing are available as accessories.

The terminal blocks come with 2-wire connection as standard. Optional supplementary terminals enable the use of 3-wire or 4-wire connections.

#### Technical specifications – general

Connection method	Screw-type terminals and spring-loaded terminals, fixed wiring; Standard: 2-wire method Optional: 3-wire and 4-wire connection
Data transmission rate, max.	1.5 Mbit/s
Direct data exchange	Sender (for digital outputs and ET 200L mixed modules; not for L-SC or IM-SC)
Galvanic isolation	Yes, between PROFIBUS DP and internal electronics
Supply voltage	24 V DC, reverse polarity protection
Degree of protection	IP20

Ambient temperature on vertical wall (preferred installation position)	<ul style="list-style-type: none"> <li>• With horizontal installation 0 °C to +60 °C</li> <li>• With other installation 0 to 40 °C</li> </ul>
Relative humidity	5 to 95 % (RH severity level 2 in accordance with IEC 1131-2)
Atmospheric pressure	795 to 1080 hPa
Mechanical rating:	
• Vibration	IEC 68, Part 2 – 6 10 - 57 Hz (const. amplitude 0.075 mm) 57 - 150 Hz (constant acceleration 1 g)
• Shock	IEC 68, Part 2–27 Half-sine, 15 g, 11 ms

#### Technical specifications

	6ES7 131-1BH01-0XB0	6ES7 131-1BL01-0XB0
<b>Supply voltages</b>		
Rated value		
• DC 24 V	Yes	Yes
• Reverse polarity protection	Yes	Yes
<b>Hardware config.</b>		
Rack		
• Required terminal block	TB 16L	TB 32L
<b>Connection point</b>		
Inputs/outputs	Screw and spring-latch techniques, in vertical wiring; standard: 2-wire technique optional: 3-wire and 4-wire techniques	Screw and spring-latch techniques, in vertical wiring; standard: 2-wire technique optional: 3-wire and 4-wire techniques
<b>PROFIBUS DP</b>		
Transmission speed, max.	1.5 Mbit/s	1.5 Mbit/s
direct data exchange (cross traffic)	Yes; Transmitter (for digital outputs and hybrid modules ET 200L: not for L-SC or IM-SC)	Yes; Transmitter (for digital outputs and hybrid modules ET 200L: not for L-SC or IM-SC)
<b>Digital inputs</b>		
Number of digital inputs	16	32
Cable length		
• Cable length for NAMUR input, shielded, max.	1,000 m	1,000 m
Input voltage		
• Rated value, DC	24 V	24 V
• for signal "0"	-30V to 5 V	-30V to 5 V
• for signal "1"	13 to 30 V	13 to 30 V
Input current		
• for signal "1", typ.	5 mA	5 mA
Input delay (for rated value of input voltage)		
• for standard inputs		
- at "0" to "1", min.	2 ms	2 ms
- at "0" to "1", max.	4.5 ms	4.5 ms

	6ES7 131-1BH01-0XB0	6ES7 131-1BL01-0XB0
<b>Isolation</b>		
between PROFIBUS DP all other circuits	Yes	Yes
Galvanic isolation, digital inputs		
• between the channels	No	No
• between the channels and PROFIBUS DP	Yes	Yes
<b>Environmental requirements</b>		
Operating temperature		
• horizontal installation, min.	0 °C	0 °C
• horizontal installation, max.	60 °C; 40°C for other mountings	60 °C; 40°C for other mountings
Air pressure		
• permissible range, min.	795 hPa	795 hPa
• permissible range, max.	1,080 hPa	1,080 hPa
Relative humidity		
• Operation, min.	5%	5%
• Operation, max.	95%; RH stressing level 2 in accordance with IEC 1131-2	95%; RH stressing level 2 in accordance with IEC 1131-2
Vibrations		
• Operation checked according to IEC 60068-2-6	Yes; IEC 68, Part 2-6 10 - 57 Hz (const. amplitude 0.075 mm) 57 - 150 Hz (constant acceleration 1 g)	Yes; IEC 68, Part 2-6 10 - 57 Hz (const. amplitude 0.075 mm) 57 - 150 Hz (constant acceleration 1 g)
Shock test		
• checked according to IEC 60068-2-27	Yes; IEC 68, Part 2-27 half sine, 15 g, 11 ms	Yes; IEC 68, Part 2-27 half sine, 15 g, 11 ms
Degree and class of protection		
• IP 20	Yes	Yes

# ET 200 distributed I/Os

## ET 200L

### ET 200L block I/O

#### Technical specifications (continued)

	6ES7 132-1BH00-0XB0	6ES7 132-1BL00-0XB0
<b>Supply voltages</b>		
Rated value		
• DC 24 V	Yes	Yes
• Reverse polarity protection	Yes	Yes
<b>Voltages and currents</b>		
Mains/voltage failure jumpering, min.	20 ms	20 ms
Load voltage 2L+		
• Rated value (DC)	24 V; 1L+, 2L+, 3L+	24 V; 1L+, 2L+, 3L+
<b>Current consumption</b>		
from load voltage L1 (without load), max.	50 mA; per load group (from L1+ or L2+ / L3+)	100 mA; per load group (from L1+ or L2+ / L3+)
from supply voltage L+, max.	70 mA; L4+ / L5+	70 mA; L4+ / L5+
Power loss, typ.	5 W	7 W
<b>Hardware config.</b>		
Rack		
• Required terminal block	TB 16L	TB 32L
<b>Communication functions</b>		
Bus protocol/transmission protocol	PROFIBUS-DP	PROFIBUS-DP
<b>Connection point</b>		
Inputs/outputs	Screw and spring-latch techniques, in vertical wiring; standard: 2-wire technique optional: 3-wire and 4-wire techniques	Screw and spring-latch techniques, in vertical wiring; standard: 2-wire technique optional: 3-wire and 4-wire techniques
<b>PROFIBUS DP</b>		
Transmission speed, max.	1.5 Mbit/s	1.5 Mbit/s
SYNC capability	Yes	Yes
direct data exchange (cross traffic)	Yes; Transmitter (for digital outputs and hybrid modules ET 200L: not for L-SC or IM-SC)	Yes; Transmitter (for digital outputs and hybrid modules ET 200L: not for L-SC or IM-SC)
<b>Digital outputs</b>		
Number of digital outputs	16	32
cable length, shielded, max.	1,000 m	1,000 m
Cable length unshielded, max.	600 m	600 m
Short-circuit protection of the output	Yes; electronic	Yes; electronic
Response threshold, typ.	0.7 A	0.7 A
Limitation of inductive shutdown voltage to	typically L1+ (-55 V) or L2+ / L3+ (-55 V)	typically L1+ (-55 V) or L2+ / L3+ (-55 V)
Lamp load, max.	5 W	5 W
Controlling a digital input	Yes	Yes
Output voltage		
• Rated value (DC)	24 V	24 V
• for signal "1", min.	U <sub>a</sub> - 3 V	U <sub>a</sub> - 3 V

	6ES7 132-1BH00-0XB0	6ES7 132-1BL00-0XB0
Output current		
• for signal "1" permissible range for 0 to 60 °C, max.	0.5 A	0.5 A
• for signal "0" residual current, max.	1 mA	1 mA
Output delay with resistive load		
• "0" to "1", max.	50 ms	50 ms
• "1" to "0", max.	200 ms	200 ms
Parallel switching of 2 outputs		
• for increased power	No	No
• for redundant control of a load	Yes; only outputs of the same group	Yes; only outputs of the same group
Switching frequency		
• with resistive load, max.	100 Hz	100 Hz
• with inductive load, max.	0.5 Hz	0.5 Hz
• on lamp load, max.	8 Hz	8 Hz
Aggregate current of the outputs (per group)		
• all other mounting positions - up to 40 °C, max.	2 A	2 A
• up to 60 °C, max.	4 A	4 A
• horizontal arrangement, to 40 °C, max.	3,000 mA	3,000 mA
• horizontal arrangement, to 60 °C, max.	2,000 mA	2,000 mA
Load impedance range		
• lower limit	41 Ω	41 Ω
• upper limit	28,000 Ω	28,000 Ω
<b>Status information/alarms/ diagnostics</b>		
Alarms		
• Alarms	No	No
Diagnoses		
• Diagnostic functions	Yes	Yes
Diagnoses indication LED		
• Bus error BF (red)	Yes	Yes
• Status indicator digital output (green)	Yes	Yes
• Status indicator digital input (green)	Yes	Yes
• Monitoring 24 V voltage supply ON (green)	Yes	Yes
<b>Isolation</b>		
Isolation checked with	500 V DC	500 V DC
<b>Isolation</b>		
between PROFIBUS DP all other circuits	Yes	Yes
Isolation, digital outputs		
• between the channels	No	No
• between the channels and PROFIBUS DP	Yes; Optocoupler	Yes

#### Technical specifications (continued)

	6ES7 132-1BH00-0XB0	6ES7 132-1BL00-0XB0
<b>Environmental requirements</b>		
Operating temperature		
• horizontal installation, min.	0 °C	0 °C
• horizontal installation, max.	60 °C; 40°C for other mountings	60 °C; 40°C for other mountings
Air pressure		
• permissible range, min.	795 hPa	795 hPa
• permissible range, max.	1,080 hPa	1,080 hPa
Relative humidity		
• Operation, min.	5%	5%
• Operation, max.	95%; RH stressing level 2 in accordance with IEC 1131-2	95%; RH stressing level 2 in accordance with IEC 1131-2
Vibrations		
• Operation checked according to IEC 60068-2-6	Yes; IEC 68, Part 2-6 10 - 57 Hz (const. amplitude 0.075 mm) 57 - 150 Hz (constant acceleration 1 g)	Yes; IEC 68, Part 2-6 10 - 57 Hz (const. amplitude 0.075 mm) 57 - 150 Hz (constant acceleration 1 g)
Shock test		
• checked according to IEC 60068-2-27	Yes; IEC 68, Part 2-27 half sine, 15 g, 11 ms	Yes; IEC 68, Part 2-27 half sine, 15 g, 11 ms
Degree and class of protection		
• IP 20	Yes	Yes
<b>General information</b>		
Vendor identification (VendorID)	0016h	0011h
<b>Dimensions and weight</b>		
Width	145 mm	145 mm
Height	60 mm	60 mm
Depth	60.5 mm	60.5 mm
<b>Weights</b>		
Weight, approx.	130 g	150 g
<b>6ES7 133-1BL01-0XB0</b>		
<b>Supply voltages</b>		
Rated value		
• DC 24 V	Yes	
• Reverse polarity protection	Yes	
<b>Hardware config.</b>		
Rack		
• Required terminal block	TB 32L	
<b>Connection point</b>		
Inputs/outputs	Screw and spring-latch techniques, in vertical wiring; standard: 2-wire technique optional: 3-wire and 4-wire techniques	
<b>PROFIBUS DP</b>		
Transmission speed, max.	1.5 Mbit/s	
direct data exchange (cross traffic)	Yes; Transmitter (for digital outputs and hybrid modules ET 200L: not for L-SC or IM-SC)	
<b>Digital inputs</b>		
Number of digital inputs	16	

	6ES7 133-1BL01-0XB0
Cable length	
• Cable length for NAMUR input, shielded, max.	1,000 m
Input voltage	
• Rated value, DC	24 V
• for signal "0"	-30 V to 5 V
• for signal "1"	13 to 30 V
Input current	
• for signal "1", typ.	5 mA
Input delay (for rated value of input voltage)	
• for standard inputs	
- at "0" to "1", min.	2 ms
- at "0" to "1", max.	4.5 ms
<b>Digital outputs</b>	
Number of digital outputs	16
cable length, shielded, max.	1,000 m
Short-circuit protection of the output	Yes; electronic
Output voltage	
• Rated value (DC)	24 V
• for signal "1", min.	U <sub>a</sub> - 3 V
Output current	
• for signal "1" permissible range for 0 to 60 °C, max.	0.5 mA
• for signal "0" residual current, max.	1 mA
Switching frequency	
• with resistive load, max.	100 Hz
• with inductive load, max.	0.5 Hz
• on lamp load, max.	8 Hz
Aggregate current of the outputs (per group)	
• horizontal installation	
• up to 60 °C, max.	4 A
<b>Isolation</b>	
between PROFIBUS DP all other circuits	Yes
Galvanic isolation, digital inputs	
• between the channels	No
• between the channels and PROFIBUS DP	Yes
<b>Environmental requirements</b>	
Operating temperature	
• horizontal installation, min.	0 °C
• horizontal installation, max.	60 °C; 40°C for other mountings
Air pressure	
• permissible range, min.	795 hPa
• permissible range, max.	1,080 hPa
Relative humidity	
• Operation, min.	5%
• Operation, max.	95%; RH stressing level 2 in accordance with IEC 1131-2
Vibrations	
• Operation checked according to IEC 60068-2-6	Yes; IEC 68, Part 2-6 10 - 57 Hz (const. amplitude 0.075 mm) 57 - 150 Hz (constant acceleration 1 g)
Shock test	
• checked according to IEC 60068-2-27	Yes; IEC 68, Part 2-27 half sine, 15 g, 11 ms
Degree and class of protection	
• IP 20	Yes

# ET 200 distributed I/Os

## ET 200L

### ET 200L block I/O

#### Technical specifications (continued)

	6ES7 193-1CH00-0XA0	6ES7 193-1CH10-0XA0	6ES7 193-1CH20-0XA0	6ES7 193-1CL00-0XA0	6ES7 193-1CL10-0XA0
<b>Dimensions and weight</b>					
Width	145 mm	145 mm	191 mm	191 mm	191 mm
Height	100 mm; Height with electronics block from top edge of DIN rail (with bus connector): 6ES7 972-0CA30-0XA0): 82 mm	100 mm; Height with electronics block from top edge of DIN rail (with bus connector): 6ES7 972-0CA30-0XA0): 82 mm	100 mm; Height with electronics block from top edge (with bus connector): 98.5 mm	100 mm; Height with electronics block from top edge of DIN rail (with bus connector): 6ES7 972-0CA30-0XA0): 82 mm	100 mm; Height with electronics block from top edge of DIN rail (with bus connector): 6ES7 972-0CA30-0XA0): 82 mm
Depth	40.5 mm	40.5 mm	40.5 mm	40.5 mm	40.5 mm
<b>Weights</b>					
Weight, approx.	230 g	230 g	283 g	350 g	350 g

#### Ordering data

##### Electronic block for ET 200L

With digital inputs/outputs for 24 V DC

- 16 DI
- 32 DI
- 16 DO; 0.5 A
- 32 DO; 0.5 A
- 16 DI/16 DO; 0.5 A

**6ES7 131-1BH01-0XB0**

**6ES7 131-1BL01-0XB0**

**6ES7 132-1BH00-0XB0**

**6ES7 132-1BL00-0XB0**

**6ES7 133-1BL01-0XB0**

##### Terminal block for ET 200L and ET 200L-SC

For mounting the electronic blocks

###### TB 16L

- 16 channels, screw-type terminals
- 16 channels, spring-loaded terminals

**6ES7 193-1CH00-0XA0**

**6ES7 193-1CH10-0XA0**

###### TB 32L

- 32 channels, screw-type terminals
- 32 channels, spring-loaded terminals

**6ES7 193-1CL00-0XA0**

**6ES7 193-1CL10-0XA0**

###### TB 16L AC

- 16 channels, screw-type terminals

**6ES7 193-1CH20-0XA0**

##### Add-on terminal for ET 200L and ET 200L-SC

16 channels; 1 tier

- Screw-type terminals
- Spring-loaded terminals

**6ES7 193-1FH20-0XA0**

**6ES7 193-1FH50-0XA0**

16 channels; 2 tiers

- Screw-type terminals
- Spring-loaded terminals

**6ES7 193-1FH30-0XA0**

**6ES7 193-1FH60-0XA0**

32 channels; 1 tier

- Screw-type terminals
- Spring-loaded terminals

**6ES7 193-1FL20-0XA0**

**6ES7 193-1FL50-0XA0**

32 channels; 2 tiers

- Screw-type terminals
- Spring-loaded terminals

**6ES7 193-1FL30-0XA0**

**6ES7 193-1FL60-0XA0**

#### Order No.

##### Accessories

##### Labeling sheet with strips for 10 electronic blocks for

- 16-channel electronic blocks incl. add-on terminals
- 32-channel electronic blocks incl. add-on terminals

**6ES7 193-1BH00-0XA0**

**6ES7 193-1BL00-0XA0**

##### PROFIBUS bus connector

- 90° cable outlet, FastConnect terminating resistor with isolating function, without PG socket, up to 12 Mbit/s
- Angular outgoing cable, insulation displacement terminals, without bus terminating resistor, without PG connection socket, up to 1.5 Mbit/s
- 90° cable outlet, FastConnect terminating resistor with isolating function, with PG socket, up to 12 Mbit/s

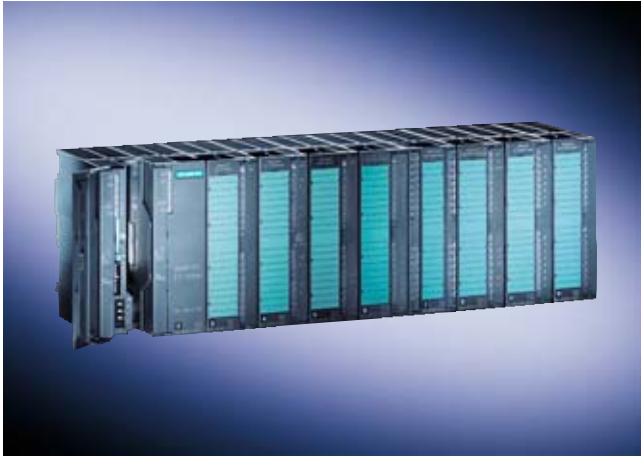
**6ES7 972-0BA50-0XA0**

**6ES7 972-0BA30-0XA0**

**6ES7 972-0BB50-0XA0**

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#### Application



- Modular I/O system with degree of protection IP20, particularly suitable for user-specific and complex automation tasks.
- 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)
- Comprises a PROFIBUS DP interface with IM 153, up to eight S7-300 I/O modules (set up with bus connectors or active bus modules) and, if applicable, a power supply unit.
- Modules can be replaced during operation (hot swapping) with the bus modules active
- Can be supplied with integrated fiber optic interface if required
- Transmission rates up to 12 Mbit/s
- Ex approval to Cat. 3 for Zone 2 acc. to ATEX100 a
- Fail-safe digital inputs and outputs as well as analog inputs for safety-related signal processing according to PROFIsafe.

#### Technical specifications – General

Connection method	Screw-type and spring-loaded method, hard-wired
Degree of protection	IP20
Ambient temperature on vertical wall (preferred installation position)	<ul style="list-style-type: none"> <li>• With horizontal installation 0 ... + 60 °C</li> <li>• With other installation 0 ... + 40 °C</li> </ul>
Relative humidity	5 ... 95 % (RH severity level 2 in accordance with IEC 1131-2)
Atmospheric pressure	795 to 1080 hPa
Mechanical strength	<ul style="list-style-type: none"> <li>• Vibration IEC 68, Part 2 - 6: 10 ... 57 Hz (const. amplitude 0.075 mm) 57 ... 150 Hz (constant acceleration 1 g)</li> <li>• Shock IEC 68, Part 2-27 Half-sine, 15 g, 11 ms</li> </ul>

#### Ordering data

#### Order No.

<b>Peripheral modules, profile rail, accessories</b>	See Catalog ST 70
<b>PROFIBUS bus connector</b>	
90° cable outlet	
terminating resistor with isolating function, up to 12 Mbit/s	
<ul style="list-style-type: none"> <li>• without PG socket</li> <li>• with PG socket</li> </ul>	<b>6ES7 972-0BA12-0XA0</b> <b>6ES7 972-0BB12-0XA0</b>
Insulation displacement method, FastConnect	
<ul style="list-style-type: none"> <li>• without PG socket</li> <li>• with PG socket</li> </ul>	<b>6ES7 972-0BA50-0XA0</b> <b>6ES7 972-0BB50-0XA0</b>
Angular outgoing cable	
insulation displacement terminals, without bus terminating resistor, up to 1.5 Mbit/s	
<ul style="list-style-type: none"> <li>• without PG connection socket</li> </ul>	<b>6ES7 972-0BA30-0XA0</b>
<b>Accessories</b>	
<b>ET 200M distributed I/O devices manual</b>	
The manual can be downloaded as a pdf file at no cost under	<a href="http://support.automation.siemens.com">http://support.automation.siemens.com</a> Entry ID: 1242798
<b>DIN rail for active bus modules</b>	
For max. 5 active bus modules	
<ul style="list-style-type: none"> <li>• Length 19"</li> <li>• 530 mm long</li> </ul>	<b>6ES7 195-1GA00-0XA0</b> <b>6ES7 195-1GF30-0XA0</b>
<b>Active bus modules</b>	
<ul style="list-style-type: none"> <li>• BM PS/IM for power supply and IM 153, incl. 1 bus module cover</li> <li>• BM IM 153/IM 153 bus module for 2 x IM 153-2/FO redundant</li> <li>• BM 2 x 40 for 2 modules with 40 mm width</li> <li>• BM 1 x 80 for 1 module with 80 mm width</li> </ul>	<b>6ES7 195-7HA00-0XA0</b> <b>6ES7 195-7HD10-0XA0</b> <b>6ES7 195-7HB00-0XA0</b> <b>6ES7 195-7HC00-0XA0</b>
<b>Ex partition</b>	<b>6ES7 195-7KA00-0XA0</b>

# ET 200 distributed I/Os

## ET 200M

IM 153-1/153-2

### Overview



- For connecting ET 200M as slave to PROFIBUS DP (via copper conductors)
- IM 153-2 can also be used in redundant PROFIBUS DP systems with the S7-400H, software redundancy and the S5-155H
- With time stamp functionality and time-of-day synchronization
- Suitable for synchronous operation

### Technical specifications

	6ES7 153-1AA03-0XB0	6ES7 153-2BA01-0XB0
<b>Power supply</b>		
Input voltage		
• Rated value, DC 24 V	Yes	
• permissible range, lower limit (DC)	20.4 V; Ripple included	
• permissible range, upper limit (DC)	28.8 V; Ripple included	
Input current		
• Rated value at DC 24 V	625 mA	
Output voltage		
• Rated value, DC 5 V	Yes	
Output current		
• for backplane bus (DC 5 V), max.	1 A	
<b>Supply voltages</b>		
Rated value		
• DC 24 V		Yes
• permissible range (ripple included), lower limit (DC)		20.4 V
• permissible range (ripple included), upper limit (DC)		28.8 V
Power supply and voltage jumpering		
• Mains/voltage failure jumpering	5 ms	5 ms
<b>Voltages and currents</b>		
external protection for supply cables (recommendation)	not necessary	2.5A
<b>Current consumption</b>		
Inrush current, typ.	2.5 A	3.5 A
$I^2t$	0.1 A <sup>2</sup> s	0.08 A <sup>2</sup> s
Current consumption, max.	350 mA	470 mA
Power loss, typ.	3 W	4 W
<b>Address area</b>		
Addressing volume		
• Outputs	128 Byte	128 Byte
• Inputs	128 Byte	128 Byte
<b>Hardware config.</b>		
Number of modules per DP slave interface, max.	8	8

	6ES7 153-1AA03-0XB0	6ES7 153-2BA01-0XB0
<b>Communication functions</b>		
Bus protocol/transmission protocol	PROFIBUS DP to EN 50 170	PROFIBUS DP
<b>interfaces</b>		
PROFIBUS DP, Output current, max.	90 mA	70 mA
interface physics, RS 485	Yes	Yes
<b>Connection point</b>		
PROFIBUS DP	9-pin -D-sub female connector	9-pin SUB-D
<b>PROFIBUS DP</b>		
Transmission procedure		RS-485
Transmission speed, max.	12 Mbit/s	12 Mbit/s
Node addresses	1 to 125 permitted	1 to 125
automatic detection of transmission speed	Yes	Yes
SYNC capability	Yes	Yes
FREECE capability	Yes	Yes
direct data exchange (cross traffic)	Yes; S ender	Yes; only with F- DO
<b>1st interface</b>		
DP slave		
• GSD file	(for DPV1) SIEM801D.GSD; SI01801D.GSG	SI03801E.GSG
• automatic baud rate search	Yes	Yes
<b>CPU/programming</b>		
Configuration software		
• STEP 7		Yes
<b>Time stamping</b>		
Accuracy		1 ms
Number of message buffers		15
Number of stampable digital inputs, max.		128
Time format		RFC 1119 Internet ISP
Time resolution		0.466 ns
Time stamp on signal change		Yes

### Technical specifications (continued)

	6ES7 153-1AA03-0XB0	6ES7 153-2BA01-0XB0
<b>Isolation</b>		
Isolation checked with	Isolation voltage 500 V	
<b>Environmental requirements</b>		
Operating temperature		
• min.	0 °C	0 °C
• max.	60 °C	60 °C
Air pressure		
• Operating height above sea level, max.		3,500 m
Degree and class of protection		
• IP 20	Yes	Yes
<b>General information</b>		
Vendor identification (VendorID)	801Dh	801E
<b>Dimensions and weight</b>		
Width	40 mm	40 mm
Height	125 mm	125 mm
Depth	117 mm	117 mm
<b>Weights</b>		
Weight, approx.	360 g	350 g

	6ES7 195-7HA00-0XA0	6ES7 195-7HB00-0XA0	6ES7 195-7HC00-0XA0
<b>Dimensions and weight</b>			
• Weight, approx.	111 g	140 g	127 g

# ET 200 distributed I/Os

## ET 200M

IM 153-1/153-2

### Ordering data

	Order No.
<b>IM 153-1 interface module</b> Slave interface for connecting an ET 200M to PROFIBUS DP Standard temperature range	<b>6ES7 153-1AA03-0XB0</b>
<b>IM 153-2 interface module</b> Slave interface for connecting an ET 200M to PROFIBUS DP; also for use in redundant systems High Feature	<b>6ES7 153-2BA01-0XB0</b>
<b>Active IM 153 /IM 153 bus module</b> For two IM 153-2 High Feature modules for designing redundant systems	<b>6ES7 195-7HD10-0XA0</b>
<b>Bus module for ET 200M</b> <ul style="list-style-type: none"> <li>To accommodate a power supply and an IM 153 module for hot swapping function during RUN time including bus module cover</li> </ul>	<b>6ES7 195-7HA00-0XA0</b>
<ul style="list-style-type: none"> <li>To accommodate two 40-mm wide I/O modules for hot swapping function</li> </ul>	<b>6ES7 195-7HB00-0XA0</b>
<ul style="list-style-type: none"> <li>To accommodate one 80-mm wide I/O module for hot swapping function</li> </ul>	<b>6ES7 195-7HC00-0XA0</b>
<b>ET 200M redundancy bundle</b> Comprising two IM 153-2 High Feature modules and one IM 153/IM 153 bus module	<b>6ES7153-2AR01-0XA0</b>

### Accessories

#### ET 200M distributed I/O devices manual

The manual can be downloaded as a pdf file at no cost under

<http://support.automation.siemens.com>

Entry ID: 1242798

#### PROFIBUS bus connector

90° cable outlet  
 terminating resistor with isolating function, up to 12 Mbit/s

- without PG socket
- with PG socket

**6ES7 972-0BA12-0XA0**

**6ES7 972-0BB12-0XA0**

Insulation displacement method, FastConnect

- without PG socket
- with PG socket

**6ES7 972-0BA50-0XA0**

**6ES7 972-0BB50-0XA0**

#### Angular outgoing cable

insulation displacement terminals, without bus terminating resistor, up to 1.5 Mbit/s

- without PG connection socket

**6ES7 972-0BA30-0XA0**

#### SIMATIC DP rail for ET 200M

For insertion of up to 5 bus modules for

- 483 mm long
- 530 mm long

**6ES7 195-1GA00-0XA0**

**6ES7 195-1GF30-0XA0**

#### SIMATIC S7-300 rail

- 160 mm long
- 480 mm long
- 530 mm long
- 830 mm long
- 2000 mm long

**6ES7 390-1AB60-0AA0**

**6ES7 390-1AE80-0AA0**

**6ES7 390-1AF30-0AA0**

**6ES7 390-1AJ30-0AA0**

**6ES7 390-1BC00-0AA0**

#### S7 Manual Collection

Electronic manuals on CD, multilingual:  
 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)

**6ES7 998-8XC01-8YE0**

#### S7 Manual Collection update service for 1 year

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

**6ES7 998-8XC01-8YE2**

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#### Overview



- For connecting ET 200M as slave to PROFIBUS DP (via copper conductors)
- IM 153-2 can also be used in redundant PROFIBUS DP systems with the S7-400H, software redundancy and the S5-155H
- With time stamp functionality and time-of-day synchronization
- Suitable for synchronous operation

	SIPLUS IM 153-1	SIPLUS IM 153-2
<b>Order No.</b>	<b>6AG1 153-1AA03-2XB0</b>	<b>6AG1 153-2BA00-2XB0</b>
<b>Order No. based on</b>	<b>6ES7 153-1AA03-0XB0</b>	<b>6ES7 153-2BA00-0XB0</b>
Ambient temperature range	-25 to +60 °C; -25 to +55 °C (for applications with cUL approval), condensation permissible	
Ambient conditions	Suitable for extraordinary medial load (for example by chloric and sulphuric atmospheres).	
Approvals	CE, cUL (available soon)	
Conformity with standard for electronic devices on rail vehicles (EN 50155, temperature T1, category 1).	Yes	No
Technical data	The technical data is identical with the technical data of the based on modules.	

#### Ordering data

Ordering data	Order No.
<b>SIPLUS IM 153-1</b> Expanded temperature range and medium load; slave interface module for connecting a ET 200M to PROFIBUS DP	<b>6AG1 153-1AA03-2XB0</b>
<b>IM 153-2</b> Expanded temperature range and medium load; slave interface module for connecting a ET 200M to PROFIBUS DP; also for use in redundant systems	<b>6AG1 153-2BA00-2XB0</b>
<b>Accessories</b>	see ordering data to IM 153-1/153-2

# ET 200 distributed I/Os

## ET 200M

IM 153-2 FO

### Overview



- For connecting the ET 200M as a slave to the optical PROFIBUS
- Optical expansion to IM 153-2 (High Feature) (RS 485)
- Integral fiber-optic interface for plastic and PCF cables
- Redundancy capability
- With time stamping functionality and time synchronization

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### Technical specifications

	6ES7 153-2BB00-0XB0
<b>Power supply</b>	
Output voltage	
• Rated value (DC)	5 V
Output current	
• for backplane bus (DC 5 V), max.	1 A
<b>Supply voltages</b>	
Rated value	
• DC 24 V	Yes
• permissible range (ripple included), lower limit (DC)	20.4 V
• permissible range (ripple included), upper limit (DC)	28.8 V
<b>Voltages and currents</b>	
external protection for supply cables (recommendation)	not necessary
<b>Current consumption</b>	
Inrush current, typ.	3.5 A
$I^2t$	0.1 A <sup>2</sup> s
Current consumption, max.	500 mA
Power loss, typ.	4.5 W
<b>Address area</b>	
Addressing volume	
• Outputs	128 Byte
• Inputs	128 Byte
<b>interfaces</b>	
interface physics, LWL	Yes
<b>Connection point</b>	
PROFIBUS DP	optical, 2 x duplex sockets

	6ES7 153-2BB00-0XB0
<b>PROFIBUS DP</b>	
Transmission procedure	LWL, wavelength 660 nm
Transmission speed, max.	12 Mbit/s; 9.6 / 19.2 / 45.45 / 93.75 / 187.5 / 500 kBaud 1.5 / 12 Mbaud
Node addresses	1 to 125 permitted
automatic detection of transmission speed	Yes
SYNC capability	Yes
FREECE capability	Yes
direct data exchange (cross traffic)	Yes; Sender
<b>1st interface</b>	
DP slave	
• GSD file	(for DPV1) SIEM8071.GSD; SI018071.GSG (for IM 153-2AB0x); SI028071.GSG (for IM 153-2BB0x)
• automatic baud rate search	Yes
<b>CPU/programming</b>	
Configuration software	
• STEP 7	Yes; STEP 7 / COM PROFIBUS / non-Siemens tools via GSD file
<b>Time stamping</b>	
Accuracy	10 ms; 10 ms / 3 ms
Number of message buffers	15
Messages per message buffer	20
Number of stampable digital inputs, max.	128
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 state

#### Technical specifications (continued)

	6ES7 153-2BB00-0XB0
<b>Isolation</b>	
Isolation checked with	Isolation voltage 500 V
<b>Environmental requirements</b>	
Operating temperature	
• min.	0 °C
• max.	60 °C
Air pressure	
• Operating height above sea level, max.	3,000 m
Degree and class of protection	
• IP 20	Yes

	6ES7 153-2BB00-0XB0
<b>General information</b>	
Vendor identification (VendorID)	8071h
<b>Dimensions and weight</b>	
Width	40 mm
Height	125 mm
Depth	117 mm
<b>Weights</b>	
Weight, approx.	360 g

	6ES7 195-7HA00-0XA0	6ES7 195-7HB00-0XA0	6ES7 195-7HC00-0XA0
<b>Dimensions and weight</b>			
Weight, approx.	111 g	140 g	127 g

	6ES7 195-7HD10-0XA0
<b>Accessories</b>	
belongs to product	ET 200M
<b>Weights</b>	
Weight, approx.	133 g

Ordering data	Order No.
<b>IM 153-2 FO interface module</b> High Feature for max. 8 S7-300 modules, redundancy capable, with integrated FOC interface for assembling an optical line	6ES7 153-2BB00-0XB0
<b>IM 153/IM 153 active bus module</b> For 2 IM 153-2 FO for assembling redundant systems	6ES7 195-7HD10-0XA0
<b>Bus module for ET 200M</b>	
• For accommodating an SV and an IM 153 for hot swapping incl. bus module cover	6ES7 195-7HA00-0XA0
• For accommodating two 40 mm wide I/O modules for hot swapping	6ES7 195-7HB00-0XA0
• For accommodating one 80 mm wide I/O module for hot swapping	6ES7 195-7HC00-0XA0
<b>Accessories</b>	
<b>PROFIBUS plastic fiber-optic connector / polishing kit</b> 100 Simplex plugs and 5 polishing kits, for assembling PROFIBUS plastic fiber-optic cables for the optical PROFIBUS DP; for 25 modules	6GK1 901-0FB00-0AA0
<b>PROFIBUS plastic fiber-optic stripping tool set</b> To remove the external or core sleeve of plastic fiber-optic cables	6GK1 905-6PA10

	Order No.
<b>Connection adapters</b> Packet of 50 for using Simplex plugs in integrated FO interfaces; for 25 modules	6ES7 195-1BE00-0XA0
<b>SIMATIC DP profile rail for ET 200M</b> For accommodating max. 5 bus modules for	
• Length 483 mm	6ES7 195-1GA00-0XA0
• Length 530 mm	6ES7 195-1GF30-0XA0
<b>SIMATIC S7-300 profile rail</b>	
• Length 160 mm	6ES7 390-1AB60-0AA0
• Length 480 mm	6ES7 390-1AE80-0AA0
• Length 530 mm	6ES7 390-1AF30-0AA0
• Length 830 mm	6ES7 390-1AJ30-0AA0
• Length 2000 mm	6ES7 390-1BC00-0AA0
<b>S7 Manual Collection</b> Electronic manuals on CD, multilingual: 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)	6ES7 998-8XC01-8YE0
<b>S7 Manual Collection - Maintenance service for 1 year</b> Scope of supply: CD containing the current S7 Manual Collection and the three subsequent updates	6ES7 998-8XC01-8YE2

# ET 200 distributed I/Os

## ET 200M – F Digital/Analog Modules

### SM 326 F digital input - Safety Integrated

#### Overview



- Digital inputs for the fail-safe SIMATIC S7 systems
- They are suitable for connecting:
  - switches and 2-wire proximity switches (BEROs)
  - sensors according to NAMUR and mechanical contacts, also for signals from hazardous areas
- With integral safety functions for fail-safe operation
- Can be used in fail-safe mode
  - centrally: With S7-31xF-2 DP
  - distributed in ET 200M: With SIMATIC IM 151-7 F-CPU, S7-31xF-2 DP, S7-416F-2 and S7-400F/FH
- Can be used in standard mode as an S7-300 module

#### Technical specifications

	6ES7 326-1RF00-0AB0	6ES7 326-1BK01-0AB0
<b>Supply voltages</b>		
Supply voltage of electronics and encoders 1L+/2L+		
• Rated value (DC)	24 V	24 V
<b>Current consumption</b>		
from load voltage L+ (without load), max.	160 mA	450 mA
from backplane bus DC 5 V, max.	90 mA	100 mA
Power loss, typ.	4.5 W	10 W
<b>Connection point</b>		
required front connectors	40-pin	40-pin
<b>Digital inputs</b>		
Number of digital inputs	8; 8 (one-channel); 4 (two-channel)	24
Number of simultaneously controllable inputs		
• Number of simultaneously controllable inputs, up to 40 °C	8; vertical setup	24
• Number of simultaneously controllable inputs, up to 60 °C	8; horizontal set up	24; (at 24 V) or 18 (at 28.8 V)
Cable length		
• cable length, shielded, max.	200 m	200 m
• Cable length unshielded, max.	100 m	100 m
Input voltage		
• Rated value, DC		24 V
• for signal "0"		-30V to 5 V
• for signal "1"		11 to 30 V
Input current		
• for signal "0", max. (permissible quiescent current)		2 mA
• for signal "1", typ.		10 mA
Input delay (for rated value of input voltage)		
• for standard inputs		
- at "0" to "1", max.		3.4 ms
- at "1" to "0", max.		3.4 ms

	6ES7 326-1RF00-0AB0	6ES7 326-1BK01-0AB0
<b>Encoder supply</b>		
Number of outputs	8	4; electrically isolated
Output voltage	8.2 V DC	
Output current, rated value		400 mA
<b>Encoder</b>		
Connectable encoders		
• 2-wire BEROs		Yes; if short-circuit test is deactivated
• permissible quiescent current (2-wire BEROs), max.		2 mA
<b>Ex(i) characteristics</b>		
Module for Ex(i) protection	Yes	
Max. values of input circuits (per channel)		
• Co (permissible external capacity), max.	3 µF	
• Io (short-circuit current), max.	13.9 mA	
• Lo (permissible external inductivity), max.	80 mH	
• Po (power of load), max.	33.1 mW	
• Uo (output no-load voltage), max.	10 V	
• Ta (permissible ambient temperature), max.	60 °C	60 °C
<b>Status information/alarms/diagnostics</b>		
Alarms		
• Diagnostic alarm	Yes	Yes
Diagnoses		
• Diagnostic information readable	Yes	Yes
<b>Isolation</b>		
Isolation checked with	500 V DC	500 V DC / 350 V AC
<b>Isolation</b>		
Galvanic isolation, digital inputs		
• between the channels	Yes	Yes
• between the channels, in groups of		12
• between the channels and the backplane bus	Yes	Yes

### Technical specifications (continued)

	6ES7 326-1RF00-0AB0	6ES7 326-1BK01-0AB0
<b>Standards, approvals, certificates</b>		
Type of protection to EN 50020 (CENELEC)	II(2)G [EEx ib] IIC to EN 50020	
Test number KEMA	99 ATEX 2671 X	
Highest safety class achievable in safety mode		
• to DIN VDE 0801	AK 4 (one channel), AK 5 und 6 (two channel)	AK 6
• to EN 954	Cat. 3 (single channel), Cat. 4 (two-channel)	Cat. 4
• to IEC 61508	SIL 2 (single channel), SIL 3 (two-channel)	SIL 3

	6ES7 326-1RF00-0AB0	6ES7 326-1BK01-0AB0
<b>Dimensions and weight</b>		
Width	80 mm	80 mm
Height	125 mm	125 mm
Depth	120 mm	120 mm
<b>Weights</b>		
Weight, approx.	482 g	442 g

# ET 200 distributed I/Os

## ET 200M – F Digital/Analog Modules

### SM 326 F digital input - Safety Integrated

Ordering data	Order No.	Order No.
<b>F digital input module SM 326</b> <ul style="list-style-type: none"> <li>• 24 inputs, 24 V DC</li> <li>• 8 inputs, 24 V DC, NAMUR</li> </ul>	<b>6ES7 326-1BK01-0AB0</b> <b>6ES7 326-1RF00-0AB0</b>	<b>Active bus module</b> BM 1 x 80 for 1 module with 80 mm width <b>6ES7 195-7HC00-0XA0</b>
<b>Distributed Safety V5.4 programming tool</b> Task: Software for configuring fail-safe user programs for SIMATIC S7-300F, S7-400F, ET 200S Requirement: STEP 7 V5.3 SP3 and higher <ul style="list-style-type: none"> <li>• Floating license</li> <li>• Software Update Service</li> </ul>	<b>6ES7 833-1FC02-0YA5</b> <b>6ES7 833-1FC00-0YX2</b>	<b>SITOP power supply module</b> for ET 200M; 120/230 V AC, 24 V DC, 5 A; Type PS 307-1E <b>6ES7 307-1EA00-0AA0</b>
<b>Distributed Safety Upgrade</b> From V5.x to V5.4; Floating license for 1 user <b>6ES7 833-1FC02-0YE5</b>		<b>Front connector</b> 40-pin, with screw contacts <ul style="list-style-type: none"> <li>• 1 piece</li> <li>• 100 pieces</li> </ul> 40-pin with cage clamp contacts <ul style="list-style-type: none"> <li>• 1 piece</li> <li>• 100 pieces</li> </ul>
<b>Labeling sheet with strips for 10 electronic blocks</b> <ul style="list-style-type: none"> <li>• For 16-channel electronic blocks incl. add-on terminals</li> <li>• For 32-channel electronic blocks incl. add-on terminals</li> </ul>	<b>6ES7 193-1BH00-0XA0</b> <b>6ES7 193-1BL00-0XA0</b>	<b>Labeling strips</b> For fail-safe modules (spare part); 10 pieces <b>6ES7 392-2XX20-0AA0</b>
<b>Connecting cable for PROFIBUS</b> 12 Mbit/s, for connecting PG to PROFIBUS DP, pre-assembled with 2 x 9-pin Sub-D connector, 3 m <b>6ES7 901-4BD00-0XA0</b>		<b>Label cover</b> For fail-safe modules (spare part); 10 pieces <b>6ES7 392-2XY20-0AA0</b>
<b>PROFIBUS bus connector</b> <u>90° cable outlet</u> Terminating resistor with isolating function, up to 12 Mbit/s <ul style="list-style-type: none"> <li>• without PG socket</li> <li>• with PG socket</li> </ul> Insulation displacement method FastConnect <ul style="list-style-type: none"> <li>• without PG socket</li> <li>• with PG socket</li> </ul> <u>Angled cable outlet</u> insulation displacement terminals, without bus connecting resistor, up to 1.5 Mbit/s <ul style="list-style-type: none"> <li>• without PG connecting socket</li> </ul>	<b>6ES7 972-0BA12-0XA0</b> <b>6ES7 972-0BB12-0XA0</b> <b>6ES7 972-0BA50-0XA0</b> <b>6ES7 972-0BB50-0XA0</b> <b>6ES7 972-0BA30-0XA0</b>	<b>LK 393 cable guide</b> For F modules; L+ and M connections; 5 pieces <b>6ES7 393-4AA10-0AA0</b>
<b>DIN rail for active bus modules</b> for max. 5 active bus modules for hot swapping function <ul style="list-style-type: none"> <li>• 483 mm long</li> <li>• 530 mm long</li> <li>• 620 mm long</li> <li>• 2000 mm long</li> </ul>	<b>6ES7 195-1GA00-0XA0</b> <b>6ES7 195-1GF30-0XA0</b> <b>6ES7 195-1GG30-0XA0</b> <b>6ES7 195-1GC00-0XA0</b>	<b>S7-300 manual</b> Design, CPU data, module data, instruction list <ul style="list-style-type: none"> <li>• German</li> <li>• English</li> <li>• French</li> <li>• Spanish</li> <li>• Italian</li> </ul> <b>6ES7 398-8FA10-8AA0</b> <b>6ES7 398-8FA10-8BA0</b> <b>6ES7 398-8FA10-8CA0</b> <b>6ES7 398-8FA10-8DA0</b> <b>6ES7 398-8FA10-8EA0</b>
		<b>SIMATIC Manual Collection</b> Electronic manuals on CD-ROM, multilingual: S7-200, S7-300, C7, S7-400, SIMATIC DP (Distributed I/O), SIMATIC PC, SIMATIC PG (Programming device), STEP 7, Engineering Tools, Runtime Software, SIMATIC PCS 7, SIMATIC HMI (Human Machine Interface), SIMATIC NET (Industrial Communication), SIMATIC Machine Vision, SIMATIC Sensors <b>6ES7 998-8XC01-8YE0</b>
		<b>SIMATIC Manual Collection update service for 1 year</b> Current "S7 Manual Collection" CD and the three subsequent updates <b>6ES7 998-8XC01-8YE2</b>

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# ET 200 distributed I/Os

## ET 200M – F Digital/Analog Modules

### SM 326 F digital output - Safety Integrated

#### Overview



- Digital outputs for the fail-safe SIMATIC S7 systems
- Two variants (1 x source/source output, 1 x source/sink output)
- For connection of solenoid valves, DC contactors and signaling lamps
- With integral safety functions for fail-safe operation
- Can be used in fail-safe mode
  - centrally: With S7-31xF-2 DP
  - distributed in ET 200M: With SIMATIC IM 151-7 F-CPU, S7-31xF-2 DP, S7-416F-2 and S7-400F/FH
- Can be used in standard mode as an S7-300 module (only applies to 6ES7326-2BF01-0AB0)

#### Technical specifications

	6ES7 326-2BF01-0AB0	6ES7 326-2BF40-0AB0
<b>Voltages and currents</b>		
Load voltage L+		
• Rated value (DC)	24 V; 1L+, 2L+, 3L+	24 V; 1L+, 2L+, 3L+
<b>Current consumption</b>		
from load voltage 1L+, max.	70 mA; from supply voltage	75 mA; from supply voltage
from load voltage 2L+ (without load), max.	100 mA	100 mA
from load voltage 3L+ (without load), max.	100 mA	100 mA
from backplane bus DC 5 V, max.	100 mA	100 mA
Power loss, typ.	12 W	12 W
<b>Connection point</b>		
required front connectors	40-pin	40-pin
<b>Digital outputs</b>		
Number of digital outputs	10	8
cable length, shielded, max.	1,000 m; 200 m for SIL3, AK 6, Cat 4	30 m
Cable length unshielded, max.	600 m	50 m
Short-circuit protection of the output	Yes; electronic	Yes; electronic
Limitation of inductive shutdown voltage to	L+ (-53 V) without series diode, L+ (-33 V) with series diode	L+ (-33 V)
Lamp load, max.	5 W	5 W
<b>Output voltage</b>		
• for signal "1" with series diode, min.	L+ (-1.8 V)	
• for signal "1" without series diode, min.	L+ (-1.0 V)	L+ (-1.0 V)

	6ES7 326-2BF01-0AB0	6ES7 326-2BF40-0AB0
<b>Output current</b>		
• for signal "1" rated value	2 A	2 A
• for signal "1" permissible range for 0 to 40 °C, min.	7 mA	7 mA
• for signal "1" permissible range for 0 to 40 °C, max.	2 A; 2 A for horizontal installation, 1 A for vertical installation	2 A; A for horizontal installation, 1 A for vertical installation
• for signal "1" permissible range for 40 to 60 °C, min.	7 mA	7 mA
• for signal "1" permissible range for 40 to 60 °C, max.	1 A; for horizontal installation	1 A; for horizontal installation
• for signal "0" residual current, max.	0.5 mA	0.5 mA
<b>Switching frequency</b>		
• with resistive load, max.	10 Hz	30 Hz
• with inductive load, max.	2 Hz	2 Hz
• on lamp load, max.	10 Hz	10 Hz
<b>Aggregate current of the outputs (per group)</b>		
• vertical installation - up to 40 °C, max.	5 A; without series diode, 4 A with series diode	5 A
• horizontal installation - up to 40 °C, max.	7.5 A; without series diode, 5 A with series diode	7.5 A
- up to 60 °C, max.	5 A; without series diode, 4 A with series diode	5 A
<b>Status information/alarms/diagnostics</b>		
<b>Alarms</b>		
• Diagnostic alarm	Yes	Yes; parameterizable
<b>Diagnoses</b>		
• Diagnostic information readable	Yes	Yes
<b>Isolation</b>		
Isolation checked with	500 V DC / 350 V AC	500 V DC / 350 V AC

# ET 200 distributed I/Os

## ET 200M – F Digital/Analog Modules

### SM 326 F digital output - Safety Integrated

#### Technical specifications (continued)

	6ES7 326-2BF01-0AB0	6ES7 326-2BF40-0AB0
<b>Isolation</b>		
Isolation, digital outputs		
• between the channels	Yes	Yes
• between the channels, in groups of	5	4
• between the channels and the backplane bus	Yes	Yes
• between the channels and the voltage supply to the electronics	Yes	Yes

	6ES7 326-2BF01-0AB0	6ES7 326-2BF40-0AB0
<b>Standards, approvals, certificates</b>		
Highest safety class achievable in safety mode		
• to DIN VDE 0801	AK 5 and 6	
• to EN 954	Cat. 4	Cat. 4
• to IEC 61508	SIL 3	SIL 3
<b>Dimensions and weight</b>		
Width	80 mm	80 mm
Height	125 mm	125 mm
Depth	120 mm	120 mm
<b>Weights</b>		
Weight, approx.	465 g	465 g

#### Ordering data

#### Order No.

<b>SM 326 F digital output module</b> 10 outputs, 24 V DC, 2 A 8 outputs, 24 V DC, 2 A	<b>6ES7 326-2BF01-0AB0</b> <b>6ES7 326-2BF40-0AB0</b>
<b>Distributed Safety V5.4 programming tool</b> Task: Software for configuring fail-safe user programs for SIMATIC S7-300F, S7-400F, ET 200S Requirement: STEP 7 V5.3 SP3 and higher Floating license Software Update Service	<b>6ES7 833-1FC02-0YA5</b> <b>6ES7 833-1FC00-0YX2</b>
<b>Distributed Safety Upgrade</b> From V5.x to V5.4; Floating license for 1 user	<b>6ES7 833-1FC02-0YE5</b>
<b>Labeling sheet with strips for 10 electronic blocks</b> • For 16-channel electronic blocks incl. add-on terminals • For 32-channel electronic blocks incl. add-on terminals	<b>6ES7 193-1BH00-0XA0</b> <b>6ES7 193-1BL00-0XA0</b>
<b>Connecting cable for PROFIBUS</b> 12 Mbit/s, for connecting PG to PROFIBUS DP, pre-assembled with 2 x 9-pin Sub-D connector, 3 m	<b>6ES7 901-4BD00-0XA0</b>
<b>PROFIBUS bus connector</b> 90° cable outlet Terminating resistor with isolating function, up to 12 Mbit/s • without PG socket • with PG socket Insulation displacement method FastConnect • without PG socket • with PG socket Angled cable outlet insulation displacement terminals, without bus connecting resistor, up to 1.5 Mbit/s • without PG connecting socket	<b>6ES7 972-0BA12-0XA0</b> <b>6ES7 972-0BB12-0XA0</b> <b>6ES7 972-0BA50-0XA0</b> <b>6ES7 972-0BB50-0XA0</b> <b>6ES7 972-0BA30-0XA0</b>
<b>DIN rail for active bus modules</b> for max. 5 active bus modules, for function "Insertion and removal" • 483 mm long • 530 mm long • 620 mm long • 2000 mm long	<b>6ES7 195-1GA00-0XA0</b> <b>6ES7 195-1GF30-0XA0</b> <b>6ES7 195-1GG30-0XA0</b> <b>6ES7 195-1GC00-0XA0</b>

#### Order No.

<b>Active bus module</b> BM 1 x 80 for 1 module with 80 mm width	<b>6ES7 195-7HC00-0XA0</b>
<b>SITOP power supply module</b> for ET 200M; 120/230 V AC, 24 V DC, 5 A Type PS 307-1E	<b>6ES7 307-1EA00-0AA0</b>
<b>Front connector</b> 40-pin, with screw contacts • 1 piece • 100 pieces 40-pin with cage clamp contacts • 1 piece • 100 pieces	<b>6ES7 392-1AM00-0AA0</b> <b>6ES7 392-1AM00-1AB0</b> <b>6ES7 392-1BM01-0AA0</b> <b>6ES7 392-1BM01-1AB0</b>
<b>Labeling strips</b> For fail-safe modules (spare part), 10 pieces	<b>6ES7 392-2XX20-0AA0</b>
<b>Label cover</b> For fail-safe modules (spare part), 10 pieces	<b>6ES7 392-2XY20-0AA0</b>
<b>LK 393 cable guide</b> For F modules; L+ and M connections, 5 pieces	<b>6ES7 393-4AA10-0AA0</b>
<b>S7-300 manual</b> Design, CPU data, module data, instruction list • German • English • French • Spanish • Italian	<b>6ES7 398-8FA10-8AA0</b> <b>6ES7 398-8FA10-8BA0</b> <b>6ES7 398-8FA10-8CA0</b> <b>6ES7 398-8FA10-8DA0</b> <b>6ES7 398-8FA10-8EA0</b>
<b>SIMATIC Manual Collection</b> Electronic manuals on CD-ROM, multilingual: S7-200, S7-300, C7, S7-400, SIMATIC DP (Distributed I/O), SIMATIC PC, SIMATIC PG (Programming device), STEP 7, Engineering Tools, Runtime Software, SIMATIC PCS 7, SIMATIC HMI (Human Machine Interface), SIMATIC NET (Industrial Communication), SIMATIC Machine Vision, SIMATIC Sensors	<b>6ES7 998-8XC01-8YE0</b>
<b>SIMATIC Manual Collection update service for 1 year</b> Current "S7 Manual Collection" CD and the three subsequent updates	<b>6ES7 998-8XC01-8YE2</b>

# ET 200 distributed I/Os

## ET 200M – F Digital/Analog Modules

### SM 336 F analog input - Safety Integrated

#### Overview



- Analog inputs for the fail-safe SIMATIC S7 systems
- For connection of analog voltage and current sensors
- With integral safety functions for fail-safe operation
- For use in the ET 200M distributed I/O station with SIMATIC IM 151-7 F-CPU, S7-31xF-2 DP, S7-416F-2 and S7-400F/FH
- Can be used in standard mode as an S7-300 module

#### Technical specifications

6ES7 336-1HE00-0AB0	
<b>Voltages and currents</b>	
Load voltage L+	
• Rated value (DC)	24 V
• reverse polarity protection	Yes
<b>Current consumption</b>	
from backplane bus DC 5 V, max.	90 mA
from supply voltage L+, max.	160 mA; typically
Power loss, typ.	4.25 W
<b>Connection point</b>	
required front connectors	40-pin
<b>Analog inputs</b>	
Number of analog inputs	6
Number of analog inputs for voltage measurement	4
cable length, shielded, max.	200 m
permissible input frequency for voltage input (destruction limit), max.	30 V
permissible input current for current input (destruction limit), max.	40 mA
Input ranges (rated values), voltages	
• 0 to +10 V	Yes
Input ranges (rated values), currents	
• 0 to 20 mA	Yes
• 4 to 20 mA	Yes
<b>Analog value creation</b>	
Integrations and conversion time/resolution per channel	
• Resolution with overload area (bit including sign), max.	14 Bit
• Integration time, ms	20 ms (at 50 Hz); 16.66 ms (at 60 Hz)
• Interference voltage suppression for interference frequency f1 in Hz	38 dB
<b>Encoder</b>	
Connection of signal encoders	
• for current measurement as 2-wire transducer	Yes
• for current measurement as 4-wire transducer	Yes

#### Errors/accuracies

Operational limit in overall temperature range

- Voltage, relative to input area +/- 0,48 %
- Current, relative to input area +/- 0,48 %

Basic error limit (operational limit at 25 °C)

- Voltage, relative to input area +/- 0,4 %
- Current, relative to input area +/- 0,4 %

#### Status information/alarms/diagnostics

Alarms

- Diagnostic alarm Yes; parameterizable

Diagnoses

- Diagnostic information readable Yes

#### Isolation

Isolation checked with 500 V DC / 350 V AC

#### Isolation

Isolation, analog inputs

- between the channels No
- between the channels and the backplane bus Yes
- between the channels and the voltage supply to the electronics Yes; only if sensors are externally supplied

#### Standards, approvals, certificates

Highest safety class achievable in safety mode

- to DIN V 19250 AK 6
- to EN 954 Cat. 4
- to IEC 61508 SIL 3

#### Dimensions and weight

Width	80 mm
Height	125 mm
Depth	120 mm

#### Weights

Weight, approx. 480 g

# ET 200 distributed I/Os

## ET 200M – F Digital/Analog Modules

### SM 336 F analog input - Safety Integrated

Ordering data	Order No.	Order No.
<b>F analog input module SM 326</b> 6 inputs, 14 bit	<b>6ES7 336-1HE00-0AB0</b>	<b>Active bus module</b> BM 1 x 80 for 1 module with 80 mm width
<b>Distributed Safety V5.4 programming tool</b> Task: Software for configuring fail-safe user programs for SIMATIC S7-300F, S7-400F, ET 200S Requirement: STEP 7 V5.3 SP3 and higher Floating license	<b>6ES7 833-1FC02-0YA5</b>	<b>SITOP power supply module</b> for ET 200M; 120/230 V AC, 24 V DC, 5 A Type PS 307-1E
Software Update Service	<b>6ES7 833-1FC00-0YX2</b>	<b>Front connector</b> 40-pin, with screw contacts • 1 piece • 100 pieces
<b>Distributed Safety Upgrade</b> From V5.x to V5.4; Floating license for 1 user	<b>6ES7 833-1FC02-0YE5</b>	40-pin with cage clamp contacts • 1 piece • 100 pieces
<b>Labeling sheet with strips for 10 electronic blocks</b> • For 16-channel electronic blocks incl. add-on terminals • For 32-channel electronic blocks incl. add-on terminals	<b>6ES7 193-1BH00-0XA0</b>  <b>6ES7 193-1BL00-0XA0</b>	<b>Labeling strips</b> For fail-safe modules (spare part), 10 pieces
<b>Connecting cable for PROFIBUS</b> 12 Mbit/s, for connecting PG to PROFIBUS DP, pre-assembled with 2 x 9-pin Sub-D connector, 3 m	<b>6ES7 901-4BD00-0XA0</b>	<b>Label cover</b> For fail-safe modules (spare part), 10 pieces
<b>PROFIBUS bus connector</b> 90° cable outlet Terminating resistor with isolating function, up to 12 Mbit/s • without PG socket • with PG socket Insulation displacement method FastConnect • without PG socket • with PG socket Angled cable outlet insulation displacement terminals, without bus connecting resistor, up to 1.5 Mbit/s • without PG connecting socket	<b>6ES7 972-0BA12-0XA0</b> <b>6ES7 972-0BB12-0XA0</b>  <b>6ES7 972-0BA50-0XA0</b> <b>6ES7 972-0BB50-0XA0</b>  <b>6ES7 972-0BA30-0XA0</b>	<b>LK 393 cable guide</b> For F modules; L+ and M connections, 5 pieces
<b>DIN rail for active bus modules</b> for max. 5 active bus modules for hot swapping function • 483 mm long • 530 mm long • 620 mm long • 2000 mm long	<b>6ES7 195-1GA00-0XA0</b> <b>6ES7 195-1GF30-0XA0</b> <b>6ES7 195-1GG30-0XA0</b> <b>6ES7 195-1GC00-0XA0</b>	<b>S7-300 manual</b> Design, CPU data, module data, instruction list • German • English • French • Spanish • Italian
		<b>SIMATIC Manual Collection</b> Electronic manuals on CD-ROM, multilingual: S7-200, S7-300, C7, S7-400, SIMATIC DP (Distributed I/O), SIMATIC PC, SIMATIC PG (Programming device), STEP 7, Engineering Tools, Runtime Software, SIMATIC PCS 7, SIMATIC HMI (Human Machine Interface), SIMATIC NET (Industrial Communication), SIMATIC Machine Vision, SIMATIC Sensors
		<b>SIMATIC Manual Collection update service for 1 year</b> Current "S7 Manual Collection" CD and the three subsequent updates

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# ET 200 distributed I/Os ET 200M – F Digital/Analog Modules

**SIPLUS SM 326 F digital input module -  
Safety Integrated**

## Overview



- Digital inputs for the fail-safe SIMATIC S7 systems
- They are suitable for connecting:
  - switches and 2-wire proximity switches (BEROs)
  - sensors according to NAMUR and mechanical contacts, also for signals from hazardous areas
- With integral safety functions for fail-safe operation
- Can be used in fail-safe mode
  - centrally: With S7-31xF-2 DP
  - distributed in ET 200M: With SIMATIC IM 151-7 F-CPU, S7-31xF-2 DP, S7-416F-2 and S7-400F/FH
- Can be used in standard mode as an S7-300 module

<b>SIPLUS SM 326 fail-safe digital input module</b>	
<b>Order No.</b>	<b>6AG1 326-1BK01-2AB0</b>
<b>Order No. based on</b>	<b>6ES7 326-1BK01-0AB0</b>
Ambient temperature range	-25 ... +60 °C, condensation permissible
Ambient conditions	Suitable for extraordinary medial load (for example by chloric and sulphuric atmospheres).
Technical data	The technical data is identical with the technical data of the based on modules.

## Ordering data

## Order No.

### SIPLUS SM 326 F digital input module

Expanded temperature range and medial load

24 inputs, 24 V DC

**6AG1 326-1BK01-2AB0**

### Accessories

see Ordering data for SM 326 F digital input module

# ET 200 distributed I/Os

## ET 200M – F Digital/Analog Modules

### SIPLUS SM 326 F digital output module - Safety Integrated

#### Overview



<b>SIPLUS SM 326 fail-safe digital output module</b>	
<b>Order No.</b>	<b>6AG1 326-2BF01-2AB0</b>
<b>Order No. based on</b>	<b>6ES7 326-2BF01-0AB0</b>
Ambient temperature range	-25 ... +60 °C, condensation permissible
Ambient conditions	Suitable for extraordinary medial load (for example by chloric and sulphuric atmospheres).
Conformity with standard for electronic devices on rail vehicles (EN 50155, temperature T1, category 1).	Yes
Technical data	The technical data is identical with the technical data of the based on modules.

- Digital outputs for the fail-safe SIMATIC S7 systems
- Two variants (1 x source/source output, 1 x source/sink output)
- For connection of solenoid valves, DC contactors and signaling lamps
- With integral safety functions for fail-safe operation
- Can be used in fail-safe mode
  - centrally: With S7-31xF-2 DP
  - distributed in ET 200M: With SIMATIC IM 151-7 F-CPU, S7-31xF-2 DP, S7-416F-2 and S7-400F/FH
- Can be used in standard mode as an S7-300 module (only applies to 6ES7326-2BF01-0AB0)

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# ET 200 distributed I/Os ET 200M – F Digital/Analog Modules

SIPLUS SM 326 F digital output module -  
Safety Integrated

Ordering data	Order No.
<b>SIPLUS SM 326 F digital output module</b> Expanded temperature range and medial load 10 outputs, 24 V DC, 2 A	<b>6AG1 326-2BF01-2AB0</b>
<b>Accessories</b>	see Ordering data for SM 326 F digital output module

# ET 200 distributed I/Os

## ET 200M – F Digital/Analog Modules

### Isolating module

#### Overview

- Supports mixed operation of fail-safe signal modules in safety mode and S7-300 standard modules in an ET 200M when Cat. 4 or SIL 3 has to be achieved.
- The isolating module is not required if the safety class or safety category to be achieved is less than SIL 3 or Cat. 4, respectively.

When Cat. 4/SIL 3 is required, the isolating module must be implemented in the following situations:

Application	Isolation module must be used
<b>Central use after CPU 31xF-2 DP or CPU 31xF-2 PN/DP</b> <ul style="list-style-type: none"> <li>• Only fail-safe modules in the tier</li> <li>• Standard and fail-safe modules in the tier</li> </ul>	Yes, behind the CPU Yes, after the last standard module and before the first fail-safe module
<b>Central use after CPU 31xF-2 DP or CPU 31xF-2 PN/DP in an expansion rack</b> <ul style="list-style-type: none"> <li>• Only fail-safe modules in the tier</li> <li>• Standard and fail-safe modules in the tier</li> </ul>	Yes, after the IM 36x Yes, after the last standard module and before the first fail-safe module
<b>Distributed behind the IM 153-2 with copper connection</b> <ul style="list-style-type: none"> <li>• Only fail-safe modules in the station</li> <li>• Standard and fail-safe modules in the station</li> </ul>	Yes, after the IM 153-2 Yes, after the last standard module and before the first fail-safe module
<b>Distributed behind the IM 153-2 with fiber-optic connection</b> <ul style="list-style-type: none"> <li>• Only fail-safe modules in the station</li> <li>• Standard and fail-safe modules in the station</li> </ul>	No Yes, after the last standard module and before the first fail-safe module

#### Technical specifications

	<b>6ES7 195-7KF00-0XA0</b>
<b>Weight</b>	
• Weight, approx.	10 g

#### Ordering data

	Order No.
<b>Isolating module</b> for simultaneous operation of fail-safe and standard modules in an ET 200M	<b>6ES7 195-7KF00-0XA0</b>
<b>Isolating bus module</b> for accommodating the isolating module in an ET 200M	<b>6ES7 195-7HG00-0XA0</b>

### Overview



- Hybrid operation of fail-safe signal modules in safety operation and S7-300 standard modules in an ET 200M
- Configuration of PROFIBUS-DP lines with Cu bus cables; fiber-optic cables are not necessary
- Any IM 153-x can be used

The isolating module is not required if safety class SIL 2 has to be achieved.

### Ordering data

### Order No.

#### SIPLUS isolating module

Expanded temperature range and medial load

for simultaneous operation of fail-safe and standard modules in an ET 200M

**6AG1 195-7KF00-2XA0**

#### Accessories

see Ordering data for isolating module

	<b>SIPLUS S7-300 isolating module</b>
<b>Order No.</b>	<b>6AG1 195-7KF00-2XA0</b>
<b>Order No. based on</b>	<b>6ES7 195-7KF00-0XA0</b>
Ambient temperature range	-25 °C to +60 °C, condensation permissible
Ambient conditions	Suitable for extraordinary medial load (for example by chloric and sulphuric atmospheres).
Conformity with standard for electronic devices on rail vehicles (EN 50155, temperature T1, category 1).	Yes
Technical data	The technical data are identical with the technical data of the based on modules.

# ET 200 distributed I/Os

## ET 200M – Digital Modules

### SM 321 digital input

#### Overview



- Digital inputs
- For connecting standard switches and two-wire proximity switches (BERO)

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#### Technical specifications

	6ES7 321-1BH02-0AA0	6ES7 321-1BH50-0AA0	6ES7 321-1BL00-0AA0	6ES7 321-1BH10-0AA0
<b>Voltages and currents</b>				
Load voltage L+				
• Rated value (DC)	24 V	24 V	24 V	24 V
<b>Current consumption</b>				
from load voltage L+ (without load), max.	25 mA			
from backplane bus DC 5 V, max.	10 mA	10 mA	15 mA	110 mA
Power loss, typ.	3.5 W	3.5 W	6.5 W	3.8 W
<b>Connection point</b>				
required front connectors	20-pin	20-pin	40-pin	20-pin
<b>Isochronous mode</b>				
Isochronous mode	No	No	No	Yes
<b>Digital inputs</b>				
Number of digital inputs	16	16	32	16
Number of simultaneously controllable inputs				
• vertical installation - up to 40 °C, max.	16	16	32	16
• horizontal installation - up to 40 °C, max. - up to 60 °C, max.	16	16	32 16	16
<b>Cable length</b>				
• cable length, shielded, max.	1,000 m	1,000 m	1,000 m	1,000 m
• Cable length unshielded, max.	600 m	600 m	600 m	600 m
Input characteristic curve to IEC 1131, Typ 1	Yes	Yes	Yes	Yes
<b>Input voltage</b>				
• Rated value, DC	24 V	24 V	24 V	24 V
• for signal "0"	-30 V to 5 V	30 V to -5V	-30V to 5 V	-30 V to 5 V
• for signal "1"	13 to 30 V	-13 to -30 V	13 to 30 V	13 to 30 V
<b>Input current</b>				
• for signal "1", typ.	7 mA	7 mA	7 mA	7 mA
<b>Input delay (for rated value of input voltage)</b>				
• for standard inputs				
- at "0" to "1", min.	1.2 ms	1.2 ms	1.2 ms	25 µs
- at "0" to "1", max.	4.8 ms	4.8 ms	4.8 ms	75 µs

#### Technical specifications (continued)

	6ES7 321-1BH02-0AA0	6ES7 321-1BH50-0AA0	6ES7 321-1BL00-0AA0	6ES7 321-1BH10-0AA0
<b>Encoder</b>				
Connectable encoders				
• 2-wire Beros	Yes	Yes	Yes	Yes
• permissible quiescent current (2-wire Beros), max.	1.5 mA	1.5 mA	1.5 mA	1.5 mA
<b>Status information/alarms/diagnostics</b>				
Alarms				
• Alarms	No	No	No	No
Diagnoses				
• Diagnostic functions	No	No	No	No
Diagnostics indication LED				
• Status indicator digital input (green)	Yes	Yes	Yes	Yes
<b>Isolation</b>				
Isolation checked with	500 V DC	500 V DC	500 V DC	500 V DC
<b>Isolation</b>				
Galvanic isolation, digital inputs				
• between the channels			Yes	
• between the channels, in groups of	16	16	16	16
• between the channels and the backplane bus	Yes; Optocoupler	Yes; Optocoupler	Yes; Optocoupler	Yes; Optocoupler
<b>Dimensions and weight</b>				
Width	40 mm	40 mm	40 mm	40 mm
Height	125 mm	125 mm	125 mm	125 mm
Depth	120 mm	120 mm	120 mm	120 mm
<b>Weights</b>				
Weight, approx.	200 g	200 g	260 g	200 g
	6ES7 321-7BH01-0AB0	6ES7 321-1CH00-0AA0	6ES7 321-1CH20-0AA0	6ES7 321-1FH00-0AA0
<b>Voltages and currents</b>				
Load voltage L+				
• Rated value (DC)	24 V	24 V	48 V	
Load voltage L1				
• Rated value (AC)		24 V		230 V; 120/230 V AC; all load voltages must have the same phase.
<b>Current consumption</b>				
from load voltage L+ (without load), max.	90 mA			
from backplane bus DC 5 V, max.	130 mA	100 mA	40 mA	29 mA
Power loss, typ.	4 W	1.5 W	4.3 W	4.9 W
<b>Connection point</b>				
required front connectors	20-pin	40-pin	20-pin	20-pin
<b>Isochronous mode</b>				
Isochronous mode	Yes	No	No	No

# ET 200 distributed I/Os

## ET 200M – Digital Modules

### SM 321 digital input

#### Technical specifications (continued)

	6ES7 321-7BH01-0AB0	6ES7 321-1CH00-0AA0	6ES7 321-1CH20-0AA0	6ES7 321-1FH00-0AA0
<b>Digital inputs</b>				
Number of digital inputs	16	16	16	16
Number of simultaneously controllable inputs				
• vertical installation - up to 40 °C, max.	16	16	8	16
• horizontal installation - up to 50 °C, max. - up to 60 °C, max.	16	16	8 8; 6 to Ue 146 V	16
Cable length				
• cable length, shielded, max.	1,000 m	1,000 m	1,000 m	1,000 m
• Cable length unshielded, max.	600 m	600 m	600 m	600 m
Input characteristic curve to IEC 1131, Typ 1		Yes	Yes	Yes
Input characteristic curve to IEC 1131, Typ 2	Yes			
Input voltage				
• Rated value, AC		24 V; AC 24 or 48 V		230 V; 120/230 V AC
• Rated value, DC	24 V	24 V; DC 24 or 48 V	48 V; DC 48 to 125 V	
• for signal "0"	-30V to 5 V	-5 to 5 V AC	-146 V to 15 V DC	0 to 40 V
• for signal "1"	13 to 30 V	14 to 60 V AC	30 to 146 V DC	85 to 264 V
• Frequency range		0 to 63 Hz		47 to 63 Hz
Input current				
• for signal "1", typ.	7 mA	2.7 mA	3.5 mA	8 mA; (120V, 60Hz), 16 mA (230V, 50Hz)
Input delay (for rated value of input voltage)				
• for standard inputs - programmable	Yes; 0.1 / 0.5 / 3 / 15 / 20 ms	No		No
- at "0" to "1", min.			0.1 ms	
- at "0" to "1", max.		16 ms	3.5 ms	25 ms
<b>Encoder</b>				
Connectable encoders				
• 2-wire BEROS	Yes	Yes	Yes	Yes
• permissible quiescent current (2-wire BEROS), max.	2 mA	1 mA	1 mA	2 mA
<b>Status information/alarms/diagnostics</b>				
Alarms				
• Alarms	Yes	No	No	No
• Diagnostic alarm	Yes; parameterizable	No	No	No
• Process alarm	Yes; parameterizable	No	No	No
Diagnoses				
• Diagnostic functions	Yes; parameterizable	No	No	No
Diagnostics indication LED				
• Status indicator digital input (green)	Yes	Yes	Yes	Yes
<b>Isolation</b>				
Isolation checked with	500 V DC	1500 V AC	1500 V DC	4000 V DC
<b>Isolation</b>				
Galvanic isolation, digital inputs				
• between the channels		Yes	Yes	Yes
• between the channels, in groups of	16	1	8	4
• between the channels and the backplane bus	Yes; Optocoupler	Yes; Optocoupler	Yes; Optocoupler	Yes; Optocoupler

#### Technical specifications (continued)

	6ES7 321-7BH01-0AB0	6ES7 321-1CH00-0AA0	6ES7 321-1CH20-0AA0	6ES7 321-1FH00-0AA0
<b>Dimensions and weight</b>				
Width	40 mm	40 mm	40 mm	40 mm
Height	125 mm	125 mm	125 mm	125 mm
Depth	120 mm	120 mm	120 mm	120 mm
<b>Weights</b>				
Weight, approx.	200 g	260 g	200 g	240 g

	6ES7 321-1EL00-0AA0	6ES7 321-1FF01-0AA0	6ES7 321-1FF10-0AA0
<b>Voltages and currents</b>			
Load voltage L1			
• Rated value (AC)	120 V	230 V; 120V/230V AC	230 V; 120/230 V AC; all load voltages must have the same phase.
<b>Current consumption</b>			
from backplane bus DC 5 V, max.	16 mA	29 mA	100 mA
Power loss, typ.	4 W	4.9 W	4.9 W
<b>Connection point</b>			
required front connectors	40-pin	20-pin	40-pin
<b>Isochronous mode</b>			
Isochronous mode	No	No	No
<b>Digital inputs</b>			
Number of digital inputs	32	8	8
Number of simultaneously control-able inputs			
• vertical installation			
- up to 40 °C, max.	32	8	8
• horizontal installation			
- up to 40 °C, max.	32		
- up to 60 °C, max.	24	8	8
<b>Cable length</b>			
• cable length, shielded, max.	1,000 m	1,000 m	1,000 m
• Cable length unshielded, max.	600 m	600 m	600 m
Input characteristic curve to IEC 1131, Typ 1		Yes	Yes
Input characteristic curve to IEC 1131, Typ 2	Yes		
<b>Input voltage</b>			
• Rated value, AC	120 V	230 V; 120/230 V AC	120 V; 120/230 V AC
• for signal "0"	0 to 20 V	0 to 40 V	0 to 40 V
• for signal "1"	74 to 132 V	85 to 264 V	85 to 264 V
• Frequency range	47 to 63 Hz	47 to 63 Hz	47 to 63 Hz
<b>Input current</b>			
• for signal "1", typ.	21 mA	6.5 mA; (120 V); 11mA (230 V)	7.5 mA; (120 V); 17.3 mA (230 V)
<b>Input delay (for rated value of input voltage)</b>			
• for standard inputs			
- programmable	No	No	No
- at "0" to "1", max.	15 ms	25 ms	25 ms
<b>Encoder</b>			
Connectable encoders			
• 2-wire BEROS	Yes	Yes	Yes
• permissible quiescent current (2-wire BEROS), max.	4 mA	2 mA	2 mA

# ET 200 distributed I/Os

## ET 200M – Digital Modules

### SM 321 digital input

#### Technical specifications (continued)

	6ES7 321-1EL00-0AA0	6ES7 321-1FF01-0AA0	6ES7 321-1FF10-0AA0
<b>Status information/alarms/diagnostics</b>			
Alarms			
• Alarms	No	No	No
• Diagnostic alarm	No	No	No
• Process alarm	No	No	No
Diagnoses			
• Diagnostic functions	No	No	No
Diagnosics indication LED			
• Status indicator digital input (green)	Yes	Yes	Yes
<b>Isolation</b>			
Isolation checked with	2500 V DC	4000 V DC	1500 V AC
<b>Isolation</b>			
Galvanic isolation, digital inputs			
• between the channels	Yes	Yes	Yes
• between the channels, in groups of	8	2	1
• between the channels and the backplane bus	Yes; Optocoupler	Yes; Optocoupler	Yes; Optocoupler
<b>Dimensions and weight</b>			
Width	40 mm	40 mm	40 mm
Height	125 mm	125 mm	125 mm
Depth	120 mm	120 mm	120 mm
<b>Weights</b>			
Weight, approx.	300 g	240 g	240 g

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Ordering data	Order No.	Order No.
<b>SM 321 digital input modules</b> incl. labeling strips, bus connector <ul style="list-style-type: none"> <li>• 16 inputs, 24 V DC</li> <li>• 16 inputs, 24 V DC, active low</li> <li>• 32 inputs, 24 V DC</li> <li>• 16 inputs, 24 ... 48 V DC</li> <li>• 16 inputs, 48 ... 125 V DC</li> <li>• 16 inputs, 24 V DC, for isochronous mode</li> <li>• 32 inputs, 120 V AC</li> <li>• 8 inputs, 120/130 V AC</li> <li>• 8 inputs, 120/130 V AC, single root</li> <li>• 16 inputs, 120/130 V AC</li> <li>• 16 inputs, 24 V DC, for isochronous mode, diagnostics-capable</li> </ul>	<b>6ES7 321-1BH02-0AA0</b> <b>6ES7 321-1BH50-0AA0</b> <b>6ES7 321-1BL00-0AA0</b> <b>6ES7 321-1CH00-0AA0</b> <b>6ES7 321-1CH20-0AA0</b> <b>6ES7 321-1BH10-0AA0</b> <b>6ES7 321-1EL00-0AA0</b> <b>6ES7 321-1FF01-0AA0</b> <b>6ES7 321-1FF10-0AA0</b> <b>6ES7 321-1FH00-0AA0</b> <b>6ES7 321-7BH01-0AB0</b>	<b>S7 SmartLabel</b> Software for automatic labeling of modules based on data of the STEP 7 project <b>2XV9 450-1SL01-0YX0</b>
<b>Front connectors</b> 20-pin, with screw contacts <ul style="list-style-type: none"> <li>• 1 piece</li> <li>• 100 pieces</li> </ul> 20-pin, with cage clamp contacts <ul style="list-style-type: none"> <li>• 1 piece</li> <li>• 100 pieces</li> </ul> 40-pin, with screw contacts <ul style="list-style-type: none"> <li>• 1 piece</li> <li>• 100 pieces</li> </ul> 40-pin with cage clamp contacts <ul style="list-style-type: none"> <li>• 1 piece</li> <li>• 100 pieces</li> </ul>	<b>6ES7 392-1AJ00-0AA0</b> <b>6ES7 392-1AJ00-1AB0</b> <b>6ES7 392-1BJ00-0AA0</b> <b>6ES7 392-1BJ00-1AB0</b> <b>6ES7 392-1AM00-0AA0</b> <b>6ES7 392-1AM00-1AB0</b> <b>6ES7 392-1BM01-0AA0</b> <b>6ES7 392-1BM01-1AB0</b>	<b>Labeling sheets for machine inscription</b> for 16-channel signal modules, DIN A4, for printing with laser printer; 10 pieces <ul style="list-style-type: none"> <li>• petrol</li> <li>• light-beige</li> <li>• yellow</li> <li>• red</li> </ul> <b>6ES7 392-2AX00-0AA0</b> <b>6ES7 392-2BX00-0AA0</b> <b>6ES7 392-2CX00-0AA0</b> <b>6ES7 392-2DX00-0AA0</b>
<b>Front door, elevated design</b> e.g. for 32-channel modules; enables connection of 1.3 mm <sup>2</sup> /16 AWG wires <b>6ES7 328-0AA00-7AA0</b>		for 32-channel signal modules, DIN A4, for printing with laser printer; 10 pieces <ul style="list-style-type: none"> <li>• petrol</li> <li>• light-beige</li> <li>• yellow</li> <li>• red</li> </ul> <b>6ES7 392-2AX10-0AA0</b> <b>6ES7 392-2BX10-0AA0</b> <b>6ES7 392-2CX10-0AA0</b> <b>6ES7 392-2DX10-0AA0</b>
<b>SIMATIC TOP connect</b> See Catalog ST 70		<b>SIMATIC Manual Collection</b> Electronic manuals on CD-ROM, multilingual: S7-200, S7-300, C7, S7-400, SIMATIC DP (Distributed I/O), SIMATIC PC, SIMATIC PG, STEP 7, Engineering Tools, Runtime Software, SIMATIC PCS 7, SIMATIC HMI (Human Machine Interface), SIMATIC NET (Industrial Communication), SIMATIC Machine Vision, SIMATIC Sensors <b>6ES7 998-8XC01-8YE0</b>
<b>Bus connectors</b> 1 piece (spare part) <b>6ES7 390-0AA00-0AA0</b>		<b>SIMATIC Manual Collection                      update service for 1 year</b> Current S7 Manual Collection CD and the three subsequent updates <b>6ES7 998-8XC01-8YE2</b>
<b>Labeling strips</b> 10 pieces (spare part) <ul style="list-style-type: none"> <li>• for modules with 20-pin front connector</li> <li>• for modules with 40-pin front connector</li> </ul>	<b>6ES7 392-2XX00-0AA0</b> <b>6ES7 392-2XX10-0AA0</b>	<b>S7-300 manual</b> Design, CPU data, module data, instruction list <ul style="list-style-type: none"> <li>• German</li> <li>• English</li> <li>• French</li> <li>• Spanish</li> <li>• Italian</li> </ul> <b>6ES7 398-8FA10-8AA0</b> <b>6ES7 398-8FA10-8BA0</b> <b>6ES7 398-8FA10-8CA0</b> <b>6ES7 398-8FA10-8DA0</b> <b>6ES7 398-8FA10-8EA0</b>
<b>Label cover</b> 10 pieces (spare part) <ul style="list-style-type: none"> <li>• for modules with 20-pin front connector</li> <li>• for modules with 40-pin front connector</li> </ul>	<b>6ES7 392-2XY00-0AA0</b> <b>6ES7 392-2XY10-0AA0</b>	

# ET 200 distributed I/Os

## ET 200M – Digital Modules

### SM 322 digital output

#### Overview



- Digital outputs
- For connecting solenoid valves, contactors, low-power motors, lamps and motor starters

#### Technical specifications

	6ES7 322-1BH01-0AA0	6ES7 322-1BH10-0AA0	6ES7 322-1BL00-0AA0	6ES7 322-8BF00-0AB0	6ES7 322-5GH00-0AB0	6ES7 322-1CF00-0AA0
<b>Voltages and currents</b>						
Load voltage L+						
• Rated value (DC)	24 V	24 V	24 V	24 V	24 V; 24/48	48 V; 48 to 125 V DC
<b>Current consumption</b>						
from load voltage L+ (without load), max.	80 mA	110 mA	160 mA	90 mA	200 mA	2 mA
from backplane bus DC 5 V, max.	80 mA	70 mA	110 mA	70 mA	100 mA	100 mA
Power loss, typ.	4.9 W	5 W	6.6 W	5 W	2.8 W	7.2 W
<b>Connection point</b>						
required front connectors	20-pin	20-pin	40-pin	20-pin	40-pin	20-pin
<b>Digital outputs</b>						
Number of digital outputs	16	16	32	8	16	8
cable length, shielded, max.	1,000 m	1,000 m	1,000 m	1,000 m	1,000 m	1,000 m
Cable length unshielded, max.	600 m	600 m	600 m	600 m	600 m	600 m
Short-circuit protection of the output	Yes; electronic	Yes; electronic	Yes; electronic	Yes; electronic	No; to be provided externally	Yes; electronic
Limitation of inductive shutdown voltage to	L+ (-53 V)	L+ (-53 V)	L+ (-53 V)	L+ (-45 V)		M (-1V)
Lamp load, max.	5 W	5 W	5 W	5 W	2.5 W	15 W; 15 W (48 V) or 40 W (125 V)
<b>Output voltage</b>						
• for signal "1", min.	L+ (-0.8 V)	L+ (-0.8 V)	L+ (-0.8 V)	L+ (-0.8 V to -1.6 V)	L+ (-0.25 V)	L+ (-1.2 V)
<b>Output current</b>						
• for signal "1" rated value	0.5 A	0.5 A	0.5 A	0.5 A	0.5 A	1.5 A
• for signal "1" permissible range for 0 to 40 °C, min.	5 mA	5 mA	5 mA	10 mA		10 mA
• for signal "1" permissible range for 0 to 40 °C, max.	0.6 A	0.6 A	0.6 A	0.6 A		1.5 A
• for signal "1" permissible range for 40 to 60 °C, min.	5 mA	5 mA	5 mA	10 mA		10 mA
• for signal "1" permissible range for 40 to 60 °C, max.	0.6 A	0.6 A	0.6 A	0.6 A		1.5 A
• for signal "1" minimum load current	5 mA	5 mA	5 mA	10 mA		10 mA
• for signal "1" permissible peak current, max.					1.5 A; for 50 ms, 1 A2s one-time	3 A; for 10 ms
• for signal "0" residual current, max.	0.5 mA	0.5 mA	0.5 mA	0.5 mA	10 µA	0.5 mA

#### Technical specifications (continued)

	6ES7 322-1BH01-0AA0	6ES7 322-1BH10-0AA0	6ES7 322-1BL00-0AA0	6ES7 322-8BF00-0AB0	6ES7 322-5GH00-0AB0	6ES7 322-1CF00-0AA0
Switching frequency						
• with resistive load, max.	100 Hz	1,000 Hz	100 Hz	100 Hz	10 Hz	25 Hz
• with inductive load, max.	0.5 Hz	0.5 Hz	0.5 Hz	2 Hz		0.5 Hz
• on lamp load, max.	10 Hz	10 Hz	10 Hz	10 Hz	0.5 Hz	10 Hz
Aggregate current of the outputs (per group)						
• vertical installation - up to 40 °C, max.	2 A	2 A	2 A	4 A		4 A
• horizontal installation - up to 40 °C, max.	4 A	4 A	4 A	4 A		6 A
- up to 50 °C, max.						4 A
- up to 60 °C, max.	3 A	3 A	3 A	3 A	0.5 A	3 A
• all other mounting positions - up to 40 °C, max.					0.5 A	
<b>Status information/alarms/diagnostics</b>						
Alarms						
• Diagnostic alarm	No	No	No	Yes; channel by channel	Yes; parameterizable	No
Diagnoses						
• Diagnostics	No	No	No	Yes	Yes; Parameters can be assigned	No
<b>Isolation</b>						
Isolation checked with	500 V DC	500 V DC	500 V DC	500 V DC	1500 V AC	1500 V AC
<b>Isolation</b>						
Isolation, digital outputs						
• between the channels, in groups of	8	8	8	8	1	4
• between the channels and the backplane bus	Yes; Optocoupler	Yes; Optocoupler	Yes; Optocoupler	Yes; Optocoupler	Yes; Optocoupler	Yes; Optocoupler
<b>Dimensions and weight</b>						
Width	40 mm	40 mm	40 mm	40 mm	40 mm	40 mm
Height	125 mm	125 mm	125 mm	125 mm	125 mm	125 mm
Depth	120 mm	120 mm	120 mm	120 mm	120 mm	120 mm
<b>Weights</b>						
Weight, approx.	190 g	200 g	260 g	210 g	260 g	250 g
	<b>6ES7 322-1BF01-0AA0</b>	<b>6ES7 322-1FF01-0AA0</b>	<b>6ES7 322-5FF00-0AB0</b>	<b>6ES7 322-1FH00-0AA0</b>	<b>6ES7 322-1FL00-0AA0</b>	<b>6ES7 322-1HF01-0AA0</b>
<b>Voltages and currents</b>						
Load voltage L+						
• Rated value (DC)	24 V					24 V
Load voltage L1						
• Rated value (AC)		230 V; 120/230 V AC	230 V; 120/230 V AC	230 V; 120/230 V AC	120 V; 120/230 V AC	
<b>Current consumption</b>						
from load voltage L+ (without load), max.	60 mA			2 mA		110 mA; Current consumption of relay
from load voltage L1 (without load), max.		2 mA	2 mA	3 mA	10 mA	110 mA
from backplane bus DC 5 V, max.	40 mA	100 mA	100 mA	200 mA	190 mA	40 mA
Power loss, typ.	6.8 W	8.6 W	8.6 W	8.6 W	25 W	3.2 W

# ET 200 distributed I/Os

## ET 200M – Digital Modules

### SM 322 digital output

#### Technical specifications (continued)

	6ES7 322-1BF01-0AA0	6ES7 322-1FF01-0AA0	6ES7 322-5FF00-0AB0	6ES7 322-1FH00-0AA0	6ES7 322-1FL00-0AA0	6ES7 322-1HF01-0AA0
<b>Connection point</b>						
required front connectors	20-pin	20-pin	40-pin	20-pin	20-pin	20-pin
<b>Digital outputs</b>						
Number of digital outputs	8	8	8	16	32	8; Relay
cable length, shielded, max.	1,000 m	1,000 m	1,000 m	1,000 m	1,000 m	1,000 m
Cable length unshielded, max.	600 m	600 m	600 m	600 m	600 m	600 m
Short-circuit protection of the output	Yes; electronic	Yes; Fuse, 8 A / 250 V; per group	Yes; to be provided externally; fuse 3,15 A / 250 V, quick response	Yes; Fuse 8 A, 250 V; per group	No	
Limitation of inductive shutdown voltage to	L+ (-48 V)					
Lamp load, max.	10 W	50 W	50 W	50 W	50 W	50 W
<b>Output voltage</b>						
• for signal "1", min.	L+ (-0.8 V)	L1 (-1.5 V)	L1 (-8.5 V)	L+(-0.8 V)	L1 (-0.8 V)	
<b>Output current</b>						
• for signal "1" rated value	2 A	2 A	2 A	1 A	1 A	
• for signal "1" permissible range for 0 to 40 °C, min.	5 mA	10 mA	10 mA	10 mA	10 mA	
• for signal "1" permissible range for 0 to 40 °C, max.	2.4 A	2 A	2 A	1 A	1 A	
• for signal "1" permissible range for 40 to 60 °C, min.	5 mA	10 mA	10 mA	10 mA	10 mA	
• for signal "1" permissible range for 40 to 60 °C, max.	2.4 A	1 A	1 A	0.5 A	1 A	
• for signal "1" minimum load current	5 mA	10 mA	10 mA	10 mA	10 mA	5 mA
• for signal "1" permissible peak current, max.		20 A; max. 1 AC cycle	20 A; with 2 half waves	20 A; with 2 half waves	10 A; per group (for 2 AC cycles)	
• for signal "0" residual current, max.	0.5 mA	2 mA	2 mA	2 mA	2 mA	
<b>Switching frequency</b>						
• with resistive load, max.	100 Hz	10 Hz	10 Hz	10 Hz	10 Hz	2 Hz
• with inductive load, max.	0.5 Hz	0.5 Hz	0.5 Hz	0.5 Hz	0.5 Hz	0.5 Hz
• on lamp load, max.	10 Hz	1 Hz	1 Hz	1 Hz	1 Hz	2 Hz
• mechanical, max.						10 Hz
<b>Aggregate current of the outputs (per group)</b>						
• vertical installation - up to 40 °C, max.	4 A	2 A	4 A	2 A	4 A	
• horizontal installation - up to 40 °C, max.		4 A	8 A	4 A	4 A	
- up to 60 °C, max.	4 A	2 A	4 A	2 A	3 A	
<b>Relay outputs</b>						
Rated input voltage of relay L+ (DC)						24 V; 110 mA
Number of operating cycles						300,000; 230 V AC: 100000, 120 V AC: 200000, 24 V DC: 300000 (at 2 A)
<b>Switching capacity of the contacts</b>						
• with inductive load, max.						2 A; 2 A (230 V AC), 2 A (24 V DC)
• with resistive load, max.						2 A

#### Technical specifications (continued)

	6ES7 322-1BF01-0AA0	6ES7 322-1FF01-0AA0	6ES7 322-5FF00-0AB0	6ES7 322-1FH00-0AA0	6ES7 322-1FL00-0AA0	6ES7 322-1HF01-0AA0
<b>Status information/alarms/diagnostics</b>						
Alarms						
• Diagnostic alarm	No	No	Yes; parameterizable	No	No	No
Diagnoses						
• Diagnostics	No	Yes	Yes; Off / last value / substitute value	Yes	Yes	No
<b>Isolation</b>						
Isolation checked with	500 V DC	1500 V AC	1500 V AC	4000 V DC	4000 V DC	1500 V AC
<b>Isolation</b>						
Isolation, digital outputs						
• between the channels, in groups of	4	4	1	8	8	2
• between the channels and the backplane bus	Yes; Optocoupler	Yes; Optocoupler	Yes; Optocoupler	Yes; Optocoupler	Yes; Optocoupler	Yes; Optocoupler
<b>Dimensions and weight</b>						
Width	40 mm	40 mm	40 mm	40 mm	80 mm	40 mm
Height	125 mm	125 mm	125 mm	125 mm	125 mm	125 mm
Depth	120 mm	120 mm	120 mm	120 mm	117 mm	120 mm
<b>Weights</b>						
Weight, approx.	190 g	275 g	275 g	275 g	500 g	190 g

	6ES7 322-1HF10-0AA0	6ES7 322-5HF00-0AB0	6ES7 322-1HH01-0AA0
<b>Voltages and currents</b>			
Load voltage L+			
• Rated value (DC)	120 V	24 V	120 V
Load voltage L1			
• Rated value (AC)	230 V	230 V	230 V
<b>Current consumption</b>			
from backplane bus DC 5 V, max.	40 mA	100 mA	100 mA
Power loss, typ.	4.2 W	3.5 W	4.5 W
<b>Connection point</b>			
required front connectors	40-pin	40-pin	20-pin
<b>Digital outputs</b>			
Number of digital outputs	8; Relay	8; Relay	16; Relay
cable length, shielded, max.	1,000 m	1,000 m	1,000 m
Cable length unshielded, max.	600 m	600 m	600 m
Short-circuit protection of the output	No; to be provided externally		
Lamp load, max.	1,500 W; AC 230 V	1,500 W; AC 230 V	50 W; AC 230 V
Output current			
• for signal "1" minimum load current	5 mA	10 mA	10 mA
Switching frequency			
• with resistive load, max.	2 Hz	2 Hz	1 Hz
• with inductive load, max.	0.5 Hz	0.5 Hz	0.5 Hz
• on lamp load, max.	2 Hz	2 Hz	1 Hz
• mechanical, max.	10 Hz	10 Hz	10 Hz

# ET 200 distributed I/Os

## ET 200M – Digital Modules

### SM 322 digital output

#### Technical specifications (continued)

	6ES7 322-1HF10-0AA0	6ES7 322-5HF00-0AB0	6ES7 322-1HH01-0AA0
Aggregate current of the outputs (per group)			
<ul style="list-style-type: none"> <li>vertical installation               <ul style="list-style-type: none"> <li>- up to 40 °C, max.</li> </ul> </li> <li>horizontal installation               <ul style="list-style-type: none"> <li>- up to 60 °C, max.</li> </ul> </li> </ul>	5 A	5 A	8 A
	5 A	5 A	8 A
<b>Relay outputs</b>			
Rated input voltage of relay L+ (DC)	24 V		24 V
Number of operating cycles	300,000; 300000 (DC 24 V, at 2 A), 200000 (AC 120 V, at 3 A), 100000 (AC 230 V, at 3 A)	100,000; 100,000 (DC 24 V, at 5 A), 100,000 (AC 230 V, at 5 A)	100,000; 50000 (24 V DC, at 2 A), 700000 (120 V AC, at 2 A), 100000 (230 V AC, at 2 A)
Switching capacity of the contacts			
<ul style="list-style-type: none"> <li>with inductive load, max.</li> </ul>	3 A; 3 A (230 V AC), 2 A (24 V DC)	5 A; 5 A (230 V AC), 5 A (24 V DC)	2 A; 2 A (230 V AC), 2 A (24 V DC)
<ul style="list-style-type: none"> <li>with resistive load, max.</li> </ul>	8 A; 8 A (230 V AC), 5 A (24 V DC)	5 A; 5 A (230 V AC), 5 A (24 V DC)	2 A; 2 A (230 V AC), 2 A (24 V DC)
<b>Status information/alarms/diagnostics</b>			
Alarms			
<ul style="list-style-type: none"> <li>Diagnostic alarm</li> </ul>	No	Yes; parameterizable	No
Diagnoses			
<ul style="list-style-type: none"> <li>Diagnostics</li> </ul>	No	Yes; Off / last value / substitute value	No
<b>Isolation</b>			
Isolation checked with	2000 V AC	1500 V AC	1500 V AC
<b>Isolation</b>			
Isolation, digital outputs			
<ul style="list-style-type: none"> <li>between the channels, in groups of</li> </ul>	1	1	8
<ul style="list-style-type: none"> <li>between the channels and the backplane bus</li> </ul>	Yes; Optocoupler	Yes; Optocoupler	Yes; Optocoupler
<b>Dimensions and weight</b>			
Width	40 mm	40 mm	40 mm
Height	125 mm	125 mm	125 mm
Depth	120 mm	120 mm	120 mm
<b>Weights</b>			
Weight, approx.	320 g	320 g	250 g

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Ordering data	Order No.	Order No.
<b>SM 322 digital output modules</b> incl. labeling strips, bus connector		
<ul style="list-style-type: none"> <li>• 8 outputs, 24 V DC, 2 A</li> </ul>	<b>6ES7 322-1BF01-0AA0</b>	
<ul style="list-style-type: none"> <li>• 16 outputs, 24 V DC, 0.5 A</li> </ul>	<b>6ES7 322-1BH01-0AA0</b>	
<ul style="list-style-type: none"> <li>• 16 outputs, 24 V DC, 0.5 A, high speed</li> </ul>	<b>6ES7 322-1BH10-0AA0</b>	
<ul style="list-style-type: none"> <li>• 32 outputs, 24 V DC, 0.5 A</li> </ul>	<b>6ES7 322-1BL00-0AA0</b>	
<ul style="list-style-type: none"> <li>• 8 outputs, 24 V DC, 0.5 A, diagnostics-capable</li> </ul>	<b>6ES7 322-8BF00-0AB0</b>	
<ul style="list-style-type: none"> <li>• 16 outputs, 24/48 V DC, 0.5 A</li> </ul>	<b>6ES7 322-5GH00-0AB0</b>	
<ul style="list-style-type: none"> <li>• 8 outputs, 48 to 125 V DC, 1.5 A</li> </ul>	<b>6ES7 322-1CF00-0AA0</b>	
<ul style="list-style-type: none"> <li>• 8 outputs, 120/230 V AC, 1 A</li> </ul>	<b>6ES7 322-1FF01-0AA0</b>	
<ul style="list-style-type: none"> <li>• 8 outputs, 120/230 V AC, 2 A</li> </ul>	<b>6ES7 322-5FF00-0AB0</b>	
<ul style="list-style-type: none"> <li>• 16 outputs, 120/230 V AC, 1 A</li> </ul>	<b>6ES7 322-1FH00-0AA0</b>	
<ul style="list-style-type: none"> <li>• 32 outputs, 120 V AC, 1 A</li> </ul>	<b>6ES7 322-1FL00-0AA0</b>	
<ul style="list-style-type: none"> <li>• 8 outputs, relay contacts, 2 A</li> </ul>	<b>6ES7 322-1HF01-0AA0</b>	
<ul style="list-style-type: none"> <li>• 8 outputs, relay contacts, 5 A</li> </ul>	<b>6ES7 322-1HF10-0AA0</b>	
<ul style="list-style-type: none"> <li>• 8 outputs, relay contacts, 5 A, with RC filter, overvoltage protection</li> </ul>	<b>6ES7 322-5HF00-0AB0</b>	
<ul style="list-style-type: none"> <li>• 16 outputs, relay contacts, 8 A</li> </ul>	<b>6ES7 322-1HH01-0AA0</b>	
<b>Front connectors</b> 20-pin, with screw contacts		
<ul style="list-style-type: none"> <li>• 1 piece</li> </ul>	<b>6ES7 392-1AJ00-0AA0</b>	
<ul style="list-style-type: none"> <li>• 100 pieces</li> </ul>	<b>6ES7 392-1AJ00-1AB0</b>	
20-pin, with cage clamp contacts		
<ul style="list-style-type: none"> <li>• 1 piece</li> </ul>	<b>6ES7 392-1BJ00-0AA0</b>	
<ul style="list-style-type: none"> <li>• 100 pieces</li> </ul>	<b>6ES7 392-1BJ00-1AB0</b>	
40-pin, with screw contacts		
<ul style="list-style-type: none"> <li>• 1 piece</li> </ul>	<b>6ES7 392-1AM00-0AA0</b>	
<ul style="list-style-type: none"> <li>• 100 pieces</li> </ul>	<b>6ES7 392-1AM00-1AB0</b>	
40-pin with cage clamp contacts		
<ul style="list-style-type: none"> <li>• 1 piece</li> </ul>	<b>6ES7 392-1BM01-0AA0</b>	
<ul style="list-style-type: none"> <li>• 100 pieces</li> </ul>	<b>6ES7 392-1BM01-1AB0</b>	
<b>Front door, elevated design</b> e.g. for 32-channel modules; for connecting 1.3 mm <sup>2</sup> /16 AWG conductors	<b>6ES7 328-0AA00-7AA0</b>	
<b>SIMATIC TOP connect</b>	See Catalog ST 70	
<b>Bus connectors</b> 1 piece (spare part)	<b>6ES7 390-0AA00-0AA0</b>	
<b>Set of fuses for SM 322</b> 10 fuses, 8 A fast, 2 fuse holders	<b>6ES7 973-1HD00-0AA0</b>	
<b>Labeling strips</b> 10 pieces (spare part)		
<ul style="list-style-type: none"> <li>• for modules with 20-pin front connector</li> </ul>	<b>6ES7 392-2XX00-0AA0</b>	
<ul style="list-style-type: none"> <li>• for modules with 40-pin front connector</li> </ul>	<b>6ES7 392-2XX10-0AA0</b>	
<b>Label cover</b> 10 pieces (spare part)		
<ul style="list-style-type: none"> <li>• for modules with 20-pin front connector</li> </ul>		<b>6ES7 392-2XY00-0AA0</b>
<ul style="list-style-type: none"> <li>• for modules with 40-pin front connector</li> </ul>		<b>6ES7 392-2XY10-0AA0</b>
<b>S7 SmartLabel</b> Software for automatic labeling of modules based on data of the STEP 7 project		<b>2XV9 450-1SL01-0YX0</b>
<b>Labeling sheets for machine inscription</b> For 16-channel signal modules, DIN A4, for printing with laser printer; 10 pieces		
<ul style="list-style-type: none"> <li>• petrol</li> </ul>		<b>6ES7 392-2AX00-0AA0</b>
<ul style="list-style-type: none"> <li>• light-beige</li> </ul>		<b>6ES7 392-2BX00-0AA0</b>
<ul style="list-style-type: none"> <li>• yellow</li> </ul>		<b>6ES7 392-2CX00-0AA0</b>
<ul style="list-style-type: none"> <li>• red</li> </ul>		<b>6ES7 392-2DX00-0AA0</b>
For 32-channel signal modules, DIN A4, for printing with laser printer; 10 pieces		
<ul style="list-style-type: none"> <li>• petrol</li> </ul>		<b>6ES7 392-2AX10-0AA0</b>
<ul style="list-style-type: none"> <li>• light-beige</li> </ul>		<b>6ES7 392-2BX10-0AA0</b>
<ul style="list-style-type: none"> <li>• yellow</li> </ul>		<b>6ES7 392-2CX10-0AA0</b>
<ul style="list-style-type: none"> <li>• red</li> </ul>		<b>6ES7 392-2DX10-0AA0</b>
<b>SIMATIC Manual Collection</b> Electronic manuals on CD-ROM, multilingual: S7-200, S7-300, C7, S7-400, SIMATIC DP (Distributed I/O), SIMATIC PC, SIMATIC PG (Programming device), STEP 7, Engineering Tools, Runtime Soft- ware, SIMATIC PCS 7, SIMATIC HMI (Human Machine Interface), SIMATIC NET (Industrial Commu- nication), SIMATIC Machine Vision, SIMATIC Sensors		<b>6ES7 998-8XC01-8YE0</b>
<b>SIMATIC Manual Collection                      update service for 1 year</b> Current S7 Manual Collection CD and the three subsequent updates		<b>6ES7 998-8XC01-8YE2</b>
<b>S7-300 manual</b> Design, CPU data, module data, instruction list		
<ul style="list-style-type: none"> <li>• German</li> </ul>		<b>6ES7 398-8FA10-8AA0</b>
<ul style="list-style-type: none"> <li>• English</li> </ul>		<b>6ES7 398-8FA10-8BA0</b>
<ul style="list-style-type: none"> <li>• French</li> </ul>		<b>6ES7 398-8FA10-8CA0</b>
<ul style="list-style-type: none"> <li>• Spanish</li> </ul>		<b>6ES7 398-8FA10-8DA0</b>
<ul style="list-style-type: none"> <li>• Italian</li> </ul>		<b>6ES7 398-8FA10-8EA0</b>

# ET 200 distributed I/Os

## ET 200M – Digital Modules

### SM 323/SM 327 digital input/output

#### Overview



- Digital inputs and outputs
- For connecting standard switches, two-wire proximity switches (BERO), solenoid valves, contactors, low-power motors, lamps and motor starters

#### Technical specifications

	6ES7 323-1BH01-0AA0	6ES7 323-1BL00-0AA0	6ES7 327-1BH00-0AB0
<b>Voltages and currents</b>			
Load voltage L+			
• Rated value (DC)	24 V	24 V	24 V
<b>Current consumption</b>			
from load voltage L+ (without load), max.	40 mA	80 mA	20 mA
from backplane bus DC 5 V, max.	40 mA	80 mA	60 mA
Power loss, typ.	3.5 W	6.5 W	3 W
<b>Connection point</b>			
required front connectors	20-pin	40-pin	20-pin
<b>Isochronous mode</b>			
Isochronous mode	No	No	No
<b>Digital inputs</b>			
Number of digital inputs	8	16	8; 8 hardwired, and 8 others individually parameterizable
Number of simultaneously controllable inputs			
• Number of simultaneously controllable inputs, up to 40 °C	8	16	16
• Number of simultaneously controllable inputs, up to 60 °C	8	8	16
<b>Cable length</b>			
• cable length, shielded, max.	1,000 m	1,000 m	1,000 m
• Cable length unshielded, max.	600 m	600 m	600 m
Input characteristic curve to IEC 1131, Typ 1	Yes	Yes	Yes
<b>Input voltage</b>			
• Rated value, DC	24 V	24 V	24 V
• for signal "0"	-30V to 5 V	-30V to 5 V	-30V to 5 V
• for signal "1"	13 to 30 V	13 to 30 V	15 to 30 V
<b>Input current</b>			
• for signal "1", typ.	7 mA	7 mA	6 mA
<b>Input delay (for rated value of input voltage)</b>			
• 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

#### Technical specifications (continued)

	6ES7 323-1BH01-0AA0	6ES7 323-1BL00-0AA0	6ES7 327-1BH00-0AB0
<b>Digital outputs</b>			
Number of digital outputs	8	16	8; can also be parameterized individually as DI
cable length, shielded, max.	1,000 m	1,000 m	1,000 m
Cable length unshielded, max.	600 m	600 m	600 m
Short-circuit protection of the output	Yes; electronic	Yes; electronic	Yes; electronic
• Response threshold, typ.	1 A	1 A	1A
Limitation of inductive shutdown voltage to	L+ (-53 V)	L+ (-48 V)	L+ (-54 V)
Lamp load, max.	5 W	5 W	5 W
Controlling a digital input	Yes	Yes	Yes
<b>Output voltage</b>			
• for signal "1", min.	L+ (-0.8 V)	L+ (-0.8 V)	L+ (-1.5 V)
<b>Output current</b>			
• for signal "1" rated value	0.5 A	0.5 A	0.5 A
• for signal "1" permissible range for 0 to 60 °C, min.			5 mA
• for signal "1" permissible range for 0 to 60 °C, max.			0.6 A
• for signal "1" minimum load current	5 mA	5 mA	
• for signal "0" residual current, max.	0.5 mA	0.5 mA	0.5 mA
<b>Output delay with resistive load</b>			
• "0" to "1", max.	100 µs	100 µs	350 µs
• "1" to "0", max.	500 µs	500 µs	500 µs
<b>Parallel switching of 2 outputs</b>			
• for increased power	No	No	No
• for redundant control of a load	Yes; Outputs of the same group only	Yes; Outputs of the same group only	Yes; only outputs of the same group
<b>Switching frequency</b>			
• 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.	10 Hz	100 Hz	10 Hz
<b>Aggregate current of the outputs (per group)</b>			
• vertical installation - up to 40 °C, max.	4 A	2 A	2 A
• horizontal installation - up to 40 °C, max.		4 A	4 A
- up to 60 °C, max.	4 A	3 A	3 A
<b>Load impedance range</b>			
• lower limit	48 Ω	48 Ω	48 Ω
• upper limit	4 kΩ	4 kΩ	4 kΩ
<b>Encoder</b>			
Connectable encoders			
• 2-wire BEROS	Yes	Yes	Yes
• permissible quiescent current (2-wire BEROS), max.	2 mA	1.5 mA	1.5 mA

# ET 200 distributed I/Os

## ET 200M – Digital Modules

### SM 323/SM 327 digital input/output

#### Technical specifications (continued)

	6ES7 323-1BH01-0AA0	6ES7 323-1BL00-0AA0	6ES7 327-1BH00-0AB0
<b>Status information/alarms/diagnostics</b>			
Alarms			
• Alarms	No	No	No
Diagnoses			
• Diagnostic functions	No	No	No
Diagnostics indication LED			
• Status indicator digital output (green)	Yes	Yes	Yes
• Status indicator digital input (green)	Yes	Yes	Yes
<b>Isolation</b>			
Isolation checked with	500 V DC	500 V DC	500 V DC
<b>Isolation, digital outputs</b>			
• between the channels	Yes	Yes	No
• between the channels, in groups of	8	8	
• between the channels and the backplane bus	Yes; Optocoupler	Yes; Optocoupler	Yes; Optocoupler
<b>Galvanic isolation, digital inputs</b>			
• between the channels	Yes	Yes	No
• between the channels, in groups of	8	16	
• between the channels and the backplane bus	Yes; Optocoupler	Yes; Optocoupler	Yes; Optocoupler
<b>Permissible potential difference</b>			
between different circuits	500 V DC	500 V DC	500 V DC
<b>Dimensions and weight</b>			
Width	40 mm	40 mm	40 mm
Height	125 mm	125 mm	125 mm
Depth	120 mm	120 mm	120 mm
<b>Weights</b>			
Weight, approx.	220 g	260 g	200 g

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Ordering data	Order No.	Order No.
<b>SM 323 digital input/output modules</b> incl. labeling strips, bus connector 8 inputs, 8 outputs 16 inputs, 16 outputs	<b>6ES7 323-1BH01-0AA0</b> <b>6ES7 323-1BL00-0AA0</b>	<b>S7 SmartLabel</b> Software for automatic labeling of modules based on data of the STEP 7 project <b>2XV9 450-1SL01-0YX0</b>
<b>SM 327 digital input/output modules</b> incl. labeling strips, bus connector 8 inputs, 8 inputs or outputs (can be configured)	<b>6ES7 327-1BH00-0AB0</b>	<b>Labeling sheets for machine inscription</b> For 16-channel signal modules, DIN A4, for printing with laser printer; 10 pieces <ul style="list-style-type: none"> <li>• petrol <b>6ES7 392-2AX00-0AA0</b></li> <li>• light-beige <b>6ES7 392-2BX00-0AA0</b></li> <li>• yellow <b>6ES7 392-2CX00-0AA0</b></li> <li>• red <b>6ES7 392-2DX00-0AA0</b></li> </ul>
<b>Front connectors</b> 20-pin, with screw contacts <ul style="list-style-type: none"> <li>• 1 piece <b>6ES7 392-1AJ00-0AA0</b></li> <li>• 100 pieces <b>6ES7 392-1AJ00-1AB0</b></li> </ul> 20-pin, with cage clamp contacts <ul style="list-style-type: none"> <li>• 1 piece <b>6ES7 392-1BJ00-0AA0</b></li> <li>• 100 pieces <b>6ES7 392-1BJ00-1AB0</b></li> </ul> 40-pin, with screw contacts <ul style="list-style-type: none"> <li>• 1 piece <b>6ES7 392-1AM00-0AA0</b></li> <li>• 100 pieces <b>6ES7 392-1AM00-1AB0</b></li> </ul> 40-pin with cage clamp contacts <ul style="list-style-type: none"> <li>• 1 piece <b>6ES7 392-1BM01-0AA0</b></li> <li>• 100 pieces <b>6ES7 392-1BM01-1AB0</b></li> </ul>		For 32-channel signal modules, DIN A4, for printing with laser printer; 10 pieces <ul style="list-style-type: none"> <li>• petrol <b>6ES7 392-2AX10-0AA0</b></li> <li>• light-beige <b>6ES7 392-2BX10-0AA0</b></li> <li>• yellow <b>6ES7 392-2CX10-0AA0</b></li> <li>• red <b>6ES7 392-2DX10-0AA0</b></li> </ul>
<b>Front door, elevated design</b> e.g. for 32 channel modules; enables connection of 1.3 mm <sup>2</sup> /16 AWG wires	<b>6ES7 328-0AA00-7AA0</b>	<b>SIMATIC Manual Collection</b> Electronic manuals on CD-ROM, multilingual: S7-200, S7-300, C7, S7-400, SIMATIC DP (Distributed I/O), SIMATIC PC, SIMATIC PG (Programming device), STEP 7, Engineering Tools, Runtime Software, SIMATIC PCS 7, SIMATIC HMI (Human Machine Interface), SIMATIC NET (Industrial Communication), SIMATIC Machine Vision, SIMATIC Sensors <b>6ES7 998-8XC01-8YE0</b>
<b>SIMATIC TOP connect</b>	See Catalog ST 70	<b>SIMATIC Manual Collection update service for 1 year</b> Current S7 Manual Collection CD and the three subsequent updates <b>6ES7 998-8XC01-8YE2</b>
<b>Bus connectors</b> 1 piece (spare part)	<b>6ES7 390-0AA00-0AA0</b>	<b>S7-300 manual</b> Design, CPU data, module data, instruction list <ul style="list-style-type: none"> <li>• German <b>6ES7 398-8FA10-8AA0</b></li> <li>• English <b>6ES7 398-8FA10-8BA0</b></li> <li>• French <b>6ES7 398-8FA10-8CA0</b></li> <li>• Spanish <b>6ES7 398-8FA10-8DA0</b></li> <li>• Italian <b>6ES7 398-8FA10-8EA0</b></li> </ul>
<b>Labeling strips</b> 10 pieces (spare part) <ul style="list-style-type: none"> <li>• for modules with 20-pin front connector <b>6ES7 392-2XX00-0AA0</b></li> <li>• for modules with 40-pin front connector <b>6ES7 392-2XX10-0AA0</b></li> </ul>		
<b>Label cover</b> 10 pieces (spare part) <ul style="list-style-type: none"> <li>• for modules with 20-pin front connector <b>6ES7 392-2XY00-0AA0</b></li> <li>• for modules with 40-pin front connector <b>6ES7 392-2XY10-0AA0</b></li> </ul>		

# ET 200 distributed I/Os

## ET 200M – Digital Modules

### SIPLUS SM 321 digital input module (extended temperature range)

#### Overview



- Digital inputs
- For connecting standard switches and two-wire proximity switches (BERO)

<b>SIPLUS SM 321</b>	<b>16 DI</b>	<b>32 DO</b>
<b>Order No.</b>	<b>6AG1 321-1BH02-2AA0</b>	<b>6AG1 321-1BL00-2AA0</b>
<b>Order No. based on</b>	<b>6ES7 321-1BH02-0AA0</b>	<b>6ES7 321-1BL00-0AA0</b>
Ambient temperature range	-25 °C to +60 °C, condensation permissible	
Ambient conditions	Suitable for extraordinary medial load (for example by chloric and sulphuric atmospheres).	
Conformity with standard for electronic devices on rail vehicles (EN 50155, temperature T1, category 1).	Yes	Yes
Technical data	The technical data is identical with the technical data of the based on modules.	

<b>SIPLUS SM 321</b>	<b>16 DI</b>
<b>Order No.</b>	<b>6AG1 321-7BH01-2AB0</b>
<b>Order No. based on</b>	<b>6ES7 321-7BH01-0AB0</b>
Ambient temperature range	-25 °C to +60 °C, condensation permissible
Ambient conditions	Suitable for extraordinary medial load (for example by chloric and sulphuric atmospheres).
Conformity with standard for electronic devices on rail vehicles (EN 50155, temperature T1, category 1).	Yes
Technical data	The technical data is identical with the technical data of the based on modules.

<b>SIPLUS SM 321</b>	<b>16 DI – 48 ... 125 V DC</b>
<b>Order No.</b>	<b>6AG1 321-1CH20-2AA0</b>
<b>Order No. based on</b>	<b>6ES7 321-1CH20-0AA0</b>
Ambient temperature range	-25 °C to +60 °C, condensation permissible
Ambient conditions	Suitable for extraordinary medial load (for example by chloric and sulphuric atmospheres).
Conformity with standard for electronic devices on rail vehicles (EN 50155, temperature T1, category 1).	Yes
Technical data	The technical data is identical with the technical data of the based on modules.

<b>SIPLUS SM 321</b>	<b>8 DI – 120/230 V AC</b>
<b>Order No.</b>	<b>6AG1 321-1FF01-2AA0</b>
<b>Order No. based on</b>	<b>6ES7 321-1FF01-0AA0</b>
Ambient temperature range	-25 °C to +60 °C, condensation permissible
Ambient conditions	Suitable for extraordinary medial load (for example by chloric and sulphuric atmospheres).
Conformity with standard for electronic devices on rail vehicles (EN 50155, temperature T1, category 1).	Yes
Technical data	The technical data is identical with the technical data of the based on modules.

Ordering data	Order No.
<p><b>SIPLUS SM 321 digital input modules</b></p> <p>Expanded temperature range and medial load including labeling strips, bus connectors</p> <ul style="list-style-type: none"> <li>• 16 inputs, 24 V DC</li> <li>• 32 inputs, 24 V DC</li> <li>• 16 inputs, 48 ... 125 V DC</li> <li>• 8 inputs, 120/230 V AC</li> <li>• 16 inputs, 24 V DC, for isochrone mode, diagnostics capability</li> </ul>	<p><b>6AG1 321-1BH02-2AA0</b></p> <p><b>6AG1 321-1BL00-2AA0</b></p> <p><b>6AG1 321-1CH20-2AA0</b></p> <p><b>6AG1 321-1FF01-2AA0</b></p> <p><b>6AG1 321-7BH01-2AB0</b></p>
<p><b>Accessories</b></p>	<p>see Ordering data for SM 321 digital input modules</p>

# ET 200 distributed I/Os

## ET 200M – Digital Modules

### SIPLUS SM 322 digital output module (extended temperature range)

#### Overview



- Digital outputs
- For connecting solenoid valves, contactors, low-power motors, lamps and motor starters

<b>SIPLUS SM 322</b>	<b>16 DO</b>
<b>Order No.</b>	<b>6AG1 322-1BH01-2AA0</b>
<b>Order No. based on</b>	<b>6ES7 322-1BH01-0AA0</b>
Ambient temperature range	-25 °C to +60 °C, condensation permissible
Ambient conditions	Suitable for extraordinary medial load (for example by chloric and sulphuric atmospheres).
Conformity with standard for electronic devices on rail vehicles (EN 50155, temperature T1, category 1).	Yes
Technical data	The technical data is identical with the technical data of the based on modules. The technical data is identical with the technical data of the based on modules.

<b>SIPLUS SM 322</b>	<b>8 DO, DC 24 V, 0,5 A</b>	<b>8 DO, DC 24 V, 2A</b>
<b>Order No.</b>	<b>6AG1 322-8BF00-2AB0</b>	<b>6AG1 322-1BF01-2XB0</b>
<b>Order No. based on</b>	<b>6ES7 322-8BF00-0AB0</b>	<b>6ES7 322-1BF01-0AA0</b>
Ambient temperature range	-25 °C to +60 °C, condensation permissible	
Ambient conditions	Suitable for extraordinary medial load (for example by chloric and sulphuric atmospheres).	
Conformity with standard for electronic devices on rail vehicles (EN 50155, temperature T1, category 1).	Yes	Yes
Technical data	The technical data is identical with the technical data of the based on modules.	

<b>SIPLUS SM 322</b>	<b>8 DO – 48 ... 125 V DC</b>
<b>Order No.</b>	<b>6AG1 322-1CF00-2AA0</b>
<b>Order No. based on</b>	<b>6ES7 322-1CF00-0AA0</b>
Ambient temperature range	-25 °C to +60 °C, condensation permissible
Ambient conditions	Suitable for extraordinary medial load (for example by chloric and sulphuric atmospheres).
Conformity with standard for electronic devices on rail vehicles (EN 50155, temperature T1, category 1).	Yes
Technical data	The technical data is identical with the technical data of the based on modules.

<b>SIPLUS SM 322</b>	<b>8 DO – 120/230 V AC</b>
<b>Order No.</b>	<b>6AG1 322-1FF01-2AA0</b>
<b>Order No. based on</b>	<b>6ES7 322-1FF01-0AA0</b>
Ambient temperature range	-25 °C to +60 °C, condensation permissible
Ambient conditions	Suitable for extraordinary medial load (for example by chloric and sulphuric atmospheres).
Conformity with standard for electronic devices on rail vehicles (EN 50155, temperature T1, category 1).	Yes
Technical data	The technical data is identical with the technical data of the based on modules.

Overview (continued)		
<b>SIPLUS SM 322</b>	<b>8 RO</b>	
<b>Order No.</b>	<b>6AG1 322-1HF10-2AA0</b>	
<b>Order No. based on</b>	<b>6ES7 322-1HF10-0AA0</b>	
Ambient temperature range	-25 °C to +60 °C, condensation permissible	
Ambient conditions	Suitable for extraordinary medial load (for example by chloric and sulphuric atmospheres).	
Conformity with standard for electronic devices on rail vehicles (EN 50155, temperature T1, category 1).	Yes	
Technical data	The technical data is identical with the technical data of the based on modules.	
<b>SIPLUS SM 322</b>	<b>32 DO</b>	<b>16 RO</b>
<b>Order No.</b>	<b>6AG1 322-1BL00-2AA0</b>	<b>6AG1 322-1HH01-2AA0</b>
<b>Order No. based on</b>	<b>6ES7 322-1BL00-0AA0</b>	<b>6ES7 322-1HH01-0AA0</b>
Ambient temperature range	-25 °C to +60 °C, condensation permissible	
Ambient conditions	Suitable for extraordinary medial load (for example by chloric and sulphuric atmospheres).	
Conformity with standard for electronic devices on rail vehicles (EN 50155, temperature T1, category 1).	Yes	Yes
Technical data	The technical data is identical with the technical data of the based on modules.	

Ordering data	Order No.
<b>SIPLUS SM 322 digital output modules</b>	
Expanded temperature range and medial load including labeling strips, bus connectors	
<ul style="list-style-type: none"> <li>• 8 outputs, 24 V DC, 2 A</li> <li>• 16 outputs, 24 V DC, 0.5 A</li> <li>• 32 outputs, 24 V DC, 0.5 A</li> <li>• 8 outputs, 24 V DC, 0.5 A, diagnostics capability</li> <li>• 8 outputs, 48 ... 125 V DC, 1.5 A</li> <li>• 8 outputs, 120/230 V AC, 1 A</li> <li>• 8 outputs, relay contacts, 5 A</li> <li>• 16 outputs, relay contacts, 8 A</li> </ul>	<b>6AG1 322-1BF01-2XB0</b> <b>6AG1 322-1BH01-2AA0</b> <b>6AG1 322-1BL00-2AA0</b> <b>6AG1 322-8BF00-2AB0</b>  <b>6AG1 322-1CF00-2AA0</b> <b>6AG1 322-1FF01-2AA0</b> <b>6AG1 322-1HF10-2AA0</b> <b>6AG1 322-1HH01-2AA0</b>
<b>Accessories</b>	see Ordering data for SM 322 digital output modules

# ET 200 distributed I/Os

## ET 200M – Digital Modules

### SIPLUS SM 323 digital input/output module (extended temperature range)

#### Overview



- Digital inputs and outputs
- For connecting standard switches, two-wire proximity switches (BERO), solenoid valves, contactors, low-power motors, lamps and motor starters

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<b>SIPLUS SM 323</b>	<b>8 DI/8 DO</b>
<b>Order No.</b>	<b>6AG1 323-1BH01-2AA0</b>
<b>Order No. based on</b>	<b>6ES7 323-1BH01-0AA0</b>
Ambient temperature range	-25 °C to +60 °C, condensation permissible
Ambient conditions	Suitable for extraordinary medial load (for example by chloric and sulphuric atmospheres).
Conformity with standard for electronic devices on rail vehicles (EN 50155, temperature T1, category 1).	Yes
Technical data	The technical data is identical with the technical data of the based on modules.

Ordering data	Order No.
<b>SIPLUS SM 323 digital input/output modules</b> Expanded temperature range and medial load including labeling strips, bus connectors 8 inputs, 8 outputs	<b>6AG1 323-1BH01-2AA0</b>
<b>Accessories</b>	

#### Overview



- Analog inputs
- For connection of voltage and current sensors, thermocouples, resistors and resistance thermometers

#### Technical specifications

	6ES7 331-7KF02-0AB0	6ES7 331-7HF01-0AB0	6ES7 331-1KF01-0AB0	6ES7 331-7KB02-0AB0
<b>Voltages and currents</b>				
Load voltage L+				
• Rated value (DC)	24 V	24 V		24 V
• reverse polarity protection	Yes	Yes		Yes
<b>Current consumption</b>				
from load voltage L+ (without load), max.	200 mA	50 mA		80 mA
from backplane bus DC 5 V, max.	50 mA	60 mA	90 mA	50 mA
Power loss, typ.	1 W	1.5 W	0.4 W	1.3 W
<b>Connection point</b>				
required front connectors	20-pin	20-pin	40-pin	20-pin
<b>Isochronous mode</b>				
Isochronous mode	No	Yes	No	No
<b>Analog inputs</b>				
Number of analog inputs	8	8	8	2
Number of analog inputs for resistance measurement	4		8	1
cable length, shielded, max.	200 m; 50 m at 80 mV and with thermocouples	200 m	200 m; max. 50 m at 50 mV	200 m; 50 m at 80 mV and with thermocouples
permissible input frequency for voltage input (destruction limit), max.	20 V; continuous; 75 V for max. 1s (mark to space ratio 1:20)	20 V; 20 V continuous, 75 V for max. 1s (mark to space ratio 1:20)	30 V; 12 V continuous, 30 V for max. 1 s	20 V; continuous; 75 V for max. 1s (mark to space ratio 1:20)
permissible input current for current input (destruction limit), max.	40 mA	40 mA	40 mA	40 mA
Input ranges (rated values), voltages				
• 0 to +10 V			Yes	
• 1 to 5 V	Yes	Yes	Yes	Yes
• 1 to 10 V		Yes	No	
• -1 V to +1 V	Yes	Yes	Yes	Yes
• -10 V to +10 V	Yes	Yes	Yes	Yes
• -2.5 V to +2.5 V	Yes		No	Yes
• -250 mV to +250 mV	Yes		No	Yes
• -5 V to +5 V	Yes	Yes	Yes	Yes
• -50 mV to +50 mV			Yes	
• -500 mV to +500 mV	Yes		Yes	Yes
• -80 mV to +80 mV	Yes			Yes

# ET 200 distributed I/Os

## ET 200M – Analog Modules

### SM 331 analog input

#### Technical specifications (continued)

	6ES7 331-7KF02-0AB0	6ES7 331-7HF01-0AB0	6ES7 331-1KF01-0AB0	6ES7 331-7KB02-0AB0
Input ranges (rated values), currents				
• 0 to 20 mA	Yes	Yes	Yes	Yes
• -10 to +10 mA	Yes			Yes
• -20 to +20 mA	Yes	Yes	Yes	Yes
• -3.2 to +3.2 mA	Yes			Yes
• 4 to 20 mA	Yes	Yes	Yes	Yes
Input ranges (rated values), thermoelements				
• Type E	Yes			Yes
• Type J	Yes			Yes
• Type K	Yes			Yes
• Type N	Yes			Yes
Input ranges (rated values), resistors				
• 0 to 150 Ohm	Yes			Yes
• 0 to 300 Ohm	Yes			Yes
• 0 to 600 Ohm	Yes		Yes	Yes
• 0 to 6000 Ohm			Yes	
Input ranges (rated values), resistance thermometers				
• Ni 100	Yes; Standard		Yes; Standard/AirCon	Yes
• LG-Ni 1000			Yes; Standard/AirCon	
• Pt 100	Yes; Standard		Yes; Standard/AirCon	Yes
Characteristic linearization				
• programmable	Yes		Yes	Yes
• for thermoelements	Type N, E, J, K, L			Type N, E, J, K, L
• for thermoresistor	Pt 100 (Standard, climatic range), Ni 100 (Standard, climatic range)		Yes; Pt100 standard/air con.; Ni100 standard/air con.; Ni1000 standard/air con.; LG-Ni1000 standard/air con.	Pt 100 (Standard, climatic range), Ni 100 (Standard, climatic range)
Temperature compensation				
• programmable	Yes			Yes
• external temperature compensation with compensations socket	Yes			Yes
• internal temperature compensation	Yes			Yes
<b>Analog value creation</b>				
Measurement principle	integrating	Conversion of instantaneous values	integrating	integrating
Integrations and conversion time/resolution per channel				
• Resolution with overload area (bit including sign), max.	15 Bit; unipolar: 9 / 12 / 12 / 14 bit, bipolar: 9 + sign/ 12 + sign/12 + sign/ 14 + sign bit	14 Bit; unipolar: 14 bit; bipolar: 13+sign bit	13 Bit	15 Bit; unipolar: 9 / 12 / 12 / 14 bit, bipolar: 9 + sign/ 12 + sign/12 + sign/ 14 + sign bit
• Integration time, parameterizable	Yes; 2.5 / 16.67 / 20 / 100 ms	Yes	Yes; 60 / 50 ms	Yes; 2.5 / 16.67 / 20 / 100 ms
• Basic conversion time, including integration time, ms	3/ 17/ 22/ 102 ms		66 / 55 ms	6/ 34/ 44/ 204 ms
• Basic conversion time, ms		52 µs per channel	66 / 55 ms	
• Interference voltage suppression for interference frequency f1 in Hz	400 / 60 / 50 / 10 Hz	400 / 60 / 50 / 10 Hz	50 / 60 Hz	400 / 60 / 50 / 10 Hz

#### Technical specifications (continued)

	6ES7 331-7KF02-0AB0	6ES7 331-7HF01-0AB0	6ES7 331-1KF01-0AB0	6ES7 331-7KB02-0AB0
<b>Encoder</b>				
Connection of signal encoders				
• for current measurement as 2-wire transducer	Yes	Yes	Yes; with external supply	Yes
• for current measurement as 4-wire transducer	Yes	Yes	Yes	Yes
• for resistance measurement with 2-conductor connection	Yes		Yes	Yes
• for resistance measurement with 3-conductor connection	Yes		Yes	Yes
• for resistance measurement with 4-conductor connection	Yes		Yes	Yes
<b>Errors/accuracies</b>				
Operational limit in overall temperature range				
• Voltage, relative to input area	+/- 1 %; +/-1% (80mV), +/-0.6% (250-1000mV), +/-0.8% (2.5-10mV)	+/- 0,4 %	+/- 0,6 %; +/- 0.6% (+/-5V,10V,1-5V, 0-10V; +/-0,5% (+/-50 mV, 500 mV, 1 V	+/- 1 %; +/-1% (80mV), +/- 0.6% (250-1000mV), +/- 0.8% (2.5-10V)
• Current, relative to input area	+/- 0,7 %; from 3.2 to 20mA	+/- 0,3 %	+/- 0,5 %; +/-20mA,0-20mA,4-20mA	+/- 0,7 %; from 3.2 to 20mA
• Impedance, relative to input area	+/- 0,7 %; 150, 300, 600 Ohm		+/- 0,5 %; 0-6kOhm, 0-600kOhm	+/- 0,7 %; 150, 300, 600 Ohm
• Resistance-type thermometer, relative to input area	+/- 0,7 %; +/-0.7% (Pt100/ Ni100); +/-0.8% (Pt100 climat)			+/- 0,7 %; +/-0.7% (Pt100/ Ni100); +/-0.8% (Pt100 climat)
<b>Basic error limit (operational limit at 25 °C)</b>				
• Voltage, relative to input area	+/- 0,6 %; +/-0.4% (250-1000mV); +/-0.6% (2.5-10mV); +/-0.7% (80mV)	+/- 0,25 %	+/- 0,4 %; 0.4% (+/-5V,10V,1-5V, 0-10V); 0.3% (+/-50mV,500mV,1V)	+/- 0.6 %; +/-0.6% (80mV, 2.5-10V); +/-0.4% (250-1000mV)
• Current, relative to input area	+/- 0,5 %; 3,2 to 20mA	+/- 0,2 %	+/- 0,3 %; +/-20mA,0-20mA,4-20mA	+/- 0,5 %; 3,2 to 20mA
• Impedance, relative to input area	+/- 0,5 %; 150, 300, 600 Ohm		+/- 0,3 %; 0-6kOhm, 0-600kOhm	+/- 0,5 %; 150, 300, 600 Ohm
• Resistance-type thermometer, relative to input area	+/- 0,6 %; +/-0.5% (Pt100/ Ni100); +/-0.6% (Pt100 climatic)			+/- 0.6 %; +/-0.5% (Pt100/ Ni100); +/-0.6% (Pt100 climatic)
<b>Status information/alarms/diagnostics</b>				
<b>Alarms</b>				
• Diagnostic alarm	Yes; parameterizable channels 0 and 2	Yes; parameterizable	No	Yes
• Limit value alarm	Yes; parameterizable	Yes; parameterizable channels 0 and 2	No	Yes; parameterizable; Channel 0
<b>Diagnoses</b>				
• Diagnostic information readable	Yes	Yes	No	Yes
<b>Isolation</b>				
Isolation checked with	500 V DC	500 V DC	500 V DC	500 V DC
<b>Isolation, analog inputs</b>				
• between the channels	Yes	No	No	No
• between the channels, in groups of 2	2			
• between the channels and the backplane bus	Yes	Yes	Yes	Yes
<b>Dimensions and weight</b>				
Width	40 mm	40 mm	40 mm	40 mm
Height	125 mm	125 mm	125 mm	125 mm
Depth	120 mm	120 mm	117 mm	120 mm
<b>Weights</b>				
Weight, approx.	250 g	200 g	250 g	250 g

# ET 200 distributed I/Os

## ET 200M – Analog Modules

### SM 331 analog input

#### Technical specifications (continued)

	6ES7 331-7PF01-0AB0	6ES7 331-7PF11-0AB0	6ES7 331-7NF00-0AB0	6ES7 331-7NF10-0AB0
<b>Voltages and currents</b>				
Load voltage L+				
• Rated value (DC)	24 V	24 V		24 V
• reverse polarity protection	Yes	Yes		Yes
<b>Current consumption</b>				
from load voltage L+ (without load), max.	240 mA	200 mA		200 mA
from backplane bus DC 5 V, max.	100 mA	100 mA	130 mA	100 mA
Power loss, typ.	4.6 W	3 W	0.6 W	3 W
<b>Connection point</b>				
required front connectors	40-pin	40-pin	40-pin	40-pin
<b>Isochronous mode</b>				
Isochronous mode	No	No	No	No
<b>Analog inputs</b>				
Number of analog inputs	8	8	8	8
Number of analog inputs for resistance measurement	8			
cable length, shielded, max.	200 m	100 m	200 m	200 m
permissible input frequency for voltage input (destruction limit), max.	75 V; 35 V continuous, 75 V for max. 1 s (mark to space ratio 1:20)	75 V; 20 V DC permanent, 75 V DC for max. 1 s (pulse duty factor 1:20)	50 V; permanent	75 V; 35 V continuous, 75 V for max. 1 s (mark to space ratio 1:20)
permissible input current for current input (destruction limit), max.			32 mA	40 mA
Input ranges (rated values), voltages				
• 1 to 5 V			Yes	Yes
• -10 V to +10 V			Yes	Yes
• -5 V to +5 V			Yes	Yes
Input ranges (rated values), currents				
• 0 to 20 mA			Yes	Yes
• -20 to +20 mA			Yes	Yes
• 4 to 20 mA			Yes	Yes
Input ranges (rated values), thermoelements				
• Type B		Yes		
• Type E		Yes		
• Type J		Yes		
• Type K		Yes		
• Type L		Yes		
• Type N		Yes		
• Type R		Yes		
• Type S		Yes		
• Type T		Yes		
• Type U		Yes		
• Typ TXK/TXK(L) to GOST		Yes		
Input ranges (rated values), resistors				
• 0 to 150 Ohm	Yes			
• 0 to 300 Ohm	Yes			
• 0 to 600 Ohm	Yes			

#### Technical specifications (continued)

	6ES7 331-7PF01-0AB0	6ES7 331-7PF11-0AB0	6ES7 331-7NF00-0AB0	6ES7 331-7NF10-0AB0
Input ranges (rated values), resistance thermometers				
• Cu 10	Yes			
• Ni 100	Yes			
• Ni 1000	Yes			
• Ni 120	Yes			
• Ni 200	Yes			
• Ni 500	Yes			
• Pt 100	Yes			
• Pt 1000	Yes			
• Pt 200	Yes			
• Pt 500	Yes			
Characteristic linearization				
• programmable	Yes	Yes		
• for thermoelements		Type B, E, J, K, L, N, R, S, T, U, C		
• for thermoresistor	Pt 100, Pt 200, Pt 500, Pt 1000, Ni 100, Ni 120, Ni 200, Ni 500, Ni 1000, Cu 10 (Standard/AirCon)			
Temperature compensation				
• programmable		Yes		
• external temperature compensation with compensations socket		Yes		
• external temperature compensation with Pt100		Yes		
• internal temperature compensation		Yes		
<b>Analog value creation</b>				
Measurement principle	integrating	integrating	integrating	integrating
Integrations and conversion time/resolution per channel				
• Resolution with overload area (bit including sign), max.	16 Bit; Two's complement	16 Bit; Two's complement	16 Bit; unipolar: 15 / 15 / 15 / 15 bit, bipolar: 15 + sign/15 + sign/15 + sign/15 + sign	16 Bit; unipolar: 15 / 15 / 15 / 15 bit, bipolar: 15 + sign/15 + sign/15 + sign/15 + sign
• Integration time, parameterizable	Yes	Yes	Yes; 10 / 16.67 / 20 / 100 ms	Yes; 23 / 72 / 83 / 95 ms
• Basic conversion time, ms	up to 4 channels: 10 ms per module, over 5 channels: 1 90 ms per module, 8 channels: 80 ms	up to 4 channels: 10 ms per module, as of 5 channels: 190 ms per module		10 ms (4-channel mode) 95 / 83 / 72 / 23 ms (8-channel mode)
• Interference voltage suppression for interference frequency f1 in Hz	400 / 60 / 50 Hz	400 / 60 / 50 Hz	400 / 60 / 50 / 10 Hz	400 / 60 / 50 Hz, combina- tions of 400, 60, 50 Hz
<b>Encoder</b>				
Connection of signal encoders				
• for current measurement as 2-wire transducer			Yes; with external transmitter; possible with separate supply for transmitter	Yes; with external trans- mitter, current supply; possible with separate supply for transmitter
• for current measurement as 4-wire transducer			Yes	Yes
• for resistance measurement with 2-conductor connection	Yes; without resistance correction			
• for resistance measurement with 3-conductor connection	Yes			
• for resistance measurement with 4-conductor connection	Yes			

# ET 200 distributed I/Os

## ET 200M – Analog Modules

### SM 331 analog input

#### Technical specifications (continued)

	6ES7 331-7PF01-0AB0	6ES7 331-7PF11-0AB0	6ES7 331-7NF00-0AB0	6ES7 331-7NF10-0AB0
<b>Errors/accuracies</b>				
Operational limit in overall temperature range				
• Voltage, relative to input area		+/- 1 K	+/- 0,1 %; +/-0.7%	+/- 0,1 %
• Current, relative to input area			+/- 0,3 %; +/-0.9%	+/- 0,1 %
• Impedance, relative to input area	+/- 0,1 %			
<b>Basic error limit (operational limit at 25 °C)</b>				
• Voltage, relative to input area		+/- 0.5 K	+/- 0,05 %	+/- 0,05 %
• Current, relative to input area			+/- 0,05 %	+/- 0,05 %
• Impedance, relative to input area	+/- 0,05 %			
<b>Status information/alarms/diagnostics</b>				
Alarms				
• Diagnostic alarm	Yes; parameters can be set per group	Yes; parameters can be set per group	Yes; parameterizable	Yes; parameterizable
• Limit value alarm	Yes; parameterizable	Yes; parameterizable	Yes; parameterizable channels 0 and 2	Yes; parameterizable all channels (end of cycle interrupt is also supported across modules)
Diagnoses				
• Diagnostic information readable	Yes	Yes	Yes	Yes
<b>Isolation</b>				
Isolation checked with				
	500 V DC	500 V DC	500 V DC	500 V AC
<b>Isolation</b>				
Isolation, analog inputs				
• between the channels	Yes	Yes		Yes
• between the channels, in groups of	2	2		2
• between the channels and the backplane bus	Yes	Yes	Yes	Yes
<b>Dimensions and weight</b>				
Width	40 mm	40 mm	40 mm	40 mm
Height	125 mm	125 mm	125 mm	125 mm
Depth	120 mm	120 mm	120 mm	120 mm
<b>Weights</b>				
Weight, approx.	272 g	272 g	272 g	272 g

Ordering data	Order No.	Order No.
<b>SM 331 analog input modules</b> Including labeling strips, bus connector, measuring range modules <ul style="list-style-type: none"> <li>• 8 inputs, 13-bit resolution</li> <li>• 8 inputs, resolution 9/12/14 bit</li> <li>• 2 inputs, resolution 9/12/14 bit</li> <li>• 8 inputs, enhanced resolution 16 bit</li> <li>• 8 inputs, enhanced resolution 16 bit, 4-channel mode</li> <li>• 8 inputs, resolution 14 bit, for isochronous mode</li> <li>• 8 inputs, for thermal resistors</li> <li>• 8 inputs, for thermoelements</li> </ul>	<b>6ES7 331-1KF01-0AB0</b> <b>6ES7 331-7KF02-0AB0</b> <b>6ES7 331-7KB02-0AB0</b> <b>6ES7 331-7NF00-0AB0</b> <b>6ES7 331-7NF10-0AB0</b> <b>6ES7 331-7HF01-0AB0</b> <b>6ES7 331-7PF01-0AB0</b> <b>6ES7 331-7PF11-0AB0</b>	<b>6ES7 392-2XY00-0AA0</b>
<b>Measuring range module for analog inputs</b> 1 module for 2 analog inputs; 2 pieces (spare part)	<b>6ES7 974-0AA00-0AA0</b>	<b>6ES7 392-2XX00-0AA0</b>
<b>Front connectors</b> 20-pin, with screw contacts <ul style="list-style-type: none"> <li>• 1 piece</li> <li>• 100 pieces</li> </ul> 20-pin, with cage clamp terminals <ul style="list-style-type: none"> <li>• 1 piece</li> <li>• 100 pieces</li> </ul> 40-pin, with screw contacts <ul style="list-style-type: none"> <li>• 1 piece</li> <li>• 100 pieces</li> </ul> 40-pin, with cage clamp terminals <ul style="list-style-type: none"> <li>• 1 piece</li> <li>• 100 pieces</li> </ul>	<b>6ES7 392-1AJ00-0AA0</b> <b>6ES7 392-1AJ00-1AB0</b> <b>6ES7 392-1BJ00-0AA0</b> <b>6ES7 392-1BJ00-1AB0</b> <b>6ES7 392-1AM00-0AA0</b> <b>6ES7 392-1AM00-1AB0</b> <b>6ES7 392-1BM01-0AA0</b> <b>6ES7 392-1BM01-1AB0</b>	<b>6ES7 392-2AX00-0AA0</b> <b>6ES7 392-2BX00-0AA0</b> <b>6ES7 392-2CX00-0AA0</b> <b>6ES7 392-2DX00-0AA0</b>  <b>6ES7 392-2AX10-0AA0</b> <b>6ES7 392-2BX10-0AA0</b> <b>6ES7 392-2CX10-0AA0</b> <b>6ES7 392-2DX10-0AA0</b>
<b>Front door, elevated design</b> e.g. for 32-channel modules; for connecting 1.3 mm <sup>2</sup> /16 AWG wires	<b>6ES7 328-0AA00-7AA0</b>	<b>6ES7 998-8XC01-8YE0</b>
<b>SIMATIC TOP connect</b>	See Catalog ST 70	<b>6ES7 998-8XC01-8YE2</b>
<b>Bus connectors</b> 1 piece (spare part)	<b>6ES7 390-0AA00-0AA0</b>	<b>6ES7 998-8XC01-8YE2</b>
<b>Shield connecting element</b> 80 mm wide, with 2 rows for 4 shielding connection clamps each	<b>6ES7 390-5AA00-0AA0</b>	<b>6ES7 998-8XC01-8YE2</b>
<b>Shielding connection clamps</b> 2 pieces <ul style="list-style-type: none"> <li>• For 2 cables with 2 mm to 6 mm diameter</li> <li>• For 1 cable with 3 mm to 8 mm diameter</li> <li>• For 1 cable with 4 mm to 13 mm diameter</li> </ul>	<b>6ES7 390-5AB00-0AA0</b> <b>6ES7 390-5BA00-0AA0</b> <b>6ES7 390-5CA00-0AA0</b>	<b>6ES7 392-2XY00-0AA0</b>
<b>Label cover</b> 10 pieces (spare part), for modules with 20-pin front connector		<b>6ES7 392-2XY00-0AA0</b>
<b>Labeling strips</b> 10 pieces (spare part), for modules with 20-pin front connector		<b>6ES7 392-2XX00-0AA0</b>
<b>S7 SmartLabel</b> Software for automatic labeling of modules based on data of the STEP 7 project		<b>2XV9 450-1SL01-0YX0</b>
<b>Labeling sheets for machine labeling</b> For 16-channel signal modules, DIN A4, for printing with laser printer; 10 pieces <ul style="list-style-type: none"> <li>• petrol</li> <li>• light-beige</li> <li>• yellow</li> <li>• red</li> </ul> For 32-channel signal modules, DIN A4, for printing with laser printer; 10 pieces <ul style="list-style-type: none"> <li>• petrol</li> <li>• light-beige</li> <li>• yellow</li> <li>• red</li> </ul>		<b>6ES7 392-2AX00-0AA0</b> <b>6ES7 392-2BX00-0AA0</b> <b>6ES7 392-2CX00-0AA0</b> <b>6ES7 392-2DX00-0AA0</b>  <b>6ES7 392-2AX10-0AA0</b> <b>6ES7 392-2BX10-0AA0</b> <b>6ES7 392-2CX10-0AA0</b> <b>6ES7 392-2DX10-0AA0</b>
<b>SIMATIC Manual Collection</b> Electronic manuals on CD-ROM, multilingual: S7-200, S7-300, C7, S7-400, SIMATIC DP (Distributed I/O), SIMATIC PC, SIMATIC PG, STEP 7, Engineering Tools, Runtime Software, SIMATIC PCS 7, SIMATIC HMI (Human Machine Interface), SIMATIC NET (Industrial Communication), SIMATIC Machine Vision, SIMATIC Sensors		<b>6ES7 998-8XC01-8YE0</b>
<b>SIMATIC Manual Collection update service for 1 year</b> Current S7 Manual Collection CD and the three subsequent updates		<b>6ES7 998-8XC01-8YE2</b>
<b>S7-300 manual</b> Design, CPU data, module data, instruction list <ul style="list-style-type: none"> <li>• German</li> <li>• English</li> <li>• French</li> <li>• Spanish</li> <li>• Italian</li> </ul>		<b>6ES7 398-8FA10-8AA0</b> <b>6ES7 398-8FA10-8BA0</b> <b>6ES7 398-8FA10-8CA0</b> <b>6ES7 398-8FA10-8DA0</b> <b>6ES7 398-8FA10-8EA0</b>

# ET 200 distributed I/Os

## ET 200M – Analog Modules

### SM 332 analog output

#### Overview



- Analog outputs
- For the connection of analog actuators

#### Technical specifications

	6ES7 332-5HB01-0AB0	6ES7 332-5HD01-0AB0	6ES7 332-5HF00-0AB0	6ES7 332-7ND02-0AB0
<b>Voltages and currents</b>				
Load voltage L+				
• Rated value (DC)	24 V	24 V	24 V	24 V
<b>Current consumption</b>				
from load voltage L+ (without load), max.	135 mA	240 mA	340 mA	290 mA
from backplane bus DC 5 V, max.	60 mA	60 mA	100 mA	120 mA
Power loss, typ.	3 W	3 W	6 W	3 W
<b>Connection point</b>				
required front connectors	20-pin	20-pin	40-pin	20-pin
<b>Analog outputs</b>				
Number of analog outputs	2	4	8	4; isochronous mode
cable length, shielded, max.	200 m	200 m	200 m	200 m
Voltage output, Short-circuit protection	Yes	Yes	Yes	Yes
Voltage output, short-circuit current, max..	25 mA	25 mA	25 mA	40 mA
Current output, no-load voltage, max.	18 V	18 V	18 V	18 V
Output ranges, voltage				
• 0 to 10 V	Yes	Yes	Yes	Yes
• 1 to 5 V	Yes	Yes	Yes	Yes
• -10 to +10 V	Yes	Yes	Yes	Yes
Output ranges, current				
• 0 to 20 mA	Yes	Yes	Yes	Yes
• -20 to +20 mA	Yes	Yes	Yes	Yes
• 4 to 20 mA	Yes	Yes	Yes	Yes
Load impedance (in rated range of output)				
• with voltage outputs, min.	1 k $\Omega$	1 k $\Omega$	1 k $\Omega$	1 k $\Omega$
• with voltage outputs, capacitive load, max.	1 $\mu$ F	1 $\mu$ F	1 $\mu$ F	1 $\mu$ F
• with current outputs, max.	500 $\Omega$	500 $\Omega$	500 $\Omega$	500 $\Omega$
• with current outputs, inductive load, max.	10 mH	10 mH	10 mH	1 mH

#### Technical specifications (continued)

	6ES7 332-5HB01-0AB0	6ES7 332-5HD01-0AB0	6ES7 332-5HF00-0AB0	6ES7 332-7ND02-0AB0
<b>Analog value creation</b>				
Integrations and conversion time/resolution per channel				
• Resolution with overload area (bit including sign), max.	12 Bit; +/- 10 V, +/- 20mA, 4 to 20 mA, 1 to 5 V: 11 bit + sign, 0 to 10 V, 0 to 20 mA: 12 bit	12 Bit; +/- 10 V, +/- 20mA, 4 to 20 mA, 1 to 5 V: 11 bit + sign, 0 to 10 V, 0 to 20 mA: 12 bit	12 Bit; +/- 10 V, +/- 20mA, 4 to 20 mA, 1 to 5 V: 11 bit + sign, 0 to 10 V, 0 to 20 mA: 12 bit	16 Bit
• Conversion time (per channel)	0.8 ms	0.8 ms	0.8 ms	200 µs; in clocked mode 640µs
<b>Settling time</b>				
• for resistive load	0.2 ms	0.2 ms	0.2 ms	0.2 ms
• for capacitive load	3.3 ms	3.3 ms	3.3 ms	3.3 ms
• for inductive load	0.5 ms; 0.5 ms (1mH); 3.3 ms (10mH)	0.5 ms; 0.5ms (1mH); 3.3 ms (10mH)	0.5 ms; 0.5ms (1mH); 3.3 ms (10mH)	0.5 ms
<b>Errors/accuracies</b>				
Operational limit in overall temperature range				
• Voltage, relative to output area	+/- 0,5 %	+/- 0,5 %	+/- 0,5 %	+/- 0,12 %
• Current, relative to output area	+/- 0,6 %	+/- 0,6 %	+/- 0,6 %	+/- 0,18 %
Basic error limit (operational limit at 25 °C)				
• Voltage, relative to output area	+/- 0,4 %	+/- 0,4 %	+/- 0,4 %	+/- 0,02 %
• Current, relative to output area	+/- 0,5 %	+/- 0,5 %	+/- 0,5 %	+/- 0,02 %
<b>Status information/alarms/diagnostics</b>				
Substitute values connectable	Yes; parameterizable	Yes; parameterizable	Yes; parameterizable	Yes; parameterizable
<b>Alarms</b>				
• Diagnostic alarm	Yes; parameterizable	Yes; parameterizable	Yes; parameterizable	Yes
<b>Diagnoses</b>				
• Diagnostic information readable	Yes	Yes	Yes	
<b>Isolation</b>				
Isolation checked with	500 V DC	500 V DC	500 V DC	1500 V DC
<b>Isolation, analog outputs</b>				
• between the channels and the backplane bus	Yes	Yes	Yes	Yes
<b>Dimensions and weight</b>				
Width	40 mm	40 mm	40 mm	40 mm
Height	125 mm	125 mm	125 mm	125 mm
Depth	120 mm	120 mm	120 mm	120 mm
<b>Weights</b>				
Weight, approx.	220 g	220 g	272 g	220 g

# ET 200 distributed I/Os

## ET 200M – Analog Modules

### SM 332 analog output

Ordering data	Order No.
<b>SM 332 analog output modules</b> incl. labeling strips, bus connector	
• 4 outputs, 11/12 bit	<b>6ES7 332-5HD01-0AB0</b>
• 4 outputs, 16 bit	<b>6ES7 332-7ND02-0AB0</b>
• 2 outputs, 11/12 bit	<b>6ES7 332-5HB01-0AB0</b>
• 8 outputs, 11/12 bit	<b>6ES7 332-5HF00-0AB0</b>
<b>Front connectors</b>	
20-pin, with screw contacts	
• 1 piece	<b>6ES7 392-1AJ00-0AA0</b>
• 100 pieces	<b>6ES7 392-1AJ00-1AB0</b>
20-pin, with cage clamp terminals	
• 1 piece	<b>6ES7 392-1BJ00-0AA0</b>
• 100 pieces	<b>6ES7 392-1BJ00-1AB0</b>
40-pin, with screw contacts	
• 1 piece	<b>6ES7 392-1AM00-0AA0</b>
• 100 pieces	<b>6ES7 392-1AM00-1AB0</b>
40-pin, with cage clamp terminals	
• 1 piece	<b>6ES7 392-1BM01-0AA0</b>
• 100 pieces	<b>6ES7 392-1BM01-1AB0</b>
<b>Front door, elevated design</b> e.g. for 32 channel modules; for connecting 1.3 mm <sup>2</sup> /16 AWG wires	<b>6ES7 328-0AA00-7AA0</b>
<b>SIMATIC TOP connect</b>	See Catalog ST 70
<b>Bus connectors</b>	
1 piece (spare part)	<b>6ES7 390-0AA00-0AA0</b>
<b>Shield connecting element</b>	<b>6ES7 390-5AA00-0AA0</b>
80 mm wide, with 2 rows for 4 shielding con- nection clamps each	
<b>Shielding connection clamps</b>	
2 pieces	
• For 2 cables with 2 mm to 6 mm diameter	<b>6ES7 390-5AB00-0AA0</b>
• For 1 cable with 3 mm to 8 mm diameter	<b>6ES7 390-5BA00-0AA0</b>
• For 1 cable with 4 mm to 13 mm diameter	<b>6ES7 390-5CA00-0AA0</b>
<b>Label cover</b>	<b>6ES7 392-2XY00-0AA0</b>
10 pieces (spare part), for modules with 20-pin front con- nector	
<b>Labeling strips</b>	<b>6ES7 392-2XX00-0AA0</b>
10 pieces (spare part), for modules with 20-pin front con- nector	

Ordering data	Order No.
<b>S7 SmartLabel</b> Software for automatic labeling of modules based on data of the STEP 7 project	<b>2XV9 450-1SL01-0YX0</b>
<b>Labeling sheets for machine labeling</b> For 16-channel signal modules, DIN A4, for printing with laser printer; 10 pieces	
• petrol	<b>6ES7 392-2AX00-0AA0</b>
• light-beige	<b>6ES7 392-2BX00-0AA0</b>
• yellow	<b>6ES7 392-2CX00-0AA0</b>
• red	<b>6ES7 392-2DX00-0AA0</b>
For 32-channel signal modules, DIN A4, for printing with laser printer; 10 pieces	
• petrol	<b>6ES7 392-2AX10-0AA0</b>
• light-beige	<b>6ES7 392-2BX10-0AA0</b>
• yellow	<b>6ES7 392-2CX10-0AA0</b>
• red	<b>6ES7 392-2DX10-0AA0</b>
<b>SIMATIC Manual Collection</b> Electronic manuals on CD-ROM, multilingual: S7-200, S7-300, C7, S7-400, SIMATIC DP (Distributed I/O), SIMATIC PC, SIMATIC PG, STEP 7, Engineering Tools, Runtime Software, SIMATIC PCS 7, SIMATIC HMI (Human Machine Interface), SIMATIC NET (Indus- trial Communication), SIMATIC Machine Vision, SIMATIC Sensors	<b>6ES7 998-8XC01-8YE0</b>
<b>SIMATIC Manual Collection update service for 1 year</b> Current S7 Manual Collection CD and the three subsequent updates	<b>6ES7 998-8XC01-8YE2</b>
<b>S7-300 manual</b> Design, CPU data, module data, instruction list	
• German	<b>6ES7 398-8FA10-8AA0</b>
• English	<b>6ES7 398-8FA10-8BA0</b>
• French	<b>6ES7 398-8FA10-8CA0</b>
• Spanish	<b>6ES7 398-8FA10-8DA0</b>
• Italian	<b>6ES7 398-8FA10-8EA0</b>

#### Overview



- Analog inputs and outputs
- For the connection of analog sensors and actuators

#### Technical specifications

	6ES7 334-0CE01-0AA0	6ES7 334-0KE00-0AB0
<b>Voltages and currents</b>		
Load voltage L+		
• Rated value (DC)	24 V	24 V
<b>Current consumption</b>		
from load voltage L+ (without load), max.	110 mA	80 mA
from backplane bus DC 5 V, max.	55 mA	60 mA
Power loss, typ.	3 W	2 W
<b>Connection point</b>		
required front connectors	20-pin	20-pin
<b>Analog inputs</b>		
Number of analog inputs	4	4
Number of analog inputs for voltage measurement	4	2
Number of analog inputs for resistance measurement		4
permissible input frequency for voltage input (destruction limit), max.	20 V	20 V; continuous; 75 V for max. 1s (mark to space ratio 1:20)
permissible input current for current input (destruction limit), max.	40 mA	
Cycle time (all channels) max.	5 ms	85 ms
Input ranges (rated values), voltages		
• 0 to +10 V	Yes	Yes
Input ranges (rated values), currents		
• 0 to 20 mA	Yes	
Input ranges (rated values), resistors		
• 0 to 10000 Ohm		Yes
Input ranges (rated values), resistance thermometers		
• Pt 100		Yes; only climatic range

	6ES7 334-0CE01-0AA0	6ES7 334-0KE00-0AB0
<b>Analog outputs</b>		
Number of analog outputs	2	2
cable length, shielded, max.	200 m	100 m
Voltage output, Short-circuit protection	Yes	Yes
Voltage output, short-circuit current, max..	11 mA	10 mA
Current output, no-load voltage, max.	15 V	
Output ranges, voltage		
• 0 to 10 V	Yes	Yes
Output ranges, current		
• 0 to 20 mA	Yes	
Load impedance (in rated range of output)		
• with voltage outputs, min.	5 kΩ	2.5 kΩ
• with voltage outputs, capacitive load, max.	1 μF	1 μF
• with current outputs, max.	300 Ω	
• with current outputs, inductive load, max.	1 mH	
<b>Analog value creation</b>		
Integrations and conversion time/resolution per channel		
• Resolution with overload area (bit including sign), max.	8 Bit	12 Bit
• Integration time, ms		16.67; 20
Settling time		
• for resistive load	0.3 ms	0.8 ms
• for capacitive load	3 ms	0.8 ms
• for inductive load	0.3 ms	
<b>Encoder</b>		
Connection of signal encoders		
• for current measurement as 4-wire transducer	Yes	
• for resistance measurement with 2-conductor connection		Yes
• for resistance measurement with 3-conductor connection		Yes
• for resistance measurement with 4-conductor connection		Yes

# ET 200 distributed I/Os

## ET 200M – Analog Modules

### SM 334 analog input/output

#### Technical specifications (continued)

	6ES7 334-0CE01-0AA0	6ES7 334-0KE00-0AB0
<b>Errors/accuracies</b>		
Operational limit in overall temperature range		
• Voltage, relative to output area	+/- 0,6 %	+/- 1 %
• Current, relative to output area	+/- 1 %	
• Voltage, relative to input area	+/- 0,9 %	+/- 0,7 %; 0 to 10 V
• Current, relative to input area	+/- 0,8 %	
• Impedance, relative to input area		+/- 3,5 %; 10 kOhm
• Resistance-type thermometer, relative to input area		+/- 1 %
Basic error limit (operational limit at 25 °C)		
• Voltage, relative to output area	+/- 0,5 %	+/- 0,85 %
• Current, relative to output area	+/- 0,5 %	
• Voltage, relative to input area	+/- 0,7 %	+/- 0,5 %; 0 to 10 V
• Current, relative to input area	+/- 0,6 %	
• Impedance, relative to input area		+/- 2,8 %; 10 kOhm
• Resistance-type thermometer, relative to input area		+/- 0,8 %

	6ES7 334-0CE01-0AA0	6ES7 334-0KE00-0AB0
<b>Status information/alarms/diagnostics</b>		
Alarms		
• Alarms	No	No
Diagnoses		
• Diagnostic functions	No	No
<b>Isolation</b>		
Isolation checked with		
	500 V DC	500 V DC
<b>Isolation</b>		
Isolation, analog outputs		
• between the channels and the backplane bus	No	Yes
Isolation, analog inputs		
• between the channels and the backplane bus	No	Yes
<b>Dimensions and weight</b>		
Width	40 mm	40 mm
Height	125 mm	125 mm
Depth	120 mm	120 mm
<b>Weights</b>		
Weight, approx.	285 g	200 g

Ordering data	Order No.	Order No.
<b>SM 334 analog input/output modules</b> incl. labeling strips, bus connector <ul style="list-style-type: none"> <li>• 4 inputs, 2 outputs</li> <li>• 4 inputs, 2 outputs, resistance measurement, Pt 100</li> </ul>	<b>6ES7 334-0CE01-0AA0</b> <b>6ES7 334-0KE00-0AB0</b>	<b>S7 SmartLabel</b> Software for automatic labeling of modules based on data of the STEP 7 project <b>2XV9 450-1SL01-0YX0</b>
<b>Front connectors</b> 20-pin, with screw contacts <ul style="list-style-type: none"> <li>• 1 piece</li> <li>• 100 pieces</li> </ul> 20-pin, with cage clamp terminals <ul style="list-style-type: none"> <li>• 1 piece</li> <li>• 100 pieces</li> </ul>	<b>6ES7 392-1AJ00-0AA0</b> <b>6ES7 392-1AJ00-1AB0</b> <b>6ES7 392-1BJ00-0AA0</b> <b>6ES7 392-1BJ00-1AB0</b>	<b>Labeling sheets for machine labeling</b> for 16-channel signal modules, DIN A4, for printing with laser printer; 10 pieces <ul style="list-style-type: none"> <li>• petrol</li> <li>• light-beige</li> <li>• yellow</li> <li>• red</li> </ul>
<b>Front door, elevated design</b> e.g. for 32 channel modules; for connecting 1.3 mm <sup>2</sup> /16 AWG wires	<b>6ES7 328-0AA00-7AA0</b>	<b>SIMATIC Manual Collection</b> Electronic manuals on CD-ROM, multilingual: S7-200, S7-300, C7, S7-400, SIMATIC DP (Distributed I/O), SIMATIC PC, SIMATIC PG, STEP 7, Engineering Tools, Runtime Software, SIMATIC PCS 7, SIMATIC HMI (Human Machine Interface), SIMATIC NET (Industrial Communication), SIMATIC Machine Vision, SIMATIC Sensors <b>6ES7 998-8XC01-8YE0</b>
<b>SIMATIC TOP connect</b>	See Catalog ST 70	
<b>Bus connectors</b> 1 piece (spare part)	<b>6ES7 390-0AA00-0AA0</b>	
<b>Shield connecting element</b> 80 mm wide, with 2 rows for 4 shielding connection clamps each	<b>6ES7 390-5AA00-0AA0</b>	
<b>Shielding connection clamps</b> 2 pieces <ul style="list-style-type: none"> <li>• For 2 cables with 2 mm to 6 mm diameter</li> <li>• For 1 cable with 3 mm to 8 mm diameter</li> <li>• For 1 cable with 4 mm to 13 mm diameter</li> </ul>	<b>6ES7 390-5AB00-0AA0</b> <b>6ES7 390-5BA00-0AA0</b> <b>6ES7 390-5CA00-0AA0</b>	<b>SIMATIC Manual Collection update service for 1 year</b> Current S7 Manual Collection CD and the three subsequent updates <b>6ES7 998-8XC01-8YE2</b>
<b>Label cover</b> 10 pieces (spare part), for modules with 20-pin front connector	<b>6ES7 392-2XY00-0AA0</b>	<b>S7-300 manual</b> Design, CPU data, module data, instruction list <ul style="list-style-type: none"> <li>• German</li> <li>• English</li> <li>• French</li> <li>• Spanish</li> <li>• Italian</li> </ul>
<b>Labeling strips</b> 10 pieces (spare part), for modules with 20-pin front connector	<b>6ES7 392-2XX00-0AA0</b>	<b>6ES7 398-8FA10-8AA0</b> <b>6ES7 398-8FA10-8BA0</b> <b>6ES7 398-8FA10-8CA0</b> <b>6ES7 398-8FA10-8DA0</b> <b>6ES7 398-8FA10-8EA0</b>

# ET 200 distributed I/Os

## ET 200M – Analog Modules

### SIPLUS SM 331 analog input module (extended temperature range)

#### Overview



- Analog inputs
- For connection of voltage and current sensors, thermocouples, resistors and resistance thermometers

SIPLUS SM 321	2 AI	8 AI	8 AI, 16 bit	8 AI, 16 bit	8 AI, 40-pole
<b>Order No.</b>	<b>6AG1 331-7KB02-2AB0</b>	<b>6AG1 331-7KF02-2AB0</b>	<b>6AG1 331-7NF00-2AB0</b>	<b>6AG1 331-7NF10-2AB0</b>	<b>6AG1 331-7PF01-2AB0</b>
<b>Order No. based on</b>	<b>6ES7 331-7KB02-0AB0</b>	<b>6ES7 331-7KF02-0AB0</b>	<b>6ES7 331-7NF00-0AB0</b>	<b>6ES7 331-7NF10-0AB0</b>	<b>6ES7 331-7PF01-0AB0</b>
Ambient temperature range	-25 ... +60 °C, condensation permissible				
Ambient conditions	Suitable for extraordinary medial load (for example by chloric and sulphuric atmospheres).				
Conformity with standard for electronic devices on rail vehicles (EN 50155, temperature T1, category 1).	Yes	No	Yes	No	No
Technical data	The technical data is identical with the technical data of the based on modules.				

#### Ordering data

#### Order No.

##### SIPLUS SM 331 analog input modules

Expanded temperature range and medial load including labeling strips, bus connectors

- 8 inputs, resolution 9/12/14 bit
- 2 inputs, resolution 9/12/14 bit
- 8 inputs, resolution 16 bit
- 8 inputs, enhanced resolution, 16 bit, 4 channel mode
- 8 inputs, enhanced resolution, for temperature sensor

**6AG1 331-7KF02-2AB0**  
**6AG1 331-7KB02-2AB0**  
**6AG1 331-7NF00-2AB0**  
**6AG1 331-7NF10-2AB0**  
**6AG1 331-7PF01-2AB0**

##### Accessories

see Ordering data for SM 331 analog input modules

#### Overview



- Analog outputs
- For the connection of analog actuators

SIPLUS SM 321	2 AO	8 AO
<b>Order No.</b>	<b>6AG1 332-5HB01-2AB0</b>	<b>6AG1 332-5HF00-2AB0</b>
<b>Order No. based on</b>	<b>6ES7 332-5HB01-0AB0</b>	<b>6ES7 332-5HF00-0AB0</b>
Ambient temperature range	-25 ... +60 °C, condensation permissible	
Ambient conditions	Suitable for extraordinary medial load (for example by chloric and sulphuric atmospheres).	
Conformity with standard for electronic devices on rail vehicles (EN 50155, temperature T1, category 1).	Yes	No
Technical data	The technical data is identical with the technical data of the based on modules.	

#### Ordering data

#### Order No.

##### **SIMPLUS SM 332 analog output modules**

Expanded temperature range and medial load including labeling strips, bus connectors

- 2 outputs, 11/12 bit
- 8 outputs, 11/12 bit

**6AG1 332-5HB01-2AB0**  
**6AG1 332-5HF00-2AB0**

##### **Accessories**

see Ordering data for SM 332 analog output modules

# ET 200 distributed I/Os

## ET 200M – Analog Modules

### SIPLUS SM 334 analog input/output module (extended temperature range)

#### Overview



- Analog inputs and outputs
- For the connection of analog sensors and actuators

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<b>SIPLUS SM 334</b>	<b>2 AO</b>
<b>Order No.</b>	<b>6AG1 334-0KE00-2AB0</b>
<b>Order No. based on</b>	<b>6ES7 334-0KE00-0AB0</b>
Ambient temperature range	-25 ... +60 °C, condensation permissible
Ambient conditions	Suitable for extraordinary medial load (for example by chloric and sulphuric atmospheres).
Technical data	The technical data is identical with the technical data of the based on modules.

Ordering data	Order No.
<b>SIPLUS SM 334 analog input/output modules</b> Expanded temperature range and medial loading including labeling strips, bus connectors 4 inputs, 2 outputs, resistance measurement, Pt 100	<b>6AG1 334-0KE00-2AB0</b>
<b>Accessories</b>	

#### Overview



For plugging into ET 200M exclusively with IM 153-2 and IM 153-2 FO.

#### Technical specifications

	6ES7 331-7TF00-0AB0
<b>Voltages and currents</b>	
Load voltage L+	
• Rated value (DC)	24 V
• reverse polarity protection	Yes
<b>Current consumption</b>	
from load voltage L+ (without load), max.	20 mA
from backplane bus DC 5 V, max.	120 mA
Power loss, typ.	1.5 W
<b>Connection point</b>	
required front connectors	20-pin
<b>Isochronous mode</b>	
Isochronous mode	No
<b>Analog inputs</b>	
Number of analog inputs	8
Number of analog inputs for resistance measurement	0
cable length, shielded, max.	800 m
permissible input current for current input (destruction limit), max.	40 mA
Input ranges (rated values), currents	
• 0 to 20 mA	Yes
• -20 to +20 mA	Yes
• 4 to 20 mA	Yes
<b>Analog value creation</b>	
Measurement principle	Sigma Delta
Integrations and conversion time/resolution per channel	
• Resolution with overload area (bit including sign), max.	16 Bit
• Integration time, parameterizable	Yes
• Integration time, ms	20ms@50Hz / 16,6ms@60Hz / 100ms@100Hz
• Basic conversion time, including integration time, ms	65ms@50Hz
• Interference voltage suppression for interference frequency f1 in Hz	60/50/10 Hz

	6ES7 331-7TF00-0AB0
<b>Encoder</b>	
Connection of signal encoders	
• for current measurement as 2-wire transducer	Yes
• for current measurement as 4-wire transducer	Yes
<b>Errors/accuracies</b>	
Operational limit in overall temperature range	
• Current, relative to input area	+/- 0,15 %
Basic error limit (operational limit at 25 °C)	
• Current, relative to input area	+/- 0,1 %
<b>Status information/alarms/diagnostics</b>	
Alarms	
• Diagnostic alarm	Yes
• Limit value alarm	Yes
Diagnoses	
• Diagnostic information readable	Yes
<b>Isolation</b>	
Isolation checked with	500
<b>Isolation</b>	
Isolation, analog inputs	
• between the channels	No
• between the channels, in groups of	8
• between the channels and the backplane bus	Yes
<b>Dimensions and weight</b>	
Width	40 mm
Height	125 mm
Depth	117 mm
<b>Weights</b>	
Weight, approx.	205 g

# ET 200 distributed I/Os

## ET 200M – Analog Modules with HART

### Analog input module with HART

#### Ordering data

#### Order No.

#### SM 331 HART analog input module

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

6ES7 331-7TF00-0AB0

#### Accessories

#### Front connectors

- 20-pin, with screw-type contacts
  - 1 piece
  - 100 pieces
- 20-pin, with spring contacts
  - 1 piece
  - 100 pieces

6ES7 392-1AJ00-0AA0

6ES7 392-1AJ00-1AB0

6ES7 392-1BJ00-0AA0

6ES7 392-1BJ00-1AB0

#### LK 393 cable guide

Mandatory for operation in hazardous areas

6ES7 393-4AA00-0AA0

#### SIMATIC DP rail for ET 200M

For insertion of up to 5 bus modules for

- length of 483 mm
- length of 530 mm

6ES7 195-1GA00-0XA0

6ES7 195-1GF30-0XA0

#### Order No.

#### Accessories (continued)

#### SIMATIC S7-300 rail

- 160 mm long
- 480 mm long
- 530 mm long
- 830 mm long
- 2000 mm long

6ES7 390-1AB60-0AA0

6ES7 390-1AE80-0AA0

6ES7 390-1AF30-0AA0

6ES7 390-1AJ30-0AA0

6ES7 390-1BC00-0AA0

#### Label cover

(10 pieces, spare part) for signal modules (not 32-channel modules), function modules and CPU 312 IFM

6ES7 392-2XY00-0AA0

#### Labeling strips

(10 pieces, spare part) for signal modules (not 32-channel modules), function modules and CPU 312 IFM

6ES7 392-2XX00-0AA0

#### Overview



For plugging into ET 200M exclusively with IM 153-2 and IM 153-2 FO

#### Technical specifications

	6ES7 332-8TF00-0AB0
<b>Voltages and currents</b>	
Load voltage L+	
• Rated value (DC)	24 V
<b>Current consumption</b>	
from load voltage L+ (without load), max.	350 mA
from backplane bus DC 5 V, max.	100 mA
Power loss, typ.	6 W
<b>Connection point</b>	
required front connectors	20-pin
<b>Analog outputs</b>	
Number of analog outputs	8
cable length, shielded, max.	800 m
Current output, no-load voltage, max.	24 V
Output ranges, current	
• 0 to 20 mA	Yes
• -20 to +20 mA	No
• 4 to 20 mA	Yes
Load impedance (in rated range of output)	
• with current outputs, max.	750 Ω
• with current outputs, inductive load, max.	10 mH
<b>Analog value creation</b>	
Integrations and conversion time/resolution per channel	
• Resolution with overload area (bit including sign), max.	16 Bit
Settling time	
• for resistive load	0.1 ms
• for inductive load	0.5 ms

	6ES7 332-8TF00-0AB0
<b>Errors/accuracies</b>	
Operational limit in overall temperature range	
• Current, relative to output area	+/- 0,2 %
Basic error limit (operational limit at 25 °C)	
• Current, relative to output area	+/- 0,1 %
<b>Status information/alarms/diagnostics</b>	
Substitute values connectable	Yes
Alarms	
• Diagnostic alarm	Yes
Diagnoses	
• Diagnostic information readable	Yes
<b>Isolation</b>	
Isolation checked with	500 V DC
<b>Isolation</b>	
Isolation, analog outputs	
• between the channels and the backplane bus	Yes
<b>Dimensions and weight</b>	
Width	40 mm
Height	125 mm
Depth	117 mm
<b>Weights</b>	
Weight, approx.	220 g

# ET 200 distributed I/Os

## ET 200M – Analog Modules with HART

### Analog output module with HART

#### Ordering data

**SM 332 HART analog output module**  
HART analog output, 8 outputs, 0/4 ... 20 mA, HART for ET 200M with IM 153-2

#### Order No.

**6ES7 332-8TF00-0AB0**

#### Accessories

##### Front connectors

- 20-pin, with screw-type contacts
  - 1 piece
  - 100 pieces
- 20-pin, with spring contacts
  - 1 piece
  - 100 pieces

**6ES7 392-1AJ00-0AA0**

**6ES7 392-1AJ00-1AB0**

**6ES7 392-1BJ00-0AA0**

**6ES7 392-1BJ00-1AB0**

##### LK 393 cable guide

Mandatory for operation in hazardous areas

**6ES7 393-4AA00-0AA0**

##### SIMATIC DP rail for ET 200M

For insertion of up to 5 bus modules for

- length of 483 mm
- length of 530 mm

**6ES7 195-1GA00-0XA0**

**6ES7 195-1GF30-0XA0**

##### SIMATIC S7-300 rail

- 160 mm long
- 480 mm long
- 530 mm long
- 830 mm long
- 2000 mm long

**6ES7 390-1AB60-0AA0**

**6ES7 390-1AE80-0AA0**

**6ES7 390-1AF30-0AA0**

**6ES7 390-1AJ30-0AA0**

**6ES7 390-1BC00-0AA0**

#### Order No.

#### Accessories (continued)

##### Reference Manual for EX I/O for S7-300, M7-300, ET 200M

- German
- English

**6ES7 398-8RA00-8AA0**

**6ES7 398-8RA00-8BA0**

##### Label cover

(10 pieces, spare part) for signal modules (not 32-channel modules), function modules and CPU 312 IFM

**6ES7 392-2XY00-0AA0**

##### Labeling strips

(10 pieces, spare part) for signal modules (not 32-channel modules), function modules and CPU 312 IFM

**6ES7 392-2XX00-0AA0**

##### S7 Manual Collection

Electronic manuals on CD, multilingual: 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)

**6ES7 998-8XC01-8YE0**

##### S7 Manual Collection update service for 1 year

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

**6ES7 998-8XC01-8YE2**

#### Overview



- For connecting HART devices in hazardous areas.
- For plugging exclusively into ET 200M

#### Technical specifications

	6ES7 331-7TB00-0AB0
<b>Voltages and currents</b>	
Load voltage L+	
• Rated value (DC)	24 V
• reverse polarity protection	Yes
Voltage supply to the transducers	
• present	Yes
• Rated value (DC)	15 V; at 22 mA
• short-circuit proof	Yes; approx. 30 mA
• No-load voltage (DC)	29.6 V
<b>Current consumption</b>	
from backplane bus DC 5 V, max.	100 mA
from supply voltage L+, max.	180 mA
Power loss, typ.	4.5 W
<b>Analog inputs</b>	
Number of analog inputs	2
cable length, shielded, max.	400 m
permissible input current for current input (destruction limit), max.	40 mA
Input ranges (rated values), currents	
• Current	Yes
• 0 to 20 mA	Yes
• Input resistance (0 to 20 mA)	50 Ω
• 4 to 20 mA	Yes
• Input resistance (4 to 20 mA)	50 Ω
<b>Analog value creation</b>	
Measurement principle	SIGMA-DELTA
Integrations and conversion time/resolution per channel	
• Resolution with overload area (bit including sign), max.	16 Bit; 10 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

	6ES7 331-7TB00-0AB0
<b>Encoder</b>	
Connection of signal encoders	
• for current measurement as 2-wire transducer	Yes
• for current measurement as 4-wire transducer	Yes
<b>Ex(i) characteristics</b>	
Module for Ex(i) protection	Yes
Max. 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.	0.6 °C
<b>Errors/accuracies</b>	
Linearity error (relative to input area)	+/- 0.01 %
Temperature error (relative to input areas)	+/- 0.01 %
Crosstalk between the inputs, min.	130 dB
Repeat accuracy in settled status at 25 °C (relative to input area)	+/- 0.05 %
Operational limit in overall temperature range	
• Current, relative to input area	+/- 0.45 %; from 0/4 to 20 mA
Basic error limit (operational limit at 25 °C)	
• Current, relative to input area	+/- 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 voltage, min.	130 dB

# ET 200 distributed I/Os

## ET 200M – Analog Modules with HART

### Ex analog input module with HART

#### Technical specifications (continued)

	6ES7 331-7TB00-0AB0
<b>Status information/alarms/diagnostics</b>	
Alarms	
• Diagnostic alarm	Yes; parameterizable
• Limit value alarm	Yes; parameterizable, channels 0 and 1
Diagnoses	
• Diagnostic functions	Yes; parameterizable, red LED, alarm message
• Diagnostic information readable	Yes
• Overrange	Yes; red LED, signal
• Wire break in signal encoder 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	
• Collective error SF (red)	Yes
• Channel error indicator F (red)	Yes
<b>Isolation</b>	
tested with	
• Channels against backplane bus and load voltage L+	1500 V AC
• Channels among one another	1500 V AC
• Load voltage L+ against backplane bus	500 V DC
<b>Isolation</b>	
between the channels and backplane bus	Yes
Isolation, analog outputs	
• between the channels	Yes
• between the channels and the load voltage L+	Yes
Isolation, analog inputs	
• Isolation, analog inputs	Yes
<b>Permissible potential difference</b>	
between the inputs (UCM)	60 V DC / 30 V AC
<b>Environmental requirements</b>	
Operating temperature	
• max.	60 °C
<b>Standards, approvals, certificates</b>	
Type of protection to EN 50020 (CENELEC)	[EEx ib] IIC
Type of protection to FM	Class I, Division 2, Group A, B, C, D T4, Class I, Zone 2, Group IIC T4
Type of protection to KEMA	II 3 (2) G Eex nA [ib] IIC T4
Test number KEMA	KEMA 97; ATEX3039 X
<b>Dimensions and weight</b>	
Width	40 mm
Height	125 mm
Depth	120 mm
<b>Weights</b>	
Weight, approx.	260 g

#### Ordering data

#### Order No.

<b>SM 331 HART analog input module</b>	<b>6ES7 331-7TB00-0AB0</b>
2 inputs, 0/4 ... 20 mA, HART for ET 200M with IM 153-2 interface module	
<b>Accessories</b>	
<b>Front connector</b> <sup>1)</sup>	
20-pin, with screw-type contacts	
• 1 piece	<b>6ES7 392-1AJ00-0AA0</b>
• 100 pieces	<b>6ES7 392-1AJ00-1AB0</b>
<b>LK 393 cable guide</b>	<b>6ES7 393-4AA00-0AA0</b>
mandatory for operation in hazardous areas	
<b>SIMATIC DP DIN rail for ET 200M</b>	
For insertion of up to 5 bus modules for	
• Length: 483 mm	<b>6ES7 195-1GA00-0XA0</b>
• Length: 530 mm	<b>6ES7 195-1GF30-0XA0</b>
<b>SIMATIC S7-300 DIN rail</b>	
• Length: 160 mm	<b>6ES7 390-1AB60-0AA0</b>
• Length: 480 mm	<b>6ES7 390-1AE80-0AA0</b>
• Length: 530 mm	<b>6ES7 390-1AF30-0AA0</b>
• Length: 830 mm	<b>6ES7 390-1AJ30-0AA0</b>
• Length: 2000 mm	<b>6ES7 390-1BC00-0AA0</b>
<b>Reference Manual for EX I/O for S7-300, M7-300, ET 200M</b>	
• German	<b>6ES7 398-8RA00-8AA0</b>
• English	<b>6ES7 398-8RA00-8BA0</b>
<b>Label cover</b>	<b>6ES7 392-2XY00-0AA0</b>
(10 pieces, spare part) for signal modules (not 32-channel modules), function modules and CPU 312 IFM	
<b>Labeling strips</b>	<b>6ES7 392-2XX00-0AA0</b>
(10 pieces, spare part) for signal modules (not 32-channel modules), function modules and CPU 312 IFM	

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

### Overview



- For using HART devices in hazardous areas
- Plugs exclusively into ET 200M

### Technical specifications

	6ES7 332-5TB00-0AB0
<b>Voltages and currents</b>	
Load voltage L+	
• Rated value (DC)	24 V
• reverse polarity protection	Yes
<b>Current consumption</b>	
from backplane bus DC 5 V, max.	100 mA
from supply voltage L+, max.	150 mA
Power loss, typ.	3.5 W
<b>Analog outputs</b>	
Number of analog outputs	2
cable length, shielded, max.	400 m
Voltage output, Short-circuit protection	Yes
Current output, no-load voltage, max.	19 V
Cycle time (all channels) max.	5 ms
Output ranges, current	
• 0 to 20 mA	Yes
• 4 to 20 mA	Yes
Connection of actuators	
• for current output 2-conductor connection	Yes
Load impedance (in rated range of output)	
• with current outputs, max.	650 Ω
• with current outputs, inductive load, max.	7.5 mH
<b>Analog value creation</b>	
Integrations and conversion time/resolution per channel	
• Resolution with overload area (bit including sign), max.	12 Bit; Output value; 8 bit (+ sign) read back value
• Conversion time (per channel)	40 ms
Settling time	
• for resistive load	2.5 ms
• for capacitive load	4 ms
• for inductive load	2.5 ms

	6ES7 332-5TB00-0AB0
<b>Ex(i) characteristics</b>	
Module for Ex(i) protection	Yes
Max. 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
<b>Errors/accuracies</b>	
Output ripple (relative to the output area, bandwidth 0 to 50 kHz)	+/- 0.02 %
Linearity error (relative to output area)	+/- 0.03 %
Temperature error (relative to output area)	+/- 0.01 %
Crosstalk between the outputs, min.	130 dB
Repeat accuracy in settled status at 25 °C (relative to output area)	+/- 0.005 %
Operational limit in overall temperature range	
• Current, relative to output area	+/- 0,55 %
Basic error limit (operational limit at 25 °C)	
• Current, relative to output area	+/- 0,15 %

# ET 200 distributed I/Os

## ET 200M – Analog Modules with HART

### Ex analog output module with HART

#### Technical specifications (continued)

	6ES7 332-5TB00-0AB0
<b>Status information/alarms/diagnostics</b>	
Substitute values connectable	Yes; parameterizable
Alarms	
• Diagnostic alarm	Yes; parameterizable
Diagnoses	
• Diagnostic functions	Yes; parameterizable
• Diagnostic information readable	Yes
• Diagnostics	Yes
• Overrange	Yes
• Wire break	Yes; as of output value > 0.5 mA
• Wire break in acuator cable	Yes
• HART communication, active	Yes; green LED (H)
Diagnostics indication LED	
• Collective error SF (red)	Yes; Additional group message per channel
• Channel error indicator F (red)	Yes; per channel
<b>Isolation</b>	
tested with	
• Channels against backplane bus and load voltage L+	1500 V AC
• Channels among one another	1500 V AC
• Load voltage L+ against backplane bus	500 V DC
<b>Isolation</b>	
between the channels and backplane bus	Yes
Isolation, analog outputs	
• Galvanic isolation, analog outputs	Yes
• between the channels	Yes
• between the channels and the load voltage L+	Yes
<b>Permissible potential difference</b>	
between the outputs (UCM)	60 V DC / 30 V AC
between M internal and the outputs	60 V DC / 30 V AC
<b>Standards, approvals, certificates</b>	
Type of protection to EN 50020 (CENELEC)	[Eex ib] IIC
Type of protection to FM	Class I, Division 2, Group A, B, C, D T4; Class I, Zone 2, Group IIC T4
Type of protection to KEMA	II 3 (2) G Eex nA [ib] IIC T4
Test number KEMA	97; ATEX 2359 X
<b>Dimensions and weight</b>	
Width	40 mm
Height	125 mm
Depth	120 mm
<b>Weights</b>	
Weight, approx.	280 g

#### Ordering data

#### Order No.

<b>SM 332 HART analog output module</b>	<b>6ES7 332-8TF00-0AB0</b>
HART analog output, 8 outputs, 0/4 ... 20 mA, HART for ET 200M with IM 153-2	
<b>Accessories</b>	
<b>Front connectors</b>	
20-pin, with screw-type contacts	
• 1 piece	<b>6ES7 392-1AJ00-0AA0</b>
• 100 pieces	<b>6ES7 392-1AJ00-1AB0</b>
<b>LK 393 cable guide</b>	<b>6ES7 393-4AA00-0AA0</b>
Mandatory for operation in hazardous areas	
<b>SIMATIC DP rail for ET 200M</b>	
For insertion of up to 5 bus modules for	
• 483 mm long	<b>6ES7 195-1GA00-0XA0</b>
• 530 mm long	<b>6ES7 195-1GF30-0XA0</b>
<b>SIMATIC S7-300 rail</b>	
• 160 mm long	<b>6ES7 390-1AB60-0AA0</b>
• 480 mm long	<b>6ES7 390-1AE80-0AA0</b>
• 530 mm long	<b>6ES7 390-1AF30-0AA0</b>
• 830 mm long	<b>6ES7 390-1AJ30-0AA0</b>
• 2000 mm long	<b>6ES7 390-1BC00-0AA0</b>
<b>Reference Manual for EX I/O for S7-300, M7-300, ET 200M</b>	
• German	<b>6ES7 398-8RA00-8AA0</b>
• English	<b>6ES7 398-8RA00-8BA0</b>
<b>Label cover</b>	<b>6ES7 392-2XY00-0AA0</b>
(10 pieces, spare part) for signal modules (not 32-channel modules), function modules and CPU 312 IFM	
<b>Labeling strips</b>	<b>6ES7 392-2XX00-0AA0</b>
(10 pieces, spare part) for signal modules (not 32-channel modules), function modules and CPU 312 IFM	
<b>S7 Manual Collection</b>	<b>6ES7 998-8XC01-8YE0</b>
Electronic manuals on CD, multilingual: 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)	
<b>S7 Manual Collection update service for 1 year</b>	<b>6ES7 998-8XC01-8YE2</b>
Scope of delivery: Current CD "S7 Manual Collection" and the three subsequent updates	

#### Overview



- Digital inputs for signals from the Ex field
- For connecting intrinsically-safe digital equipment from the Ex field

#### Technical specifications

	6ES7 321-7RD00-0AB0
<b>Voltages and currents</b>	
Load voltage L+	
• Rated value (DC)	24 V
<b>Current consumption</b>	
from load voltage L+ (without load), max.	50 mA
from backplane bus DC 5 V, max.	80 mA
Power loss, typ.	1.1 W
<b>Connection point</b>	
required front connectors	20-pin
<b>Digital inputs</b>	
Number of NAMUR inputs	4
Cable length	
• Cable length unshielded, max.	200 m
Input voltage	
• Rated value, DC	8.2 V; from internal power circuit supply
Input current	
• on wire break, max.	0.1 mA
• on short -circuit, max.	8.5 mA
• for NAMUR encoders	
- for signal "0"	0.35 to 1.2 mA
- for signal "1"	2.1 to 7 mA
Input delay (for rated value of input voltage)	
• Input frequency (with 0.1 ms delay), max.	2 kHz
• for NAMUR inputs	
- programmable	Yes; 0.1 / 0.5 / 3 / 15 / 20 ms (plus 0.25 ms preparation time)

	6ES7 321-7RD00-0AB0
<b>Encoder supply</b>	
Output voltage	via the inputs
<b>Encoder</b>	
Connectable encoders	
• NAMUR encoder	Yes; Two-wire connection
<b>Ex(i) characteristics</b>	
Max. values of input circuits (per channel)	
• Co (permissible external capacity), max.	3 µF
• Io (short-circuit current), max.	14.1 mA
• Lo (permissible external inductivity), max.	100 mH
• Po (power of load), max.	33.7 mW
• Uo (output no-load voltage), max.	10 V
<b>Status information/alarms/diagnostics</b>	
Diagnoses	
• Diagnostic information readable	Yes
<b>Isolation</b>	
Galvanic isolation, digital inputs	
• galvanic isolation, digital inputs	Yes
• between the channels, in groups of	1
<b>Standards, approvals, certificates</b>	
Type of protection to EN 50020 (CENELEC)	[Ex ib] IIC
Type of protection to FM	CL.2, DIV 2, GP A,B,C,D T4
Test number PTB	Ex-96.D.2094X
<b>Weights</b>	
Weight, approx.	230 g

# ET 200 distributed I/Os

## ET 200M – Ex Digital Modules

### Ex digital input modules

#### Ordering data

#### Order No.

##### Ex digital input module

4 inputs, isolated, NAMUR

**6ES7 321-7RD00-0AB0**

##### Front connectors

20-pin, with screw contacts

- 1 piece
- 100 pieces

**6ES7 392-1AJ00-0AA0**

**6ES7 392-1AJ00-1AB0**

##### Front door, elevated design

e.g. for 32 channel modules;  
enables connection of  
1.3 mm<sup>2</sup>/16 AWG wires

**6ES7 328-0AA00-7AA0**

##### LK 393 cable guide

Mandatory for operation  
in Ex-hazard areas

**6ES7 393-4AA00-0AA0**

##### Labeling strips

10 pieces (spare part),  
for modules with 20-pin front  
connector

**6ES7 392-2XX00-0AA0**

##### Label cover

10 pieces (spare part),  
for modules with 20-pin front  
connector

**6ES7 392-2XY00-0AA0**

##### S7 SmartLabel

Software for automatic labeling  
of modules based on data of the  
STEP 7 project

**2XV9 450-1SL01-0YX0**

#### Labeling sheets for machine inscription

For 16-channel signal modules,  
DIN A4, for printing with laser  
printer; 10 pieces

- petrol
- light-beige
- yellow
- red

#### Order No.

**6ES7 392-2AX00-0AA0**

**6ES7 392-2BX00-0AA0**

**6ES7 392-2CX00-0AA0**

**6ES7 392-2DX00-0AA0**

#### SIMATIC Manual Collection

Electronic manuals on CD-ROM,  
multilingual: S7-200, S7-300, C7,  
S7-400, SIMATIC DP (Distributed  
I/O), SIMATIC PC, SIMATIC PG,  
STEP 7, Engineering Tools,  
Runtime Software, SIMATIC PCS  
7, SIMATIC HMI (Human Machine  
Interface), SIMATIC NET (Indus-  
trial Communication), SIMATIC  
Machine Vision, SIMATIC Sensors

**6ES7 998-8XC01-8YE0**

#### SIMATIC Manual Collection update service for 1 year

Current S7 Manual Collection CD  
and the three subsequent  
updates

**6ES7 998-8XC01-8YE2**

#### Reference manual Ex I/O station S7-300, ET 200M

- German
- English

**6ES7 398-8RA00-8AA0**

**6ES7 398-8RA00-8BA0**

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#### Overview



- Digital outputs for signals from the Ex field
- For connecting intrinsically-safe digital equipment from the Ex field

#### Technical specifications

	6ES7 322-5SD00-0AB0	6ES7 322-5RD00-0AB0
<b>Voltages and currents</b>		
Load voltage L+		
• Rated value (DC)	24 V	24 V
<b>Current consumption</b>		
from load voltage L+ (without load), max.	160 mA	160 mA
from backplane bus DC 5 V, max.	70 mA	70 mA
Power loss, typ.	3 W	3 W
<b>Connection point</b>		
required front connectors	20-pin	20-pin
<b>Digital outputs</b>		
Number of digital outputs	4	4
Cable length unshielded, max.	200 m	200 m
Short-circuit protection of the output	Yes; electronic	Yes; electronic
• Response threshold, typ.	Output current with short-circuit protection, min. 10 mA + 10 %	Output current with short-circuit protection, min. 20.5 mA + 10 %
<b>Output voltage</b>		
• Rated value (DC)	24 V	15 V
<b>Output current</b>		
• for signal "1" permissible range for 0 to 60 °C, max.	10 mA; +/- 10%	20 mA; +/- 10%
<b>Switching frequency</b>		
• with resistive load, max.	100 Hz	100 Hz
<b>Load impedance range</b>		
• upper limit	390 Ω; Two-wire connection	200 Ω; Two-wire connection

	6ES7 322-5SD00-0AB0	6ES7 322-5RD00-0AB0
<b>Ex(i) characteristics</b>		
Max. values of output circuits (per channel)		
• Co (permissible external capacity), max.	90 nF	500 nF
• Io (short-circuit current), max.	70 mA	85 mA
• Lo (permissible external inductivity), max.	6.7 mH	5 mH
• Po (power of load), max.	440 mW	335 mW
• Uo (output no-load voltage), max.	25.2 V	15.75 V
<b>Status information/alarms/diagnostics</b>		
Diagnoses		
• Diagnostic information readable	Yes	Yes
• Short circuit	Yes	Yes
• Group error	Yes	Yes
<b>Isolation</b>		
Isolation, digital outputs		
• Galvanic isolation, digital outputs	Yes	Yes
• between the channels, in groups of	1	1
<b>Standards, approvals, certificates</b>		
Type of protection to EN 50020 (CENELEC)	[EEx ib] IIC	[EEx ib] IIC
Type of protection to FM	CL I, DIV 2, GP A,B,C,D T4	AIS CL. 1, DIV 1, GP A,B,C,D; CL.I, DIV 2, GP A,B,C,D T4
Test number PTB	Ex-96.D.2093X	Ex-96.D.2102X
<b>Weights</b>		
Weight, approx.	230 g	230 g

# ET 200 distributed I/Os

## ET 200M – Ex Digital Modules

### Ex digital output modules

#### Ordering data

##### Ex digital output modules

- 4 outputs, isolated, 24 V DC, 10 mA
- 4 outputs, isolated, 15 V DC, 20 mA

6ES7 322-5SD00-0AB0

6ES7 322-5RD00-0AB0

##### Front connectors

20-pin, with screw contacts

- 1 piece
- 100 pieces

6ES7 392-1AJ00-0AA0

6ES7 392-1AJ00-1AB0

##### Front door, elevated design

e.g. for 32 channel modules; enables connection of 1.3 mm<sup>2</sup>/16 AWG wires

6ES7 328-0AA00-7AA0

##### LK 393 cable guide

Mandatory for operation in Ex-hazard areas

6ES7 393-4AA00-0AA0

##### Labeling strips

10 pieces (spare part), for modules with 20-pin front connector

6ES7 392-2XX00-0AA0

##### Label cover

10 pieces (spare part), for modules with 20-pin front connector

6ES7 392-2XY00-0AA0

##### S7 SmartLabel

Software for automatic labeling of modules based on data of the STEP 7 project

2XV9 450-1SL01-0YX0

##### Labeling sheets for machine inscription

For 16-channel signal modules, DIN A4, for printing with laser printer; 10 pieces

- petrol
- light-beige
- yellow
- red

6ES7 392-2AX00-0AA0

6ES7 392-2BX00-0AA0

6ES7 392-2CX00-0AA0

6ES7 392-2DX00-0AA0

##### SIMATIC Manual Collection

Electronic manuals on CD-ROM, multilingual: S7-200, S7-300, C7, S7-400, SIMATIC DP (Distributed I/O), SIMATIC PC, SIMATIC PG, STEP 7, Engineering Tools, Runtime Software, SIMATIC PCS 7, SIMATIC HMI (Human Machine Interface), SIMATIC NET (Industrial Communication), SIMATIC Machine Vision, SIMATIC Sensors

6ES7 998-8XC01-8YE0

##### SIMATIC Manual Collection update service for 1 year

Current S7 Manual Collection CD and the three subsequent updates

6ES7 998-8XC01-8YE2

##### Reference manual

##### Ex-Peripherals S7-300, ET 200M

- German
- English

6ES7 398-8RA00-8AA0

6ES7 398-8RA00-8BA0

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#### Overview



- Analog inputs for signals from the Ex area
- For connecting intrinsically-safe analog equipment from the Ex field

#### Technical specifications

	6ES7 331-7RD00-0AB0	6ES7 331-7SF00-0AB0
<b>Voltages and currents</b>		
Load voltage L+		
• Rated value (DC)	24 V	24 V
Voltage supply to the transducers		
• present	Yes	
• Rated value (DC)	13 V; at 22 mA	
• No-load voltage (DC)	25.2 V	
<b>Current consumption</b>		
from backplane bus DC 5 V, max.	60 mA	120 mA
from supply voltage L+, max.	150 mA	
Power loss, typ.	3 W	0.6 W
<b>Connection point</b>		
required front connectors	20-pin	20-pin
<b>Analog inputs</b>		
Number of analog inputs	4	8; 8 x thermo- couples, 4 x RTD thermistors
cable length, shielded, max.	200 m	200 m; HTC:50 m
permissible input current for current input (destruction limit), max.	40 mA	
Input ranges (rated values), currents		
• 0 to 20 mA	Yes	
• 4 to 20 mA	Yes	

	6ES7 331-7RD00-0AB0	6ES7 331-7SF00-0AB0
Input ranges (rated values), thermoelements		
• Type B		Yes
• Type E		Yes
• Type J		Yes
• Type K		Yes
• Type L		Yes
• Type N		Yes
• Type R		Yes
• Type S		Yes
• Type T		Yes
• Type U		Yes
Input ranges (rated values), resistance thermometers		
• Ni 100		Yes
• Pt 100		Yes
• Pt 200		Yes
<b>Analog value creation</b>		
Measurement principle	SIGMA-DELTA	SIGMA-DELTA
Integrations and conversion time/resolution per channel		
• Resolution with overload area (bit including sign), max.	16 Bit; 10 to 15 bit + sign	16 Bit; 10 to 15 bit + sign
• Integration time, parameterizable	Yes; 2.5 to 100 ms	Yes; 2.5 to 100 ms
• Interference voltage suppression for interference frequency f1 in Hz	10 to 400 Hz	10 to 400 Hz
<b>Encoder</b>		
Connection of signal encoders		
• for current measurement as 2-wire transducer	Yes	Yes
• for current measurement as 4-wire transducer	Yes	Yes

# ET 200 distributed I/Os

## ET 200M – Ex Analog Modules

### Ex analog input modules

#### Technical specifications (continued)

	6ES7 331-7RD00-0AB0	6ES7 331-7SF00-0AB0
<b>Ex(i) characteristics</b>		
Max. values of input circuits (per channel)		
• Co (permissible external capacity), max.	90 nF	60 µF
• Io (short-circuit current), max.	68.5 mA	28.8 mA
• Lo (permissible external inductivity), max.	7.5 mH	40 mH
• Po (power of load), max.	431 mW	41.4 mW
• Ri, max.	50 Ω	
• Uo (output no-load voltage), max.	25.2 V	5.9 V
<b>Errors/accuracies</b>		
Operational limit in overall temperature range		
• Current, relative to input area	+/- 0,45 %	
Basic error limit (operational limit at 25 °C)		
• Current, relative to input area	+/- 0,1 %	
• Resistance-type thermometer, relative to input area		+/- 0,1 %
Interference voltage suppression for $f = n \times (fl \pm 1 \%)$ , $fl =$ interference frequency		
• Series mode interference (peak value of interference < rated value of input range), min.	60 dB	60 dB
• common mode voltage, min.	130 dB	130 dB
<b>Status information/alarms/diagnostics</b>		
Diagnoses		
• Diagnostic information readable	Yes	Yes
• Overrange	Yes	Yes
• Wire break in signal encoder cable	Yes	Yes
• Short circuit of the signal encoder cable	Yes	Yes
<b>Isolation</b>		
Isolation, analog inputs		
• Isolation, analog inputs	Yes	Yes
<b>Permissible potential difference</b>		
between the inputs (UCM)	60 V DC	60 V DC
between inputs and MANA (UCM)	60 V DC	30 V DC
<b>Standards, approvals, certificates</b>		
Type of protection to EN 50020 (CENELEC)	[EEEx ib] IIC	[EEEx ib] IIC
Type of protection to FM	CL.I, DIV 2, GP A,B,C,D T4	CL.I, DIV 2, GP A,B,C,D T4
Test number PTB	Ex-96.D.2092X	Ex-96.D.2108X
<b>Weights</b>		
Weight, approx.	290 g	210 g

#### Ordering data

#### Order No.

<b>Ex analog input modules</b>	
• 4 inputs, isolated, 0/4 to 20 mA, 15 bit	6ES7 331-7RD00-0AB0
• 8/4 inputs, isolated, for thermocouples and Pt100, Pt200, Ni100	6ES7 331-7SF00-0AB0
<b>Front connectors</b>	
20-pin, with screw contacts	
• 1 piece	6ES7 392-1AJ00-0AA0
• 100 pieces	6ES7 392-1AJ00-1AB0
<b>Front door, elevated design</b>	
e.g. for 32 channel modules; enables connection of 1.3 mm <sup>2</sup> /16 AWG wires	6ES7 328-0AA00-7AA0
<b>LK 393 cable guide</b>	
Mandatory for operation in Ex-hazard areas	6ES7 393-4AA00-0AA0
<b>Labeling strips</b>	
10 pieces (spare part), for modules with 20-pin front connector	6ES7 392-2XX00-0AA0
<b>Label cover</b>	
10 pieces (spare part), for modules with 20-pin front connector	6ES7 392-2XY00-0AA0
<b>S7 SmartLabel</b>	
Software for automatic labeling of modules based on data of the STEP 7 project	2XV9 450-1SL01-0YX0
<b>Labeling sheets for machine inscription</b>	
For 16-channel signal modules, DIN A4, for printing with laser printer; 10 pieces	
• petrol	6ES7 392-2AX00-0AA0
• light-beige	6ES7 392-2BX00-0AA0
• yellow	6ES7 392-2CX00-0AA0
• red	6ES7 392-2DX00-0AA0
<b>SIMATIC Manual Collection</b>	
Electronic manuals on CD-ROM, multilingual: S7-200, S7-300, C7, S7-400, SIMATIC DP (Distributed I/O), SIMATIC PC, SIMATIC PG, STEP 7, Engineering Tools, Runtime Software, SIMATIC PCS 7, SIMATIC HMI (Human Machine Interface), SIMATIC NET (Industrial Communication), SIMATIC Machine Vision, SIMATIC Sensors	6ES7 998-8XC01-8YE0
<b>SIMATIC Manual Collection update service for 1 year</b>	
Current S7 Manual Collection CD and the three subsequent updates	6ES7 998-8XC01-8YE2
<b>Reference manual Ex-Peripherals S7-300, ET 200M</b>	
• German	6ES7 398-8RA00-8AA0
• English	6ES7 398-8RA00-8BA0

#### Overview



- Analog outputs for signals from the Ex area
- For connecting intrinsically-safe analog equipment from the Ex field

#### Technical specifications

	6ES7 332-5RD00-0AB0
<b>Voltages and currents</b>	
Load voltage L+	
• Rated value (DC)	24 V
<b>Current consumption</b>	
from load voltage L+ (without load), max.	180 mA
from backplane bus DC 5 V, max.	80 mA
Power loss, typ.	4 W
<b>Connection point</b>	
required front connectors	20-pin
<b>Analog outputs</b>	
Number of analog outputs	4
cable length, shielded, max.	200 m
Voltage output, Short-circuit protection	Yes
Voltage output, short-circuit current, max..	70 mA
Current output, no-load voltage, max.	14 V
Output ranges, current	
• 0 to 20 mA	Yes
• 4 to 20 mA	Yes
Connection of actuators	
• for current output 2-conductor connection	Yes
Load impedance (in rated range of output)	
• with current outputs, max.	500 Ω
<b>Analog value creation</b>	
Integrations and conversion time/resolution per channel	
• Resolution with overload area (bit including sign), max.	15 Bit
• Basic conversion time, ms	2.5 ms

	6ES7 332-5RD00-0AB0
<b>Ex(i) characteristics</b>	
Max. values of output circuits (per channel)	
• Co (permissible external capacity), max.	850 nF
• Io (short-circuit current), max.	70 mA
• Lo (permissible external inductivity), max.	6.6 mH
• Po (power of load), max.	440 mW
• Uo (output no-load voltage), max.	14 V
<b>Errors/accuracies</b>	
Operational limit in overall temperature range	
• Current, relative to output area	+/- 0,55 %
Basic error limit (operational limit at 25 °C)	
• Current, relative to output area	+/- 0,2 %
<b>Status information/alarms/diagnostics</b>	
Diagnoses	
• Diagnostic information readable	Yes
• Overrange	Yes
• Wire break in actuator cable	Yes
• Group error	Yes
<b>Isolation</b>	
Isolation, analog outputs	
• Galvanic isolation, analog outputs	Yes
<b>Permissible potential difference</b>	
between outputs and MANA (UCM)	60 V DC / 30 V AC
between the outputs (UCM)	60 V DC/30 V AC
<b>Standards, approvals, certificates</b>	
Type of protection to EN 50020 (CENELEC)	[Ex ib] IIC
Type of protection to FM	CL.I, DIV 2, GP A,B,C,D T4
Test number PTB	Ex-96.D.2026X
<b>Weights</b>	
Weight, approx.	280 g

# ET 200 distributed I/Os

## ET 200M – Ex Analog Modules

### Ex analog output modules

Ordering data	Order No.	Order No.
<b>Ex analog output module</b> 4 outputs, isolated, 0/4 to 20 mA	<b>6ES7 332-5RD00-0AB0</b>	
<b>Front connectors</b> 20-pin, with screw contacts		
<ul style="list-style-type: none"> <li>• 1 piece</li> </ul>	<b>6ES7 392-1AJ00-0AA0</b>	
<ul style="list-style-type: none"> <li>• 100 pieces</li> </ul>	<b>6ES7 392-1AJ00-1AB0</b>	
<b>Front door, elevated design</b> e.g. for 32 channel modules; enables connection of 1.3mm <sup>2</sup> /16 AWG wires	<b>6ES7 328-0AA00-7AA0</b>	
<b>LK393 cable guide</b> Mandatory for operation in Ex-hazard areas	<b>6ES7 393-4AA00-0AA0</b>	
<b>Labeling strips</b> 10 pieces (spare part), for modules with 20-pin front connector	<b>6ES7 392-2XX00-0AA0</b>	
<b>Label cover</b> 10 pieces (spare part), for modules with 20-pin front connector	<b>6ES7 392-2XY00-0AA0</b>	
<b>S7 SmartLabel</b> Software for automatic labeling of modules based on data of the STEP 7 project	<b>2XV9 450-1SL01-0YX0</b>	
		<b>Labeling sheets for machine inscription</b> For 16-channel signal modules, DIN A4, for printing with laser printer; 10 pieces
		<ul style="list-style-type: none"> <li>• petrol</li> </ul>
		<ul style="list-style-type: none"> <li>• light-beige</li> </ul>
		<ul style="list-style-type: none"> <li>• yellow</li> </ul>
		<ul style="list-style-type: none"> <li>• red</li> </ul>
		<b>SIMATIC Manual Collection</b> Electronic manuals on CD-ROM, multilingual: S7-200, S7-300, C7, S7-400, SIMATICDP (Distributed I/O), SIMATIC PC, SIMATIC PG, STEP 7, Engineering Tools, Runtime Software, SIMATIC PCS 7, SIMATIC HMI (Human Machine Interface), SIMATIC NET (Industrial Communication), SIMATIC Machine Vision, SIMATIC Sensors
		<b>6ES7 998-8XC01-8YE0</b>
		<b>SIMATIC Manual Collection                      update service for 1 year</b> Current S7 Manual Collection CD and the three subsequent updates
		<b>6ES7 998-8XC01-8YE2</b>
		<b>Reference manual                      Ex-Peripherals S7-300, ET 200M</b>
		<ul style="list-style-type: none"> <li>• German</li> </ul>
		<b>6ES7 398-8RA00-8AA0</b>
		<ul style="list-style-type: none"> <li>• English</li> </ul>
		<b>6ES7 398-8RA00-8BA0</b>

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#### Overview



- Intelligent 8-channel electronics module for S7-300/ET 200M
- For the connection of up to 8 IQ-Sense sensors:
  - Optoelectronic sensors
  - Ultrasound sensors
- With standard function blocks for the various sensor technologies for simplified handling on a SIMATIC S7
- Conventional sensors cannot be operated.

#### Technical specifications

	6ES7 338-7XF00-0AB0
<b>Voltages and currents</b>	
Load voltage L+	
• Rated value (DC)	24 V
<b>Current consumption</b>	
from load voltage L+ (without load), max.	1 A
from backplane bus DC 5 V, max.	150 mA; typically
<b>Connection point</b>	
required front connectors	20-pin
<b>Digital inputs</b>	
Number of digital inputs	8
Cable length	
• Cable length unshielded, max.	50 m
<b>Encoder</b>	
Connectable encoders	
• Description	photoelectronic proximity switches and ultrasonic sensors with IQ-Sense, cycle time 2.88 to 6 ms
<b>Status information/alarms/diagnostics</b>	
Diagnostics indication LED	
• Status indicator digital input (green)	Yes
<b>Isolation</b>	
Isolation checked with	500 V DC
<b>Isolation</b>	
Galvanic isolation, digital inputs	
• between the channels	No
• between the channels and the backplane bus	Yes
<b>Dimensions and weight</b>	
Width	40 mm
Height	125 mm
Depth	120 mm
<b>Weights</b>	
Weight, approx.	250 g

#### Ordering data

#### Order No.

#### 8x IQ-Sense sensor module

6ES7 338-7XF00-0AB0

#### *Sensors for connecting to the sensor module*

#### Diffuse sensors

- Model C40 IQ-Sense
- Model K80 IQ-Sense
- with background fading, model K80 IQ-Sense

3SF7 240-3JQ00

3SF7 210-3JQ00

3SF7 214-3JQ00

#### Diffuse barrier

- Model C40 IQ-Sense
- Model K80 IQ-Sense

3SF7 241-3JQ00

3SF7 211-3JQ00

#### Ultrasound sensor

- Model M18 IQ-Sense; Range 6-30 cm
- Model M18 IQ-Sense; Range 15-100 cm

3SF6 232-3JA00

3SF6 233-3JA00

# ET 200 distributed I/Os

## ET 200M – IQ Sense Modules and Sensors

### SIMATIC PXO opto proximity switches with IQ-Sense

#### Overview



Opto BERO with IQ-Sense, C40 design IQ-Sense



Opto BERO with IQ-Sense, K80 design IQ-Sense

The photoelectric proximity switches react to changes in the received quantity of light. The light beam emitted from the emitter diode is interrupted or reflected by the object to be detected.

These sensors detect all objects regardless of their composition, whether metal, wood or plastic.

Depending on the type of BERO, the interruption or reflection of the light beam is evaluated. The following operating modes are possible with IQ-Sense:

- Diffuse sensors (energetic)
- Diffuse sensor (with background suppression)
- Reflex sensors

Features:

- Designs K80 IQ-Sense and C40 IQ-Sense
- IntelliTeach functionality
- Integrated anti-interference function
- Pre-failure warning (fouling/misalignment)

#### Technical specifications

Design		C40 design IQ-Sense	K80 design IQ-Sense
<b>Diffuse sensor (energetic)</b>			
Sensing range	m	0.7	2
Standard test object	mm	200 × 200 (white)	
Transmitter (type of light)	nm	Red LED, 660	IR LED, 880
Supply current	mA	50	
Response time	ms	1	
LEDs		Switching status (yellow), surplus light (green)	
Enclosure material		ABS + PBTP	PBTP
Protection		IP67	
Dimensions	mm	40 × 40 × 53	83 × 65 × 25
<b>Diffuse sensor with background suppression</b>			
Sensing range	m	–	0.2 ... 1
Standard test object	mm	–	200 × 200 (white)
Transmitter (type of light)	nm	–	IR-LED, 880
Supply current	mA	–	50
Response time	ms	–	2
LEDs		–	Switching status (yellow), surplus light (green)
Enclosure material		–	PBTP
Protection		–	IP67
Dimensions	mm	–	83 × 65 × 25

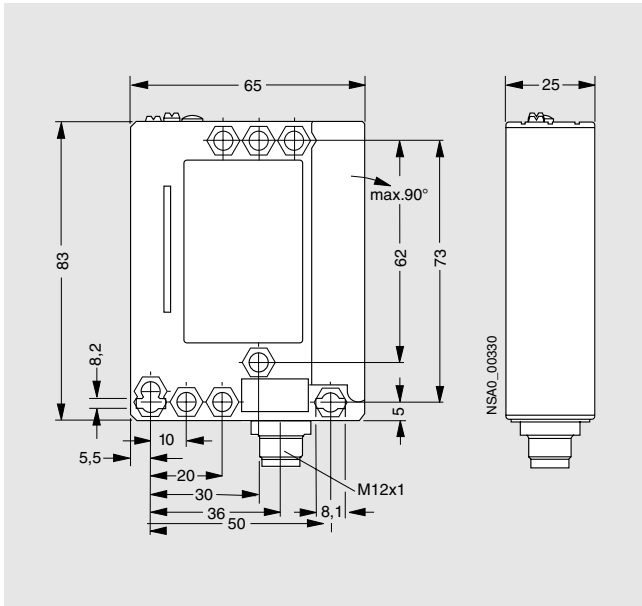
### Technical specifications (continued)

Design	C40 IQ-Sense	K80 IQ-Sense
<b>Reflex sensor</b>		
Sensing range	m 6	8
Standard test object	Reflector D84, 3RX7916	
Transmitter (type of light)	nm Red LED 660 nm, polarized	
Supply current	mA 50	
Response time	ms 1	
LEDs	Switching status (yellow), surplus light (green)	
Enclosure material	ABS + PBTP	PBTP
Protection	IP67	
Dimensions	mm 40 × 40 × 53	83 × 65 × 25

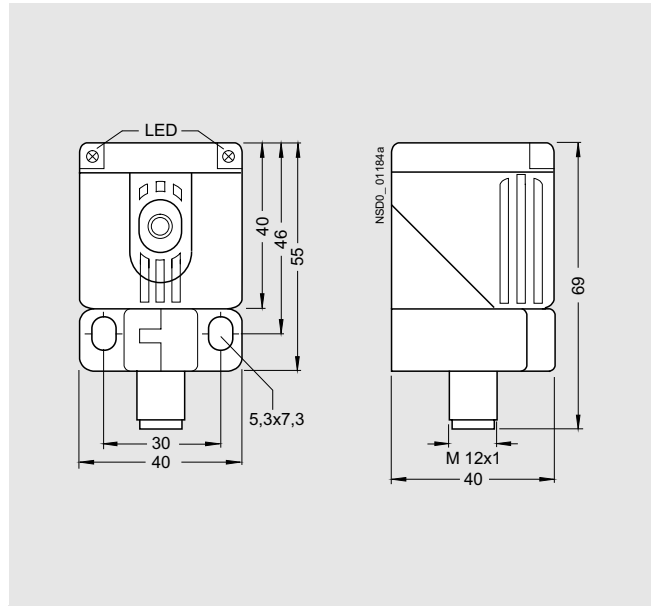
### Selection and Ordering data

Version	Design	Type	Order No.
<b>Photoelectric sensors</b> for connection to the 4 IQ-Sense sensor module	C40 IQ-Sense	Diffuse sensor	<b>3SF7 240-3JQ00</b>
		Reflex sensor	<b>3SF7 241-3JQ00</b>
	K80 IQ-Sense	Diffuse sensor	<b>3SF7 210-3JQ00</b>
		Diffuse sensor (with background suppression)	<b>3SF7 214-3JQ00</b>
		Reflex sensor	<b>3SF7 211-3JQ00</b>

### Dimension drawings



Opto BERO with IQ-Sense, K80 IQ-Sense design



Opto BERO with IQ-Sense, C40 IQ-Sense design

# ET 200 distributed I/Os

## ET 200M – IQ Sense Modules and Sensors

### SIMATIC PXS sonar proximity switches with IQ-Sense

#### Overview



The sonar BEROs of the M18 IQ compact series are ready-to-use complete units with a cylindrical M18 housing for connection to the S7-300/ET 200M IQ-Sense module SM338, 8xIQ-Sense.

- Five operating modes:
  - Operation as measuring sensor (“analog signal“)
  - Diffuse sensor with background blanking
  - Diffuse sensor with differential travel
  - Diffuse sensor with foreground and background blanking
  - Retroreflective sensor.
- Statically configurable using STEP 7,
- Dynamically configurable using an S7 function block
- Measured distance to object is always transmitted
- Synchronizable, multiplex operation
- Temperature compensation,
- Connection with M12 connector
- Non-polarized 2-conductor connection (protected against polarity reversal),
- Channel-specific system diagnosis (e.g. wire-break, short-circuit, parameterization error).

#### Technical specifications

Type		3SF62 32–3JA00	3SF62 33–3JA00
Sensing range			
• Rated value	cm	5 ... 30	15 ... 100
• Maximum value	cm	5 ... 50	15 ... 150
Standard test object	mm	10 × 10	20 × 20
Differential travel <i>H</i> (adjustable)	mm	3 ... 30	10 ... 100
Repeat accuracy <i>R</i>	mm	1	2
Operating voltage (DC)		of IQ-Sense	
Rated operational current <i>I<sub>e</sub></i>		of IQ-Sense	
No-load current <i>I<sub>0</sub></i>		of IQ-Sense	
Adjustment / configuration		Beginning and end of switching range via IQ-Sense (IntelliTeach) or local teach-in via potentiometer	
Ultra-sound frequency	kHz	400	200
Switching frequency <i>f</i>	Hz	8	4
Response time	ms	54	110
Measuring rate	ms	13.44	26.88
Status display		yellow LED	
Casing material		nickel-plated brass, Transformer cover CRASTIN, Transformer surface epoxy resin	
Degree of protection		IP67	
Ambient temperature			
• Operation	°C	–25 ... +70	
• Storage	°C	–40 ... +85	

#### Selection and Ordering data

Version	Type	Sensing range	Order No.
<b>Ultrasonic sensors</b>	M18 IQ-Sense	5 ... 30	<b>3SF62 32–3JA00</b>
For connection to IQ-Sense		15 ... 100	<b>3SF62 33–3JA00</b>

#### Overview



- Simulator module for testing programs during startup and operation
- For simulation of sensor signals using switches
- For indicating signal statuses at the outputs using LEDs

#### Technical specifications

	6ES7 374-2XH01-0AA0
<b>Current consumption</b>	
from backplane bus DC 5 V, max.	80 mA
Power loss, typ.	0.35 W
<b>Digital inputs</b>	
Number of digital inputs	16; Switch
<b>Digital outputs</b>	
Number of digital outputs	16; LEDs
<b>Isolation</b>	
Isolation, digital outputs	
• between the channels and the backplane bus	No
Galvanic isolation, digital inputs	
• between the channels and the backplane bus	No
<b>Dimensions and weight</b>	
Width	40 mm
Height	125 mm
Depth	120 mm
<b>Weights</b>	
Weight, approx.	190 g

#### Ordering data

#### Order No.

<b>SM 374 simulator module</b> Including bus connector and labeling strip	<b>6ES7 374-2XH01-0AA0</b>
<b>Bus connector</b> 1 unit (spare part)	<b>6ES7 390-0AA00-0AA0</b>
<b>Labeling strip</b> 10 units (spare part)	<b>6ES7 392-2XX00-0AA0</b>
<b>S7-SmartLabel</b> Software for machine labeling of modules directly from the STEP 7 project	<b>2XV9 450-1SL01-0YX0</b>
<b>Labeling sheets for machine labeling</b> for 16-channel signal modules, DIN A4, for printing using laser printer; 10 units	
• Petrol	<b>6ES7 392-2AX00-0AA0</b>
• Light beige	<b>6ES7 392-2BX00-0AA0</b>
• Yellow	<b>6ES7 392-2CX00-0AA0</b>
• Red	<b>6ES7 392-2DX00-0AA0</b>
<b>Label cover</b> 10 units (spare part)	<b>6ES7 392-2XY00-0AA0</b>

# ET 200 distributed I/Os

## ET 200M – Special Modules

### DM 370 dummy module

#### Overview



- Dummy module for reserving slots for non-parameterized signal modules
- Structure and address allocation is retained when replaced with a signal module

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Technical specifications	
	<b>6ES7 370-0AA01-0AA0</b>
<b>Current consumption</b>	
from backplane bus DC 5 V, max.	5 mA
Power loss, max.	0.03 W
<b>Dimensions and weight</b>	
Width	40 mm
Height	125 mm
Depth	120 mm
<b>Weights</b>	
Weight, approx.	180 g

Ordering data	Order No.
<b>DM 370 dummy module</b> Including bus connector and labeling strip	<b>6ES7 370-0AA01-0AA0</b>
<b>Bus connector</b> 1 unit (spare part)	<b>6ES7 390-0AA00-0AA0</b>
<b>Labeling strip</b> 10 units (spare part)	<b>6ES7 392-2XX00-0AA0</b>
<b>S7-SmartLabel</b> Software for machine labeling of modules directly from the STEP 7 project	<b>2XV9 450-1SL01-0YX0</b>
<b>Labeling sheets for machine labeling</b> for 16-channel signal modules, DIN A4, for printing using laser printer; 10 units	
• Petrol	<b>6ES7 392-2AX00-0AA0</b>
• Light beige	<b>6ES7 392-2BX00-0AA0</b>
• Yellow	<b>6ES7 392-2CX00-0AA0</b>
• Red	<b>6ES7 392-2DX00-0AA0</b>
<b>Label cover</b> 10 units (spare part)	<b>6ES7 392-2XY00-0AA0</b>

#### Overview



- Load power supplies for S7-300/ET 200M
- For conversion of the line voltage to the required operating voltage of 24 V DC
- Output current of 2 A, 5 A or 10 A

#### Technical specifications

Power supply, type	2 A	2 A	5 A	5 A	10 A
Order No.	6ES7 307-1BA00-0AA0	6ES7 305-1BA80-0AA0	6ES7 307-1EA00-0AA0	6ES7 307-1EA80-0AA0	6ES7 307-1KA01-0AA0
Order No. SIPLUS		6AG1 305-1BA80-2AA0 <sup>1)</sup>		6AG1 307-1EA80-2AA0 <sup>1)</sup>	
Input	Single-phase AC	DC voltage	Single-phase AC	Single-phase AC	Single-phase AC
Rated voltage $V_{in \text{ rated}}$	<b>120/230 V AC</b> Settable via selector switch on device	<b>24 V ... 110 V DC</b> Wide-range input	<b>120/230 V AC</b> Settable via selector switch on device	<b>120/230 V AC</b> Set via switch on device	<b>120/230 V AC</b> Settable via selector switch on device
Voltage range	85 ... 132 V/ 170 ... 264 V AC	16.8 ... 138 V DC	85 ... 132 V/ 170 ... 264 V AC	93 ... 132 V AC/ 187 ... 264 V AC	85 ... 132/ 170 ... 264 V AC
Overvoltage strength	2.3 x -pole, 1.3 ms	154 V; 0.1 s	2.3 x -pole, 1.3 ms	2.3 x $V_{in \text{ rated}}$ , 1.3 ms	2.3 x -pole, 1.3 ms
Mains buffering $I_{out \text{ rated}}$	> 20 ms at $V_{in} = 93/187 \text{ V}$	> 10 ms at $V_{in \text{ rated}}$	> 20 ms at $V_{in} = 93/187 \text{ V}$	> 20 ms at $V_{in} = 93/187 \text{ V}$	> 20 ms at $V_{in} = 93/187 \text{ V}$
Rated line frequency; range	50/60 Hz; 47 ... 63 Hz	-	50/60 Hz; 47 ... 63 Hz	50/60 Hz, 47 ... 63 Hz	50/60 Hz; 47 ... 63 Hz
Rated current $I_{in \text{ rated}}$	0.9/0.6 A	2.7-0.6 A (4-0.9 A)	2.1/1.3 A	2.1/1.2 A	4.1/1.8 A
Inrush current limitation (+25°C)	< 20 A, < 3 ms	< 20 A, < 10 ms	< 45 A, < 3 ms	< 45 A, < 3 ms	< 55 A, < 3 ms
$I^2t$	< 1.0 A <sup>2</sup> s	< 5 A <sup>2</sup> s	< 1.2 A <sup>2</sup> s	< 1.8 A <sup>2</sup> s (typ. 1.2 A <sup>2</sup> s)	< 3.3 A <sup>2</sup> s
Integrated line-side fuse	T 1.6 A/250 V (not accessible)	T 6.3 A/250 V (inaccessible)	F 4 A/250 V (not accessible)	T 3.15 A/250 V (not accessible)	T 6.3 A/250 V (not accessible)
Recommended circuit-breaker (IEC 898) in mains supply line	3 A, Characteristic C	At and above 10 A, C characteristic, suitable for DC	From 6 A, Characteristic C	At and above 10 A, Characteristic C or at and above 6 A, Characteristic D	From 10 A, Characteristic C

1) SIPLUS module for temperature range -25 ... +60°C and use under medial load (e.g. sulphur chloride atmosphere). This SIPLUS power supply conforms with standards for electronic equipment used on rolling stock (EN 50155, temperature T1, category 1).

# ET 200 distributed I/Os

## ET 200M – Power Supplies

### 2 A, 5 A, 10 A load power supplies

#### Technical specifications (continued)

Power supply, type	2 A	2 A	5 A	5 A	10 A
Order No.	6ES7 307-1BA00-0AA0	6ES7 305-1BA80-0AA0	6ES7 307-1EA00-0AA0	6ES7 307-1EA80-0AA0	6ES7 307-1KA01-0AA0
Order No. SIPLUS		6AG1 305-1BA80-2AA0 <sup>1)</sup>		6AG1 307-1EA80-2AA0 <sup>1)</sup>	
Output	Stabilized, floating direct voltage	Controlled, isolated DC voltage	Stabilized, floating direct voltage	Controlled, isolated DC voltage	Stabilized, floating direct voltage
Rated voltage $V_{out\ rated}$	24 V DC	24 V DC	24 V DC	24 V DC	24 V DC
Total tolerance	± 3 %	± 3 %	± 3 %	± 3 %	± 3 %
• Stat. mains compensation	Approx. 0.1 %	Approx. 0.2 %	Approx. 0.1 %	Approx. ± 0.2 %	Approx. 0.1 %
• Stat. load compensation	Approx. 0.2 %	Approx. 0.4 %	Approx. 0.2 %	Approx. ± 0.4 %	Approx. 0.5 %
Residual ripple (clock frequency: approx. 50 kHz)	< 150 mV <sub>pp</sub> (typ. < 20 mV <sub>pp</sub> )	< 150 mV <sub>pp</sub> (typ. < 30 mV <sub>pp</sub> )	< 150 mV <sub>pp</sub> (typ. 40 mV <sub>pp</sub> )	< 150 mV <sub>pp</sub> (typ. 40 mV <sub>pp</sub> )	< 150 mV <sub>pp</sub> (typ. 40 mV <sub>pp</sub> )
Spikes (bandwidth: 20 MHz)	< 240 mV <sub>pp</sub> (typ. < 150 mV <sub>pp</sub> )	< 240 mV <sub>pp</sub> (typ. < 150 mV <sub>pp</sub> )	< 240 mV <sub>pp</sub> (typ. 90 mV <sub>pp</sub> )	< 240 mV <sub>pp</sub> (typ. 90 mV <sub>pp</sub> )	< 240 mV <sub>pp</sub> (typ. 100 mV <sub>pp</sub> )
Setting range	-	-	-	-	-
Status display	Green LED for 24 V O.K.	Green LED for 24 V O.K.	Green LED for 24 V O.K.	Green LED for 24 V O.K.	Green LED for 24 V O.K.
Power ON/OFF behavior	No overshoot of $V_{out}$ (soft start)	No overshoot of $V_{out}$ (soft start)	No overshoot of $V_{out}$ (soft start)	No overshoot of $V_{out}$ (soft start)	No overshoot of $V_{out}$ (soft start)
Starting delay/voltage rise	< 3 s/typ. 60 ms	< 3 s (typ. 7 ms)/typ. 5 ms	< 2 s/typ. 60 ms	< 3 s/typ. 100 ms	< 1.5 s/typ. 80 ms
Rated current $I_{out\ rated}$	2 A	2 A (3 A with $V_{in} > 24\text{ V}$ )	5 A	5 A	10 A
Current range					
• Up to +45 °C	0 ... 2 A	0 ... 2 A (3 A)	0 ... 5 A	0 ... 5 A	0 ... 10 A
• Up to +60 °C	0 ... 2 A	0 ... 3 A (3 A)	0 ... 5 A	0 ... 5 A	0 ... 10 A
Dyn. V/I with					
• Starting on short circuit	typ. 10 A for 90 ms	typ. 9 A for 270 ms	typ. 20 A for 75 ms	typ. 20 A for 180 ms	typ. 35 A for 80 ms
• Short-circuit in operation	typ. 10 A for 90 ms	typ. 9 A for 270 ms	typ. 20 A for 75 ms	typ. 20 A for 80 ms	typ. 35 A for 150 ms
Parallel connection for increased output	Not permissible	Yes, 2 units	Not permissible	Not permissible	Not permissible
<b>Efficiency</b>					
Efficiency at $V_{out\ rated}$ , $I_{out\ rated}$	Approx. 83 %	Approx. 75 %	Approx. 87 %	Approx. 84 %	Approx. 87 %
Power loss at $V_{out\ rated}$ , $I_{out\ rated}$	Approx. 10 W	Approx. 16 W (24 W)	Approx. 18 W	Approx. 23 W	Approx. 34 W
<b>Control</b>					
Dyn. mains compensation ( $V_{in\ rated} \pm 15\%$ )	± 0.3 % $V_{out}$	± 0.3 % $V_{out}$	± 0.3 % $V_{out}$	± 0.3 % $V_{out}$	± 0.3 % $V_{out}$
Dyn. load compensation ( $I_{out}$ : 50/100/50 %)	± 0.8 % $V_{out}$	± 2.5 % $V_{out}$	± 2.5 % $V_{out}$	± 3 % $V_{out}$	± 2.5 % $V_{out}$
Settling time					
• Load step from 50 to 100 %	< 5 ms (typ. 2.5 ms)	< 5 ms (typ. 2.5 ms)	typ. 0.1 ms	< 5 ms (typ. 0.2 ms)	< 5 ms
• Load step from 100 to 50 %	< 5 ms (typ. 2.5 ms)	< 5 ms (typ. 2.5 ms)	typ. 0.1 ms	< 5 ms (typ. 0.2 ms)	< 5 ms
<b>Protection and monitoring</b>					
Output overvoltage protection	Additional control loop, shutdown at approx. 30 V, automatic restart	Additional control loop, shutdown at approx. 30 V, automatic restart	Additional control loop, shutdown at approx. 30 V, automatic restart	Additional control loop, shutdown at approx. 30 V, automatic restart	Additional control loop, shutdown at approx. 30 V, automatic restart
Current limitation	2.2 ... 2.6 A	3.3 ... 3.9 A	5.5 ... 6.5 A	5.5 ... 6.5 A	11 ... 12 A
Short-circuit protection	Electronic shutdown, automatic restart	Electronic shutdown, automatic restart	Electronic shutdown, automatic restart	Electronic shutdown, automatic restart	Electronic shutdown, automatic restart
RMS sustained short-circuit current	< 4 A	< 2 A	< 9 A	< 5 A	< 10 A
Overload/short-circuit indicator	-	-	-	-	-

1) SIPLUS module for temperature range -25 ... +60°C and use under medial load (e.g. sulphur chloride atmosphere). This SIPLUS power supply conforms with standards for electronic equipment used on rolling stock (EN 50155, temperature T1, category 1).

#### Technical specifications (continued)

Power supply, type	2 A	2 A	5 A	5 A	10 A
Order No.	6ES7 307-1BA00-0AA0	6ES7 305-1BA80-0AA0	6ES7 307-1EA00-0AA0	6ES7 307-1EA80-0AA0	6ES7 307-1KA01-0AA0
Order No. SIPLUS		6AG1 305-1BA80-2AA0 <sup>1)</sup>		6AG1 307-1EA80-2AA0 <sup>1)</sup>	
<b>Safety</b>					
Electrical isolation primary/secondary	Yes, SELV output voltage $V_{out}$ acc. to EN 60950 and EN 50178	Yes, safety extra-low output voltage $V_{out}$ to EN 60950 and EN 50178, creepages and clearances > 5 mm	Yes, SELV output voltage $V_{out}$ acc. to EN 60950 and EN 50178	Yes, safety extra-low output voltage $V_{out}$ to EN 60950 and EN 50178, creepages and clearances > 8 mm	Yes, SELV output voltage $V_{out}$ acc. to EN 60950 and EN 50178
Protective class	Class I	Class I	Class I	Class I	Class I
Discharge current	< 3.5 mA (typ. 0.7 mA)	< 3.5 mA (typ. 0.7 mA)	< 3.5 mA (typ. 0.3 mA)	< 3.5 mA (typ. 0.3 mA)	< 3.5 mA (typ. 0.5 mA)
TÜV test	Yes	Yes	Yes	Yes	Yes
CE marking	Yes	Yes	Yes	Yes	Yes
UL/cUL (CSA) approval	Yes, UL listed (UL 508), File E143289, CSA (CSA 22.2 No. 14-95)	Yes, UL-listed (UL 508), file E143289, CSA (CSA22.2 no. 14-95)	Yes, UL listed (UL 508), File E143289, CSA (CSA 22.2 No. 14-95)	Yes, UL-listed (UL 508), file E143289, CSA (CSA22.2 no. 14-95)	Yes, UL listed (UL 508), File E143289, CSA (CSA 22.2 No. 14-95)
FM approval	Yes, Class I Div. 2 Group A, B, C, D, T4	-	Yes, Class I Div. 2 Group A, B, C, D, T4	-	Yes, Class I Div. 2, A, B, C, D, T4
Apr. for use in marine vessels	in the S7-300 system	Yes, GL, LRS	in the S7-300 system	Yes, GL, LRS	in the S7-300 system
Degree of protection (EN 60529)	IP20	IP20	IP20	IP20	IP20
<b>EMC</b>					
Interference emission	EN 55022 Class B	EN 55011 Class A	EN 55022 Class B	EN 55011 Class A	EN 55022 Class B
Line harmonics limitation	Not applicable	Not applicable	EN 61000-3-2	-	EN 61000-3-2
Interference immunity	EN 61000-6-2	EN 61000-6-2	EN 61000-6-2	EN 61000-6-2	EN 61000-6-2
<b>Operating specifications</b>					
Ambient temperature range	0 ... +60 °C with natural convection	-25°C ... +70°C with natural convection	0 ... +60 °C with natural convection	-25°C ... +70°C with natural convection	0 ... +60°C with natural convection
Transportation and storage temperature range	-40 ... +85 °C	- 40 ... + 85 °C	-40 ... +85 °C	- 40 ... + 85 °C	-40 ... +85 °C
Humidity rating	Climatic class 3K3 acc. to EN 60721, no condensation	Climate class 3K5 to EN 60721, transient condensation permitted	Climatic class 3K3 acc. to EN 60721, no condensation	Climate class 3K5 to EN 60721, transient condensation permitted	Climatic class 3K3 acc. to EN 60721, no condensation
<b>Mechanical specifications</b>					
Connections					
• (Mains input L, N, PE (DC input: L+1, M1, PE)	One screw-type terminal each for 0.5 to 2.5 mm <sup>2</sup> single-core/finely stranded	Solid/finely-stranded per screw-type terminal for 0.5 mm to 2.5 mm <sup>2</sup>	One screw-type terminal each for 0.5 to 2.5 mm <sup>2</sup> single-core/finely stranded	Solid/finely-stranded per screw-type terminal for 0.5 mm to 2.5 mm <sup>2</sup>	One screw-type terminal each for 0.5 to 2.5 mm <sup>2</sup> single-core/finely stranded
• (Output L+	2 screw-type terminals for 0.5 to 2.5 mm <sup>2</sup>	3 screw-type terminals for 0.5 mm to 2.5 mm <sup>2</sup>	3 screw-type terminals for 0.5 to 2.5 mm <sup>2</sup>	3 screw-type terminals for 0.5 mm to 2.5 mm <sup>2</sup>	4 screw-type terminals for 0.5 to 2.5 mm <sup>2</sup>
• (Output M	2 screw-type terminals for 0.5 to 2.5 mm <sup>2</sup>	3 screw-type terminals for 0.5 mm to 5 mm <sup>2</sup>	3 screw-type terminals for 0.5 to 2.5 mm <sup>2</sup>	3 screw-type terminals for 0.5 mm to 2.5 mm <sup>2</sup>	4 screw-type terminals for 0.5 to 2.5 mm <sup>2</sup>
Dimensions (W x H x D) in mm	50 x 125 x 120	80 x 125 x 120	80 x 125 x 120	80 x 125 x 120	120 x 125 x 120 <sup>1)</sup>
Weight approx.	0.42 kg	0.75 kg	0.74 kg	0.57 kg	1.1 kg
Mounting	Snap-mounting on S7 rail	Snaps onto S7 bus-bar	Snap-mounting on S7 rail	Snaps onto S7 bus-bar	Snap-mounting on S7 rail <sup>1)</sup>
<b>Accessories</b>					
	Mounting adapter for DIN rail and PS-CPU power connector	Mounting adapter for DIN rail and PS-CPU power connector	Mounting adapter for DIN rail and power connector	Mounting adapter for DIN rail and PS-CPU power connector	Mounting adapter for DIN rail and PS-CPU power connector

1) SIPLUS module for temperature range -25 ... +60°C and use under medial load (e.g. sulphur chloride atmosphere). This SIPLUS power supply conforms with standards for electronic equipment used on rolling stock (EN 50155, temperature T1, category 1).

# ET 200 distributed I/Os

## ET 200M – Power Supplies

### 2 A, 5 A, 10 A load power supplies

#### Ordering data

##### PS 305/307 load power supply

incl. power connector

- 120/230 V AC / 24 V DC; 2 A
- 24 ... 110 V DC / 24 V DC; 2 A, for extended temperature range
- 120/230 V AC / 24 V DC; 5 A
- 120/230 V AC / 24 V DC; 5 A, for extended temperature range
- 120/230 V AC / 24 V DC; 10 A

#### Order No.

**6ES7 307-1BA00-0AA0**

**6ES7 305-1BA80-0AA0**

**6ES7 307-1EA00-0AA0**

**6ES7 307-1EA80-0AA0**

**6ES7 307-1KA01-0AA0**

##### SIPLUS load power supply PS 305/307

for temperature range -25 ... +60 °C and use under medial load (e.g. sulphur chloride atmosphere). Conforms with standard for electronic equipment used on rolling stock (EN 50155, temperature T1, category 1).

- 24 ... 110 V DC / 24 V DC; 2 A
- 120/230 V AC / 24 V DC; 5 A

#### Order No.

**6AG1 305-1BA80-2AA0**

**6AG1 307-1EA80-2AA0**

##### Installation adapter

For snapping the PS 307 onto a 35 mm DIN rail (EN 50022)

**6ES7 390-6BA00-0AA0**

##### PS-CPU power connector

Spare part

**6ES7 390-7BA00-0AA0**

### Overview



- Compact, cost-effective I/O devices for processing digital signals
- Design without control cabinet with degree of protection IP65/67 with flexible and fast connections
- Comprises a basic module and various connection blocks for application-specific implementation options:
  - ECOFAST: 2 x RS 485 hybrid fieldbus connection with identification plug for setting the PROFIBUS address
  - M12: 2 x M12 and 2 x 7/8" with 2 rotary coding switches for assigning the PROFIBUS address
- Connection block contains T-functionality for bus and power supply so that during commissioning and service, the modules can be disconnected from and reconnected to the PROFIBUS without interruption
- Module variance: 8DI, 16DI, 8DI/8DO (1.3 A), 8DI/8DO (2.0 A), 8DO (2.0 A), 16DO (0.5 A)
- Transmission rates up to 12 Mbit/s
- Fail-safe DI modules 4/8 F-DI with safety-related signal processing according to PROFIsafe

### Technical specifications

	6ES7 141-3BF00-0XA0	6ES7 141-3BH00-0XA0	6ES7 148-3FA00-0XB0
<b>Supply voltages</b>			
Supply voltage of electronics 1L+			
• Rated value (DC)	24 V	24 V	24 V
• reverse polarity protection	Yes	Yes	No
<b>Current consumption</b>			
from supply voltage 1L+, max.	70 mA; typically	70 mA; typically	100 mA
Power loss, typ.	2.4 W	3.6 W	3 W
<b>FH technology</b>			
Module for fail-safe applications			Yes
<b>Protocols</b>			
PROFIBUS DP protocol	Yes	Yes	Yes
<b>PROFIBUS DP</b>			
Transmission speed, max.	12 Mbit/s; 9.6 / 19.2 / 45.45 / 93.75 / 187.5 / 500 kBaud 1.5 / 3 / 6 / 12 Mbaud	12 Mbit/s; 9.6 / 19.2 / 45.45 / 93.75 / 187.5 / 500 kBaud 1.5 / 3 / 6 / 12 Mbaud	12 Mbit/s
<b>Digital inputs</b>			
Number of digital inputs	8	16	8; 8 single channel, 4 two-channel
Number of simultaneously controllable inputs	8; all mounting positions up to 55 °C	16; all mounting positions up to 55 °C	8; 8 single channel, 4 two-channel
Cable length			
• Cable length unshielded, max.	30 m	30 m	30 m
Input characteristic curve to IEC 1131, Typ 1			
Input voltage	Yes	Yes	Yes
• Rated value, DC	24 V	24 V	24 V
• for signal "0"	-3 to 5 V	-3 to 5 V	-30V to 5 V
• for signal "1"	13 to 30 V	13 to 30 V	15 to 30 V
Input current			
• for signal "1", typ.	7 mA	7 mA	3.7 mA
Input delay (for rated value of input voltage)			
• for standard inputs			
- at "0" to "1", max.	3 ms; typ.	3 ms; typ.	
- at "1" to "0", max.	3 ms; typically	3 ms; typically	

# ET 200 distributed I/Os

## ET 200eco

### Technical specifications (continued)

	6ES7 141-3BF00-0XA0	6ES7 141-3BH00-0XA0	6ES7 148-3FA00-0XB0
<b>Encoder supply</b>			
Number of outputs	8	8	2
Output voltage	24 V DC	24 V DC	min. L+ (-1.5V)
Output current, rated value	1 A; Aggregate current up to 55 °C	1 A; Aggregate current up to 55 °C	300 mA
Short-circuit protection	Yes; electronic	Yes; electronic	Yes
<b>Encoder</b>			
Connectable encoders			
• 2-wire Beros	Yes	Yes	No
• permissible quiescent current (2-wire Beros), max.	1.5 mA	1.5 mA	
<b>Status information/alarms/diagnostics</b>			
Status indicator	Yes	Yes	
Alarms			
• Alarms	No	No	
Diagnoses			
• Diagnostics	Yes; Diagnostic information readable	Yes; Diagnostic information readable	
Diagnostics indication LED			
• Collective error SF (red)	Yes	Yes	Yes
• Status indicator digital input (green)	Yes	Yes	Yes
• Channel error indicator F (red)	No	No	No
<b>Isolation</b>			
Isolation checked with	500 V DC	500 V DC	350 V AC/ 1min
<b>Isolation</b>			
between PROFIBUS DP all other circuits	Yes	Yes	Yes
Galvanic isolation, digital inputs			
• between the channels	No	No	No
<b>Permissible potential difference</b>			
between different circuits	500 V DC	500 V DC	500 V DC
<b>Standards, approvals, certificates</b>			
Highest safety class achievable in safety mode			
• to EN 954			Cat.3 (one-channel), Cat.4 (two-channel)
• to IEC 61508			SIL 2 (one channel), SIL 3 (two channel)
<b>General information</b>			
Vendor identification (VendorID)	80DBh	80DAh	
<b>Dimensions and weight</b>			
Width	60 mm	60 mm	60 mm
Height	210 mm	210 mm	210 mm
Depth	28 mm	28 mm	28 mm
<b>Weights</b>			
Weight, approx.	210 g	210 g	220 g

### Technical specifications (continued)

	6ES7 142-3BF00-0XA0	6ES7 142-3BH00-0XA0
<b>Supply voltages</b>		
Supply voltage of electronics 1L+		
• Rated value (DC)	24 V	24 V
• reverse polarity protection	Yes	Yes
<b>Voltages and currents</b>		
Load voltage 2L+		
• Rated value (DC)	24 V	24 V
• Reverse polarity protection	Yes	Yes
<b>Current consumption</b>		
from load voltage 2L+ (without load), max.	60 mA; typically	80 mA; typically
from supply voltage 1L+, max.	70 mA; typically	70 mA; typically
Power loss, typ.	4 W	4 W
<b>Protocols</b>		
PROFIBUS DP protocol	Yes	Yes
<b>PROFIBUS DP</b>		
Transmission speed, max.	12 Mbit/s; 9.6 / 19.2 / 45.45 / 93.75 / 187.5 / 500 kBaud 1.5 / 3 / 6 / 12 Mbaud	12 Mbit/s; 9.6 / 19.2 / 45.45 / 93.75 / 187.5 / 500 kBaud 1.5 / 3 / 6 / 12 Mbaud
<b>Digital outputs</b>		
Number of digital outputs	8	16
Cable length unshielded, max.	30 m	30 m
Short-circuit protection of the output	Yes; electronic	Yes; electronic
• Response threshold, typ.	4 A (per channel)	1.4 A (per channel)
Limitation of inductive shutdown voltage to	2L+ (-44 V)	2L+ (-47 V)
Lamp load, max.	10 W	5 W
Controlling a digital input	Yes	Yes
Output voltage		
• for signal "1", min.	2L+ (- 0.8 V)	2L+ (- 0.8 V)
Output current		
• for signal "1" rated value	2 A	0.5 A
• for signal "1" permissible range for 0 to 55 °C, min.	5 mA	5 mA
• for signal "1" permissible range for 0 to 55 °C, max.	2.4 A	1 A
• for signal "0" residual current, max.	0.5 mA	0.1 mA
Parallel switching of 2 outputs		
• for increased power	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; to IEC 947-5-1, DC13	0.5 Hz; to IEC 947-5-1, DC13
• on lamp load, max.	1 Hz	1 Hz

	6ES7 142-3BF00-0XA0	6ES7 142-3BH00-0XA0
Aggregate current of the outputs (per group)		
• up to 55 °C, max.	4 A; 4 A each for sockets X1, X3, X5, X7, 4 A each for X2, X4, X6, X8; note the current carrying capacity of the cable	4 A; Please note the current carrying capacity of the cable.
Load impedance range		
• lower limit	12 Ω	12 Ω
• upper limit	4 kΩ	4 kΩ
<b>Status information/alarms/ diagnostics</b>		
Status indicator	Yes	Yes
Alarms		
• Alarms	No	No
Diagnoses		
• Diagnostics	Yes; Diagnostic information readable	Yes; Diagnostic information readable
Diagnoses indication LED		
• Collective error SF (red)	Yes	Yes
• Status indicator digital output (green)	Yes	Yes
• Channel error indicator F (red)	No	No
<b>Isolation</b>		
Isolation checked with	500 V DC	500 V DC
<b>Isolation</b>		
between PROFIBUS DP all other circuits	Yes	Yes
Isolation, digital outputs		
• between the channels	No	No
<b>Permissible potential difference</b>		
between different circuits	500 V DC	500 V DC
<b>General information</b>		
Vendor identification (VendorID)	80DDh	80FBh
<b>Dimensions and weight</b>		
Width	60 mm	60 mm
Height	210 mm	210 mm
Depth	28 mm	28 mm
<b>Weights</b>		
Weight, approx.	210 g	210 g

### Technical specifications (continued)

	6ES7 143-3BH00-0XA0	6ES7 143-3BH10-0XA0
<b>Supply voltages</b>		
Supply voltage of electronics 1L+		
• Rated value (DC)	24 V	24 V
• reverse polarity protection	No	Yes
<b>Voltages and currents</b>		
Load voltage 2L+		
• Rated value (DC)	24 V	24 V
• Reverse polarity protection	No	Yes
<b>Current consumption</b>		
from load voltage 2L+ (without load), max.	60 mA; typically	60 mA; typically
from supply voltage 1L+, max.	70 mA; typically	70 mA; typically
Power loss, typ.	5 W	5 W
<b>Protocols</b>		
PROFIBUS DP protocol	Yes	Yes
<b>PROFIBUS DP</b>		
Transmission speed, max.	12 Mbit/s; 9.6 / 19.2 / 45.45 / 93.75 / 187.5 / 500 kBaud 1.5 / 3 / 6 / 12 Mbaud	12 Mbit/s; 9.6 / 19.2 / 45.45 / 93.75 / 187.5 / 500 kBaud 1.5 / 3 / 6 / 12 Mbaud
<b>Digital inputs</b>		
Number of digital inputs	8	8
Number of simultaneously controllable inputs	8; all mounting positions up to 55 °C	8; all mounting positions up to 55 °C
Input characteristic curve to IEC 1131, Typ 1	Yes	Yes
Input voltage		
• Rated value, DC	24 V	24 V
• for signal "0"	-3 to 5 V	-3 to 5 V
• for signal "1"	13 to 30 V	13 to 30 V
Input current		
• for signal "1", typ.	7 mA	7 mA
Input delay (for rated value of input voltage)		
• for standard inputs		
- at "0" to "1", max.	3 ms; typ.	3 ms; typ.
- at "1" to "0", max.	3 ms; typically	3 ms; typically

	6ES7 143-3BH00-0XA0	6ES7 143-3BH10-0XA0
<b>Digital outputs</b>		
Number of digital outputs	8	8
Cable length unshielded, max.	30 m	30 m
Short-circuit protection of the output	Yes; electronic	Yes; electronic
• Response threshold, typ.	4 A per channel	4 A per channel
Limitation of inductive shutdown voltage to	2L+ (-44 V)	2L+ (-44 V)
Lamp load, max.	10 W	10 W
Controlling a digital input	Yes	Yes
Output voltage		
• for signal "1", min.	2L+ (- 0.8 V)	2L+ (-1.2 V)
Output current		
• for signal "1" rated value	2 A	1.3 A
• for signal "1" permissible range for 0 to 55 °C, min.	5 mA	5 mA
• for signal "1" permissible range for 0 to 55 °C, max.	2.4 A	1.8 A
• for signal "0" residual current, max.	0.5 mA	0.5 mA
Parallel switching of 2 outputs		
• for increased power	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; to IEC 947-5-1, DC13	0.5 Hz; to IEC 947-5-1, DC13
• on lamp load, max.	1 Hz	1 Hz
Aggregate current of the outputs (per group)		
• up to 55 °C, max.	4 A; 4 A each for sockets X1, X3, X5, X7 and 4 A each for sockets X2, X4, X6, X8; note the current carrying capacity of the cable	5.2 A; Please note the current carrying capacity of the cable.
Load impedance range		
• lower limit	12 Ω	12 Ω
• upper limit	4 kΩ	4 kΩ

### Technical specifications (continued)

	6ES7 143-3BH00-0XA0	6ES7 143-3BH10-0XA0
<b>Encoder supply</b>		
Number of outputs	8	8
Output voltage	24 V DC	
Output current, rated value	0.75 A; up to 55°C max. 0.75 A (summation current)	1 A; up to 55°C max. 1 A (summation current)
Short-circuit protection	Yes; electronic	Yes; electronic
<b>Encoder</b>		
Connectable encoders		
• 2-wire BEROS	Yes	Yes
• permissible quiescent current (2-wire BEROS), max.	1.5 mA	1.5 mA
<b>Status information/alarms/diagnostics</b>		
Status indicator	Yes	Yes
Alarms		
• Alarms	No	No
Diagnoses		
• Diagnostics	Yes; Diagnostic information readable	Yes; Diagnostic information readable
Diagnostics indication LED		
• Collective error SF (red)	Yes	Yes
• Status indicator digital output (green)	Yes	Yes
• Status indicator digital input (green)	Yes	Yes
• Channel error indicator F (red)	No	No

	6ES7 143-3BH00-0XA0	6ES7 143-3BH10-0XA0
<b>Isolation</b>		
Isolation checked with	500 V DC	500 V DC
<b>Isolation</b>		
between PROFIBUS DP all other circuits	Yes	Yes
Isolation, digital outputs		
• between the channels	No	No
Galvanic isolation, digital inputs		
• between the channels	No	No
<b>Permissible potential difference</b>		
between different circuits	500 V DC	500 V DC
<b>General information</b>		
Vendor identification (VendorID)	80DCh	80FCh
<b>Dimensions and weight</b>		
Width	60 mm	60 mm
Height	210 mm	210 mm
Depth	28 mm	28 mm
<b>Weights</b>		
Weight, approx.	210 g	210 g
	6ES7 194-3AA00-0AA0	6ES7 194-3AA00-0BA0
<b>Current consumption</b>		
Power loss, typ.	2 W	2 W
<b>Dimensions and weight</b>		
Width	79 mm	79 mm
Height	60 mm	60 mm
Depth	30 mm	29 mm
<b>Weights</b>		
Weight, approx.	313 g	392 g

# ET 200 distributed I/Os

## ET 200eco

Ordering data	Order No.	Order No.
<b>ET 200eco BM 141 basic module</b> <ul style="list-style-type: none"> <li>• 8 DI 24 V DC 8 x M12, single assignment, degree of protection IP65/67 connection block 6ES7194-3AA00-0.A0 to be ordered separately</li> <li>• 16 DI 24 V DC 8 x M12, dual assignment, degree of protection IP65/67 connection block 6ES7194-3AA00-0.A0 to be ordered separately</li> </ul>	<b>6ES7 141-3BF00-0XA0</b>  <b>6ES7 141-3BH00-0XA0</b>	<b>Accessories</b>  <b>F programming tool "Distributed Safety" V5.4</b> Floating license for one user, with three-language documentation (German, English, French), on CD, executes as of STEP 7 V5.3 SP3  <b>F programming tool "Distributed Safety" upgrade from V5.x to V5.4</b>  <b>F programming tool "Distributed Safety"</b>
<b>ET 200eco BM 142 basic module</b> <ul style="list-style-type: none"> <li>• 8 DO 24 V DC/ 1.2 A 8 x M12, single assignment, degree of protection IP65/67 connection block 6ES7194-3AA00-0.A0 to be ordered separately</li> <li>• 16 DO 24 V DC/0.5 A 8 x M12, dual assignment degree of protection IP65/67; Connection block 6ES7 194-3AA00-0.A0 to be ordered separately</li> </ul>	<b>6ES7 142-3BF00-0XA0</b>  <b>6ES7 142-3BH00-0XA0</b>	<b>6ES7 833-1FC02-0YA5</b>  <b>6ES7 833-1FC02-0YE5</b>  <b>6ES7 833-1FC02-0YX2</b>
<b>ET 200eco BM 143 basic module</b> <ul style="list-style-type: none"> <li>• 8 DI/8 DO, 2 A; 8 x M12, IP65/67 connection block 6ES7194-3AA00-0.A0 to be ordered separately</li> <li>• 8 DI/8 DO, 1.3 A; 8 x M12, dual assignment, degree of protection IP65/67 connection block 6ES7 194-3AA00-0.A0 to be ordered separately</li> </ul>	<b>6ES7 143-3BH00-0XA0</b>  <b>6ES7 143-3BH10-0XA0</b>	<b>Inscription labels</b> <b>3RT1 900-1SB20</b>  <b>Module description "ET 200eco distributed I/O device" except F-DI</b> Paper <ul style="list-style-type: none"> <li>• German <b>6ES7 198-8GA00-8AA0</b></li> <li>• English <b>6ES7 198-8GA00-8BA0</b></li> <li>• French <b>6ES7 198-8GA00-8CA0</b></li> </ul>
<b>ET 200eco BM 148 basic module</b> <ul style="list-style-type: none"> <li>• 4/8 F-DI, 8 x M12, connection block 6ES7194-3AA00-0.A0 to be ordered separately</li> </ul>	<b>6ES7 148-3FA00-0XBO</b>	<b>PROFIBUS ECOFAST Hybrid cable – Cu</b> See ECOFAST bus cables  <b>PROFIBUS ECOFAST Terminating plug</b> ECOFAST terminating resistor for PROFIBUS DP <ul style="list-style-type: none"> <li>• 1 package = 1 item <b>6GK1 905-0DA10</b></li> <li>• 1 package = 5 items <b>6GK1 905-0DA00</b></li> </ul>
<b>ECOFAST connection block</b> For ET 200eco, 2 x ECOFAST connection RS 485 identification plug for PROFIBUS DP, address setting	<b>6ES7 194-3AA00-0AA0</b>	<b>M12 sealing caps</b> For covering input or output sockets <b>3RX9 802-0AA00</b>
<b>M12 connection block, 7/8"</b> For ET 200eco, 2 x M12 and 2 x 7/8" 2 rotary coding switches for PROFIBUS DP, address setting	<b>6ES7 194-3AA00-0BA0</b>	

Ordering data	Order No.	Order No.	
<b>Accessories for M12, 7/8" connecting block</b>		<b>Accessories for M12, 7/8" connecting block</b> (continued)	
<b>PROFIBUS M12 connecting cable</b> 2-core (inverse coded) pre-assembled with M12 plugs in various lengths: <ul style="list-style-type: none"> <li>• 0.3 m</li> <li>• 0.5 m</li> <li>• 1.0 m</li> <li>• 1.5 m</li> <li>• 2.0 m</li> <li>• 3.0 m</li> <li>• 5.0 m</li> <li>• 10.0 m</li> <li>• 15.0 m</li> </ul>	6XV1 830-3DE30 6XV1 830-3DE50 6XV1 830-3DH10 6XV1 830-3DH15 6XV1 830-3DH20 6XV1 830-3DH30 6XV1 830-3DH50 6XV1 830-3DN10 6XV1 830-3DN15	<b>PROFIBUS M12 plug connector</b> 1 pack = 5 items <ul style="list-style-type: none"> <li>• Connector insert</li> <li>• Socket insert</li> </ul>	6GK1 905-0EA00 6GK1 905-0EB00
<b>SIMATIC NET Energy Cable</b> 5-core power cable, 5 x 1.5 mm <sup>2</sup> conductors, can be trailed <ul style="list-style-type: none"> <li>• Sold by the meter,                              minimum length = 20 m</li> </ul>	6XV1 830-8AH10	<b>7/8" cable connector</b> 1 pack = 5 pieces <ul style="list-style-type: none"> <li>• Male insert</li> <li>• Female insert</li> </ul>	6GK1 905-0FA00 6GK1 905-0FB00
<b>PROFIBUS M12 bus terminating connector</b> For PROFIBUS DP, 1 pack = 5 pieces	6GK1 905-0EC00	<b>7/8" sealing caps</b> 1 pack = 10 items	6ES7 194-3JA00-0AA0
<b>7/8" connecting cable for power supply</b> 5-core pre-assembled with 7/8" plugs in various lengths: <ul style="list-style-type: none"> <li>• 0.3 m</li> <li>• 0.5 m</li> <li>• 1.0 m</li> <li>• 1.5 m</li> <li>• 2.0 m</li> <li>• 3.0 m</li> <li>• 5.0 m</li> <li>• 10.0 m</li> <li>• 15.0 m</li> </ul>	6XV1 822-5BE30 6XV1 822-5BE50 6XV1 822-5BH10 6XV1 822-5BH15 6XV1 822-5BH20 6XV1 822-5BH30 6XV1 822-5BH50 6XV1 822-5BN10 6XV1 822-5BN15	<b>M12 Y-coupler plug</b> For dual connection of sensors using single cable, 5-pole; not used with F-DI4/8	6ES7 194-1KA01-0XA0
		<b>M12 coupler plug</b> For connecting actuators and sensors, 5-pole	3RX1 667
		<b>M12 angular coupler plug</b> For connecting actuators and sensors, 5-pole	3RX1 668
		<b>S7 Manual Collection</b> Electronic manuals on CD, 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)	6ES7 998-8XC01-8YE0
		<b>S7 Manual Collection –                      Update service for one year</b> Scope of supply: Current S7 Manual Collection CD as well as the subsequent three updates	6ES7 998-8XC01-8YE2

### Overview



- Distributed I/O to the degree of protection IP65
- Die-cast aluminum housing
- Integrated repeater
- Parameterizable inputs/ outputs: 8 DI/8 DO up to 16 DI
- Terminal strip at rear for connecting up analog signals for welding transformers
- Connection through hybrid line to 17-pin M23 connector

### Technical specifications

	6ES7 143-2BH00-0AB0	6ES7 143-2BH50-0AB0
<b>Supply voltages</b>		
Rated value		
• DC 24 V	Yes; -15 / +20 %	Yes; -15 / +20 %
• permissible range, lower limit (DC)	20.4 V	20.4 V
• permissible range, upper limit (DC)	28.8 V	28.8 V
• Reverse polarity protection	Yes; also electronic protection	Yes; also electronic protection
<b>Connection point</b>		
Bus cables	Bus and voltage: X01/X02: 2 x M23 (17-pin)	Bus and voltage: X01/X02: 2 x M23 (17-pin)
Inputs/outputs	8 x 5-pin plug M12x1	8 x 5-pin plug M12x1
<b>Protocols</b>		
PROFIBUS DP protocol	Yes; Run-up time at 12 Mbaud: about 80 ms	Yes
<b>PROFIBUS DP</b>		
Cable length, max.	30 m; per chain, shielded	30 m; per chain, shielded
<b>Digital inputs</b>		
Number of digital inputs	8; 16 process channels, 8 DI fixed, 8 DI/DO parameterizable	8; 16 process channels, 8 DI fixed, 8 DI/DO parameterizable
Cable length		
• Cable length unshielded, max.	10 m; for signal lines	10 m; for signal lines
Input characteristic curve to IEC 1131, Typ 2	Yes	Yes
Input voltage		
• for signal "0"	-3 to 5 V	-3 to 5 V
• for signal "1"	15 to 30 V	15 to 30 V
Input current		
• for signal "1", typ.	7 mA	7 mA

	6ES7 143-2BH00-0AB0	6ES7 143-2BH50-0AB0
Input delay (for rated value of input voltage)		
• for standard inputs - at "0" to "1", max.	3 ms; typ.	3 ms; typ.
<b>Digital outputs</b>		
Number of digital outputs	8; 16 process channels, 8 DI fixed, 8 DI/DO parameterizable	8; 16 process channels, 8 DI fixed, 8 DI/DO parameterizable
Cable length unshielded, max.	10 m	10 m
Short-circuit protection of the output	Yes; electronic	Yes; electronic
Output current		
• for signal "1" permissible range for 0 to 55 °C., max.	0.5 A	0.5 A
Switching frequency		
• with resistive load, max.	100 Hz	100 Hz
Aggregate current of the outputs (per group)		
• up to 55 °C, max.	2 A	2 A
<b>Encoder supply</b>		
Number of outputs	8	8
Output current, rated value	0.5 A; 8 channels each	0.5 A; 8 channels each
<b>Encoder</b>		
Connectable encoders		
• 2-wire Beros	Yes	Yes
<b>Status information/alarms/diagnostics</b>		
Diagnoses		
• Diagnostic functions	Yes; Diagnostic frames	Yes; Diagnostic frames
• Short circuit	Yes; (Digital outputs) per group - X0 to X1 or X2 to X3	Yes; (Digital outputs) per group - X0 to X1 or X2 to X3
• Short circuit encoder supply	Yes; per group X0 to X3 or X4 to X7	Yes; per group X0 to X3 or X4 to X7
• missing load voltage	Yes	Yes

### Technical specifications (continued)

	6ES7 143-2BH00-0AB0	6ES7 143-2BH50-0AB0
<b>Diagnostics indication LED</b>		
• Description	Channel 01, Channel 02	Channel 01, Channel 02
• Bus error BF (red)	Yes	Yes
• Rated load voltage PWR (green)	Yes; 24 V DC (load voltage) US2	Yes; 24 V DC (load voltage) US2
• Collective error SF (red)	Yes	Yes
• Status indicator digital output (green)	Yes	Yes
• Status indicator digital input (green)	Yes	Yes
• Monitoring 24 V voltage supply ON (green)	Yes; (Logic circuits/encoder voltage) US1	Yes; (Logic circuits/encoder voltage) US1
<b>Environmental requirements</b>		
Operating temperature		
• max.	55 °C	55 °C
Degree and class of protection		
• IP 65	Yes	Yes
<b>Standards, approvals, certificates</b>		
CE symbol	Yes	Yes
CSA approval	Yes; ES 02 or higher	Yes
UL Approval	Yes; ES 02 or higher	Yes
<b>General information</b>		
Housing	Die-cast aluminum	Die-cast aluminum
<b>Dimensions and weight</b>		
Width	54 mm	54 mm
Height	55 mm; 64 mm incl. overall plug height	55 mm; 64 mm incl. overall plug height
Length	150 mm	150 mm
<b>Weights</b>		
Weight, approx.	780 g	780 g

### Ordering data

### Order No.

<b>ET 200R handling module IP65</b> metal casing 8 DI + 8 DI/DO, configurable; 24 V DC, 5-pole, 8 x M12, 2 x M23 (DP, PS, analog)	<b>6ES7 143-2BH00-0AB0</b>
<b>ET 200R welding module IP65</b> metal casing 8 DI + 8 DI/DO, configurable; 24 V DC, 5-pole, 8 x M12, 2 x M23 (DP, PS, analog)	<b>6ES7 143-2BH50-0AB0</b>
<b>Accessories</b>	
<b>ELOCAB cables</b>	Can be ordered at: ELOCAB Sonderkabel Obere Lerch 34 D-91166 Georgensmünd, Germany Tel.: ++49 (0) 91 72 69 80-0 Fax: ++49 (0) 91 72 20 29
<b>Interconnectron M23 connector</b>	Can be ordered at: Hypertac GmbH Auwiesenstr. 5, PO Box 14 65 D-94454 Deggendorf, Germany
<b>S7 manual collection</b> Electronic manuals on CD, 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)	<b>6ES7 998-8XC01-8YE0</b>
<b>S7 Manual Collection update service for 1 year</b> Scope of supply: Up-to-date CD S7 Manual Collection as well as the three subsequent updates	<b>6ES7 998-8XC01-8YE2</b>

