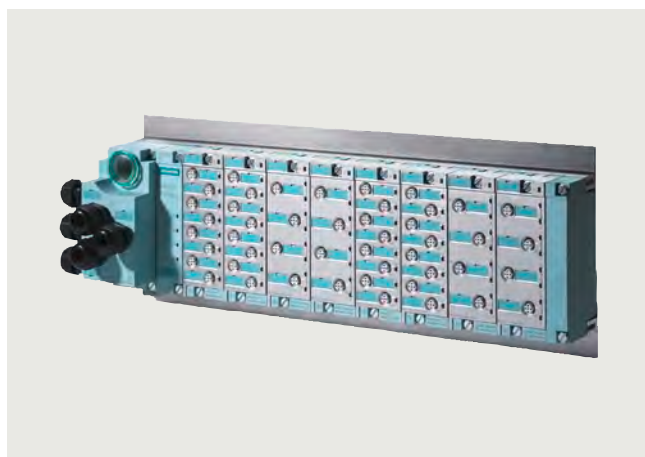


Overview



SIMATIC ET 200pro video
https://players.brightcove.net/1813624294001/70fecf0f-fbad-4fad-a077-d0e26af4d84c_default/index.html?videoId=6187716010001



- SIMATIC ET 200pro distributed I/O system with IP65/67 degree of protection for cabinet-free use at the machine
- Small, multifunctional complete solution: Digital inputs/outputs, fail-safe modules, motor starters up to 5.5 kW, etc.
- Communication over PROFIBUS or PROFINET
- Mixed arrangement of fail-safe and standard modules in the same station
- Freely selectable connection technique: M12 7/8", M12 M12-L, direct, ECOFAST, push pull (CU, FO)
- Power module for easy implementation of load groups
- Module replacement during operation (Hot Swap)
- Easy installation as well as permanent wiring
- Transmission rate for PROFIBUS DP up to 12 Mbps
- Extensive diagnostics: module-specific or channel-specific
- Intelligent motor starters for starting and protection of motors and loads up to 5.5 kW
 - Versions: direct and reversing starters - Standard and High Feature
- Safety motor starters
- Fail-safe modules with safety-related signal processing according to PROFIsafe
- Frequency converters
- RFID communications modules
- Pneumatic interface modules
- IO-Link master

Technical specifications

General technical specifications	
Electronic modules	• Digital inputs/outputs • Analog inputs • Analog outputs
Connections	M12 and M8 round connector with standard assignment for actuator/sensor
Transmission rate, max.	12 Mbps (PROFIBUS DP), 100 Mbps (PROFINET IO)
Supply voltage	24 V DC
Current consumption of ET 200pro (internal and sensor supply, non-switched voltage), up to 55 °C, max.	≤ 5 A
Load current for ET 200pro per incoming supply (IM, PM, switched voltage), up to 55 °C, max.	10 A
For overall configuration with looping through (multiple ET 200pros), up to 55 °C, max.	16 A (with terminal module, directly)
Degree of protection	IP65/66/IP67 for interface, digital and analog modules
Material	Thermoplastic (reinforced with glass fiber)
Ambient conditions	
Temperature	From -25 °C/0 °C to +55 °C
Relative humidity	From 5 to 100%
Air pressure	From 795 to 1080 hPa
Mechanical stress	
• Vibration	Vibration test according to IEC 60068, Part 2-6 (sinusoidal) • Constant acceleration 5 g, occasionally 10 g for interface, digital and analog modules • 2 g motor starters
• Shock	Shock test according to IEC 680068 Part 2-27, half-sine, 30 g, 18 ms duration for interface, digital and analog modules • 15 g, 11 ms duration for motor starters
Approvals	UL, CSA or cULus

I/O systems

SIMATIC ET 200 systems without control cabinet

SIMATIC ET 200pro

Interface modules > IM 154-1 and IM 154-2

Overview



Interface modules for handling communication between the ET 200pro and the higher-level master over PROFIBUS DP.

Ordering data

Article No.

Article No.

IM154-1 interface module

For ET 200pro;
for communication between
ET 200pro and higher-level
masters over PROFIBUS DP.

6ES7154-1AA01-0AB0

IM154-2 DP High Feature interface module

For ET 200pro;
for communication between
ET 200pro and higher-level
masters over PROFIBUS DP;
supports PROFIsafe.

6ES7154-2AA01-0AB0

Accessories

CM IM DP ECOFAST connection module

For connecting PROFIBUS DP
and the 24 V power supply to
PROFIBUS interface modules,
2 ECOFAST Cu connections.

6ES7194-4AA00-0AA0

CM IM DP direct connection module

For connecting PROFIBUS DP
and the 24 V power supply directly
to PROFIBUS interface modules,
up to six M20 cable glands.

6ES7194-4AC00-0AA0

CM IM DP M12, 7/8" connection module

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

6ES7194-4AD00-0AA0

Accessories for CM IM DP ECOFAST

PROFIBUS ECOFAST hybrid cable, pre-assembled

With 2 ECOFAST connectors,
trailing-type cable
with 2 x Cu 0.64 mm² and
4 x Cu 1.5 mm²,
in various lengths:

1.5 m
3.0 m
5.0 m
10 m
15 m
20 m

6XV1830-7BH15
6XV1830-7BH30
6XV1830-7BH50
6XV1830-7BN10
6XV1830-7BN15
6XV1830-7BN20

PROFIBUS ECOFAST hybrid cable GP, pre-assembled

With 2 ECOFAST connectors,
trailing-type cable
with 2 x Cu 0.64 mm² and
4 x Cu 1.5 mm²,
in various lengths:

1.5 m
3.0 m
5.0 m
10 m
15 m
20 m

6XV1860-3PH15
6XV1860-3PH30
6XV1860-3PH50
6XV1860-3PN10
6XV1860-3PN15
6XV1860-3PN20

PROFIBUS ECOFAST hybrid cable, non-assembled

Trailing-type cable
with 2 x Cu 0.64 mm² and
4 x Cu 1.5 mm²,
sold by the meter,
minimum order quantity 20 m,
maximum order quantity 1 000 m.

6XV1830-7AH10

PROFIBUS ECOFAST hybrid connector 180

ECOFAST Cu, 2 x Cu, 4 x 1.5 mm²,
HANBRID connector

- With male insert, 5-pack
- With female insert, 5-pack

6GK1905-0CA00
6GK1905-0CB00

PROFIBUS ECOFAST hybrid connector angular

ECOFAST Cu, 2 x Cu, 4 x 1.5 mm²,
HANBRID connector

- With male insert, 5-pack
- With female insert, 5-pack

6GK1905-0CC00
6GK1905-0CD00

Accessories for CM IM DP direct

PROFIBUS trailing cable

Max. acceleration 4 m/s²,
at least 3 million bending cycles,
bending radius at least 60 mm,
2-wire shielded, sold by the meter,
minimum order quantity 20 m,
maximum order quantity 1 000 m.

6XV1830-3EH10

Ordering data	Article No.		Article No.
PROFIBUS FC Food bus cable With PE sheath for use in the food and beverages industry, 2-wire, shielded, sold by the meter, minimum order quantity 20 m, maximum order quantity 1 000 m.	6XV1830-0GH10	M12 sealing cap For protection of unused M12 connections with ET 200pro.	3RX9802-0AA00
PROFIBUS FC Robust bus cable With PUR sheath for use in environments subject to harsh chemicals and extreme mechanical stress, 2-wire, shielded, sold by the meter, minimum order quantity 20 m, maximum order quantity 1 000 m.	6XV1830-0JH10	Sealing cap 7/8" For protection of unused 7/8" connections with ET 200pro; 10 units per pack.	6ES7194-3JA00-0AA0
Power line 5-wire, 5 x 1.5 mm ² , trailing type, sold by the meter, minimum order quantity 20 m, maximum order quantity 1 000 m.	6XV1830-8AH10	General accessories	
Accessories for CM IM DP M12, 7/8"		ET 200pro rack - Narrow, for interface, electronics and power modules 500 mm 1 000 mm 2 000 mm, can be cut to length - Compact, for interface, electronics and power modules 500 mm 1 000 mm 2 000 mm, can be cut to length - Wide, for interface, electronics, power modules and motor starters 500 mm 1 000 mm 2 000 mm, can be cut to length - Wide, for I/O modules and motor starters 500 mm 1 000 mm 2 000 mm	6ES7194-4GA00-0AA0 6ES7194-4GA60-0AA0 6ES7194-4GA20-0AA0 6ES7194-4GC70-0AA0 6ES7194-4GC60-0AA0 6ES7194-4GC20-0AA0 6ES7194-4GB00-0AA0 6ES7194-4GB60-0AA0 6ES7194-4GB20-0AA0 6ES7194-4GD00-0AA0 6ES7194-4GD10-0AA0 6ES7194-4GD20-0AA0
PROFIBUS M12 connecting cable Pre-assembled with two M12 connectors, 5-pin, in various lengths: 1.5 m 2.0 m 3.0 m 5.0 m 10 m 15 m	6XV1830-3DH15 6XV1830-3DH20 6XV1830-3DH30 6XV1830-3DH50 6XV1830-3DN10 6XV1830-3DN15	Spare fuse 12.5 A fast-blow, for interface and power modules, 10 units per pack.	6ES7194-4HB00-0AA0
7/8" connecting cable to power supply 5-wire, 5 x 1.5 mm ² , trailing type, pre-assembled with two 7/8" connectors, 5-pin, in various lengths: 1.5 m 2.0 m 3.0 m 5.0 m 10 m 15 m	6XV1822-5BH15 6XV1822-5BH20 6XV1822-5BH30 6XV1822-5BH50 6XV1822-5BN10 6XV1822-5BN15	PROFIBUS FastConnect bus cable Standard type with special design for quick mounting, 2-wire, shielded, sold by the meter, max. delivery unit 1 000 m, minimum order quantity 20 m.	6XV1830-0EH10
M12 connection plug For ET 200eco, with axial cable outlet. - With male insert, 5-pack - With female insert, 5-pack	6GK1905-0EA00 6GK1905-0EB00	PROFIBUS hybrid standard cable GP Standard PROFIBUS hybrid cable with 2 energy cables (1.5 mm ²) for supplying data and energy for ET 200pro.	6XV1860-2R
PROFIBUS M12 bus termination connector With male insert.	6GK1905-0EC00	SIMATIC Manual Collection Electronic manuals on DVD, multi-language: All manuals for S7-1200/1500/200/300/400, LOGO!, SIMATIC DP, PC, PG, STEP 7, Engineering SW, Runtime SW, SIMATIC HMI, SIMATIC NET, SIMATIC IDENT	6ES7998-8XC01-8YE0
7/8" connection plug For ET 200eco, with axial cable outlet. - With male insert, 5-pack - With female insert, 5-pack	6GK1905-0FA00 6GK1905-0FB00	SIMATIC Manual Collection update service for 1 year Scope of delivery: Current DVD "S7 Manual Collection" and the three subsequent updates.	6ES7998-8XC01-8YE2

I/O systems

SIMATIC ET 200 systems without control cabinet

SIMATIC ET 200pro

Interface modules > IM 154-1 and IM 154-2**Technical specifications**

Article number	6ES7154-1AA01-0AB0 ET 200pro, IM 154-1 DP	6ES7154-2AA01-0AB0 ET 200pro, IM154-2 DP HF
General information		
Product type designation	IM 154-1 DP	IM 154-2 DP HF
Supply voltage		
Rated value (DC)	24 V	24 V
Reverse polarity protection	Yes; against destruction	Yes; against destruction
Short-circuit protection	Yes; over exchangeable fuses	Yes; over exchangeable fuses
Load voltage 2L+		
• Rated value (DC)	24 V	24 V
• Reverse polarity protection	Yes; against destruction	Yes; against destruction
Input current		
from supply voltage 1L+, max.	200 mA	200 mA
Address area		
Addressing volume		
• Inputs	244 byte	244 byte
• Outputs	244 byte	244 byte
Interfaces		
Interfaces/bus type	PROFIBUS DP	PROFIBUS DP
Interface types		
RS 485		
• Transmission rate, max.	12 Mbit/s	12 Mbit/s
• automatic detection of transmission rate	Yes	Yes
Protocols		
PROFIBUS DP		
Services		
- SYNC capability	Yes	Yes
- FREEZE capability	Yes	Yes
- Direct data exchange (slave-to-slave communication)	Yes	Yes
Interrupts/diagnostics/status information		
Alarms		
• Diagnostic alarm	Yes; Parameterizable	Yes; Parameterizable
• Hardware interrupt	Yes; Parameterizable	Yes; Parameterizable
Diagnostics indication LED		
• For load voltage monitoring	Yes	Yes
• Bus fault BF (red)	Yes	Yes
• Group error SF (red)	Yes	Yes
• Monitoring 24 V voltage supply ON (green)	Yes	Yes
Potential separation		
between supply voltage and electronics	Yes	Yes
Degree and class of protection		
IP degree of protection	IP65/67	IP65/67
Ambient conditions		
Ambient temperature during operation		
• min.	-25 °C	-25 °C
• max.	55 °C	55 °C
Ambient temperature during storage/transportation		
• min.	-40 °C	-40 °C
• max.	70 °C	70 °C
Dimensions		
Width	90 mm	90 mm
Height	130 mm	130 mm
Depth	60 mm	60 mm
Weights		
Weight, approx.	375 g	375 g

Overview



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

Ordering data

Article No.

Article No.

IM 154-3 PN High Feature interface module

6ES7154-3AB00-0AB0

For communication between ET 200pro and higher-level controllers via PROFINET IO; supports PROFINsafe.

Connection module 6ES7194-4AK00-0AA0 must be ordered separately.

IM 154-4 PN High Feature interface module

6ES7154-4AB10-0AB0

For communication between ET 200pro and higher-level controllers via PROFINET IO; supports PROFINsafe.

Order connection module 6ES7194-4A .00-0AA0 separately.

Accessories**Connection modules for IM 154-3 PN High Feature**

- **CM IM PN M12 connection module 7/8" S** for connecting PROFINET PN and 24 V power supply to PROFINET interface modules, 2 x M12 and 2 x 7/8"

6ES7194-4AK00-0AA0

- **CM IM PN M12 connection module M12-L S** for connecting PROFINET PN and 24 V power supply to PROFINET interface modules, 2x M12-D and 2x M12-L

6ES7194-4AL00-0AA0

Connection modules for IM 154-4 PN High Feature

- **CM IM PN M12 connection module, 7/8"** for connecting PROFINET PN and 24 V power supply to PROFINET interface modules, 2 x M12 and 2 x 7/8"
- **CM IM PN 2xRJ45 connection module** for connecting PROFINET PN and 24 V power supply to PROFINET interface modules, 2 x RJ45 and 2 x push-pull power connector

6ES7194-4AJ00-0AA0

6ES7194-4AF00-0AA0

- **CM IM PN 2xSCRJ FO connection module** for connecting PROFINET PN and 24 V power supply to PROFINET interface modules, 2 x SCRJ FO and 2 x push-pull power connector

6ES7194-4AG00-0AA0

M12 sealing cap

For protection of unused M12 connections with ET 200pro.

3RX9802-0AA00

IE M12 connecting cables

Preassembled with two M12 plug, up to 85 m, in various lengths:

0.3 m

6XV1870-8AE30

0.5 m

6XV1870-8AE50

1.0 m

6XV1870-8AH10

1.5 m

6XV1870-8AH15

2.0 m

6XV1870-8AH20

3.0 m

6XV1870-8AH30

5.0 m

6XV1870-8AH50

10 m

6XV1870-8AN10

15 m

6XV1870-8AN15

20 m

6XV1870-8AN20

30 m

6XV1870-8AN30

40 m

6XV1870-8AN40

50 m

6XV1870-8AN50

7/8" sealing caps

1 pack = 10 units

6ES7194-3JA00-0AA0

7/8" connecting cable to power supply

5-wire, 5 x 1.5 mm², trailing type, preassembled with two 7/8" connectors, 5-pin, up to 50 m, in various lengths:

1.5 m

6XV1822-5BH15

2.0 m

6XV1822-5BH20

3.0 m

6XV1822-5BH30

5.0 m

6XV1822-5BH50

10 m

6XV1822-5BN10

15 m

6XV1822-5BN15

I/O systems

SIMATIC ET 200 systems without control cabinet
SIMATIC ET 200pro

Interface modules > IM 154-3 PN and IM 154-4 PN

Ordering data	Article No.		Article No.
Power line 5-wire, 5 x 1.5 mm ² , trailing type, sold by the meter, minimum order quantity 20 m, maximum order quantity 1000 m.	6XV1830-8AH10		
7/8" connection plug For ET 200eco, with axial cable outlet. • With male contact insert, 5-pack • With female contact insert, 5-pack	6GK1905-0FA00 6GK1905-0FB00		
Industrial Ethernet FastConnect installation cables • IE FC TP standard cable GP 2 x 2; Sold by the meter, max. delivery unit 1000 m; minimum order quantity 20 m. • IE FC TP trailing cable 2 x 2; sold by the meter, max. delivery unit 1000 m; minimum order quantity 20 m. • IE FC TP trailing cable GP 2 x 2; sold by the meter, max. delivery unit 1000 m; minimum order quantity 20 m. • IE TP torsion cable GP 2 x 2; sold by the meter, max. delivery unit 1000 m; minimum order quantity 20 m. • IE FC TP marine cable 2 x 2; sold by the meter, max. delivery unit 1000 m; minimum order quantity 20 m.	6XV1840-2AH10 6XV1840-3AH10 6XV1870-2D 6XV1870-2F 6XV1840-4AH10		
IE RJ45 plug PRO RJ45 plug connector in IP65/67 degree of protection for on-site assembly, plastic enclosure, insulation displacement connection system, for SCALANCE X-200 IRT PRO and ET 200pro: 1 pack = 1 unit.	6GK1901-1BB10-6AA0		
IE SC RJ POF Plug PRO SC RJ plug connector for POF fibers in IP65/67 degree of protection, for on-site assembly, plastic enclosure, for SCALANCE X-200 IRT PRO and ET 200pro 1 pack = 1 unit	6GK1900-0MB00-6AA0		
IE SC RJ PCF Plug PRO SC RJ plug connector for PCF fibers in IP65/67 degree of protection, for on-site assembly, plastic enclosure, for SCALANCE X-200 IRT PRO 1 pack = 1 unit.	6GK1900-0NB00-6AA0		
Power Plug PRO 5-pin power plug connector for 2 x 24 V power supply in IP65/67 degree of protection, for on-site assembly, plastic enclosure, for SCALANCE X-200 IRT and ET 200pro 1 pack = 1 unit.	6GK1907-0AB11-6AA0		
		IE panel feedthrough Control cabinet feed-through for converting M12 D-coded connection system (IP65) to RJ45 connection system (IP20) • 1 pack = 5 units	6GK1901-0DM20-2AA5
		Push-pull connection plug For 1L+/ 2L+, unassembled	6GK1907-0AB11-6AA0
		Cover caps for push-pull RJ45 female connectors 5 items per pack	6ES7194-4JD50-0AA0
		Cover caps for push-pull female connectors power (1L+, 2L+) 5 units	6ES7194-4JA50-0AA0
		General accessories	
		ET 200pro rack • Narrow, for interface, electronics and power modules - 500 mm - 1000 mm - 2000 mm, can be cut to length • Compact, for interface, electronics and power modules - 500 mm - 1000 mm - 2000 mm, can be cut to length • Wide, for interface, electronics, power modules and motor starters - 500 mm - 1000 mm - 2000 mm, can be cut to length • Wide, for I/O modules and motor starters - 500 mm - 1000 mm - 2000 mm	6ES7194-4GA00-0AA0 6ES7194-4GA60-0AA0 6ES7194-4GA20-0AA0 6ES7194-4GC70-0AA0 6ES7194-4GC60-0AA0 6ES7194-4GC20-0AA0 6ES7194-4GB00-0AA0 6ES7194-4GB60-0AA0 6ES7194-4GB20-0AA0 6ES7194-4GD00-0AA0 6ES7194-4GD10-0AA0 6ES7194-4GD20-0AA0
		Spare fuse 12.5 A quick-response, for interface and power modules, 10 units per packing unit.	6ES7194-4HB00-0AA0
		SIMATIC Manual Collection Electronic manuals on DVD, multi-language: All manuals for S7-1200/1500/200/300/400, LOGO!, SIMATIC DP, PC, PG, STEP 7, Engineering SW, Runtime SW, SIMATIC HMI, SIMATIC NET, SIMATIC IDENT	6ES7998-8XC01-8YE0
		SIMATIC Manual Collection – Update service for 1 year Current Manual Collection DVD and the three subsequent updates	6ES7998-8XC01-8YE2

Technical specifications

Article number	6ES7154-3AB00-0AB0 ET 200pro, IM 154-3 PN HF	6ES7154-4AB10-0AB0 ET 200pro, IM 154-4 PN HF
General information		
Product type designation	IM 154-3 PN HF	IM 154-4 PN HF
Supply voltage		
Rated value (DC)	24 V	24 V
Reverse polarity protection	Yes; against destruction	Yes; against destruction
Short-circuit protection	Yes; Fuse in lower part is exchangeable, the fuse on the IM-LP is not	Yes; Fuse in lower part is exchangeable, the fuse on the IM-LP is not
Load voltage 2L+		
• Rated value (DC)	24 V	24 V
• Reverse polarity protection	Yes; against destruction	Yes; against destruction
Input current		
from supply voltage 1L+, max.	300 mA	400 mA; Dependent on terminal module, typ. maximum value for FO connection method, full load on RWB and 20.4 V input voltage
Address area		
Addressing volume		
• Inputs	256 byte	256 byte
• Outputs	256 byte	256 byte
Interfaces		
Interfaces/bus type	PROFINET IO	PROFINET IO
Interface types		
M12 port		
• Autonegotiation	Yes	Yes
• Transmission rate, max.	100 Mbit/s	100 Mbit/s
Protocols		
Protocols (Ethernet)		
• SNMP	Yes	Yes
• LLDP	Yes	
• ping	Yes	Yes
• ARP	Yes	Yes
Redundancy mode		
Media redundancy		
- MRP	Yes	Yes
Interrupts/diagnostics/ status information		
Alarms		
• Diagnostic alarm	Yes; Parameterizable	Yes; Parameterizable
• Hardware interrupt	Yes; Parameterizable	Yes; Parameterizable
Diagnostics indication LED		
• MAINT LED	Yes	Yes
• LINK LED	Yes	Yes
• RX/TX LED	Yes	Yes
• For load voltage monitoring	Yes	Yes
• Bus fault BF (red)	Yes	Yes
• Group error SF (red)	Yes	Yes
• Monitoring 24 V voltage supply ON (green)	Yes	Yes

I/O systems

SIMATIC ET 200 systems without control cabinet

SIMATIC ET 200pro

Interface modules > IM 154-3 PN and IM 154-4 PN**Technical specifications**

Article number	6ES7154-3AB00-0AB0 ET 200pro, IM 154-3 PN HF	6ES7154-4AB10-0AB0 ET 200pro, IM 154-4 PN HF
Potential separation		
between backplane bus and electronics	No	No
between supply voltage and electronics	Yes	Yes
Degree and class of protection		
IP degree of protection	IP65/67	IP65/67
Ambient conditions		
Ambient temperature during operation		
• min.	-25 °C	-25 °C
• max.	55 °C	55 °C
Ambient temperature during storage/transportation		
• min.	-40 °C	-40 °C
• max.	70 °C	70 °C
Dimensions		
Width	90 mm	135 mm
Height	130 mm	130 mm
Depth	60 mm	60 mm
Weights		
Weight, approx.	375 g	490 g

Overview



- Expansion modules with digital inputs/outputs for connection of actuators/sensors
- With scalable diagnostics
 - Standard modules with module-specific diagnostics
 - High Feature module with channel-specific diagnostics and parameterizable input delay or hardware interrupts
- Double or single assignment can be implemented for each M12 in the case of the 8 DI and 8 DO module by selecting CM IO 4 x M12 or CM IO 8 x M12
- IO connection modules are available in metal and plastic versions

Ordering data

Article No.

Article No.

8 DI digital input module

24 V DC, with module-specific diagnostics, including bus module. Connection module must be ordered separately

6ES7141-4BF00-0AA0

8 DI High Feature digital input module

24 V DC, with channel-specific diagnostics, including bus module. Connection module must be ordered separately

6ES7141-4BF00-0AB0

16 DI digital input module

24 V DC, with module-specific diagnostics, including bus module. Connection module 6ES7194-4CB50-0AA0 must be ordered separately

6ES7141-4BH00-0AA0

4 DQ digital output module

24 V DC, 2 A, with module-specific diagnostics, including bus module. Connection module must be ordered separately

6ES7142-4BD00-0AA0

4 DQ High Feature digital output module

24 V DC, 2 A, with channel-specific diagnostics, including bus module. Connection module must be ordered separately

6ES7142-4BD00-0AB0

8 DQ digital output module

24 V DC, 0.5 A, with module-specific diagnostics, including bus module. Connection module must be ordered separately

6ES7142-4BF00-0AA0

4 DI/4 DQ digital input and output module

24 V DC, 0.5 A, with module-specific diagnostics, including bus module. Connection module must be ordered separately

6ES7143-4BF50-0AA0

4 DIQ / 4 DQ digital input and output module

24 V DC, 0.5 A, with module-specific diagnostics, including bus module. Connection module must be ordered separately

6ES7143-4BF00-0AA0

Accessories**CM IO 4 x M12 connection module**

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

6ES7194-4CA00-0AA0

CM IO 4 x M12 inverse connection module

4 M12 sockets for connection of digital actuators to ET 200pro (4 DQ and 4 DQ HF); 2 x M12 single assignment, 2 x M12 double assignment

6ES7194-4CA50-0AA0

CM IO 4 x M12 P connection module

4 M12 sockets for connecting digital sensors/actuators to ET 200pro; plastic version

6ES7194-4CA10-0AA0

CM IO 8 x M12 connection module

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

6ES7194-4CB00-0AA0

CM IO 8 x M12 P connection module

8 M12 sockets for connecting digital sensors or actuators to ET 200pro; plastic version

6ES7194-4CB10-0AA0

CM IO 8 x M12D connection module

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

6ES7194-4CB50-0AA0

CM IO 8 x M8 connection module

8 sockets M8 for connection of digital sensors or actuators to ET 200pro

6ES7194-4EB00-0AA0

CM IO 2 x M12 connection module

2 M12 8-pin sockets; for use with: EM 8 DI, 24 V DC and 8 DQ, 24 V DC/0.5 A

6ES7194-4FB00-0AA0

CM IO 1 x M23 connection module

1 M23 socket; for use with: EM 8 DI, 24 V DC and 8 DQ, 24 V DC/0.5 A

6ES7194-4FA00-0AA0

Module identification labels

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

6ES7194-4HA00-0AA0

M12 sealing cap

For protection of unused M12 connections with ET 200pro

3RX9802-0AA00

M12 Y circular connector

For double connection of sensors via a single cable, 5-pin; cannot be used for F-DI 4/8

6ES7194-1KA01-0XA0

M12 Y cable

For double connection of I/O by means of a single cable on ET 200, 5-pin

6ES7194-6KA00-0XA0

M8 sealing cap

For IP67 modules

3RK1901-1PN00

I/O systems

SIMATIC ET 200 systems without control cabinet

SIMATIC ET 200pro

I/O modules > Digital expansion modules

Technical specifications

Article number	6ES7141-4BF00-0AA0 ET 200pro, EM 8DI 24V DC	6ES7141-4BF00-0AB0 ET 200pro, EM 8DI 24V DC HF	6ES7141-4BH00-0AA0 ET 200pro, EM 16DI DC 24V
General information			
Product function			
• Isochronous mode	No	No	No
Supply voltage			
Rated value (DC)	24 V	24 V	24 V
Reverse polarity protection	Yes; Against destruction; encoder power supply outputs applied with reversed polarity	Yes; against destruction; load increasing	Yes; Against destruction; encoder power supply outputs applied with reversed polarity
Input current			
from supply voltage 1L+, max.	20 mA	40 mA	30 mA
from backplane bus 3.3 V DC, max.	20 mA	20 mA	20 mA
Encoder supply			
Number of outputs	8	8	8
Short-circuit protection	Yes; per module, electronic	Yes; per channel, electronic	Yes; per module, electronic
Output current			
• up to 55 °C, max.	1 A	1 A	1 A
Digital inputs			
Number of digital inputs	8	8	16
Input characteristic curve in accordance with IEC 61131, type 1	Yes	No	Yes
Input characteristic curve in accordance with IEC 61131, type 2	No	Yes	
Number of simultaneously controllable inputs			
all mounting positions			
- up to 55 °C, max.	8	8	16
Input voltage			
• Rated value (DC)	24 V	24 V	24 V
• for signal "0"	-3 to +5V	-3 to +5V	-3 to +5V
• for signal "1"	13 to 30V	+11 to +30V	+11 to +30V
Input current			
• for signal "1", typ.	7 mA	7 mA	4 mA
Input delay (for rated value of input voltage)			
for standard inputs			
- parameterizable	No	Yes	No
Cable length			
• unshielded, max.	30 m	30 m	30 m
Encoder			
Connectable encoders			
• 2-wire sensor	Yes	Yes	Yes
- permissible quiescent current (2-wire sensor), max.	1.5 mA	1.5 mA	1.5 mA
Interrupts/diagnostics/ status information			
Diagnostics function	Yes	Yes; channel by channel, parameterizable	Yes
Alarms			
• Diagnostic alarm	Yes	Yes	Yes
• Hardware interrupt		Yes	
Diagnoses			
• Diagnostic information readable	Yes	Yes	Yes
• Wire-break		Yes; Monitoring, $I < 0.3 \text{ mA}$; per channel	
• Short-circuit	Yes; Sensor supply to M; module by module	Yes; channel by channel	Yes; Sensor supply to M; module by module
Diagnostics indication LED			
• Group error SF (red)	Yes	Yes	Yes
• Status indicator digital input (green)	Yes; Per channel	Yes; Per channel	Yes; Per channel

Technical specifications

Article number	6ES7141-4BF00-0AA0 ET 200pro, EM 8DI 24V DC	6ES7141-4BF00-0AB0 ET 200pro, EM 8DI 24V DC HF	6ES7141-4BH00-0AA0 ET 200pro, EM 16DI DC 24V
Potential separation			
between backplane bus and all other circuit components	Yes	Yes	Yes
Potential separation digital inputs			
• between the channels	No	No	No
• between the channels and backplane bus	Yes	Yes	Yes
Dimensions			
Width	45 mm	45 mm	45 mm
Height	130 mm	130 mm	130 mm
Depth	35 mm	35 mm; without terminal module	35 mm
Weights			
Weight, approx.	140 g	140 g	140 g
Article number	6ES7142-4BD00-0AA0 ET 200pro, EM 4DO 24V DC/2.0A	6ES7142-4BD00-0AB0 ET 200pro, EM 4DO 24VDC/2.0A HF	6ES7142-4BF00-0AA0 ET 200pro, EM 8DO DC24V/0.5A
Supply voltage			
Load voltage 2L+			
• Rated value (DC)	24 V	24 V	24 V
• Short-circuit protection	Yes; per channel, electronic	Yes; per channel, electronic	Yes; per channel, electronic
• Reverse polarity protection	Yes; against destruction; load increasing	Yes; against destruction; load increasing	Yes; against destruction; load increasing
Input current			
from load voltage 2L+ (without load), max.	20 mA	40 mA	30 mA
from backplane bus 3.3 V DC, max.	20 mA	30 mA	30 mA
Digital outputs			
Number of digital outputs	4	4	8
Short-circuit protection	Yes	Yes	Yes
Limitation of inductive shutdown voltage to	2L+ (-47 V)	2L+ (-47 V)	2L+ (-47 V)
Controlling a digital input	Yes	Yes	Yes; Isolation between 1L+ and 2L+ is no longer provided, as 1M and 2M are jumpered
Switching capacity of the outputs			
• on lamp load, max.	10 W	10 W	5 W
Load resistance range			
• lower limit	12 Ω	12 Ω	48 Ω
• upper limit	4 kΩ	4 kΩ	4 kΩ
Output voltage			
• for signal *1*, min.	2L+ (-0,8 V)	2L+ (-0,8 V)	2L+ (-0,8 V)
Output current			
• for signal *1* rated value	2 A	2 A	0.5 A
• for signal *0* residual current, max.	0.5 mA	0.5 mA	0.5 mA
Parallel switching of two outputs			
• for uprating	No	No	No
• for redundant control of a load	Yes	Yes	Yes
Switching frequency			
• with resistive load, max.	100 Hz	100 Hz	100 Hz
• with inductive load, max.	0.5 Hz	0.5 Hz	0.5 Hz
• on lamp load, max.	1 Hz	1 Hz	1 Hz
Total current of the outputs (per group)			
all mounting positions			
- up to 55 °C, max.	4 A	4 A	4 A
Cable length			
• shielded, max.	30 m	30 m	30 m
• unshielded, max.	30 m	30 m	30 m

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I/O modules > Digital expansion modules

Technical specifications

Article number	6ES7142-4BD00-0AA0 ET 200pro, EM 4DO 24V DC/2.0A	6ES7142-4BD00-0AB0 ET 200pro, EM 4DO 24VDC/2.0A HF	6ES7142-4BF00-0AA0 ET 200pro, EM 8DO DC24V/0.5A
Interrupts/diagnostics/ status information			
Diagnostics function	Yes	Yes	Yes
Substitute values connectable		Yes	
Alarms			
• Diagnostic alarm	Yes	Yes	Yes
Diagnoses			
• Diagnostic information readable	Yes	Yes	Yes
• Wire-break		Yes; channel by channel	
• Short-circuit	Yes; Short-circuit of outputs to ground; module by module	Yes; channel by channel	Yes; Short-circuit of outputs to ground; module by module
Diagnostics indication LED			
• Group error SF (red)	Yes	Yes	Yes
• Status indicator digital output (green)	Yes	Yes	Yes
• Channel fault indicator F (red)		Yes	
Potential separation			
between backplane bus and all other circuit components	Yes	Yes	Yes
Potential separation digital outputs			
• between the channels	No	No	No
• between the channels and backplane bus	Yes	Yes	Yes
Standards, approvals, certificates			
Suitable for safety-related tripping of standard modules	Yes	Yes	Yes
Highest safety class achievable for safety-related tripping of standard modules			
• Performance level according to ISO 13849-1	PL d	PL d	PL d
• Category according to ISO 13849-1	Cat. 3	Cat. 3	Cat. 3
• SIL acc. to IEC 62061	SIL 2	SIL 2	SIL 2
Dimensions			
Width	45 mm	45 mm	45 mm
Height	130 mm	130 mm	130 mm
Depth	35 mm	35 mm; without terminal module	35 mm
Weights			
Weight, approx.	140 g	140 g	140 g
Article number	6ES7143-4BF50-0AA0 ET 200pro, EM 4DI / 4DO DC 24V, 0.5A	6ES7143-4BF00-0AA0 ET 200pro, EM 4 DIO / 4 DO DC 24V, 0.5A	
Supply voltage			
Rated value (DC)		24 V	
Reverse polarity protection		Yes; Against destruction; encoder power supply outputs applied with reversed polarity	
Load voltage 2L+			
• Rated value (DC)	24 V	24 V	
• Short-circuit protection	Yes	Yes	
• Reverse polarity protection	Yes	Yes; against destruction; load increasing	
Input current			
from supply voltage 1L+, max.		20 mA	
from load voltage 2L+ (without load), max.	20 mA	20 mA	
from backplane bus 3.3 V DC, max.	20 mA	30 mA	
Encoder supply			
Short-circuit protection	Yes; per module, electronic	Yes; per module, electronic	
Output current			
• up to 55 °C, max.	1 A	1 A	

Technical specifications

Article number	6ES7143-4BF50-0AA0 ET 200pro, EM 4DI / 4DO DC 24V, 0.5A	6ES7143-4BF00-0AA0 ET 200pro, EM 4 DIO / 4 DO DC 24V, 0.5A
Digital inputs		
Number of digital inputs	4	4; 4 DIOs can be parameterized
Input characteristic curve in accordance with IEC 61131, type 3	Yes	Yes
Number of simultaneously controllable inputs		
all mounting positions - up to 55 °C, max.		4
Input voltage		
• Rated value (DC)	24 V	24 V
• for signal "0"	-3 to +5V	-3 to +5V
• for signal "1"	+11 to +30V	+11 to +30V
Input current		
• for signal "1", typ.	7 mA	7 mA
Cable length		
• unshielded, max.	30 m	30 m
Digital outputs		
Number of digital outputs	4	8; 4 DO fixed, 4 DIO parameterizable
• in groups of		4; 2 load groups for 4 outputs each
Short-circuit protection	Yes; per channel, electronic	Yes; per channel, electronic
Limitation of inductive shutdown voltage to	Typ. (2L+) -47 V	Typ. (L1+, L2+) -47 V
Controlling a digital input	Yes	Yes
Switching capacity of the outputs		
• on lamp load, max.	5 W	5 W
Load resistance range		
• lower limit	48 Ω	48 Ω
• upper limit	4 kΩ	4 kΩ
Output voltage		
• for signal "1", min.		2L+ (-0,8 V)
Output current		
• for signal "1" rated value	0.5 A	0.5 A
• for signal "0" residual current, max.	0.5 mA	0.5 mA
Parallel switching of two outputs		
• for uprating	No	No
• for redundant control of a load	Yes	Yes
Switching frequency		
• with resistive load, max.	100 Hz	100 Hz
• with inductive load, max.	0.5 Hz	0.5 Hz
• on lamp load, max.	1 Hz	1 Hz
Total current of the outputs (per group)		
all mounting positions - up to 55 °C, max.	2 A	2 A
Cable length		
• unshielded, max.	30 m	30 m
Encoder		
Connectable encoders		
• 2-wire sensor	Yes	Yes
- permissible quiescent current (2-wire sensor), max.	1.5 mA	1.5 mA

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Article number	6ES7143-4BF50-0AA0 ET 200pro, EM 4DI / 4DO DC 24V, 0.5A	6ES7143-4BF00-0AA0 ET 200pro, EM 4 DIO / 4 DO DC 24V, 0.5A
Interrupts/diagnostics/ status information		
Diagnostics function	Yes	Yes
Alarms		
• Diagnostic alarm	Yes	Yes
Diagnoses		
• Diagnostic information readable	Yes	Yes
• Short-circuit	Yes; Short-circuit of outputs to ground; module by module	Yes; Short-circuit of outputs to ground; module by module
Diagnostics indication LED		
• Group error SF (red)		Yes
• Status indicator digital input (green)	Yes	Yes
• Status indicator digital output (green)	Yes	Yes
Potential separation		
between backplane bus and all other circuit components	Yes	Yes
Potential separation digital inputs		
• between the channels	No	No
• between the channels and backplane bus	Yes	Yes
Potential separation digital outputs		
• between the channels	No	
• between the channels and backplane bus	Yes	Yes
Standards, approvals, certificates		
Suitable for safety-related tripping of standard modules		Yes
Highest safety class achievable for safety-related tripping of standard modules		
• Performance level according to ISO 13849-1		PL d
• Category according to ISO 13849-1		Cat. 3
• SIL acc. to IEC 62061		SIL 2
Dimensions		
Width	45 mm	45 mm
Height	130 mm	130 mm
Depth	35 mm	35 mm
Weights		
Weight, approx.	140 g	140 g

Overview



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

Ordering data

Article No.

Article No.

4AI U analog input module

High Feature, ± 10 V; ± 5 V;
0 to 10 V; 1 to 5 V,
channel-specific diagnostics,
including bus module. Connection
module must be ordered separately

6ES7144-4FF01-0AB0**4AI I analog input module**

High Feature, ± 20 mA;
0 to 20 mA; 4 to 20 mA,
channel-specific diagnostics,
including bus module. Connection
module must be ordered separately

6ES7144-4GF01-0AB0**4AI RTD analog input module**

High Feature; resistances:
150, 300, 600 and 3000 Ohm;
resistance thermometer: Pt100,
200, 500, 1000, Ni100, 120, 200,
500 and 1000; channel-specific
diagnostics, incl. bus module.
Connection module must be
ordered separately

6ES7144-4JF00-0AB0**4AI TC analog input module**

High Feature; thermocouples:
Type B, E, J, K, L, N, R, S, T;
voltage measurement ± 80 mV;
channel diagnostics, including
bus module. Connection module
must be ordered separately

6ES7144-4PF00-0AB0**4AO U analog output module**

High Feature, ± 10 V; 0 to 10 V;
1 to 5 V, channel-specific
diagnostics, including bus module.
Connection module must be
ordered separately

6ES7145-4FF00-0AB0**4AO I analog output module**

High Feature, ± 20 mA; 0 to 20 mA;
4 to 20 mA, channel-specific
diagnostics, including bus module.
Connection module must be
ordered separately

6ES7145-4GF00-0AB0**Accessories**

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

6ES7194-4CA00-0AA0**M12 compensation connectors**

With integral Pt100 for reference
point compensation when
connecting thermocouples

6ES7194-4AB00-0AA0**Module identification labels**

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

6ES7194-4HA00-0AA0**M12 sealing cap**

For protection of unused M12
connections with ET 200pro

3RX9802-0AA00

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Technical specifications

Article number	6ES7144-4FF01-0AB0 ET 200pro, EM 4AI-U HF	6ES7144-4GF01-0AB0 ET 200pro, EM 4AI-I HF	6ES7144-4JF00-0AB0 ET 200pro, EM 4 AI-RTD HF	6ES7144-4PF00-0AB0 ET 200pro, EM 4 AI-TC HF
Supply voltage				
Rated value (DC)	24 V	24 V	24 V	24 V
Reverse polarity protection	Yes; against destruction	Yes; against destruction	Yes; against destruction	Yes; against destruction
Input current				
from supply voltage 1L+, max.	40 mA; Typical	40 mA; Typical	27 mA; Typical	34 mA; Typical
from backplane bus 3.3 V DC, max.	12 mA; Typical	12 mA; Typical	10 mA; Typical	20 mA; Typical
Encoder supply				
Number of outputs	4	4		
Short-circuit protection	Yes; per module, electronic to frame	Yes; per module, electronic to frame		
Output current				
• up to 55 °C, max.	1 A	1 A		
Analog inputs				
Number of analog inputs	4	4	4	4
permissible input voltage for voltage input (destruction limit), max.	35 V			20 V
permissible input current for current input (destruction limit), max.		40 mA		
Constant measurement current for resistance-type transmitter, typ.			1.25 mA; 1.25 / 0.5 mA depending on measuring range	
Cycle time (all channels) max.	5 ms	10 ms	83 ms; 83 ms at 50 Hz; 69 ms at 60 Hz	Number of active channels per module x basic conversion time
Technical unit for temperature measurement adjustable			Yes; Degrees Celsius/degrees Fahrenheit	Yes; °C/°F/K
Input ranges (rated values), voltages				
• 0 to +10 V	Yes			
• 1 V to 5 V	Yes			
• -10 V to +10 V	Yes			
• -5 V to +5 V	Yes			
• -80 mV to +80 mV				Yes
Input ranges (rated values), currents				
• 0 to 20 mA		Yes		
• -20 mA to +20 mA		Yes		
• 4 mA to 20 mA		Yes		
Input ranges (rated values), thermocouples				
• Type 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
Input ranges (rated values), resistance thermometer				
• Cu 10			No	
• 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	

Technical specifications

Article number	6ES7144-4FF01-0AB0 ET 200pro, EM 4AI-U HF	6ES7144-4GF01-0AB0 ET 200pro, EM 4AI-I HF	6ES7144-4JF00-0AB0 ET 200pro, EM 4 AI-RTD HF	6ES7144-4PF00-0AB0 ET 200pro, EM 4 AI-TC HF
Input ranges (rated values), resistors				
• 0 to 150 ohms			Yes	
• 0 to 300 ohms			Yes	
• 0 to 600 ohms			Yes	
• 0 to 3000 ohms			Yes	
Thermocouple (TC)				
Temperature compensation				
- internal temperature compensation				Yes
- external temperature compensation with compensations socket				Yes
Characteristic linearization				
• parameterizable			Yes	
- for resistance thermometer			Ptxxx, Nixxx	
Cable length				
• shielded, max.	30 m	30 m	30 m	30 m
Analog value generation for the inputs				
Measurement principle	integrating	integrating	integrating	integrating
Integration and conversion time/resolution per channel				
• Resolution with overrange (bit including sign), max.	15 bit; 15 bit + sign at ± 10 V, at ± 5 V; 15 bit at 0 V to 10 V, at 1 V to 5 V	15 bit; 15 bit + sign at ± 10 V, at ± 5 V; 15 bit at 0 V to 10 V, at 1 V to 5 V	15 bit; at 150, 300, 600 and 3 000 ohms; otherwise 15 bits + sign	15 bit; + sign
• Integration time (ms)	0,3 / 16,7 / 20 / 60	0,3 / 16,7 / 20 / 60	20 / 16,667	2,5 / 16,67 / 20 / 100 ms
• Interference voltage suppression for interference frequency f1 in Hz	16,67 / 50 / 60 / 3 600	16,67 / 50 / 60 / 3 600	50 / 60 Hz	10 / 50 / 60 / 400 Hz
• Conversion time (per channel)	1.1 ms	1.1 ms	20.625 ms; 20.625 ms at 50 Hz; 17.25 ms at 60 Hz	4.7/19/22/102 ms
Smoothing of measured values				
• parameterizable	Yes	Yes	Yes	Yes
Encoder				
Connection of signal encoders				
• for voltage measurement	Yes			Yes
• for current measurement as 2-wire transducer		Yes		
• for current measurement as 4-wire transducer		Yes		
• for resistance measurement with two-wire connection			Yes; Line resistances are also measured	
• for resistance measurement with three-wire connection			Yes	
• for resistance measurement with four-wire connection			Yes	
Errors/accuracies				
Linearity error (relative to input range), (+/-)	0.0075 %	0.0075 %	0.05 %	0.01 %
Temperature error (relative to input range), (+/-)	0.00075 %/K	0.00075 %/K	0.002 %/K	0.0004 %/K; Positive temperature
Crosstalk between the inputs, min.	-70 dB	-70 dB	-50 dB	-90 dB; max.
Repeat accuracy in steady state at 25 °C (relative to input range), (+/-)	0.004 %	0.004 %	0.015 %	0.01 %
Operational error limit in overall temperature range				
• Voltage, relative to input range, (+/-)	0.1 %			0.12 %; Positive temperature
• Current, relative to input range, (+/-)		0.1 %		
• Resistance thermometer, relative to input range, (+/-)			0.175 %	

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Article number	6ES7144-4FF01-0AB0 ET 200pro, EM 4AI-U HF	6ES7144-4GF01-0AB0 ET 200pro, EM 4AI-I HF	6ES7144-4JF00-0AB0 ET 200pro, EM 4 AI-RTD HF	6ES7144-4PF00-0AB0 ET 200pro, EM 4 AI-TC HF
Basic error limit (operational limit at 25 °C)				
• Voltage, relative to input range, (+/-)	0.075 %			0.1 %
• Current, relative to input range, (+/-)		0.075 %		
• Resistance thermometer, relative to input range, (+/-)			0.125 %	
Interference voltage suppression for $f = n \times (f_1 \pm 1 \%)$, $f_1 =$ interference frequency				
• Series mode interference (peak value of interference < rated value of input range), min.			50 dB	42 dB
• Common mode interference (USS < 2.5 V), min.			70 dB; Interference voltage < 5 V	85 dB; Interference voltage < 10 V
Interference voltage suppression for $f = n \times (f_1 \pm 0.5 \%)$, $f_1 =$ interference frequency				
• Series mode interference (peak value of interference < rated value of input range), min.	60 dB	60 dB		
• Common mode interference (USS < 2.5 V), min.	80 dB; Interference voltage < 10 V	80 dB; Interference voltage < 5 V		
Interrupts/diagnostics/ status information				
Diagnostics function	Yes	Yes	Yes	Yes
Alarms				
• Diagnostic alarm	Yes; Parameterizable	Yes; Parameterizable	Yes; Parameterizable	Yes; Parameterizable
• Hardware interrupt	Yes; (limit value alarm), can be parameterized for channel 0	Yes; (limit value alarm), can be parameterized for channel 0	No	No
Diagnoses				
• Diagnostic information readable	Yes	Yes	Yes	Yes
• Wire-break	Yes; at 1 to 5 V	Yes; at 4 to 20 mA	Yes	Yes
• Short-circuit	Yes; at 1 to 5 V	Yes; at 4 to 20 mA		
• Overflow/underflow			Yes	Yes
Diagnostics indication LED				
• Group error SF (red)	Yes	Yes	Yes	Yes
Potential separation				
Potential separation analog inputs				
• between the channels	No	No	No	No
• between the channels and backplane bus	Yes	Yes	Yes	Yes
Standards, approvals, certificates				
Suitable for applications according to AMS 2750				Yes; Declaration of Conformity, see online support entry 109757262
Suitable for applications according to CQI-9				Yes; Based on AMS 2750 E
Dimensions				
Width	45 mm	45 mm	45 mm	45 mm
Height	130 mm	130 mm	130 mm	130 mm
Depth	35 mm	35 mm	35 mm	35 mm
Weights				
Weight, approx.	150 g	150 g	150 g	150 g

Technical specifications

Article number	6ES7145-4FF00-0AB0 ET 200pro, EM 4AO-U HF	6ES7145-4GF00-0AB0 ET 200pro, EM 4 AO-I HF
Supply voltage		
Rated value (DC)	24 V	24 V
Reverse polarity protection	Yes; against destruction	Yes; against destruction
Input current		
from supply voltage 1L+, max.	65 mA	110 mA
from backplane bus 3.3 V DC, max.	10 mA	10 mA
Actuator supply		
Number of outputs	4	4
Short-circuit protection	Yes; per module	Yes; per module
Output current		
• up to 55 °C, max.	1 A	1 A
Analog outputs		
Number of analog outputs	4	4
Voltage output, short-circuit protection	Yes; per channel, electronic to chassis	Yes; per module, electronic to frame
Voltage output, short-circuit current, max.	50 mA	
Current output, no-load voltage, max.		16 V
Cycle time (all channels) max.	3 ms	3 ms
Output ranges, voltage		
• 0 to 10 V	Yes	
• 1 V to 5 V	Yes	
• -10 V to +10 V	Yes	
Output ranges, current		
• 0 to 20 mA		Yes
• -20 mA to +20 mA		Yes
• 4 mA to 20 mA		Yes
Connection of actuators		
• for voltage output two-wire connection	Yes	
• for voltage output four-wire connection	Yes	
• for current output two-wire connection		Yes
• for current output four-wire connection		Yes
Load impedance (in rated range of output)		
• with voltage outputs, min.	1 000 Ω	
• with voltage outputs, capacitive load, max.	1 µF	
• with current outputs, max.		600 Ω
• with current outputs, inductive load, max.		1 mH
Cable length		
• shielded, max.	30 m	30 m
Analog value generation for the outputs		
Integration and conversion time/resolution per channel		
• Resolution with overrange (bit including sign), max.	15 bit; at -10 to +10 V; 14 bit at 1 to 5 V; 15 bit at 0 to 10 V	15 bit; at ±20 mA; 14 bit at 0 to 20 mA; 15 bit 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

I/O systems

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SIMATIC ET 200pro

I/O modules > Analog expansion modules**Technical specifications**

Article number	6ES7145-4FF00-0AB0 ET 200pro, EM 4AO-U HF	6ES7145-4GF00-0AB0 ET 200pro, EM 4 AO-I HF
Errors/accuracies		
Output ripple (relative to output range, bandwidth 0 to 50 kHz), (+/-)	0.02 %	0.02 %
Linearity error (relative to output range), (+/-)	0.1 %	0.1 %
Temperature error (relative to output range), (+/-)	0.01 %/K	0.01 %/K
Repeat accuracy in steady state at 25 °C (relative to output range), (+/-)	0.05 %	0.05 %
Operational error limit in overall temperature range		
• Voltage, relative to output range, (+/-)	0.2 %	
• Current, relative to output range, (+/-)		0.2 %
Basic error limit (operational limit at 25 °C)		
• Voltage, relative to output range, (+/-)	0.15 %	
• Current, relative to output range, (+/-)		0.15 %
Interrupts/diagnostics/status information		
Diagnostics function		Yes
Substitute values connectable	Yes	Yes
Alarms		
• Diagnostic alarm	Yes; Parameterizable	Yes; Parameterizable
• Hardware interrupt	No	No
Diagnoses		
• Diagnostic information readable	Yes	Yes
• Wire-break	No	Yes; per channel, not in zero range
• Short-circuit	Yes; per channel, not in zero range	No
Diagnostics indication LED		
• Group error SF (red)	Yes	Yes
Potential separation		
Potential separation analog outputs		
• between the channels	No	No
• between the channels and backplane bus	Yes	Yes
Dimensions		
Width	45 mm	45 mm
Height	130 mm	130 mm
Depth	35 mm	35 mm
Weights		
Weight, approx.	150 g	150 g

Overview

- 45 mm wide 4 IO-LINK HF electronic module
- 4 IO-Link ports according to IO-Link specification V1.1
- Port Class B
- The IO-Link parameters are configured using the Port Configuration Tool (S7-PCT), version V3.4 and higher

Ordering data**Article No.****4 IO-Link HF electronic module****6ES7147-4JD00-0AB0**

4 IO-Link ports according to IO-Link specification V1.1, port Class B; High Feature, channel-specific diagnostics, including bus module. Connection module must be ordered separately

Accessories**CM IO-Link 4 x M12 P connection module****6ES7194-4CA20-0AA0**

4 M12 sockets for connecting IO-Link devices to ET 200pro electronic module 4 IO-Link HF

Module identification labels**6ES7194-4HA00-0AA0**

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

M12 sealing cap**3RX9802-0AA00**

For protection of unused M12 connections with ET 200pro

Technical specifications

Article number	6ES7147-4JD00-0AB0 ET200pro, EM 4 IO-Link HF
Supply voltage	
Rated value (DC)	24 V
Reverse polarity protection	Yes
Load voltage 2L+	
• Rated value (DC)	24 V
• Short-circuit protection	Yes
• Reverse polarity protection	Yes; against destruction; load increasing
Input current	
from supply voltage 1L+, max.	40 mA
from load voltage 2L+ (without load), max.	20 mA
from backplane bus 3.3 V DC, max.	20 mA
Encoder supply	
Number of outputs	4
Short-circuit protection	Yes; per module, electronic
Output current	
• up to 55 °C, max.	2 A

Article number	6ES7147-4JD00-0AB0 ET200pro, EM 4 IO-Link HF
IO-Link	
Number of ports	4
• of which simultaneously controllable	4
IO-Link protocol 1.0	Yes
IO-Link protocol 1.1	Yes
Transmission rate	4.8 kBaud (COM1); 38.4 kBaud (COM2), 230.4 kBaud (COM3)
Size of process data, input per port	32 byte
Size of process data, input per module	32 byte
Size of process data, output per port	32 byte
Size of process data, output per module	32 byte
Memory size for device parameter	2 kbyte; for each port
Master backup	Possible with function block IO_LINK_MASTER
Configuration without S7-PCT	Possible; autostart/manual function
Cable length unshielded, max.	20 m
Operating modes	
• IO-Link	Yes
• DI	Yes
• DQ	Yes; max. 100 mA
Connection of IO-Link devices	
• Port type A	Yes; via 3-core cable
• Port type B	Yes; Additional device supply: for X1 and X2 max. 2 A in total, for X3 and X4 max. 2 A in total
Interrupts/diagnostics/status information	
Diagnostics function	Yes
Alarms	
• Diagnostic alarm	Yes
Diagnoses	
• Diagnostic information readable	Yes
• Wire-break	Yes; channel by channel
• Short-circuit	Yes; channel by channel
Diagnostics indication LED	
• Channel status display	Yes; One green LED for channel status Qn (SIO mode) and port status IO-Ln (IO-Link mode)
• Group error SF (red)	Yes
• Channel fault indicator F (red)	Yes; combined with the IO-Link port status
Potential separation	
between the load voltages	Yes
between backplane bus and all other circuit components	Yes
Potential separation channels	
• between the channels	No
Degree and class of protection	
IP degree of protection	IP65/67
Standards, approvals, certificates	
Suitable for safety-related tripping of standard modules	No
Dimensions	
Width	45 mm
Height	130 mm
Depth	35 mm
Weights	
Weight, approx.	150 g

I/O systems

SIMATIC ET 200 systems without control cabinet

SIMATIC ET 200pro

I/O modules > Fail-safe expansion modules > Fail-safe digital expansion modules

Overview



Fail-safe digital inputs/outputs with IP65/66/67 degree of protection for cabinet-free application on the machine level.

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 (switching to P/M potential) of actuators
- Actuators can be controlled up to 2 A

All modules are certified up to SIL 3 (IEC 61508) and feature detailed diagnostics.

The modules support PROFIsafe in both PROFIBUS and PROFINET configurations. They can be used with IM151-7 F-CPU, CPU31xF-2 DP, CPU31xF-2 PN/DP and CPU416F-2.

Ordering data

Article No.

Fail-safe digital input module 8/16 F-DI PROFIsafe

24 V DC, including bus module.
Terminal module must be ordered separately

6ES7148-4FA00-0AB0

Fail-safe digital input/output module 4/8 F-DI, 4 F-DO 2 A

24 V DC, including bus module.
Terminal module must be ordered separately

6ES7148-4FC00-0AB0

Fail-safe electronic module F-Switch PROFIsafe

Three fail-safe outputs switching to PP potential for safe switching of the rear panel busbar (2L+, F0, F1); two fail-safe digital inputs, 45 mm; usable up to SIL3 (IEC 61508)

6ES7148-4FS00-0AB0

Accessories

Terminal module

For the fail-safe electronic module F-Switch PROFIsafe

6ES7194-4DA00-0AA0

Terminal module

For the fail-safe electronic module 4/8 F-DI/4 F-DO, 24 V DC/2 A

6ES7194-4DC00-0AA0

Terminal module

For the fail-safe electronic module 8/16 F-DI, 24 V DC

6ES7194-4DD00-0AA0

PROFIBUS DP interface module IM154-2

Including termination module

6ES7154-2AA01-0AB0

PROFINET interface module IM154-4 PN

Including termination module

6ES7154-4AB10-0AB0

M12 sealing cap

For protection of unused M12 connections with ET 200pro

3RX9802-0AA00

Technical specifications

Article number	6ES7148-4FA00-0AB0 ET200PRO, EI-Mod., 8/16 F-DI 24V DC	Article number	6ES7148-4FA00-0AB0 ET200PRO, EI-Mod., 8/16 F-DI 24V DC
Supply voltage		Standards, approvals, certificates	
Rated value (DC)	24 V	Highest safety class achievable in safety mode	
Reverse polarity protection	Yes	• Performance level according to ISO 13849-1	e
Input current		• SIL acc. to IEC 61508	3
from supply voltage 1L+, max.	120 mA; Typical	Dimensions	
from backplane bus 3.3 V DC, max.	20 mA	Width	90 mm
Digital inputs		Height	130 mm
Number of digital inputs	16	Depth	65 mm
Input current			
• for signal *1*, typ.	3.7 mA		

Article number	6ES7148-4FC00-0AB0 ET200PRO, EI-Mod., 4/8 F-DI/4 F-DO 24VDC/2A	6ES7148-4FS00-0AB0 ET200PRO, EI-Mod., F-Switch PROFIsafe
Supply voltage		
Rated value (DC)	24 V	24 V
Input current		
from supply voltage 1L+, max.	100 mA; Typical	50 mA
from load voltage 2L+ (without load), max.	50 mA; Typical	25 mA; Typical
from backplane bus 3.3 V DC, max.	20 mA	40 mA
Digital inputs		
Number of digital inputs	8	2
Input current		
• for signal *1*, typ.	3.7 mA	3.5 mA
Digital outputs		
Number of digital outputs	4	3
Short-circuit protection	Yes	Yes
Output current		
• for signal *1* rated value	2 A	
Dimensions		
Width	90 mm	45 mm
Height	130 mm	130 mm
Depth	65 mm	65 mm

I/O systems

SIMATIC ET 200 systems without control cabinet

SIMATIC ET 200pro

I/O modules > PM-E power module

Overview



- PM-E DC 24 V power module

Ordering data

Article No.

Article No.

PM-E DC 24 V power module

For backfeed and group formation of the 24 V DC load voltage for electronic modules within an ET 200pro station.

6ES7148-4CA00-0AA0

Accessories

CM PM-E ECOFAST connection module

For backfeed of 24 V load voltage, 1 ECOFAST Cu connection

6ES7194-4BA00-0AA0

CM PM-E direct connection module

For backfeed of 24 V load voltage, up to 2 M20 screwed cable glands

6ES7194-4BC00-0AA0

CM PM-E 7/8" connection module

For backfeed of 24 V load voltage, 1 x 7/8"

6ES7194-4BD00-0AA0

CM PM-E PP connection module

For supplying 24 V load voltage, 2 x push-pull, with spare fuse

6ES7194-4BE00-0AA0

PM-E M12-L connection module

For backfeed of 24 V load voltage, 1x M12-L

6ES7194-4BL00-0AA0

Spare fuse

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

6ES7194-4HB00-0AA0

PROFIBUS ECOFAST hybrid cable, copper

Trailing-type cable (PUR sheath), with two shielded Cu wires for PROFIBUS DP plus four Cu wires of 1.5 mm², sold by the meter, minimum order quantity 20 m, maximum order quantity 1 000 m

Preassembled with ECOFAST male and female connector, fixed length

- 1.5 m
- 3 m
- 5 m
- 10 m
- 15 m
- 20 m

6XV1830-7AH10

6XV1830-7BH15
6XV1830-7BH30
6XV1830-7BH50
6XV1830-7BN10
6XV1830-7BN15
6XV1830-7BN20

PROFIBUS ECOFAST hybrid cable, GP

Trailing-type cable with 4 x copper cores and 2 x copper cores, shielded, with UL approval

Preassembled with ECOFAST male and female connector

- 1.5 m
- 3 m
- 5 m
- 10 m
- 15 m
- 20 m

6XV1860-3PH15
6XV1860-3PH30
6XV1860-3PH50
6XV1860-3PN10
6XV1860-3PN15
6XV1860-3PN20

Ordering data	Article No.	Article No.
ECOFAST connection plug, for user assembly Female connector; ordering unit 5 items	6GK1905-0CB00	Accessories for CM PM-E 7/8"
PROFIBUS ECOFAST hybrid plug, angled With 2 x shielded copper cores and 4 x 1.5 mm ² copper cores; 5 items; with assembly instructions; female contact insert	6GK1905-0CD00	7/8" connecting cable to power supply 5-wire, 5 x 1.5 mm ² , trailing type, preassembled with two 7/8" connectors, 5-pin • 1.5 m long • 2.0 m long • 3.0 m long • 5.0 m long • 10 m long • 15 m long
Push-pull connection plug For 1L+/ 2L+, unassembled	6GK1907-0AB11-6AA0	6XV1822-5BH15 6XV1822-5BH20 6XV1822-5BH30 6XV1822-5BH50 6XV1822-5BN10 6XV1822-5BN15
Cover caps for push-pull female connectors 5 units	6ES7194-4JA50-0AA0	7/8" connection plug With axial cable outlet • with female contact insert, 5 per pack
Accessories for CM PM-E direct		6GK1905-0FB00
Power line 5-wire, 5 x 1.5 mm ² , trailing type, sold by the meter, minimum order quantity 20 m, maximum order quantity 1 000 m	6XV1830-8AH10	

Technical specifications

Article number	6ES7148-4CA00-0AA0 ET 200pro, PM-E 24V DC	Article number	6ES7148-4CA00-0AA0 ET 200pro, PM-E 24V DC
Supply voltage		Potential separation	between load voltage and backplane bus Yes
Load voltage 2L+		Degree and class of protection	IP degree of protection IP65/67
• Rated value (DC)	24 V	Dimensions	Width 45 mm Height 130 mm Depth 35 mm
• Short-circuit protection	Yes; via an exchangeable fuse in the power module	Weights	Weight, approx. 140 g
• Reverse polarity protection	Yes; against destruction		
Input current			
from load voltage 2L+, max.	3 mA		
Current carrying capacity			
max.	10 A; up to 55 °C (on the internal busbars of the ET 200pro)		
Power loss			
Power loss, typ.	0.1 W		
Interrupts/diagnostics/status information			
Diagnostics function	Yes		
Diagnoses			
• Diagnostic information readable	Yes		
• missing load voltage	Yes		
Diagnostics indication LED			
• For load voltage monitoring	Yes		
• Group error SF (red)	Yes		

I/O systems

SIMATIC ET 200 systems without control cabinet

SIMATIC ET 200pro

I/O modules > PM-O power module output

Overview



PM-O 2 x 24 V DC power module with CM PM-O PP

- PM-O 2x 24 V DC power module

Ordering data

Article No.

Article No.

PM-O 2 x 24 V DC power module

For drawing the 24 V load voltage 2L+ and electronic/encoder supply voltage 1L+ within an ET 200pro station.

6ES7148-4CA60-0AA0

Accessories

CM PM-O PP connection module

For drawing the 24 V load voltage and electronic/encoder supply voltage, 2 x push-pull connector

6ES7194-4BH00-0AA0

Push-pull cable connector

For 1L+/ 2L+, unassembled

6GK1907-0AB11-6AA0

Cover caps for push-pull female connectors

5 units

6ES7194-4JA50-0AA0

Technical specifications

Article number	6ES7148-4CA60-0AA0 ET200PRO, PM-O DC 2x24V
Supply voltage	
Load voltage 2L+	
• Rated value (DC)	24 V
• Short-circuit protection	Yes
• Reverse polarity protection	Yes; against destruction
Input current	
from load voltage 2L+, max.	3 mA
Current carrying capacity	
max.	10 A; up to 55 °C (on the internal busbars of the ET 200pro)
Power loss	
Power loss, typ.	1.1 W
Interrupts/diagnostics/status information	
Diagnostics function	Yes
Diagnoses	
• Diagnostic information readable	Yes
• missing load voltage	No
Diagnostics indication LED	
• For load voltage monitoring	No; Signalled in IM or in PM
• Group error SF (red)	Yes

Article number	6ES7148-4CA60-0AA0 ET200PRO, PM-O DC 2x24V
Potential separation	
between load voltage and backplane bus	Yes
Degree and class of protection	
IP degree of protection	IP65/67
Dimensions	
Width	45 mm
Height	130 mm
Depth	35 mm
Weights	
Weight, approx.	150 g

Overview



- Interface for holding an original FESTO CPV 10 or CPV 14 compact performance valve terminal
- For using ET 200pro in applications with flexible pneumatics
- Highly flexible pneumatics due to a variety of valve functions and choice of flow rates

Ordering data

Article No.

Article No.

EM 148-P pneumatic interface

DO 16 x P/CPV 10 for direct accommodation of FESTO valve terminal CPV 10 16 DO x P

DO 16 x P/CPV 14 for direct accommodation of FESTO valve terminal CPV 14 16 DO x P

6ES7148-4EA00-0AA0**6ES7148-4EB00-0AA0**

FESTO CPV 10 valve terminal

FESTO CPV 14 valve terminal

available from FESTO

available from FESTO

FESTO AG & Co
Ruiterstr. 82
D-73732 Esslingen

More addresses
on the Internet at:
<http://www.festo.com>

Technical specifications

Article number	6ES7148-4EA00-0AA0 ET200PRO, 16DO,Pneumatic Interface CPV10	6ES7148-4EB00-0AA0 ET200PRO, 16DO,Pneumatic Interface CPV14
Supply voltage		
Load voltage 2L+		
• Rated value (DC)	24 V	24 V
• Short-circuit protection	Yes	Yes
• Reverse polarity protection	Yes	Yes
Input current		
from load voltage 2L+, max.	300 mA; Including valves	370 mA; Including valves
from backplane bus 3.3 V DC, max.	25 mA	25 mA
Power loss		
Power loss, typ.	2.6 W	3.7 W
Address area		
Address space per module		
• Address space per module, max.	2 byte	2 byte
Digital outputs		
Number of digital outputs	16	16
Load resistance range		
• lower limit	500 Ω	500 Ω
• upper limit	2 500 Ω	2 500 Ω
Output current		
• for signal "1" rated value	12 mA	16 mA
Switching frequency		
• with inductive load, max.	25 Hz	20 Hz
Total current of the outputs (per group)		
all mounting positions		
- up to 55 °C, max.	250 mA; only up to 50 °C, limited by valves	330 mA; only up to 50 °C, limited by valves

I/O systems

SIMATIC ET 200 systems without control cabinet

SIMATIC ET 200pro

I/O modules > ET 200pro pneumatic interface

Technical specifications

Article number	6ES7148-4EA00-0AA0 ET200PRO, 16DO,Pneumatic Interface CPV10	6ES7148-4EB00-0AA0 ET200PRO, 16DO,Pneumatic Interface CPV14
Interrupts/diagnostics/ status information		
Diagnostics function	Yes	Yes
Alarms		
• Diagnostic alarm	Yes	Yes
Diagnoses		
• Diagnostic information readable	Yes	Yes
Diagnostics indication LED		
• Group error SF (red)	Yes	Yes
• Status indicator digital output (green)	Yes	Yes
Pneumatics		
Number of connectable valves, max.	16	16
permissible working pressure, min.	3 bar	3 bar
permissible working pressure, max.	8 bar	8 bar
Rated flow rate	400 l/min	800 l/min
Standards, approvals, certificates		
Suitable for safety-related tripping of standard modules	Yes	Yes
Highest safety class achievable for safety-related tripping of standard modules		
• Performance level according to ISO 13849-1	PL d	PL d
• Category according to ISO 13849-1	Cat. 3	Cat. 3
• SIL acc. to IEC 62061	SIL 2	SIL 2
Dimensions		
Width	90 mm	120 mm
Height	130 mm	152 mm
Depth	47 mm	47 mm

Overview



The SIMATIC RF170C is a communications module for connecting the SIMATIC identification systems to the ET 200pro distributed I/O system. The readers of all RFID systems as well as the MV400 optical readers and MV300 optical handheld readers can be operated on the RF170C. In addition, the RF170C provides a universal RS232/ RS422 interface for connecting devices using the Freeprot protocol.

Thanks to the high degree of protection and ruggedness, ET 200pro is particularly suitable for machine-level use. The modular structure with PROFIBUS and PROFINET connection systems allows it to be used in all applications. The uniform plug-in connection system ensures rapid commissioning.

Ordering data

Article No.

Article No.

SIMATIC RF170C communications module

For connecting to the ET 200pro distributed I/O system

6GT2002-0HD01

Accessories**Connection block for SIMATIC RF170C**

For connecting 2 readers or other RS422/RS232 devices via an M12 connector

6GT2002-1HD01

Reader cable for SIMATIC RF200 / RF300 / RF600 / MV440

Or MOBY D extension cable and SIMATIC RF200 / RF300 / RF600 / MV400, PUR material, trailable

2 m, straight plug

6GT2891-4FH20

5 m, straight plug

6GT2891-4FH50

10 m, straight plug

6GT2891-4FN10

20 m, straight plug

6GT2891-4FN20

50 m, straight plug

6GT2891-4FN50

2 m, plug angled at reader

6GT2891-4JH20

5 m, plug angled at reader

6GT2891-4JH50

10 m, plug angled at reader

6GT2891-4JN10

Connecting cable for SIMATIC RF1000

Prefabricated RS232, between RF1040R or RF1070R and a communications module; black, length 2 m

6GT2891-4UH20

Reader cable for MV300 handheld readers

Coiled cable with usable length of 1.6 m to 4 m for MV320, PUR material

6GT2191-0BH50

Plug for connection of other RS422/RS232 devices

8-pole M12 plug, male, screw connections for wires up to 0.5 mm².
Order quantity 1 pack with 5 units

6GT2090-0BE00

M12 sealing caps for unused reader connections

Minimum order quantity 10 units, price per 100 units

3RX9802-0AA00

I/O systems

SIMATIC ET 200 systems without control cabinet

SIMATIC ET 200pro

I/O modules > RF170C

Technical specifications

Article number	6GT2002-0HD01
product type designation	RF170C communication module
suitability for operation	ET 200pro distributed I/O together with RF200/300/1000, MV300/400/500, MOBY D/E/I/U and RS-232 devices
transfer rate	
transfer rate at the point-to-point connection serial maximum	115.2 kbit/s
interfaces	
design of the interface for point-to-point connection	RS422/RS232 via connection block
number of readers connectable	2
type of electrical connection	
• of the backplane bus	ET 200pro backplane bus
• of the PROFIBUS interface	(according to the head module)
• of Industrial Ethernet interface	(according to the head module)
• for supply voltage	ET 200pro backplane bus
design of the interface to the reader for communication	Internal plug to the connection block
mechanical data	
material	Thermoplastic (Valox 467, fiberglass reinforced)
color	IP Basic 714
tightening torque of the screw for securing the equipment maximum	1.5 N·m
supply voltage, current consumption, power loss	
supply voltage	
• at DC rated value	24 V
• at DC	20 ... 30 V
• consumed current at DC at 24 V without connected devices typical	0.13 A
• Consumed current from supply voltage 1L+ maximum	1 A
ambient conditions	
ambient temperature	
• during operation	-25 ... +55 °C
• during storage	-40 ... +70 °C
• during transport	-40 ... +70 °C
protection class IP	IP67
shock resistance	According to IEC 61131-2
shock acceleration	300 m/s ²
vibrational acceleration	100 m/s ²

Article number	6GT2002-0HD01
product type designation	RF170C communication module
design, dimensions and weights	
width	90 mm
height	130 mm
depth	35 mm
net weight	0.27 kg
fastening method	ET 200pro rack
wire length for RS 422 interface maximum	1 000 m
product features, product functions, product components general	
display version	(see connection block)
product function addressable	No
transponder file handler	
protocol is supported	
• S7 communication	Yes
product functions management, configuration, engineering	
type of parameterization	HSP
type of programming	FB 45, FB 55, ID profile, library with functions, (FC 45/55 with restricted functionality)
type of computer-switched communication	acyclic communication
standards, specifications, approvals	
certificate of suitability	CE, FCC, cULus
MTBF	77 a
accessories	
accessories	Connection block for RF170C

Overview

**Power supply for ET200pro:**

- 3-phase, 24 V DC/8 A

The SIMATIC ET200pro PS power supply unit with IP67 degree of protection is used as the electronics/encoder supply and load voltage supply of the new SIMATIC ET 200pro distributed I/O system for use close to the machine without a cabinet. With a second connector for looping the input voltage.

Product highlights

- 3-phase, 24 V DC/8 A
- Wide-range input, input voltage 340 ... 550 V
- Up to 88% efficiency
- With signaling contact for "24 V OK" and "Overtemperature"
- Status indicator on the device by means of LED (green = "24 V OK")
- Temperature range from -25 °C to +55 °C

Ordering data

Article No.

Article No.

SIMATIC ET 200pro PS

Stabilized power supply in distributed I/O system design, permitting the loop-through of energy to further modules; with degree of protection IP67; Input: 400–480 V 3 AC Output: 24 V DC/8 A

Accessories**Power connector**

For connecting to the distributed I/O system

- For X1 (6 mm²)
- For X2 (4 mm²)

6ES7148-4PC00-0HA0
3RK1911-2BE30
3RK1911-2BF10
National Fire Protection Association compatible

These devices are only approved for installation in industrial machinery according to the NFPA79 Electrical Standard for Industrial Machinery.

- for X1 SIMATIC ET200pro PS 61 88 201 1003.xx (AWG10)*
- for X1 SITOP PSU300P 61 88 201 1000.xx / 61 88 201 1002.xx (AWG14)*
- for X2 SIMATIC ET200pro PS 61 88 202 1010.xx (AWG10)*
supplied blanking cap for X2
- for X3 Phoenix-Contact SAC-5P-M12-M12FS
supplied blanking cap for X3

* <http://www.harting.com/startseite>**3RK1902-0CK00****Sealing cap**

For 9-pole power sockets

- X2 (1 unit)
- X2 (10 units)

3RK1902-0CK00
3RK1902-0CJ00

Technical specifications

Article number	6ES7148-4PC00-0HA0
Product	SIMATIC ET200pro PS
Power supply, type	24 V/8 A
Input	
type of the power supply network	3-phase AC
supply voltage at AC	
• minimum rated value	400 V
• maximum rated value	480 V
• initial value	340 V; 320 ... 340 V for max. 1 min
• full-scale value	550 V
design of input wide range input	Yes
overvoltage overload capability	Implemented internally with varistors
operating condition of the mains buffering	at Vin = 400 V
buffering time for rated value of the output current in the event of power failure minimum	15 ms

Article number	6ES7148-4PC00-0HA0
Product	SIMATIC ET200pro PS
Power supply, type	24 V/8 A
operating condition of the mains buffering	at Vin = 400 V
line frequency	
• 1 rated value	50 Hz
• 2 rated value	60 Hz
line frequency	45 ... 66 Hz
input current	
• at rated input voltage 400 V	0.5 A
current limitation of inrush current at 25 °C maximum	40 A
I2t value maximum	3.5 A ² ·s
fuse protection type	T 4 A
• in the feeder	Required: Circuit breaker 3RV2011-1DA10 or 3RV2711-1DD10 (UL 489)

I/O systems

SIMATIC ET 200 systems without control cabinet

SIMATIC ET 200pro

Power supplies > 3-phase, 24 V DC (ET200pro PS, IP67)

Technical specifications

Article number	6ES7148-4PC00-0HA0
Product	SIMATIC ET200pro PS
Power supply, type	24 V/8 A
Output	
voltage curve at output	Controlled, isolated DC voltage
output voltage at DC rated value	24 V
output voltage	
• at output 1 at DC rated value	24 V
relative overall tolerance of the voltage	3 %
relative control precision of the output voltage	
• on slow fluctuation of input voltage	0.5 %
• on slow fluctuation of ohm loading	0.5 %
residual ripple	
• maximum	200 mV
voltage peak	
• maximum	250 mV
product function output voltage adjustable	No
type of output voltage setting	-
display version for normal operation	Green LED for 24 V OK
type of signal at output	max. 30 V, 10 mA; Power-Good (High-Pegel 1L+ for V_{out} in range 21.3 ... 29 V); Overtemperature warning at least 30 s before switch-off (high level 1L+ when the max. internal temperature is exceeded)
behavior of the output voltage when switching on	Overshoot of $V_{out} < 2 \%$
response delay maximum	1.5 s
voltage increase time of the output voltage	
• typical	40 ms
output current	
• rated value	8 A
• rated range	0 ... 8 A
supplied active power typical	192 W
short-term overload current	
• on short-circuiting during the start-up typical	50 A
• at short-circuit during operation typical	50 A
duration of overloading capability for excess current	
• on short-circuiting during the start-up	100 ms
• at short-circuit during operation	100 ms
product feature	
• bridging of equipment	No
Efficiency	
efficiency in percent	88 %
power loss [W]	
• at rated output voltage for rated value of the output current typical	25 W

Article number	6ES7148-4PC00-0HA0
Product	SIMATIC ET200pro PS
Power supply, type	24 V/8 A
Closed-loop control	
relative control precision of the output voltage with rapid fluctuation of the input voltage by +/- 15% typical	0.5 %
relative control precision of the output voltage load step of resistive load 50/100/50 % typical	1 %
setting time	
• maximum	2 ms
Protection and monitoring	
design of the overvoltage protection	< 33 V
response value current limitation typical	9.4 A
property of the output short-circuit proof	Yes
design of short-circuit protection	Electronic shutdown, automatic restart
enduring short circuit current RMS value	
• maximum	10 A
display version for overload and short circuit	-
Safety	
galvanic isolation between input and output	Yes
galvanic isolation	Protective extra low output voltage V_{out} according to EN 60950-1 and EN 50178
operating resource protection class	Class I
leakage current	
• maximum	3.5 mA
• typical	0.4 mA
protection class IP	IP67, enclosure type 5 indoor
Approvals	
certificate of suitability	
• CE marking	Yes
• UL approval	Yes; UL-Listed (UL 508) according to NFPA compatibility (National Fire Protection Association), see operating instructions
• CSA approval	No; -
• cCSAus, Class 1, Division 2	No
• ATEX	No
certificate of suitability	
• IECEx	No
• NEC Class 2	No
• ULhazloc approval	No
• FM registration	No
type of certification CB-certificate	Yes
certificate of suitability	
• EAC approval	Yes
certificate of suitability shipbuilding approval	No
shipbuilding approval	-
Marine classification association	
• American Bureau of Shipping Europe Ltd. (ABS)	No
• French marine classification society (BV)	No
• DNV GL	No
• Lloyds Register of Shipping (LRS)	No
• Nippon Kaiji Kyokai (NK)	No

Technical specifications

Article number	6ES7148-4PC00-0HA0
Product	SIMATIC ET200pro PS
Power supply, type	24 V/8 A
EMC	
standard	
• for emitted interference	EN 55022 Class A
• for mains harmonics limitation	-
• for interference immunity	EN 61000-6-2
environmental conditions	
ambient temperature	
• during operation	-25 ... +55 °C; with natural convection
• during transport	-40 ... +70 °C
• during storage	-40 ... +70 °C
environmental category according to IEC 60721	Climate class 3K3, 5 ... 95% no condensation

Article number	6ES7148-4PC00-0HA0
Product	SIMATIC ET200pro PS
Power supply, type	24 V/8 A
Mechanics	
type of electrical connection	screw-type terminals
• at input	L1, L2, L3, PE: Plug connector HAN Q4/2 (counterpart see "Electrical accessories")
• at output	L+, M: 2 x 1.5 mm² each (4-pole cable for +/- with open, labeled ends, 4 x 1.5 mm²)
• for auxiliary contacts	Alarm signals: M12 plug-in connector 5-pin
width of the enclosure	310 mm
height of the enclosure	135 mm
depth of the enclosure	90 mm
net weight	2.8 kg
product feature of the enclosure	No
housing can be lined up	
fastening method	Can be mounted onto ET200pro mounting rail
electrical accessories	Power connector (Input: 3RK1911-2BE30 (6 mm²)) (Output: 3RK1911-2BF10 (4 mm²))
MTBF at 40 °C	196 354 h
other information	Specifications at rated input voltage and ambient temperature +25 °C (unless otherwise specified)

I/O systems

SIMATIC ET 200 systems without control cabinet

SIMATIC ET 200pro

ET 200pro motor starters > General data

Overview

ET 200pro motor starters in I/O system ET 200pro

SIMATIC ET 200pro is the modular I/O system with high degree of protection IP65/66/67 for local, cabinet-free use. The ET 200pro motor starters with the high degree of protection IP65 are an integral part of ET 200pro.



ET 200pro motor starter: Isolator module, Standard starter and High Feature starter mounted on a wide module rack

ET 200pro motor starters (see pages 10/415 and 10/416)

- Only two variants up to 5.5 kW
- All settings can be parameterized by bus
- Comprehensive diagnostic signals
- Support for PROFlenergy
- Overload can be acknowledged by remote reset
- Current unbalance monitoring
- Stall protection
- EMERGENCY START function on overload
- Current value transmission by bus
- Current limit monitoring
- Full support of acyclic services
- Direct-on-line or reversing starters
- Power bus connection can be plugged in using Han Q4/2 plug-in connectors
- Motor feeder with Han Q8/0 connector
- Conductor cross-section up to 6 x 4 mm²
- 25 A per segment (power looped through using jumper plug)
- In the Standard and High Feature versions (with 4 DI on-board)
- Electromechanical switching and electronic switching
- Electronic starter for direct activation or with integrated soft starter function
- Supplied with 400 V AC brake contact as an option
- Temperature sensor can be connected (Thermoclick or PTC type A)
- Provision of the motor current in PROFlenergy format to higher-level systems, motor current shutdown in dead times using PROFlenergy

More information

Homepage see <https://www.siemens.com/sirius-motor-starter-et200sp>

Industry Mall see <https://www.siemens.com/product?ET200pro>

Further components in the ET 200pro distributed I/O system:

- Interface modules, CPUs, I/O modules, ET 200pro PS see from page 10/377
- ET 200pro FC-2 frequency converter see page 10/425

Catalog IC 10 see <https://www.siemens.com/ic10>

ET 200pro isolator modules (see page 10/417)

The isolator module with switch disconnecter function is used for safe disconnection of the 400 V operational voltage during repair work in the plant and provides an integrated group fusing function (i.e. additional group short-circuit protection for all subsequently supplied motor starters).

Depending on the power distribution concept, all stations can be equipped with an isolator module as an option.

Safety applications

Safety Solution PROFIsafe (see page 10/418)

With the Safety PROFIsafe modules

- F-Switch and
 - 400 V disconnecting module
- with an appropriate connection, safety levels SIL 3 (according to IEC 62061) and PL e (according to ISO 13849-1) can also be reached.

Functionality

With the ET 200pro motor starters, any three-phase loads can be protected and switched.

The ET 200pro motor starters are available with mechanical and also electronic contacts.

The ET 200pro electromechanical starters are offered as direct-on-line starters (DSe) and reversing starters (RSe) as **Standard** and **High Feature** versions. There are device versions with or without control for externally fed brakes with 400 V AC.

Compared with the Standard motor starters, the **High Feature, mechanical** motor starter also has:

- Four digital inputs
- Advanced parameterization options

The ET 200pro electronic starters are offered as direct-on-line starters (sDSSt/sDSt) and reversing starters (sRSSt/sRSt) in the High Feature version.

Compared with the High Feature mechanical motor starters, the **High Feature, electronic** motor starter also has:

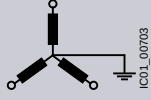
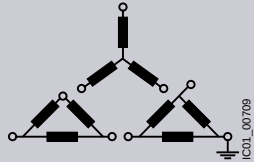
- Soft starting and smooth ramp-down function
- Deactivated soft start function as an electronic starter for applications with a high switching frequency
- Advanced parameterization options

As a result of the protection concept with solid-state overload evaluation and the use of SIRIUS switching devices, size S00, additional advantages are realized on the Standard and High Feature motor starters – advantages that soon make themselves positively felt particularly in manufacturing processes with high plant stoppage costs:

- Configuration is made easier by the fine modular structure with ET 200pro. When using ET 200pro motor starters, the parts list per load feeder is reduced to two main items: the bus module and the motor starter. This makes the ET 200pro ideal for modular machine concepts or solutions for conveying systems and 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 also optimized by the low level of variance (two units up to 5.5 kW).
- With four locally acting inputs available on the High Feature motor starter it is possible to realize autonomous special functions that work independently of the bus and the higher level control system, e.g. as a quick stop on gate valve controls or limit position disconnectors. In parallel with this, the states of these inputs are signaled to the control system.

Voltages

The specifications for 3-phase line supply according to IEC 60947-4-1 are valid for the following line system configurations:

Voltage U_e	Line system configurations	
	Three-phase four-wire systems	Three-phase three-wire systems
		
V	V	V
230	--	230
400	230/400	400
440	260/440	440
500	--	500

-- Not specified

Article No. scheme

Product versions		Article number					
Motor starters		3RK1304 – 5 ☐ S ☐ 0 ☐ – ☐ A A ☐					
Setting range	0.15 ... 2.0 A 1.5 ... 12 A	K L					
Product function	Direct-on-line starters DSe Reversing starters RSe Direct-on-line starters DSe Reversing starters RSe Direct-on-line starters sDSSte/sDSte Reversing starters sDSSte/sDSte	4 4 4 4 7 7	4 5 2 3 2 3				Standard Standard High Feature High Feature High Feature High Feature
Inputs/outputs	Without brake output With brake output					0 3	400 V AC, with High Feature + 4 inputs
Example		3RK1304 – 5 K S 4 0 – 4 A A 0					

Product versions		Article number					
Modules		3RK1304 – 0 H S 0 0 – ☐ A A 0					
Product function	Isolator modules 400 V disconnecting module					6 8	Safety modules PROFIsafe
Example		3RK1304 – 0 H S 0 0 – 6 A A 0					

Note:

The article number schemes show an overview of product versions for better understanding of the logic behind the article numbers.

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

I/O systems

SIMATIC ET 200 systems without control cabinet

SIMATIC ET 200pro

ET 200pro motor starters > General data

Type		Standard motor starters	High Feature motor starters
Technology designation ¹⁾		DSe, RSe	DSe, RSe sDSSSte, sDSte, sRSSSte, sRSte
Device functions (firmware features)			
Parameterizable rated operational current		✓	
Integrated short-circuit protection		✓	
Parameterizable current limit values		--	✓ 2 limit values
Parameterizable response in case of current limit violation		--	✓
Zero current monitoring		✓	
Parameterizable response in case of zero current violation		✓	
Parameterizable current unbalance limit	%	-- Fixed limit value	✓ 30 ... 60 x I_e
Parameterizable response in case of unbalance limit violation		✓	
Motor blocking monitoring		--	✓
Parameterizable blocking current limit	%	--	✓ 150 ... 1 000 x I_e
Parameterizable blocking time limit	s	--	✓ 1 ... 5
Current value transmission		✓	
Group warning diagnostics		--	✓ Parameterizable
Group diagnostics		✓ Parameterizable	
EMERGENCY START		✓	
Digital inputs		--	✓ 4 inputs
• Parameterizable input signal		--	✓ Latching/non-latching
• Parameterizable input level		--	✓ NC/NO contacts
• Parameterizable input signal delay	ms	--	✓ 10 ... 80
• Parameterizable input signal extension	ms	--	✓ 0 ... 200
• Parameterizable input control actions		--	✓ 12 different actions
Brake output (400 V AC)		✓ Order option	
Parameterizable brake enabling delay	s	✓ -2.5 ... +2.5	
Parameterizable holding time of the brake during stopping	s	✓ 0 ... 25	
Parameterizable start up type		--	✓
Parameterizable ramp-down time		--	✓
Parameterizable starting voltage		--	✓
Parameterizable stopping voltage		--	✓
Local device interface		✓	
Firmware update		✓ By specialists	
Thermal motor model		✓	
Parameterizable trip class		-- CLASS 10 fixed	✓ CLASS 5, 10, 15, 20
Parameterizable response in case of overload of thermal motor model		--	✓ 3 possible states
Advance warning limit for motor heating	%	--	✓ Parameterizable 0 ... 95
Advance warning limit time-related trip reserve	s	--	✓ Parameterizable 0 ... 500
Parameterizable recovery time	min	--	✓ 1 ... 30
Parameterizable protection against voltage failure		-- Permanently	✓
Reversing start function		✓ Order option	
Parameterizable interlock time for reversing starters		-- 150 ms fixed	✓ 0 ... 60 s
Integrated logbook functions		✓ 3 device logbooks	
Integrated statistics data memory		✓	
Parameterizable response in case of CPU/master stop		✓	
PROFenergy profile support		✓	
• Disconnection of the motor current during idle times		✓	
• Measured motor current values		✓	
Device indications			
• Group fault		SF LED (red)	
• Switching state		STATE LED (red, yellow, green)	
• Device status		DEVICE LED (red, yellow, green)	
• Digital inputs		--	IN 1 ... IN 4, LED

✓ Function available

-- Function not available

- ¹⁾ DS Direct-on-line starters
 RS Reversing starters
 DSS .. Direct-on-line soft starters
 RSS .. Reversing soft starters
 e Electronic motor protection
 te Full motor protection (thermal + electronic)
 s Electronic switching with semiconductor.

Benefits

ET 200pro motor starters provide the following advantages:

- High flexibility thanks to a modular and compact design
- Little variance among all motor starter versions (two units up to 5.5 kW)
- Extensive parameterization using STEP 7 HW Config
- Increase of plant availability through fast replacement of units (easy mounting and plug-in technology)
- Extensive diagnostics and information for preventive maintenance
- Parameterizable inputs for on-site control functions (High Feature)
- Cabinet-free design thanks to high degree of protection IP65

Application

The SIMATIC ET 200pro motor starters are ideal for the use of several spatially concentrated distributed drive solutions in which several motors, or digital or analog sensors and actuators are addressed from a distributed station. They are perfectly suited for protecting and switching any AC loads.

Application areas

The SIMATIC ET 200pro motor starters are suitable for numerous sectors of industry, e.g. machinery and plant engineering or conveying applications.

Use of ET 200pro motor starters in conjunction with IE3 and IE4 motorsNote:

For the use of ET 200pro motor starters in conjunction with highly efficient IE3 and IE4 motors, please observe the information on dimensioning and configuring [see Application manual, https://support.industry.siemens.com/cs/ww/en/view/94770820](https://support.industry.siemens.com/cs/ww/en/view/94770820).

More Information [see Catalog IC 10, https://www.siemens.com/ic10](https://www.siemens.com/ic10).

I/O systems

SIMATIC ET 200 systems without control cabinet

SIMATIC ET 200pro

ET 200pro motor starters > General data

Technical specifications

More information			
Manual, see https://support.industry.siemens.com/cs/ww/en/view/22332388		Notes on security: System networking requires suitable protective measures (including network segmentation for IT security) in order to ensure safe plant operation. For more information on the subject of Industrial Security, see https://www.siemens.com/industrialsecurity .	
Type		Standard motor starters	High Feature motor starters
		Mechanically switching without inputs	Mechanically switching with inputs
Technology designation ¹⁾		DSe, RSe	DSe, RSe
			Mechanically switching with inputs and soft starter function sDSSSte, sDSte, sRSSSte, sRSte
Mechanics and environment			
Motor starters or modules that can be connected to ET 200pro With width of 110 mm		max. 8	
Mounting dimensions (W x H x D) • Direct-on-line starters and reversing starters		mm	110 x 230 x 150
			110 x 230 x 160
Permissible ambient temperature • During operation • During storage		°C	-25 ... +55, from +40 with derating
		°C	-40 ... +70
Permissible mounting position			Vertical, horizontal
Vibration resistance acc. to IEC 60068, Part 2-6		g	2
Shock resistance acc. to IEC 60068, Part 2-27		g/ms	Half-sine 15/11
Degree of protection			IP65
Pollution degree			3, IEC 60664 (IEC 61131)
Electrical specifications			
Power consumption at 24 V DC • From auxiliary circuit L+/M (U1) • From auxiliary circuit A1/A2 (U2)		mA	Approx. 40
		mA	Approx. 200
Rated operational current I_g for power bus		A	25
Rated operational voltage U_g • Approval according to EN 60947-1, Appendix N • Approval according to CSA and UL		AC V	400 (50/60 Hz)
		AC V	Up to 400 (50/60 Hz)
		AC V	Up to 600 (50/60 Hz)
			Up to 400 (50/60 Hz)
			Up to 480 (50/60 Hz)
Approval • DIN VDE 0106, Part 101 • CSA and UL approval		V	Up to 400
		V	Up to 600
			Up to 480
			Up to 480
Conductor cross-sections • Incoming power supply		mm ²	Max. 6 x 4
Touch protection			Finger-safe
Rated impulse withstand voltage U_{imp}		kV	6
Rated insulation voltage U_i		V	400
Rated operational current I_g for starters • AC-1/2/3, AC-3e at 40 °C - At 400 V - At 500 V • AC-4 at 40 °C - At 400 V		A	0.15 ... 2.0/1.5 ... 12.0
		A	0.15 ... 2.0/1.5 ... 9.0
		A	0.15 ... 2.0/1.5 ... 4.0
Rated short-circuit breaking capacity		kA	100 at 400 V
Type of coordination acc. to IEC 60947-4-1			1
Power of three-phase motors at 400 V		kW	Max. 5.5
			Max. 5.5/4 ³⁾
Utilization categories			AC-1, AC-2, AC-3, AC-3e, AC-4
			AC-53a ⁴⁾ (max. 9 A with deactivated soft start function up to CLASS 10)
Protective separation between main and auxiliary circuits		V	400, acc. to EN 60947-1, Appendix N
Endurance of contactor • Mechanical • Electrical		Oper. cycles	30 million
		Oper. cycles	Up to 10 million; depending on the current loading (see manual, https://support.industry.siemens.com/cs/ww/en/view/22332388)
			--
			--
Permissible switching frequency			Depending on the current loading, motor starting time, and relative ON period (see manual, https://support.industry.siemens.com/cs/ww/en/view/22332388)
Operating times at 0.85 ... 1.1 x U_g • Closing delay • Opening delay		ms	11 ... 50
		ms	5 ... 45

¹⁾ DS Direct-on-line starters
RS Reversing starters
DSS .. Direct-on-line soft starters
RSS .. Reversing soft starters
e Electronic motor protection
te Full motor protection (thermal + electronic)
s Electronic switching with semiconductor.

²⁾ If the soft starter control function is deactivated, the permissible rated operational current is reduced to 9 A to CLASS 10.

³⁾ With parameterization as electronic starter max. 4 kW.

⁴⁾ 8-hour operation.

Overview

The functionality, device functions, and technical specifications of the Standard motor starter are described in

"ET 200pro motor starters, General data", (see page 10/410 onwards).

Selection and ordering data

Version		Article No.	
Standard motor starters, mechanical Motor protection: thermal model			
 DSe Standard	DSe direct-on-line starters¹⁾		
	- Without brake output - With brake output 400 V AC	3RK1304-5□S40-4AA0 3RK1304-5□S40-4AA3	
	RSe reversing starters¹⁾		
	- Without brake output - With brake output 400 V AC	3RK1304-5□S40-5AA0 3RK1304-5□S40-5AA3	
Setting range Rated operational current			
0.15 ... 2.0 A 1.5 ... 12.0 A		K L	

¹⁾ Only functions when used together with the backplane bus module and the wide module rack. The backplane bus module and the wide module rack must be ordered separately (see "Accessories for ET 200pro motor starters", page 10/424).

Motorstarter für den Einsatz im Feld, hohe Schutzart

SIMATIC ET 200 systems without control cabinet

SIMATIC ET 200pro

ET 200pro motor starters > High Feature motor starters

IE3/IE4 ready

AC-3e

Overview

The functionality, device functions, and technical specifications of the High Feature motor starter are described in "ET 200pro motor starters, General data" (see page 10/410 onwards).

The High Feature motor starter differs from the Standard motor starter in having more parameters and four integrated, freely-parameterizable digital inputs.

Selection and ordering data

Version		Article No.
High Feature motor starters, mechanical		
Motor protection: thermal model		
 RSe High Feature	DSe direct-on-line starters¹⁾	
	- Without brake output and with 4 inputs - With brake output 400 V AC and 4 inputs	3RK1304-5□S40-2AA0 3RK1304-5□S40-2AA3
	RSe reversing starters¹⁾	
	- Without brake output and with 4 inputs - With brake output 400 V AC and 4 inputs	3RK1304-5□S40-3AA0 3RK1304-5□S40-3AA3
	Setting range Rated operational current 0.15 ... 2.0 A 1.5 ... 12.0 A	K L
High Feature motor starters²⁾, electronic		
Full motor protection, comprising thermal motor protection and thermistor motor protection		
 sRSSSte High Feature	Direct-on-line starters sDSSSte/sDSte¹⁾²⁾	
	- Without brake output and with 4 inputs - With brake output 400 V AC and 4 inputs	3RK1304-5□S70-2AA0 3RK1304-5□S70-2AA3
	Reversing starters sRSSSte/sRSte¹⁾²⁾	
	- Without brake output and with 4 inputs - With brake output 400 V AC and 4 inputs	3RK1304-5□S70-3AA0 3RK1304-5□S70-3AA3
	Setting range Rated operational current 0.15 ... 2.0 A 1.5 ... 12.0 A	K L

¹⁾ Only functions when used together with the backplane bus module and the wide module rack. The backplane bus module and the wide module rack must be ordered separately (see "Accessories for ET 200pro motor starters", page 10/424).

²⁾ The solid-state motor starters can be used not only as solid-state motors starters with a high level of switching frequency but also as fully fledged soft starters for soft starting and stopping. The changeover from motor starter to soft starter takes place through reparameterization in HW Config. Depending on the setting, this results in the following current ranges:

- Parameterization as solid-state motor starter: 0.15 to 2 A and 1.5 to 9 A (4 kW).
- Parameterization as soft starter: 0.15 to 2 A and 1.5 to 12 A (5.5 kW).

Overview

The isolator module with integrated group fusing function (i.e. additional group short-circuit protection for all subsequently supplied motor starters) and switch disconnecter function is used to safely disconnect the 400 V operating voltage during repair work in the plant.

Depending on the power distribution concept, all stations can be equipped with an isolator module as an option.

The following properties apply to the isolator module:

- Increase of plant availability through fast replacement of units (easy mounting and plug-in technology)
- Cabinet-free design thanks to high degree of protection IP65

Technical specifications

Type	Isolator modules	
General data		
Mounting dimensions (W x H x D) • Direct-on-line starters and reversing starters	mm	110 x 230 x 170
Permissible ambient temperature • During operation • During storage	°C °C	-25 ... +55 -40 ... +70
Permissible mounting position		Any
Vibration resistance acc. to IEC 60068 Part 2-6	g	2
Shock resistance acc. to IEC 60068 Part 2-27	g/ms	Half-sine 15/11
Power consumption • From auxiliary circuit L+/M (U1) • From auxiliary circuit A1/A2 (U2)	mA	Approx. 20 --
Rated operational current I_e for power bus	A	25
Rated operational voltage U_e	V	400
Approvals according to • DIN VDE 0106, Part 101 • CSA and UL	V V	Up to 500 Up to 600
Conductor cross-sections • Incoming power supply	mm ²	Max. 6 x 4

Type	Isolator modules	
Degree of protection	IP65	
Touch protection	Finger-safe	
Pollution degree	3, IEC 60664 (IEC 61131)	
Rated impulse withstand voltage U_{imp}	kV	6
Rated insulation voltage U_i	V	400
Rated operational current I_e for starters		
• AC-1 / 2 / 3 at 40 °C		
- At 400 V	A	25
- At 500 V	A	25
Rated short-circuit breaking capacity	kA	50 at 400 V
Type of coordination acc. to IEC 60947-4-1	2	
Protective separation between main and auxiliary circuits	V	400, according to DIN VDE 0106, Part 101
Device functions		
• Group diagnostics	Yes, parameterizable	
Device indications		
• Group fault	SF LED (red)	

Selection and ordering data

Version	Article No.
---------	-------------

ET 200pro isolator module, mechanical



3RK1304-0HS00-6AA0

Isolator module¹⁾

Rated operational current 25 A

3RK1304-0HS00-6AA0

¹⁾ Only functions when used together with the backplane bus module and the wide module rack. The backplane bus module and the wide module rack must be ordered separately (see "Accessories for ET 200pro motor starters", page 10/424).

I/O systems

SIMATIC ET 200 systems without control cabinet
SIMATIC ET 200pro

ET 200pro Safety motor starters Solutions local/PROFIsafe > Safety modules PROFIsafe

Overview

Safety Solution PROFIsafe

With the Safety PROFIsafe modules

- F-Switch and
- 400 V disconnecting module

With an appropriate connection, safety levels SIL 3 (according to IEC 62061) and PL e (according to ISO 13849-1) can be reached.

F-Switch PROFIsafe

Fail-safe digital inputs/outputs in degrees of protection IP65 to IP67 for near-machine, cabinet-free use.

Fail-safe digital inputs

- For the fail-safe reading in of sensor information (1-/2-channel)
- Including integrated discrepancy evaluation for 2v2 signals
- Internal sensor supplies (incl. testing) available

Fail-safe digital outputs

- Three fail-safe switching to PP potential outputs for safe switching of the backplane busbars

The F-Switch is certified up to SIL 3/PL e and has detailed diagnostics. It supports PROFIsafe in PROFIBUS configurations as well as in PROFINET configurations.

Note:

Safety characteristics, [see](#)

<https://support.industry.siemens.com/cs/ww/en/view/109739348>.

Functionality

The PROFIsafe F-Switch is a fail-safe solid-state module for PROFIsafe safety applications. It has two fail-safe inputs and outputs for safe switching of the 24 V supply over backplane busbars. In combination with the 400 V disconnecting module, fail-safe disconnection of ET 200pro motor starters is possible in PROFIsafe applications up to SIL 3/PL e.

400 V disconnecting module

The 400 V disconnecting module enables the safe disconnection of an operational voltage of 400 V up to PL e. For operation in a Safety PROFIsafe application it functions only in combination with the F-Switch.

Functionality

The 400 V disconnecting module can be used together with the F-Switch for PROFIsafe safety applications. It contains two contactors connected in series for safety-related disconnection of the main circuit. The auxiliary circuit supply of the device is over a safety power rail in the backplane bus module. The 400 V disconnecting module can be used in conjunction with the F-Switch for safety applications up to PL e.

Technical specifications

Type	400 V disconnecting module	
General data		
Mounting dimensions (W x H x D)		
• Direct-on-line starters and reversing starters	mm	110 x 230 x 150
Permissible ambient temperature		
• During operation	°C	-25 ... +55
• During storage	°C	-40 ... +70
Permissible mounting position		Any
Vibration resistance acc. to IEC 60068, Part 2-6		2 g
Shock resistance acc. to IEC 60068, Part 2-27		Half-sine 15 g/11 ms
Power consumption		
• From auxiliary circuit L+/M (U1)	mA	Approx. 20 --
• From auxiliary circuit A1/A2 (U2)		
Rated operational current I_e for power bus		A 25
Rated operational voltage U_e		V 400 (50/60 Hz)
Approval DIN VDE 0106, Part 101		V Up to 500
CSA and UL approval		V Up to 600
Conductor cross-sections		
Incoming power supply	mm ²	Max. 6 x 4
Degree of protection		IP65
Touch protection		Finger-safe
Pollution degree		3, IEC 60664 (IEC 61131)

Type	400 V disconnecting module	
Rated impulse withstand voltage U_{imp}	kV	6
Rated insulation voltage U_i	V	400
Rated operational current I_e for starters		
• AC-1 / 2 / 3 at 40 °C		
- At 400 V	A	25
- At 500 V	A	25
Rated short-circuit breaking capacity	kA	50 at 400 V
Type of coordination acc. to IEC 60947-4-1		
		2
Protective separation between main and auxiliary circuits		
	V	400, according to DIN VDE 0106, Part 101
Operating times at 0.85 ... 1.1 x U_s		
• Closing delay	ms	25 ... 100
• Opening delay	ms	7 ... 10
Device functions		
• Group diagnostics		Yes, parameterizable
Device indications		
• Group fault		SF LED (red)

Selection and ordering data

Version		Article No.
Safety modules PROFIsafe		
 3RK1304-0HS00-8AA0	400 V disconnecting modules¹⁾²⁾ Rated operational current 25 A	3RK1304-0HS00-8AA0
 6ES7148-1FS00-0AB0	F-Switch PROFIsafe 24 V DC, including bus module <u>Note:</u> Connection module must be ordered separately	6ES7148-4FS00-0AB0
	Connection modules for F-Switch 24 V DC	6ES7194-4DA00-0AA0

1) The 400 V disconnecting module functions only when used together with the Safety local isolator module or with the F-Switch.

2) The 400 V disconnecting module functions only when used together with the backplane bus module and the wide module rack. The backplane bus module and the wide module rack must be ordered separately (see "Accessories for ET 200pro motor starters", page 10/424).

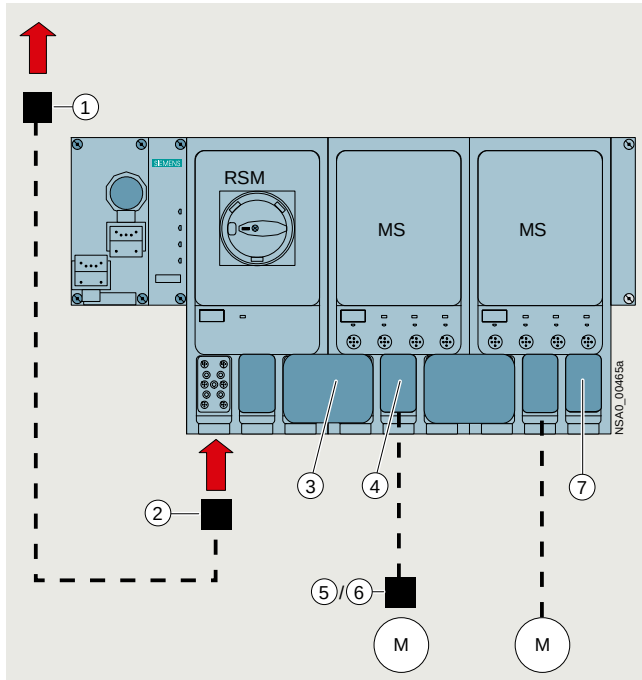
I/O systems

SIMATIC ET 200 systems without control cabinet

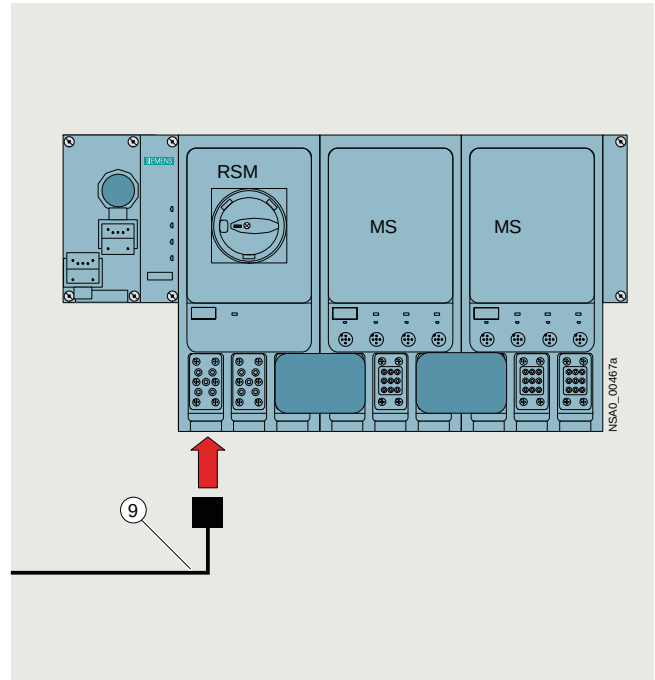
SIMATIC ET 200pro

Accessories for ET 200pro motor starters

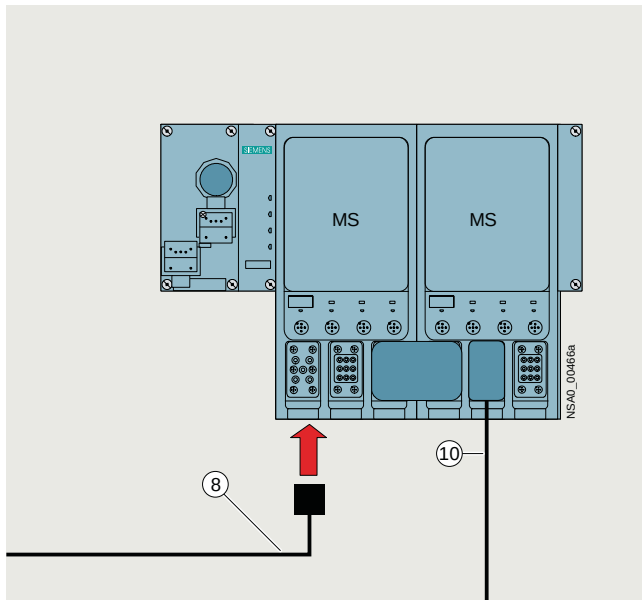
Overview



Basic design of an ET 200pro version with (from the left) connection module for IM, interface module for communication (IM), RSM isolator module, two ET 200pro motor starters (MS), and connections for energy



Infeed on the RSM isolator module



Infeed on the ET 200pro motor starter

Legend:

- ① Power feeder plug (see page 10/422)
- ② Power connection plug (see page 10/422)
- ③ Power jumper plug (see page 10/422)
- ④ Motor connection plug (see page 10/422)
- ⑤ Motor plug (see page 10/422)
- ⑥ Motor plug with EMC suppressor circuit (see page 10/422)
- ⑦ Power loop-through plug (see page 10/422)
- ⑧ Power connection cable (see page 10/422)
- ⑨ Power connection cable for isolator module (see page 10/422)
- ⑩ Motor cable (see page 10/423)

Power bus

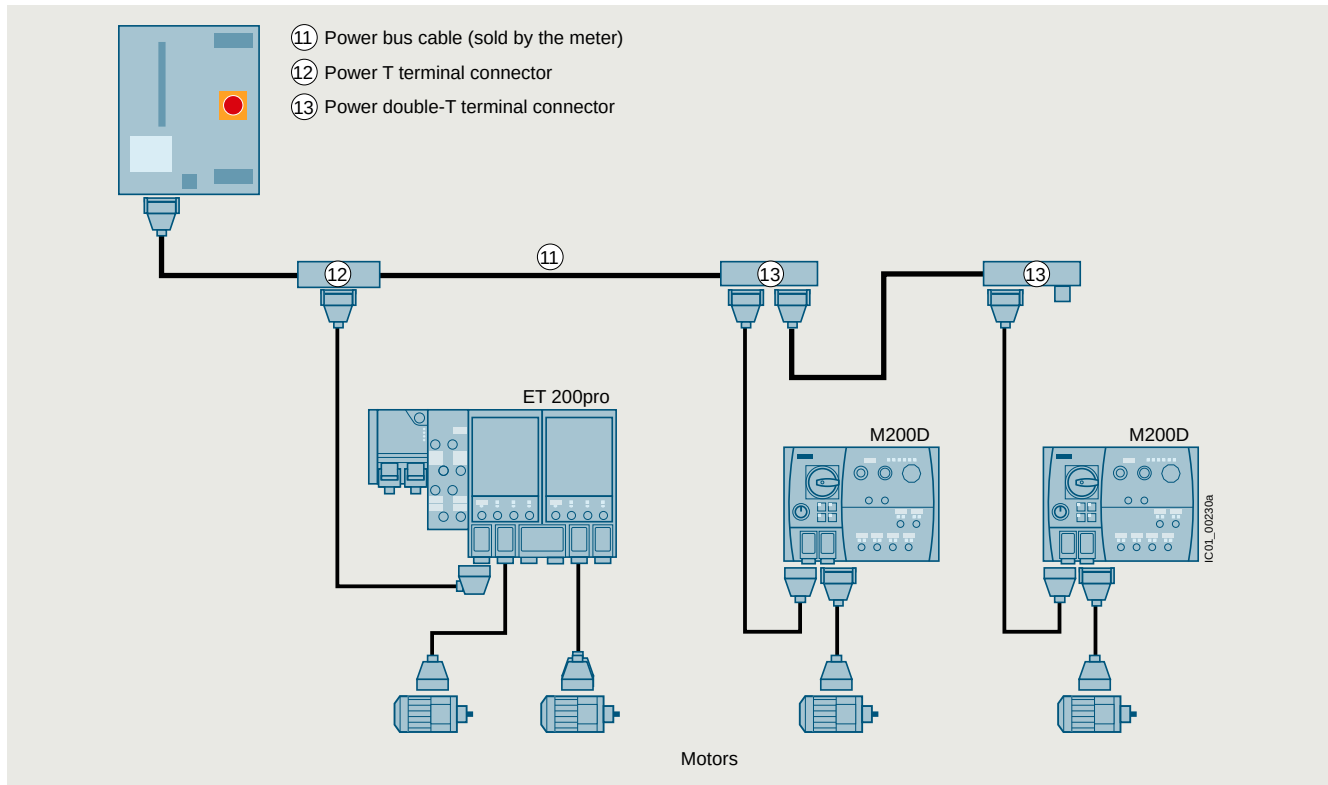
The power supply to the field devices (ET 200pro motor starters, M200D motor starters) is provided via the power bus, in which the power T terminal connectors or power double-T terminal connectors are connected by power bus cables.

Feeders

From the terminal connectors, spur lines with Han Q4/2 plugs lead to the field devices, from which the motors are supplied with power via motor connection cables.

Interruption-free thanks to power terminal connectors

In finger-safe connection technology the power T terminal connectors and power double-T terminal connectors connect the components of a feeder to the power bus. They ensure interruption-free operation, i.e. the power bus is not interrupted when the components are plugged in.



Power supply to the motors via the power bus with power T and double-T terminal connectors linked by power bus cables, spur lines to the field devices (motor starters), and power loop-through connections to the motors via motor connection cables

Motor control via PROFIBUS

The interface modules (IM) for PROFIBUS can be combined with two different connection modules for connecting PROFIBUS DP and the power supply:

- Direct connection with cable bushings
- M12, 7/8" connection
 - with M12 connecting cable and M12 plugs for data transmission with PROFIBUS DP
 - with 7/8" connecting cable and 7/8" plugs for the power supply

For the connection modules with the associated accessories, see "Accessories ET 200pro interface modules", page 10/378.

Motor control via PROFINET

For the connection modules with the associated accessories, see "Accessories ET 200pro interface modules", page 10/378

I/O systems

SIMATIC ET 200 systems without control cabinet

SIMATIC ET 200pro

Accessories for ET 200pro motor starters**Selection and ordering data**

Version	Article No.
Incoming power supply	
① Power feeder plugs Connector set for incoming power supply, e.g. for connecting to T terminal connectors, comprising a coupling enclosure, straight outgoing feeder (with bracket), pin insert for Han Q4/2, incl. bushing • 5 male contacts, 2.5 mm² • 5 male contacts, 4 mm² • 5 male contacts, 6 mm²	3RK1911-2BS60 3RK1911-2BS20 3RK1911-2BS40
② Power connection plugs Connector set for incoming power supply for connection to ET 200pro motor starters/ET 200pro isolator modules, comprising a cable-end connector hood, angular outgoing feeder, female insert for Han Q4/2, including bushing • 5 female contacts, 2.5 mm² • 5 female contacts, 4 mm² • 5 female contacts, 6 mm²	3RK1911-2BE50 3RK1911-2BE10 3RK1911-2BE30
⑧ Power connection cables, assembled at one end Power connection cable for ET 200pro motor starters, open at one end, for Han Q4/2, angular, 4 x 4 mm ² • Length 1.5 m • Length 5.0 m	3RK1911-0DB13 3RK1911-0DB33
⑨ Power connection cables for isolator module, assembled at one end Power connection cable for ET 200pro isolator modules, open at one end, for Han Q4/2, angular, insert turned at isolator module end, 4 x 4 mm ² • Length 1.5 m • Length 5.0 m	3RK1911-0DF13 3RK1911-0DF33
Power loop-through on the field device	
③ Power jumper plugs	3RK1922-2BQ00
⑦ Power loop-through plugs Connector set for power loop-through for connection to ET 200pro motor starters/ET 200pro isolator modules, comprising a cable-end connector hood, angular outgoing feeder, pin insert for Han Q4/2, including bushing • 4 male contacts, 2.5 mm² • 4 male contacts, 4 mm²	3RK1911-2BF50 3RK1911-2BF10
Motor cables	
④ Motor connection plugs Connector set for motor cable for connection to ET 200pro motor starters, comprising a cable-end connector hood, angular outgoing feeder, pin insert for Han Q8/0, incl. bushing • 8 male contacts, 1.5 mm² • 6 male contacts, 2.5 mm²	3RK1902-0CE00 3RK1902-0CC00
⑤ Motor plugs Connector set for motor cable for connection to motors, comprising a cable-end connector hood, straight outgoing feeder, female insert for Han 10e, incl. star jumper, including bushing • 7 female contacts, 1.5 mm² • 7 female contacts, 2.5 mm²	3RK1911-2BM21 3RK1911-2BM22
⑥ Motor plugs with EMC suppressor circuit Connector set for motor cable for connection to motors, comprising a cable-end connector hood, straight outgoing feeder, female insert for Han 10e with EMC suppressor circuit, including star jumper, including bushing • 7 female contacts, 1.5 mm² • 7 female contacts, 2.5 mm²	3RK1911-2BL21 3RK1911-2BL22

Accessories for ET 200pro motor starters

Version	Article No.
Motor cables (continued)	
⑩ Motor cables, assembled at one end Open at one end, Han Q8, angular, length 5 m - For motor without brake, for ET 200pro, 4 x 1.5 mm² - For motor with brake for ET 200pro, 6 x 1.5 mm² - For motor without brake, with thermistor, for ET 200pro, 6 x 1.5 mm² - For motor with brake and thermistor for ET 200pro, 8 x 1.5 mm²	3RK1911-0EB31 3RK1911-0ED31 3RK1911-0EF31 3RK1911-0EG31
Power bus	
⑫ Power T terminal connectors For 400 V AC, for connection of feeders (e.g. motor starters) by means of standard round cable at any point of the power bus, by insulation displacement connection, used with preassembled bus segments 2.5 mm² / 4 mm² 4 mm² / 6 mm²	3RK1911-2BF01 3RK1911-2BF02
⑬ Power double-T terminal connectors For 400 V AC, for connection of feeders (e.g. motor starters) by means of standard round cable at any point of the power bus, by insulation displacement connection, used with preassembled bus segments, connection of two motor starters possible 4 mm² / 6 mm²	3RK1911-2BG02
Sealing set (comprising 2 seals) For power T/power double-T terminal connectors - For power cables with Ø 10 ... 13 mm - For power cables with Ø 13 ... 16 mm - For power cables with Ø 16 ... 19 mm - For power cables with Ø 19 ... 22 mm - Blanking plugs	3RK1911-5BA00 3RK1911-5BA10 3RK1911-5BA20 3RK1911-5BA30 3RK1911-5BA50
Further accessories for power connections	
 Crimping tool for pins/sockets, 4 mm ² and 6 mm ²	3RK1902-0CW00
 Dismantling tools - For male and female contacts for 9-pole Han Q4/2 inserts - For male and female contacts for 9-pole Han Q8 inserts	3RK1902-0AB00 3RK1902-0AJ00
Sealing caps For 9-pole power socket connectors 1 unit per pack 10 units per pack	3RK1902-0CK00 3RK1902-0CJ00

3RK1902-0CW00

3RK1902-0CK00

Overview



SIMATIC ET 200pro FC-2 frequency converter

The SIMATIC ET 200pro FC-2 frequency converter has the design of a SIMATIC ET 200pro module. It supplements the SIMATIC ET 200pro system range with distributed, speed-controlled drives. It is suitable for the open-loop and closed-loop control of asynchronous (induction) motors in a wide range of industrial applications. It is predestined for conveyor technology applications using drives networked via PROFIBUS and PROFINET, in particular in distributed designs without control cabinet with high degree of protection (IP65), when combining several drives. The modular, service-friendly concept is ideally suited to manufacturing processes with high plant standstill costs.

Reasons for using distributed drive systems

- Modular drive solutions – therefore standardized mechatronic elements that can be individually tested
- A control cabinet is not required, resulting in a smaller space requirement and lower cooling requirements
- Long motor cables between converter and motor are not required
 - Less power losses
 - Reduced noise radiation
 - Reduced costs for shielded cables
 - No additional filters
- Distributed configurations offer considerable benefits for conveyor systems with their extensive coverage (e.g. in the automotive and logistics sectors)

Siemens family of distributed drives

Siemens offers an innovative portfolio of frequency converters to optimally implement distributed drive solutions. The strengths of the individual members of the drive family permit simple adaptation to the widest range of application demands:

- Identical connection systems
- User-friendly commissioning and configuration tools

Products from the family of distributed drives:

- SINAMICS G115D distributed drive system (wall and motor-mounted)
- SINAMICS G120D frequency converters
- SIMATIC ET 200pro FC-2 frequency converters
- SIRIUS M200D motor starters

Safety Integrated

The distributed SIMATIC ET 200pro FC-2 frequency converters are already equipped with the integrated STO (Safe Torque Off) safety function, certified in accordance with IEC 61508 SIL 2 as well as EN ISO 13849-1 PL d and Category 3. It can be activated locally via the F-RSM or by means of PROFIsafe.

STARTER commissioning tool

The STARTER commissioning tool (V4.4 and higher) plus the corresponding SINAMICS Support Package (SSP) supports the commissioning and maintenance of SIMATIC ET 200pro FC-2 frequency converters.

The operator guidance combined with comprehensive, user-friendly functions for the relevant drive solution allow you to commission the device quickly and easily.

Engineering Framework STEP7 classic (V5.5 and higher)

Hardware Support Packages (HSP) are available to integrate SIMATIC ET 200pro FC-2 in STEP7 classic.

Engineering Framework TIA Portal (as from V13 SP1)

TIA Portal is a powerful engineering framework providing full access to the whole digitized automation.

Hardware Support Packages (HSP) are available to integrate SIMATIC ET 200pro FC-2 in TIA Portal.

I/O systems

SIMATIC ET 200 systems without control cabinet
SIMATIC ET 200pro

SIMATIC ET 200pro FC-2 frequency converter

Ordering data	Article No.		Article No.
SIMATIC ET 200pro FC-2 frequency converter with integrated safety function STO (Safe Torque Off)	6SL3514-1KE13-5AE0	STARTER commissioning tool ¹⁾ on DVD-ROM	6SL3072-0AA00-0AG0
Backplane bus module for mounting the frequency converter (absolutely essential for operation of the converter)	6SL3260-2TA00-0AA0	PC converter connection kit 2 Mini USB interface cable for communication with a PC, 3 m (9.84 ft) long	6SL3255-0AA00-2CA0
Accessories		Connecting cable pre-assembled at one end Power supply cable, open at one end, for Q4/2, angled, 4 x 4 mm ²	
IOP-2 Handheld For use with SINAMICS G120 SINAMICS G120C SINAMICS G120P SINAMICS G120D SIMATIC ET 200pro FC-2 Included in the scope of delivery:	6SL3255-0AA00-4HA1	1.5 m (4.92 ft) long 5 m (16.4 ft) long	3RK1911-0DB13 3RK1911-0DB33
- IOP-2 - Handheld housing - Rechargeable batteries (4 x AA) - Charging unit (international) - RS232 connecting cable 3 m (9.84 ft) long, can be used in combination with SINAMICS G120, SINAMICS G120C, SINAMICS G120P - USB cable 1 m (3.28 ft) long		Connector set for the power supply Q4/2	
		2.5 mm² 4 mm² 6 mm²	3RK1911-2BE50 3RK1911-2BE10 3RK1911-2BE30
RS232 connecting cable 2.5 m (8.20 ft) long, with optical interface for connecting the IOP-2 Handheld to SINAMICS G120D, SIMATIC ET 200pro FC-2	3RK1922-2BP00	Motor cables pre-assembled at one end for motors with brake and temperature sensor with Q8 plug, shielded	(HTG: supplied by Harting) (ZKT: supplied by KnorrTec)
Memory cards		Cross-section	4 x 1,5 mm ² 2 x (2 x 0,75 mm ²)
SINAMICS SD-Card 512 Mbyte	6SL3054-4AG00-2AA0	1.5 m (4.92 ft) long 3 m (9.84 ft) long 5 m (16.4 ft) long 10 m (32.8 ft) long	HTG: 61 88 201 0288 ZKT: 70020501000150 HTG: 61 88 201 0289 ZKT: 70020501000300 HTG: 61 88 201 0290 ZKT: 70020501000500 HTG: 61 88 201 0299 ZKT: 70020501001000
Optional firmware memory cards		Connector set for motor cable Q8, shielded	HTG: 61 83 401 0131 ZKT: 10032001
SINAMICS SD card 512 MB + firmware V4.7 SP13 (Multicard V4.7 SP13)	6SL3054-7TG00-2BA0		
SINAMICS SD card 512 MB + firmware V4.7 SP14 (Multicard V4.7 SP14)	6SL3054-7TH00-2BA0		

¹⁾ The STARTER commissioning tool is also available on the internet at <http://www.siemens.com/starter>

Technical specifications

Distributed frequency converter	SIMATIC ET 200pro FC-2
Selection features	
Integrated safety functions acc. to IEC 61508 SIL 2 and EN ISO 13849-1 PL d and Category 3	- Safe Torque Off (STO) - Control of the integrated safety function via the Safety Local isolator module F-RSM or via F-Switch PROFI-safe
Electrical specifications	
Line voltage	380 ... 480 V 3 AC ±10 %
Power	
- With an ambient temperature of 0 ... 55 °C (32 °F ... 131 °F) - With an ambient temperature of 0 ... 45 °C (32 °F ... 113 °F)	1.1 kW 1.5 kW
Rated input current/output current	
- With an ambient temperature of 0 ... 55 °C (32 °F ... 131 °F) - With an ambient temperature of 0 ... 45 °C (32 °F ... 113 °F)	2 A/3.5 A 2.5 A/3.9 A
Line frequency	47 ... 63 Hz
Overload capability	- Overload current 1.5 x rated output current (i.e. 150 % overload) for 60 s, cycle time 300 s - Overload current 2 x rated output current (i.e. 200 % overload) for 3 s, cycle time 300 s

Technical specifications

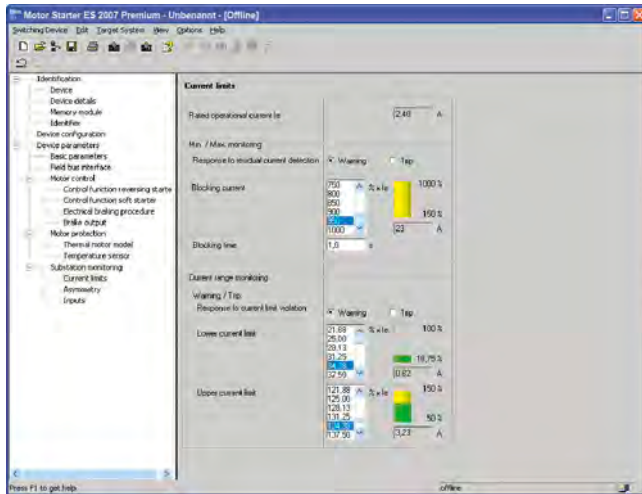
Distributed frequency converter	SIMATIC ET 200pro FC-2																								
Output frequency	0 ... 550 Hz																								
Pulse frequency	4 kHz (standard), 4 ... 16 kHz (in 2-kHz increments)																								
Standard SCCR (Short Circuit Current Rating)	10 kA																								
Skipped frequency range	1, parameterizable																								
Converter efficiency	95 ... 97 %																								
Interfaces	• Connection to PROFIBUS and PROFINET over the SIMATIC ET 200pro backplane bus • Mini USB interface for commissioning via PC (as from STARTER V4.4 plus SSP) • Optical interface for commissioning via the IOP-2 Handheld • Slot for an optional memory card (SD) for uploading or downloading parameter settings. Facilitates easy device replacement. • PTC, bimetal, KTY84, Pt1000 interface for motor temperature monitoring																								
Functions																									
Open-loop/closed-loop control methods	• V/f control – linear ($M \sim n$) with/without flux current control (FCC), quadratic ($M \sim n^2$) or parameterizable • Vector control – sensorless • Closed-loop torque control																								
Operating functions	• Jogging • BICO technology • Automatic restart following interruptions in operation due to a power failure • Smooth connection of converter to rotating motor																								
Braking functions	• Integrated regenerative feedback functionality • Control of an electromagnetic holding brake <table><tr><td colspan="5">Integrated brake control supplies DC power supply to the brake</td></tr><tr><td>Line voltage</td><td>380 V AC</td><td>400 V AC</td><td>440 V AC</td><td>480 V AC</td></tr><tr><td>Rectified brake voltage</td><td>171 V DC</td><td>180 V DC</td><td>198 V DC</td><td>216 V DC</td></tr><tr><td>Recommended brake coil voltage for Siemens motors</td><td>170 ... 200 V DC</td><td>170 ... 200 V DC 184 ... 218 V DC</td><td>184 ... 218 V DC</td><td>184 ... 218 V DC</td></tr></table>					Integrated brake control supplies DC power supply to the brake					Line voltage	380 V AC	400 V AC	440 V AC	480 V AC	Rectified brake voltage	171 V DC	180 V DC	198 V DC	216 V DC	Recommended brake coil voltage for Siemens motors	170 ... 200 V DC	170 ... 200 V DC 184 ... 218 V DC	184 ... 218 V DC	184 ... 218 V DC
Integrated brake control supplies DC power supply to the brake																									
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Recommended brake coil voltage for Siemens motors	170 ... 200 V DC	170 ... 200 V DC 184 ... 218 V DC	184 ... 218 V DC	184 ... 218 V DC																					
Protection functions	Disconnection on the DC side permits "fast" braking. • Undervoltage • Overvoltage • Ground fault • Short-circuit • Stall protection • Thermal motor protection (I^2t or sensor) • Converter overtemperature • Motor blocking protection • Phase failure detection																								
Connectable motors	• Low-voltage asynchronous (induction) motors • Motor cable lengths: max. 15 m (49 ft) (shielded)																								
Mechanical specifications																									
Degree of protection	IP65																								
Operating temperature	0 ... 55 °C (32 ... 131 °F)																								
Mounting position	Vertical wall mounting (vertical alignment of the cooling fins)																								
Dimensions (W × H × D)	155 mm × 246 mm × 248 mm (6.10 in × 9.69 in × 9.76 in)																								
Weight, approx.	4 kg (8.8 lb)																								
Standards																									
Certificates of suitability	UL508C, cUL, CE, UKCA, Low Voltage Directive 2014/35/EU, EMC Directive 2014/30/EU																								

IO Systeme

SIMATIC ET 200 systems without control cabinet
SIMATIC ET 200pro

ET 200pro software > Motor Starter ES

Overview



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

More information

Industry Mall see <https://www.siemens.com/product?3ZS1>

Technical specifications and system requirements, see <https://support.industry.siemens.com/cs/ww/en/ps/16713/td>

Catalog IC 10 see <https://www.siemens.com/ic10>

Motor Starter ES is used for the startup, parameterization, diagnostics, documentation and preventive maintenance of SIMATIC ET 200S, ET 200pro, ECOFAST and M200D motor starters.

Interfacing is performed

- Via the local interface on the device
- With PROFIBUS DP-V1-capable motor starters from any point in PROFIBUS (applies to ET 200S DP V1/ET 200pro/ECOFAST/M200D)
- With PROFINET-capable motor starters from any point in PROFINET (applies to ET 200S DP V1/ET 200pro/M200D).

Using Motor Starter ES, the communication-capable motor starters are easily parameterized during startup, 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 via an Object Manager.

Note:

The Motor Starter ES functionalities in relation to startup, parameterization and diagnostics are integrated directly in the TIA Portal from V17 and are accessible online for the SIMATIC ET 200pro, ET 200SP and M200D motor starters.

Efficient engineering with three program versions

The Motor Starter ES software program is available in three versions which differ in their user-friendliness, scope of functions and price.

Motor Starter ES	Basic	Standard	Premium
ET 200S High Feature PROFIBUS IM	✓	✓	✓
ET 200S High Feature PROFINET IM	✓	✓	✓
ECOFAST AS-Interface High Feature	✓	✓	--
ECOFAST PROFIBUS	✓	✓	✓
ET 200pro PROFIBUS IM	✓	✓	✓
ET 200pro PROFINET IM	✓	✓	✓
M200D AS-Interface Standard	✓	✓	(✓)
M200D PROFIBUS	✓	✓	✓
M200D PROFINET	✓	✓	✓

✓ Function available,

(✓) Available with restricted functionality

-- Function not available

Motor Starter ES	Basic	Standard	Premium
Access via the local interface on the device	✓	✓	✓
Parameter assignment	✓	✓	✓
Operating	✓	✓	✓
Diagnostics	--	✓	✓
Creation of typicals	--	✓	✓
Comparison functions	--	✓	✓
Standard-compliant printout according to EN ISO 7200	--	✓	✓
Service data (slave pointer, statistics data)	--	✓	✓
Access via PROFIBUS	--	--	✓
Access via PROFINET	--	--	✓
S7 routing	--	--	✓
Teleservice via MPI	--	--	✓
STEP 7 object manager ¹⁾	--	--	✓
Trace function	--	✓	✓

✓ Function available

-- Function not available

¹⁾ Only for STEP 7 V5.x

Additional functions

Standard-compliant printouts

The software tool greatly simplifies machine documentation. It enables parameterization printouts according to EN ISO 7200. The elements to be printed are easy to select and group as required.

Easy creation of typicals

Typicals can be created for devices and applications with only minimum differences in their parameters. These typicals contain all the parameters which are needed for the parameterization. In addition it is possible to specify which of these parameters are fixed and which can be adapted, e.g. by the startup engineer.

Teleservice via MPI

The Motor Starter ES Premium version supports the use of MPI Teleservice (comprising the Teleservice software and various Teleservice adapters) for remote diagnostics of the devices. This facilitates diagnostics and maintenance, and it shortens response times for service purposes.

Benefits

- Fast, error-free configuration and startup of motor starters even without extensive previous knowledge
- Transparent setting of the device functions and their parameters – online and offline
- Effective diagnostics functions on the soft starter and display of the most important measured values
- Trace function (oscilloscope function) for recording measured values and events (included in the Motor Starter ES Standard and Premium software version for M200D PROFIBUS and PROFINET).

Selection and ordering data**Parameterization, startup and diagnostics software
Motor Starter ES 2007**

For ECOFAST Motor Starter, SIMATIC ET 200S High-Feature Starter, SIMATIC ET 200pro Starter and M200D (AS-I Standard, PROFIBUS, PROFINET)

- Delivered without PC cable

Version	Article No.
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Motor Starter ES 2007 Basic

3ZS1310-4CC10-0YA5

Floating license for one user

Engineering software in limited-function version for diagnostics purposes, Class A, 3 languages (German/English/French), communication via system interface
Type of delivery:

- Software and documentation on CD and floating license on USB flash drive
- Floating license as download

3ZS1310-4CC10-0YA5**3ZS1310-4CE10-0YB5****Motor Starter ES 2007 Standard**

3ZS1310-5CC10-0YA5

Floating license for one user

Engineering software, Class A, 3 languages (German/English/French), communication via system interface
Type of delivery:

- Software and documentation on CD and floating license on USB flash drive
- Floating license as download

3ZS1310-5CC10-0YA5**3ZS1310-5CE10-0YB5****Motor Starter ES 2007 Premium**

3ZS1310-6CC10-0YA5

Floating license for one user

Engineering-Software, Class A, 3 languages (German/English/French), communication via system interface or PROFIBUS/PROFINET, STEP 7 Object Manager
Type of delivery:

- Software and documentation on CD and floating license on USB flash drive
- Floating license as download

3ZS1310-6CC10-0YA5**3ZS1310-6CE10-0YB5**

For a description of the software versions, see [page 10/428](#).

Accessories

Version	Article No.
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Optional accessories**RS 232 interface cable**

Serial data connection between ET 200pro MS/FC, M200D and laptop/PC/PG or MS

3RK1922-2BP00**USB interface cable**

Serial data connection between ET 200pro MS/FC, M200D and laptop/PC/PG or MS

6SL3555-0PA00-2AA0**USB/serial adapters**

For connecting an RS 232 PC cable to the USB interface of a PC, recommended for use in conjunction with ET 200S/ECOFAST/ET 200pro motor starters

3UF7946-0AA00-0

I/O systems

SIMATIC ET 200 systems without control cabinet

SIMATIC ET 200pro

Add-on products for ET 200pro > EtherNet/IP interface module

Overview

An interface module (EtherNet/IP adapter) is available for operating ET 200pro on EtherNet/IP.

It can be used together with system and IO components of the ET 200pro distributed I/O system.

Ordering data

Article No.

Article No.

SIMATIC ET 200pro interface module for EtherNet/IP

ZNX:EIP200PRO

Including:

- Bus terminating module for ET 200pro
- Companion disk with the manuals and the Configuration Tool

Terminal module for EtherNet/IP

For connecting the interface module to EtherNet/IP

ZNX:EIP200PROCM1

Technical specifications

Article number	ZNX:EIP200PRO
	Ethernet/IP Head Assembly for ET 200PRO
General information	
Product type designation	Ethernet/IP
Supply voltage	
Rated value (DC)	24 V
Input current	
from supply voltage 1L+, max.	400 mA
Address area	
Addressing volume	
• Inputs	255 byte
• Outputs	255 byte
Interface types	
M12 port	
• Autonegotiation	Yes
• Transmission rate, max.	100 Mbit/s
Interrupts/diagnostics/status information	
Diagnostics indication LED	
• For load voltage monitoring	Yes
• Bus fault BF (red)	Yes
• Group error SF (red)	Yes
• Monitoring 24 V voltage supply ON (green)	Yes
Potential separation	
between backplane bus and electronics	Yes
between supply voltage and electronics	Yes
Degree and class of protection	
IP degree of protection	IP65/67
Ambient conditions	
Ambient temperature during operation	
• min.	-25 °C
• max.	55 °C
Ambient temperature during storage/transportation	
• min.	-40 °C
• max.	70 °C
Dimensions	
Width	135 mm
Height	130 mm
Depth	59.3 mm
Weights	
Weight, approx.	490 g

Article number	ZNX:EIP200PROCM1
	ET 200pro, CM IM DP M12 / 7/8"
Input current	
from supply voltage 1L+, max.	No current input, only infeed current, max. 8 A
from load voltage 2L+ (without load), max.	No current input, only infeed current, max. 8 A
Dimensions	
Width	90 mm
Height	130 mm
Depth	51 mm
Weights	
Weight, approx.	540 g