

I/O systems

SIMATIC ET 200 systems for the control cabinet

SIMATIC ET 200iSP

Overview



The ET 200iSP is a modular, intrinsically safe I/O system with IP30 degree of protection which can be operated in gas and dust atmospheres at ambient temperatures from -20 to +70 °C. It is optimized for use with SIMATIC PCS 7 and PCS neo, but can also be integrated in other systems such as SIMATIC S5 by means of GSD/GSDML file.

In accordance with ATEX directive 2014/34/EU, the ET 200iSP remote I/O stations can be installed directly in the hazardous zones 1 and 2 as well as in non-hazardous areas. The intrinsically safe sensors, actuators and HART field devices can also be located in zone 0 or 20 if necessary.

The modular design of the ET 200iSP makes it possible to optimally adapt the remote I/O stations to the respective automation task through individual configuration and flexible expansion. To increase plant availability, the pressure-encapsulated power supply and the intrinsically safe PROFINET or PROFIBUS DP connection of the stations can also be of redundant design. The intrinsically safe, optical PROFINET connection allows redundancy functions S2 and R1 as well as the setup of fail-safe MRP rings.

The modern architecture with hardwiring and automatic slot coding supports pre-wiring without the electronic modules, simple and reliable hot swapping of individual modules without a fire certificate as well as configuration in run (CiR).

In addition to analog and digital I/O modules for the automation of technological functions of the process (Basic Process Control), the range of electronic modules also includes fail-safe I/O modules for implementing safety applications. The various types of electronic module can be arranged mixed within a station. Comprehensive diagnostic options facilitate commissioning and troubleshooting.

Technical specifications

ET 200iSP – general

Degree of protection	IP30	
Ambient temperature	-20 ... +70 °C • Horizontal mounting position • Other mounting positions -20 ... +50 °C	
Exposure to environmental substances	According to ISA-S71.04 severity level G1; G2; G3 (except for NH3, only level G2 in this case)	
EMC	Electromagnetic compatibility according to NE21	
Vibration resistance	0.5 g continuously, 1 g periodically	
Approvals, standards • ATEX • IECEx • INMETRO • cFMus • cULus • CCC Ex • PROFIBUS • PROFINET • IEC • CE • UKCA • KCC • Marine approval	II 2 G (1) GD I M2 Zone 1 Zone 1	Ex db eb [ia/ib] IIC T4 Ex db eb [ia/ib] I Ex db eb [ia/ib] IIC T4 BR-Ex db eb [ia/ib] IIC T4 NI Division 2, Groups A, B, C, D T4
	Class I, II, III	AIS Division 1, Groups A, B, C, D, E, F, G
	Class I	Zone 1, AEx de [ia/ib] IIC T4 Division 2, Groups A, B, C, D T4
	Class I, II, III	providing int. safe circuits for Division 1, Groups A, B, C, D, E, F, G
	Class I	Zone 1, AEx de [ia/ib] IIC T4
	Ex de ib[ia] IIC T4 Ex de [ia/ib] IIC T4 EN 50170, Volume 2 IEC 61158 and IEC 61784 IEC 61131, Part 2 In accordance with ATEX directive 2014/34/EU, EMC Directive 2014/30/EU and LVD-guideline 2014/35/EU According to Regulations UKSI 2016:1107 Korea Certification Classification companies • ABS (American Bureau of Shipping) • BV (Bureau Veritas) • DNV (Det Norske Veritas) • GL (Germanischer Lloyd) • LRS (Lloyds Register of Shipping) • Class NK (Nippon Kaiji Kyokai)	

Overview



An ET 200iSP power supply unit consists of a TM-PS terminal module (A or B) and a PS power supply module which is plugged onto this. Terminal modules and power supply modules can be ordered separately.

The power supply modules are suitable for both individual operation (standard) and redundant operation. Depending on the operating mode, they must be combined with the terminal modules as follows:

- Standard: 1 × PS on TM-PS-A UC
- Redundancy: 1 × PS on TM-PS-A UC (left) plus 1 × PS on TM-PS-B UC (right)

Power supply modules are available for supplies of 24 V DC and 120/230 V AC.

The operating state of the power supply modules is indicated by two LEDs on the IM 152 interface module (one for each module).

Ordering data

PS 24 V DC power supply module for ET 200iSP	6ES7138-7EA01-0AA0
PS 120/230 V AC power supply module for ET 200iSP	6ES7138-7EC00-0AA0

Article No.

TM-PS-A UC terminal module For standard operation	6ES7193-7DA20-0AA0
TM-PS-B UC terminal module Additional terminal module for redundant operation	6ES7193-7DB20-0AA0

Technical specifications

Article number	6ES7138-7EA01-0AA0 ET200iSP, POWER SUPPLY MODULE	6ES7138-7EC00-0AA0 ET200iSP, POWER SUPPLY MOD. AC120/230V
Supply voltage		
Rated value (DC)	24 V	
Rated value (AC)		230 V; 120/230 V AC
Reverse polarity protection	Yes	
Line frequency		
• permissible range, lower limit		47 Hz
• permissible range, upper limit		63 Hz
Input current		
from supply voltage L+, max.	4 A	
from supply voltage L1, max.		1.04 A; at rated voltage 230 VAC:0.45A at rated voltage 120 VAC:0.75A
Interrupts/diagnostics/ status information		
Status indicator	Yes	Yes
Alarms	No	No
Diagnoses		
• Diagnostic information readable	Yes; via IM 152	Yes; via IM 152
Diagnostics indication LED		
• Group error SF (red)	No	No
Potential separation		
primary/secondary	Yes	Yes
between supply voltage and electronics	Yes	No

I/O systems

SIMATIC ET 200 systems for the control cabinet

SIMATIC ET 200iSP

Power supply unit

Technical specifications

Article number	6ES7138-7EA01-0AA0 ET200iSP, POWER SUPPLY MODULE	6ES7138-7EC00-0AA0 ET200iSP, POWER SUPPLY MOD. AC120/230V
Standards, approvals, certificates		
CE mark	Yes	Yes
Use in hazardous areas		
• ATEX marking	Ex de [ib]IIC T4	Ex de [ib]IIC T4
Dimensions		
Width	60 mm	60 mm
Height	190 mm	190 mm
Depth	136.5 mm	136.5 mm
Weights		
Weight, approx.	2 700 g	2 700 g
Article number	6ES7193-7DA20-0AA0 ET200iSP, TERM.-MOD. TM-PS-A UC	6ES7193-7DB20-0AA0 ET200iSP, TERM.-MOD. TM-PS-B UC
Standards, approvals, certificates		
CE mark	Yes	Yes
Use in hazardous areas		
• ATEX marking	see ET 200iSP system	see ET 200iSP system
Dimensions		
Width	60 mm	60 mm
Height	190 mm	190 mm
Depth	52 mm	52 mm
Weights		
Weight, approx.	230 g	230 g

Overview

The IM 152 interface module realizes the connection of the ET 200iSP to a PROFINET network with an intrinsically safe multimode glass fiber-optic cable up to 100 Mbps or to PROFIBUS DP with intrinsically safe RS 485-iS transmission technology for transfer rates of up to 1.5 Mbps. A redundant connection is also possible. In this case, the ET 200iSP is connected via two interface modules to two redundant segments of a high-availability automation system (PROFINET R1 redundancy or PROFIBUS redundancy). Alternatively, the S2 redundancy function and the setup of fail-safe MRP rings is possible with PROFINET.

The IM 152 is plugged onto a special terminal module (to be ordered separately). The following terminal modules are available:

- TM-IM/IM terminal module for two interface modules (for device redundancy)
- TM-IM/EM60 terminal module for one interface module and one watchdog, reserve or electronic module (except 2 DQ relay)
 - with blue screw-type or spring-loaded terminals for hazardous environments
 - with black screw-type terminals for non-hazardous environments

Tasks of the IM 152-1PN interface module

- Connection of ET 200iSP to the intrinsically safe, optical PROFINET network
- Autonomous communication with the host automation system
- Preparation of data for the fitted electronic modules
- Backup of electronic module parameters
- Time stamping of digital process signals with an accuracy of 20 ms

Tasks of the IM 152-1DP interface module

- Connection of ET 200iSP to the intrinsically safe PROFIBUS DP
- Autonomous communication with the host automation system
- Preparation of data for the fitted electronic modules
- Backup of electronic module parameters
- Time stamping of digital process signals with an accuracy of 20 ms

The maximum address space of the interface module is 244 bytes for inputs, and 244 bytes for outputs.

I/O systems

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

Interface modules

Ordering data	Article No.	Article No.
ET 200iSP interface module IM 152-1DP	6ES7152-1AA00-0AB0	RS 485-iS coupler Isolating transformer for coupling PROFIBUS DP segments with RS 485 and RS 485-iS transmission technology
ET 200iSP interface module IM 152-1PN	6ES7152-1BA00-0AB0	Labeling sheet DIN A4, perforated, each consisting of 10 sheets of 30 strips each for electronic modules and 20 strips each for IM 152
ET 200iSP terminal module TM-IM/EM60 For an IM 152 and a watchdog, reserve or electronic module (except 2 DQ relay), including termination module		- Petrol - Yellow
- For hazardous environments - TM-IM/EM60S (blue screw-type terminals) - TM-IM/EM60C (blue spring-loaded terminals) - For non-hazardous environments - TM-IM/EM60S (black screw-type terminals)	6ES7193-7AA00-0AA0 6ES7193-7AA10-0AA0 6ES7193-7AA20-0AA0	6ES7193-7BH00-0AA0 6ES7193-7BB00-0AA0
ET 200iSP terminal module TM-IM/IM For two IM 152 modules (redundant operation), including termination module	6ES7193-7AB00-0AA0	Labels, inscribed For slot numbering, label size H x W (in mm): 5 x 7
Accessories		204 labels, for slots 1 to 20 204 labels, for slots 1 to 40 136 labels, inscription in plain text
SFP transceiver Ex Spare part for IM 152-1PN, multimode glass fiber-optic cable, LC, 50/125 µm and 62.5/125 µm	A5E51793919	Labels, blank 136 labels for slot numbering, label size H x W (in mm): 5 x 7
PROFIBUS connection plug with selectable terminating resistor For connection of IM 152-1DP to PROFIBUS DP with RS 485-iS transmission technology	6ES7972-0DA60-0XA0	S7-300 DIN rails 585 mm long, suitable for assembly of ET 200iSP in a 650 mm wide wall box 885 mm long, suitable for assembly of ET 200iSP in a 950 mm wide wall box

Technical specifications

Article number	6ES7193-7AA00-0AA0 ET200iSP, TERM.-MOD. TM-IM/EM60S, SCREW	6ES7193-7AA10-0AA0 ET200iSP, TERM.-MOD. TM-IM/EM60C ,SPRING	6ES7193-7AA20-0AA0 ET200iSP, TERM.-MOD. TM-IM/EM60S	6ES7193-7AB00-0AA0 ET200iSP, TERM.-MOD. TM-IM/IM F. TWO IM
Standards, approvals, certificates				
CE mark	Yes	Yes	Yes	Yes
Use in hazardous areas				
• ATEX marking	see ET 200iSP system	see ET 200iSP system		see ET 200iSP system
Dimensions				
Width	60 mm	60 mm	60 mm	60 mm
Height	190 mm	190 mm	190 mm	190 mm
Depth	52 mm	52 mm	52 mm	52 mm
Weights				
Weight, approx.	235 g	235 g	235 g	195 g

Article number	6ES7152-1AA00-0AB0 ET200iSP, INTERFACE MODULE IM152-1 PB	6ES7152-1BA00-0AB0 ET200iSP, INTERFACE MODULE IM 152-1 PN
General information		
Product function		
• Isochronous mode	No	No
Supply voltage		
Rated value (DC)		11.5 V supply voltage; 3.55 V bus
Input current		
from supply voltage L+, max.	30 mA	150 mA

Technical specifications

Article number	6ES7152-1AA00-0AB0 ET200iSP, INTERFACE MODULE IM152-1 PB	6ES7152-1BA00-0AB0 ET200iSP, INTERFACE MODULE IM 152-1 PN
Time stamping		
Description	for each digital input, digital input module, total ET 200iS	
Accuracy	20 ms	
Number of stampable digital inputs, max.	64; for accuracy class 20 ms	
Time format	RFC 1119 Internet (ISP)	
Time resolution	1 ms	
Time interval for transmitting the message buffer if a message is present	1 000 ms	
Time stamp on signal change	rising / falling edge as signal entering or exiting	
Interfaces		
Interfaces/bus type	RS 485	PROFINET IO
Transmission rate, max.	1.5 Mbit/s; 9,6 / 19,2 / 45,45 / 93,75 / 187,5 / 500 kbit/s; 1,5 Mbit/s	100 Mbit/s
Supports protocol for PROFINET IO		
Cable length		
- Multimode graded-index fiber 50/125 µm		3 000 m
- Multimode graded-index fiber 62.5/125 µm		3 000 m
1. Interface		
Interface type		multimode fiber-optic cable
Interface types		
• RJ 45 (Ethernet)		No
• Number of ports		2
• integrated switch		Yes
• BusAdapter (PROFINET)		No
Protocols		
• PROFINET IO Device		Yes
• Media redundancy		Yes
PROFINET IO Device		
Services		
- Shared device		No
Protocols		
PROFIBUS DP	Yes	No
Redundancy mode		
• PROFINET system redundancy (S2)		Yes
• PROFINET system redundancy (R1)		Yes
Media redundancy		
- MRP		Yes
Open IE communication		
• LLDP		Yes
PROFIBUS DP		
Services		
- SYNC capability	Yes	
- FREEZE capability	Yes	
- Direct data exchange (slave-to-slave communication)	Yes	

I/O systems

SIMATIC ET 200 systems for the control cabinet

SIMATIC ET 200iSP

Interface modules

Technical specifications

Article number	6ES7152-1AA00-0AB0 ET200iSP, INTERFACE MODULE IM152-1 PB	6ES7152-1BA00-0AB0 ET200iSP, INTERFACE MODULE IM 152-1 PN
Interrupts/diagnostics/ status information		
Alarms	Yes	Yes
Diagnostics function	Yes	Yes
Alarms		
• acyclic function, interrupts	Yes	Yes
• acyclic function, parameters	Yes	Yes
Diagnostics indication LED		
• RUN LED		Yes; green LED
• ERROR LED		Yes; red LED
• MAINT LED		Yes; Yellow LED
• LINK LED		Yes; green LED
• Monitoring of the supply voltage (PWR-LED)		Yes; green LED
• Bus fault BF (red)	Yes	No
• Group error SF (red)	Yes	No
• Monitoring 24 V voltage supply ON (green)	Yes	No
Potential separation		
between supply voltage and electronics	Yes	No
Standards, approvals, certificates		
CE mark	Yes	Yes
UKCA mark		No
Use in hazardous areas		
• ATEX marking	II 2 G Ex ib IIC T4 and I M2 Ex ib I	II 2 G Ex ib IIC T4 Gb and I M2 Ex ib I Mb
Ambient conditions		
Ambient temperature during operation		
• horizontal installation, min.		-20 °C
• horizontal installation, max.		70 °C
• vertical installation, min.		-20 °C
• vertical installation, max.		50 °C
Relative humidity		
• Operation, max.		95 %
Dimensions		
Width	30 mm	30 mm
Height	129 mm	190 mm
Depth	136.5 mm	130 mm
Weights		
Weight, approx.	245 g	440 g

Overview

**Digital input modules**

- 8-channel digital input module DI NAMUR EEx i, for evaluation of NAMUR sensors, connected and non-connected contacts, as well as for use as counter or frequency meter
Parameterizable connections:
 - NAMUR sensor on/off
 - NAMUR changeover contact
 - Single contact connected (mechanical NO contact)
 - Changeover contact connected (mechanical changeover contact)
 - Single contact non-connected (mechanical NO contact with single contact)
 - Changeover contact non-connected (mechanical changeover contact)
 - Counting function: optional use of 2 channels for recording counter pulses or for frequency measurement
 - Short-circuit and wire-break monitoring

Digital output modules

- 4-channel digital output modules DQ EEx i, 23.1 V DC/20 mA, 17.4 V DC/27 mA, 17.4 V DC/40 mA or 25.5 V DC/22 mA, with external actuator switch-off via High or Low signal (H/L switch-off)
 - Load-free switching of outputs via external intrinsically safe signal
 - Power boosting through parallel connection of two outputs for one actuator with 4 DQ 17.4 V DC/27 mA or 4 DQ 17.4 V DC/40 mA
 - Short-circuit and wire-break monitoring
- 2-channel digital output module DQ Relay EEx e, e.g. for switching solenoid valves, DC contactors or signaling lamps
 - Can be plugged onto TM-RM/RM terminal module
 - Output current up to 2 A with 60 V UC for each of the two relay outputs
 - Installation up to Ex zone 1
 - Intrinsically safe and non-intrinsically safe signals can be mixed in a station

Extra functionsActuator shutdown function of the 4 DQ EEx i modules

The 4 DQ EEx i modules are equipped with a shutdown function. This permits implementation of an external actuator switch-off independent of the automation system (controller).

As soon as the intrinsically safe switch-off signal (High or Low) is present at the actuator switch-off input of the electronic module, its outputs are deactivated.

You can also combine several DQ modules into a switch-off group. The intrinsically safe power supply for the switch-off device is either via the watchdog module or a separate intrinsically safe source.

Ordering data**Article No.****Digital input modules**Digital input modules EEx i**8 DI NAMUR**

For evaluation of NAMUR sensors, connected/non-connected contacts, as well as for recording counter pulses or measuring frequencies

- 8 × NAMUR (NAMUR sensor on/off, NAMUR changeover contact) or connected/non-connected inputs (single/changeover contact)
- 2 channels optionally usable as counters (max. 5 kHz) or frequency meters (1 Hz ... 5 kHz)
- Time tagging 20 ms, rising or falling edge
- Wire-break monitoring
- Short-circuit monitoring
- Sensor power supply monitoring
- Flutter monitoring

6ES7131-7RF00-0AB0**Article No.****Digital output modules**Digital output modules EEx i with H-switch-off

(external actuator switch-off via H-signal); for switching of solenoid valves, DC relays, signal lamps, actuators

4 DQ DC 23.1 V/20 mA

- 4 channels with 20 mA each
- Short-circuit monitoring
- Wire-break monitoring
- Configurable connection of substitute value in the event of CPU failure
- Load-free switching of outputs via external intrinsically safe signal

6ES7132-7RD01-0AB0**4 DQ DC 17.4 V/27 mA**

- 4 channels with 27 mA each or
- 2 outputs connected in parallel with 54 mA each
- Short-circuit monitoring
- Wire-break monitoring
- Configurable connection of substitute value in the event of CPU failure
- Load-free switching of outputs via external intrinsically safe signal

6ES7132-7RD11-0AB0

I/O systems

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

Digital electronic modules

Ordering data	Article No.		Article No.
4 DQ DC 17.4 V/40 mA 4 channels with 40 mA each or 2 outputs connected in parallel with 80 mA each - Short-circuit monitoring - Wire-break monitoring - Configurable connection of substitute value in the event of CPU failure - Load-free switching of outputs via external intrinsically safe signal	6ES7132-7RD22-0AB0		
Digital output modules EEx i with L-switch-off (external actuator switch-off via L-signal); for switching of solenoid valves, DC relays, signal lamps, actuators			
4 DQ DC 23.1 V/20 mA 4 channels with 20 mA each - Short-circuit monitoring - Wire-break monitoring - Configurable connection of substitute value in the event of CPU failure - Load-free switching of outputs via external intrinsically safe signal	6ES7132-7GD00-0AB0		
4 DQ DC 17.4 V/27 mA 4 channels with 27 mA each or 2 outputs connected in parallel with 54 mA each - Short-circuit monitoring - Wire-break monitoring - Configurable connection of substitute value in the event of CPU failure - Load-free switching of outputs via external intrinsically safe signal	6ES7132-7GD10-0AB0		
4 DQ DC 17.4 V/40 mA 4 channels with 40 mA each or 2 outputs connected in parallel with 80 mA each - Short-circuit monitoring - Wire-break monitoring - Configurable connection of substitute value in the event of CPU failure - Load-free switching of outputs via external intrinsically safe signal	6ES7132-7GD21-0AB0		
4 DQ DC 25.5 V/22 mA¹⁾ 4 channels with 22 mA each - Short-circuit monitoring - Wire-break monitoring - Configurable connection of substitute value in the event of CPU failure - Load-free switching of outputs via external intrinsically safe signal	6ES7132-7GD30-0AB0		
Digital output modules EEx e For switching of solenoid valves, DC contactors or indicator lights			
2 DQ Relay, 60 V UC, 2 A - Can be plugged onto TM-RM/RM terminal module - Output current up to 2 A with 60 V UC for each of the two relay outputs - Installation up to Ex zone 1 - Configurable connection of substitute value in the event of CPU failure	6ES7132-7HB00-0AB0		
		Terminal modules	
		ET 200iSP terminal module TM-EM/EM60 For two modules (reserve module, watchdog module and all electronic modules except 2 DQ relays can be plugged in) - For hazardous environments - TM-EM/EM60S (blue screw-type terminals) - TM-EM/EM60C (blue spring-loaded terminals) - For non-hazardous environments - TM-EM/EM60S (black screw-type terminals)	6ES7193-7CA00-0AA0 6ES7193-7CA10-0AA0 6ES7193-7CA20-0AA0
		ET 200iSP terminal module TM-RM/RM 60 For two modules (electronic module 2 DQ Relay and reserve module can be plugged in) TM-RM/RM60S (screw-type terminals)	6ES7193-7CB00-0AA0
		Accessories	
		Reserve module For any electronic module	6ES7138-7AA00-0AA0
		Labeling sheet DIN A4, perforated, each consisting of 10 sheets of 30 strips each for electronic modules and 20 strips each for IM 151 - Petrol - Yellow	6ES7193-7BH00-0AA0 6ES7193-7BB00-0AA0
		Labels, inscribed For slot numbering, label size H x W (in mm): 5 x 7 204 labels, for slots 1 to 20 204 labels, for slots 1 to 40	8WA8361-0AB 8WA8361-0AC
		Labels, blank 136 labels for slot numbering, label size H x W (in mm): 5 x 7	8WA8348-2AY
		S7-300 DIN rails 585 mm long, suitable for assembly of ET 200iSP in a 650 mm wide wall box 885 mm long, suitable for assembly of ET 200iSP in a 950 mm wide wall box	6ES7390-1AF85-0AA0 6ES7390-1AJ85-0AA0

¹⁾ Can be used with SIMATIC PCS 7 V7.1+SP2 or higher

Technical specifications

Article number	6ES7131-7RF00-0AB0 ET200iSP, EL-MOD., 8DI, NAMUR
General information	
Product type designation	8DI NAMUR
Digital inputs	
Number of digital inputs	8
Input current	
• for signal "0", max. (permissible quiescent current)	1.2 mA
• for signal "1", min.	2.1 mA
Encoder	
Number of connectable encoders, max.	8
Connectable encoders	
• NAMUR encoder	Yes
Interrupts/diagnostics/ status information	
Diagnostics function	Yes
Alarms	
• Diagnostic alarm	Yes; Parameterizable
• Hardware interrupt	No
Diagnoses	
• Diagnostic information readable	Yes
• Short-circuit	Yes; R load < 150 ohms with NAMUR sensor/sensor and NAMUR changeover contact/sensor to DIN 19234
Diagnostics indication LED	
• Group error SF (red)	Yes
• Status indicator digital input (green)	Yes

Article number	6ES7131-7RF00-0AB0 ET200iSP, EL-MOD., 8DI, NAMUR
Integrated Functions	
Frequency measurement	Yes; (Gate time) 50 ms; 200 ms; 1 s
• Number of frequency meters	2
Potential separation	
Potential separation digital inputs	
• between the channels and backplane bus	Yes
Standards, approvals, certificates	
CE mark	Yes
Dimensions	
Width	30 mm
Height	129 mm
Depth	136.5 mm
Weights	
Weight, approx.	255 g

Article number	6ES7132-7RD01-0AB0 ET200iSP, EL-MOD., 4DO, DC 23,1V, 20MA	6ES7132-7RD11-0AB0 ET200iSP, EL-MOD., 4DO, DC 17,4V, 27MA	6ES7132-7RD22-0AB0 ET200iSP, EL-MOD., 4DO, DC 17.4V, 40MA
General information			
Product type designation	4DQ 23.1 V DC/20 mA	4DQ 17.4 V DC/27 mA	4DQ 17.4 V DC/40 mA
Digital outputs			
Type of digital output	Transistor	Transistor	Transistor
Number of digital outputs	4; additionally 1 intrinsically-safe input for H shutdown	4; additionally 1 intrinsically-safe input for H shutdown	4; additionally 1 intrinsically-safe input for H shutdown
Short-circuit protection	Yes	Yes	Yes
No-load voltage U _{ao} (DC)	23.1 V	17.4 V	17.4 V
Internal resistor R _i	275 Ω	150 Ω	167 Ω
Trend key points E			
• Voltage U _e (DC)	17.6 V	13.3 V	10.7 V
• Current I _e	20 mA	27 mA	40 mA; 80 mA when outputs connected in parallel
Output current			
• for signal "1" rated value	0.02 A	0.027 A	0.04 A
Output delay with resistive load			
• "0" to "1", max.	2 ms	2 ms	2 ms
• "1" to "0", max.	1.5 ms	1.5 ms	1.5 ms
Parallel switching of two outputs			
• for uprating	No; for Ex reasons not possible; nor for predecessor	Yes	Yes
Switching frequency			
• with resistive load, max.	100 Hz	100 Hz	100 Hz
• with inductive load, max.	2 Hz	2 Hz	2 Hz

I/O systems

SIMATIC ET 200 systems for the control cabinet

SIMATIC ET 200iSP

Digital electronic modules**Technical specifications**

Article number	6ES7132-7RD01-0AB0 ET200iSP, EL-MOD., 4DO, DC 23,1V, 20MA	6ES7132-7RD11-0AB0 ET200iSP, EL-MOD., 4DO, DC 17,4V, 27MA	6ES7132-7RD22-0AB0 ET200iSP, EL-MOD., 4DO, DC 17.4V, 40MA
Interrupts/diagnostics/ status information			
Diagnostics function	Yes	Yes	
Alarms			
• Diagnostic alarm	Yes; Parameterizable	Yes; Parameterizable	Yes; Parameterizable
Diagnoses			
• Diagnostic information readable	Yes	Yes	Yes
• Wire-break	Yes; R > 10 kohms, I < 100 µA	Yes	Yes; R > 10 kohms, I < 100 µA
• Short-circuit	Yes; R < 800 ohms (one output), R < 40 ohms (outputs connected in parallel)	Yes	Yes; R < 80 Ohm (one output), R < 40 Ohm (outputs connected in parallel)
Diagnostics indication LED			
• Group error SF (red)	Yes	Yes	Yes
• Status indicator digital output (green)	Yes	Yes	Yes; Per channel
Ex(i) characteristics			
maximum values for connecting terminals for gas group IIC			
• U _o (no-load voltage), max.			19.4 V
• I _o (short-circuit current), max.			118 mA
• P _o (power output), max.			572 mW
• C _o (permissible external capacity), max.			241 nF; For IIC, 1507 nF for IIB
• L _o (permissible external inductivity), max.			1.7 mH; For IIC, 10.4 mH for IIB
Potential separation			
Potential separation digital outputs			
• between the channels and backplane bus	Yes	Yes	Yes
Standards, approvals, certificates			
CE mark			Yes
Highest safety class achievable in safety mode			
• SIL acc. to IEC 61508	No		No
Dimensions			
Width	30 mm	30 mm	30 mm
Height	129 mm	129 mm	129 mm
Depth	136.5 mm	136.5 mm	136.5 mm
Weights			
Weight, approx.	255 g	255 g	255 g

Technical specifications

Article number	6ES7132-7GD00-0AB0 ET200iSP, EL-MOD., 4DO, DC 23,1V, 20mA	6ES7132-7GD10-0AB0 ET200iSP, EL-MOD., 4DO, DC 17,4V, 27MA	6ES7132-7GD21-0AB0 ET200iSP, EL-MOD., 4DO, DC 17,4V, 40MA	6ES7132-7GD30-0AB0 ET200iSP, EL-MOD., 4DO, DC 25.5V, 22MA
General information				
Product type designation	4DQ 23.1 V DC/20 mA	4DQ 17.4 V DC/27 mA	4DQ 17.4 V DC/40 mA	4DQ 25.5 V DC/22 mA
Digital outputs				
Type of digital output	Transistor	Transistor	Transistor	Transistor
Number of digital outputs	4; additionally 1 intrinsically-safe input for L shutdown	4; additionally 1 intrinsically-safe input for L shutdown	4; additionally 1 intrinsically-safe input for L shutdown	4; additionally 1 intrinsically-safe input for L shutdown
Short-circuit protection	Yes	Yes	Yes	Yes
No-load voltage U_{ao} (DC)	23.1 V	17.4 V	17.4 V	25.5 V
Internal resistor R_i	275 Ω	150 Ω	167 Ω	260 Ω
Trend key points E				
• Voltage U_e (DC)	17.6 V	13.3 V	10.7 V	19.8 V
• Current I_e	20 mA	27 mA; 54 mA when outputs connected in parallel	40 mA	22 mA
Output current				
• for signal "1" rated value	0.02 A	0.027 A	0.04 A	0.022 A
Output delay with resistive load				
• "0" to "1", max.	2 ms	2 ms	2 ms	2 ms
• "1" to "0", max.	1.5 ms	1.5 ms	1.5 ms	1.5 ms
Parallel switching of two outputs				
• for uprating	No; for Ex reasons not possible; nor for predecessor	Yes	Yes	No
Switching frequency				
• with resistive load, max.	100 Hz	100 Hz	100 Hz	100 Hz
• with inductive load, max.	2 Hz	2 Hz	2 Hz	2 Hz
Interrupts/diagnostics/status information				
Diagnostics function	Yes	Yes	Yes	Yes
Alarms				
• Diagnostic alarm	Yes; Parameterizable	Yes; Parameterizable	Yes; Parameterizable	Yes; Parameterizable
Diagnoses				
• Diagnostic information readable	Yes	Yes	Yes	Yes
• Wire-break	Yes; $R > 10 \text{ kohms}$, $I < 100 \mu\text{A}$	Yes; $R > 10 \text{ kohms}$, $I < 100 \mu\text{A}$	Yes; $R > 10 \text{ kohms}$, $I < 100 \mu\text{A}$	Yes; $R > 10 \text{ kohms}$, $I < 100 \mu\text{A}$
• Short-circuit	Yes; $R < 80 \text{ Ohm}$ (one output), $R < 40 \text{ Ohm}$ (outputs connected in parallel)	Yes; $R < 800 \text{ ohms}$ (one output), $R < 40 \text{ ohms}$ (outputs connected in parallel)	Yes; $R < 80 \text{ Ohm}$ (one output), $R < 40 \text{ Ohm}$ (outputs connected in parallel)	Yes; $R < 80 \text{ ohms}$
Diagnostics indication LED				
• Group error SF (red)	Yes	Yes	Yes	Yes
• Status indicator digital output (green)	Yes	Yes	Yes; Per channel	Yes; Per channel
Ex(i) characteristics				
maximum values for connecting terminals for gas group IIC				
• U_o (no-load voltage), max.			19.4 V	27.9 V
• I_o (short-circuit current), max.			118 mA	110 mA
• P_o (power output), max.			572 mW	764 mW
• C_o (permissible external capacity), max.			241 nF; For IIC, 1507 nF for IIB	81 nF; For IIC, 651 nF for IIB
• L_o (permissible external inductivity), max.			1.7 mH; For IIC, 10.4 mH for IIB	1.7 mH; For IIC, 11.5 mH for IIB

I/O systems

SIMATIC ET 200 systems for the control cabinet

SIMATIC ET 200iSP

Digital electronic modules

Technical specifications

Article number	6ES7132-7GD00-0AB0 ET200iSP, EL-MOD., 4DO, DC 23,1V, 20MA	6ES7132-7GD10-0AB0 ET200iSP, EL-MOD., 4DO, DC 17,4V, 27MA	6ES7132-7GD21-0AB0 ET200iSP, EL-MOD., 4DO, DC 17,4V, 40MA	6ES7132-7GD30-0AB0 ET200iSP, EL-MOD., 4DO, DC 25.5V, 22MA
Potential separation				
Potential separation digital outputs • between the channels and backplane bus	Yes	Yes	Yes	Yes
Standards, approvals, certificates				
CE mark	Yes	Yes	Yes	Yes
Highest safety class achievable in safety mode • SIL acc. to IEC 61508	No	No	No	No
Dimensions				
Width	30 mm	30 mm	30 mm	30 mm
Height	129 mm	129 mm	129 mm	129 mm
Depth	136.5 mm	136.5 mm	136.5 mm	136.5 mm
Weights				
Weight, approx.	255 g	255 g	255 g	255 g
Article number	6ES7193-7CA00-0AA0 ET200iSP, TERM.-MOD. TM-EM/EM60S F. EM	6ES7193-7CA10-0AA0 ET200iSP, TERM.-MOD. TM-EM/EM60C F. EM	6ES7193-7CA20-0AA0 ET200iSP, TERM.-MOD. TM-EM/EM60S F. EM	
Standards, approvals, certificates				
CE mark	Yes	Yes	Yes	
Use in hazardous areas • ATEX marking	see ET 200iSP system	see ET 200iSP system		
Dimensions				
Width	60 mm	60 mm	60 mm	
Height	190 mm	190 mm	190 mm	
Depth	52 mm	52 mm	52 mm	
Weights				
Weight, approx.	275 g	275 g	235 g	
Article number	6ES7132-7HB00-0AB0 ET200iSP, RELAY-MOD., 2DO, UC60V, 2A		Article number	6ES7132-7HB00-0AB0 ET200iSP, RELAY-MOD., 2DO, UC60V, 2A
General information			Switching frequency • with resistive load, max. • with inductive load, max.	0.5 Hz; See data in manual 0.2 Hz; See data in manual
Digital outputs Type of digital output Number of digital outputs Short-circuit protection	Relays 2 No		Relay outputs Switching capacity of contacts - with resistive load, up to 60 °C, max. - Thermal continuous current, max.	2 A; See data in manual 2 A; See data in manual
Output current • for signal "1" rated value	2 A		Interrupts/diagnostics/ status information Substitute values connectable	Yes
Output delay with resistive load • "0" to "1", max. • "1" to "0", max.	8 ms 3 ms		Alarms • Diagnostic alarm • Hardware interrupt	Yes No
Parallel switching of two outputs • for uprating • for redundant control of a load	No No			

Technical specifications

Article number	6ES7132-7HB00-0AB0 ET200iSP, RELAY-MOD., 2DO, UC60V, 2A
Diagnoses	
• Diagnostic information readable	Yes
• Wire-break	No; Cannot be determined in contact power circuit
• Short-circuit	No; Cannot be determined in contact power circuit
Diagnostics indication LED	
• Group error SF (red)	Yes
• Status indicator digital output (green)	Yes; Per channel
Ex(i) characteristics	
maximum values for connecting terminals for gas group IIC	
• U ₀ (no-load voltage), max.	60 V
• U _m (voltage at non-intrinsically safe connecting terminals), max.	250 V
Potential separation	
Potential separation digital outputs	
• between the channels and backplane bus	Yes

Article number	6ES7132-7HB00-0AB0 ET200iSP, RELAY-MOD., 2DO, UC60V, 2A
Standards, approvals, certificates	
CE mark	Yes
Highest safety class achievable in safety mode	
• SIL acc. to IEC 61508	No
Dimensions	
Width	30 mm
Height	129 mm
Depth	136.5 mm
Weights	
Weight, approx.	255 g

I/O systems

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

Analog electronic modules

Overview



Analog input modules

- 4-channel analog input module AI 2 WIRE HART EEx i for current measurement in the range 4 to 20 mA, suitable for connection of 2-wire transmitters (with/without HART functionality)
 - Resolution 12 bit + sign
 - Max. load of transmitter 750 Ω
 - Short-circuit and wire break monitoring
- 4-channel analog input module AI 4 WIRE HART EEx i for current measurement in the range 0/4 to 20 mA, suitable for connection of 4-wire transmitters (with/without HART functionality)
 - Resolution 12 bit + sign
 - Max. load of transmitter 750 Ω
 - Wire break monitoring

- 4-channel analog input module AI RTD EEx i for resistance testing and for temperature measurement by Pt100/Ni100 resistance thermometer
 - Resolution 15 bit + sign
 - 2, 3, or 4-wire connection possible
 - Resistance measurements 600 Ω absolute and 1 000 Ω absolute
 - Wire break monitoring
- 4-channel analog input module AI TC EEx i for thermoelectric EMF measurements and for temperature measurement by thermocouple, type B, E, N, J, K, L, S, R, T, U
 - Resolution 15 bit + sign
 - Internal temperature compensation possible using TC sensor module (included in scope of delivery of module)
 - External temperature compensation by means of a temperature value acquired at an analog module of the same ET 200iSP station
 - Wire break monitoring

Analog output modules

- 4-channel analog output module AO I HART EEx i for output of current signals in the range 0/4 to 20 mA to field devices (with/without HART functionality)
 - Resolution 14 bit
 - Parameterizable substitute value in case of CPU failure
 - Short-circuit and wire break monitoring

Extra functions

Temperature compensation

A TC sensor module for internal temperature compensation is provided with the 4 AI TC module, and is fitted on the corresponding terminals of the associated terminal module.

External temperature compensation is possible via a Pt100 on a 4 AI RTD module.

Ordering data

Article No.

Article No.

Analog input modules

Analog input modules EEx i

4 AI I 2 WIRE HART For measuring currents with 2-wire transmitters with/without HART functionality • 4 x 4 ... 20 mA, HART, 2-wire transmitter • Transmitter load: max. 750 Ω • Resolution 12 bit + sign • Short-circuit monitoring • Wire-break monitoring	6ES7134-7TD00-0AB0
4 AI I 4 WIRE HART For measuring currents with 4-wire transmitters with/without HART functionality • 4 x 0/4 ... 20 mA, HART, 4-wire transmitter • Transmitter load: max. 750 Ω • Resolution 12 bit + sign • Wire-break monitoring	6ES7134-7TD50-0AB0
4 AI RTD For measuring resistances as well as for temperature measurements with resistance thermometers • 4 x RTD, resistance thermometer Pt100/Ni100 • 2, 3, 4-wire • Resolution 15 bit + sign • Short-circuit monitoring • Wire-break monitoring	6ES7134-7SD51-0AB0

4 AI TC

- For thermoelectric EMF measurements as well as for temperature measurements with thermocouples
- 4 x TC (thermocouples)
 - Type B [PtRh-PtRh]
 - Type N [NiCrSi-NiSi]
 - Type E [NiCr-CuNi]
 - Type R [PtRh-Pt]
 - Type S [PtPh-Pt]
 - Type J [Fe-CuNi]
 - Type L [Fe-CuNi]
 - Type T [Cu-CuNi]
 - Type K [NiCr-Ni]
 - Type U [Cu-CuNi]
 - Resolution 15 bit + sign
 - Internal compensation of reference junction temperature possible using TC sensor module (included in scope of supply of module)
 - External temperature compensation via Pt100, connected to RTD module of same ET 200iSP station
 - Wire-break monitoring

6ES7134-7SD00-0AB0

Ordering data	Article No.	Article No.
Analog output modules		Accessories
Analog output modules EEx i		Reserve module For any electronic module
4 AO I HART For output of currents to field devices with/without HART functionality	6ES7135-7TD00-0AB0	Labeling sheet DIN A4, perforated, each consisting of 10 sheets of 30 strips each for electronic modules and 20 strips each for IM 151
4 × 0/4 ... 20 mA, HART (max. load 750 Ω) - Resolution 14-bit - Short-circuit monitoring - Wire-break monitoring - Parameterizable substitute value in case of CPU failure		- Petrol - Yellow
Terminal modules		Labels, inscribed For slot numbering, label size H × W (in mm): 5 × 7
ET 200iSP terminal module TM-EM/EM60 For two modules (reserve module, watchdog module and all electronic modules except 2 DQ relays can be plugged in)		204 labels, for slots 1 to 20 204 labels, for slots 1 to 40
- For hazardous environments - TM-EM/EM60S (blue screw-type terminals) - TM-EM/EM60C (blue spring-loaded terminals) - For non-hazardous environments - TM-EM/EM60S (black screw-type terminals)	6ES7193-7CA00-0AA0 6ES7193-7CA10-0AA0 6ES7193-7CA20-0AA0	Labels, blank 136 labels for slot numbering, label size H × W (in mm): 5 × 7
		S7-300 DIN rails
		585 mm long, suitable for assembly of ET 200iSP in a 650 mm wide wall box 885 mm long, suitable for assembly of ET 200iSP in a 950 mm wide wall box
		6ES7193-7BH00-0AA0 6ES7193-7BB00-0AA0 8WA8361-0AB 8WA8361-0AC 8WA8348-2AY 6ES7390-1AF85-0AA0 6ES7390-1AJ85-0AA0

Technical specifications

Article number	6ES7135-7TD00-0AB0 ET200iSP, EL-MOD., 4 AO, 4-20MA, HART
General information	
Product type designation	4AQ I HART
Analog outputs	
Number of analog outputs	4
Cycle time (all channels) max.	3.6 ms
Output ranges, current	
• 0 to 20 mA	Yes
• 4 mA to 20 mA	Yes
Connection of actuators	
• for current output two-wire connection	Yes
Load impedance (in rated range of output)	
• with current outputs, max.	750 Ω
Cable length	
• shielded, max.	500 m
Analog value generation for the outputs	
Integration and conversion time/resolution per channel	
• Resolution with overrange (bit including sign), max.	14 bit
Settling time	
• for resistive load	4 ms
• for capacitive load	40 ms
• for inductive load	40 ms

Article number	6ES7135-7TD00-0AB0 ET200iSP, EL-MOD., 4 AO, 4-20MA, HART
Errors/accuracies	
Basic error limit (operational limit at 25 °C)	
• Current, relative to output range, (+/-)	0.1 %
Interrupts/diagnostics/status information	
Substitute values connectable	Yes
Alarms	
• Diagnostic alarm	Yes
Diagnoses	
• Diagnostic information readable	Yes
• Wire-break	Yes
• Short-circuit	Yes
Diagnostics indication LED	
• Group error SF (red)	Yes
Potential separation	
Potential separation analog outputs	
• between the channels and backplane bus	Yes
Standards, approvals, certificates	
CE mark	Yes
Dimensions	
Width	30 mm
Height	129 mm
Depth	136.5 mm
Weights	
Weight, approx.	265 g

I/O systems

SIMATIC ET 200 systems for the control cabinet

SIMATIC ET 200iSP

Safety-related electronic modules

Overview



The electronic modules of the SIMATIC ET 200iSP distributed I/O system equipped with safety functions can be used together with the safety-related automation systems (controllers) for the implementation of safety applications. The input modules record the process signals, evaluate them, and prepare them for additional processing by the automation system. The output modules convert the safety-related signals output by the automation systems so that they are suitable for controlling the connected actuators.

F-digital input modules

- 8 F-DI Ex NAMUR
Safety-related digital input module for evaluating the signals from IEC 60947-5-6/NAMUR sensors and connected/non-connected mechanical contacts in hazardous and non-hazardous areas
 - SIL3/Cat.3/PLc with 8 inputs (1-channel/1oo1 evaluation) or 4 inputs (2-channel/1oo2 evaluation)
 - 8 short-circuit-proof sensor supplies (8 V DC) for 1 channel each
 - Inputs and sensor supplies electrically isolated from power bus and backplane bus
 - Diagnostics evaluation (deactivated for non-connected mechanical contacts)
 - Internal diagnostics buffer
 - Programmable diagnostics interrupt
 - Supports time stamping
 - Channel-selective passivation
 - Firmware update using HW Config possible
 - Exclusively for safety mode
 - LED displays for safety mode, group errors and channel status/fault

F-digital output modules

- 4 F-DO Ex DC 17.4 V/40 mA
Safety-related digital output module for controlling actuators in hazardous and non-hazardous areas, e.g. solenoid valves, DC current relays or indicator lamps
 - SIL3/Cat.3/PLc with 4 outputs, switching to P/P potential
 - Electrical isolation from power bus and backplane bus
 - Rated load voltage 17.4 V DC
 - Max. output current 40 mA
 - Performance enhancement through parallel connection of two digital outputs for one actuator
 - Short-circuit, overload and wire-break monitoring
 - Configurable diagnostics
 - Internal diagnostics buffer
 - Programmable diagnostics interrupt
 - Channel-selective passivation
 - Firmware update using HW Config possible
 - Exclusively for safety mode
 - LED displays for safety mode, group errors and channel status/fault

F-analog input modules

- 4 F-AI Ex HART (0 ... 20 mA or 4 ... 20 mA)
Safety-related digital input module for evaluating the signals from current sensors in hazardous and non-hazardous areas, e.g. 2-wire transmitters and HART field devices
 - SIL3/Cat.3/PLc with 4 inputs of one module (1-channel/1oo1 evaluation) or 4 inputs of two modules (2-channel/1oo2 evaluation)
 - Measuring ranges: 0 ... 20 mA or 4 ... 20 mA
 - Resolution 15 bit + sign
 - HART communication in measuring range 4 ... 20 mA
 - 4 short-circuit-proof sensor supplies (min. 12 V DC; max. 26 V DC) for 1 channel each
 - Inputs and sensor supplies electrically isolated from backplane bus
 - Configurable diagnostics
 - Programmable diagnostics interrupt
 - Internal diagnostics buffer
 - Firmware update using HW Config possible
 - Exclusively for safety mode
 - LED displays for safety mode, group errors, channel faults and HART status per channel

Ordering data	Article No.		Article No.
Safety-related electronic modules		Terminal modules	
<u>F-digital input modules</u>		ET 200iSP terminal module TM-EM/EM60	
8 F-DI Ex NAMUR For evaluating the signals from IEC 60947-5-6/NAMUR sensors and connected/non-connected mechanical contacts in hazardous and non-hazardous areas • SIL3/Cat.3/PLe with 8 inputs (1-channel/1oo1 evaluation) or 4 inputs (2-channel/1oo2 evaluation)	6ES7138-7FN00-0AB0	For two modules (reserve module, watchdog module and all electronic modules except 2 DQ relays can be plugged in) • For hazardous environments - TM-EM/EM60S (blue screw-type terminals) - TM-EM/EM60C (blue spring-loaded terminals) • For non-hazardous environments - TM-EM/EM60S (black screw-type terminals)	6ES7193-7CA00-0AA0 6ES7193-7CA10-0AA0 6ES7193-7CA20-0AA0
<u>F-digital output modules</u>		Accessories	
4 F-DO Ex 17.4 V DC/40 mA For controlling actuators in hazardous and non-hazardous areas, e.g. solenoid valves, DC current relays or indicator lamps • SIL3/Cat.3/PLe with 4 outputs, switching to P/P potential	6ES7138-7FD00-0AB0	Reserve module For any electronic module	6ES7138-7AA00-0AA0
<u>F-analog input modules</u>		Labeling sheet DIN A4, perforated, each consisting of 10 sheets of 30 strips each for electronic modules and 20 strips each for IM 151 • Petrol • Yellow	6ES7193-7BH00-0AA0 6ES7193-7BB00-0AA0
4 F-AI Ex HART (0 ... 20 mA or 4 ... 20 mA) For evaluating the signals from current sensors in hazardous and non-hazardous areas, e.g. 2-wire transmitters and HART field devices • SIL3/Cat.3/PLe with 4 inputs of one module (1-channel/1oo1 evaluation) or 4 inputs of two modules (2-channel/1oo2 evaluation) • Resolution 15 bit + sign • HART communication in measuring range 4 ... 20 mA	6ES7138-7FA00-0AB0	Labels, inscribed For slot numbering, label size H x W (in mm): 5 x 7 • 204 labels, for slots 1 to 20 • 204 labels, for slots 1 to 40	8WA8361-0AB 8WA8361-0AC
		Labels, blank 136 labels for slot numbering, label size H x W (in mm): 5 x 7	8WA8348-2AY
		S7-300 DIN rails • 585 mm long, suitable for assembly of ET 200iSP in a 650 mm wide wall box • 885 mm long, suitable for assembly of ET 200iSP in a 950 mm wide wall box	6ES7390-1AF85-0AA0 6ES7390-1AJ85-0AA0

I/O systems

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

Safety-related electronic modules

Technical specifications

Article number	6ES7138-7FN00-0AB0 ET200iSP, 8F-DI NAMUR EX, FAILSAFE
General information	
Product type designation	8F-DI ExNAMUR
Encoder supply	
Number of outputs	8
Digital inputs	
Number of digital inputs	8
Input current	
• for signal "0", max. (permissible quiescent current)	1.2 mA
• for signal "1", min.	2.1 mA
• for signal "1", typ.	9.5 mA
Encoder	
Number of connectable encoders, max.	8
Connectable encoders	
• NAMUR encoder	Yes
Interrupts/diagnostics/ status information	
Diagnostics function	Yes
Alarms	
• Diagnostic alarm	Yes; Parameterizable
• Hardware interrupt	No
Diagnoses	
• Diagnostic information readable	Yes
• Wire-break	Yes; NAMUR encoders or single contact with 10 kOhm parallel resistor
• Short-circuit	Yes; R load < 150 ohms with NAMUR sensor/sensor and NAMUR changeover contact/sensor to DIN 19234
Diagnostics indication LED	
• Group error SF (red)	Yes
Potential separation	
Potential separation digital inputs	
• between the channels and backplane bus	Yes
Standards, approvals, certificates	
CE mark	Yes
Highest safety class achievable in safety mode	
• Performance level according to ISO 13849-1	PLe
• SIL acc. to IEC 61508	SIL 3
Use in hazardous areas	
• ATEX marking	II 2 G (1) GD Ex ib[ia Ga][ia IIIC Da] IIC T4 GB and I M2 Ex ib[ia Ma] I Mb
Dimensions	
Width	30 mm
Height	129 mm
Depth	136.5 mm
Weights	
Weight, approx.	288 g

Article number	6ES7138-7FD00-0AB0 ET200iSP, 4F-DO 40MA EX, FAILSAFE
General information	
Product type designation	4F-DO Ex(i) 17.4 V DC/40 mA
Digital outputs	
Type of digital output	Transistor
Number of digital outputs	4
Short-circuit protection	Yes
Controlling a digital input	No
No-load voltage U _{ao} (DC)	17.4 V
Internal resistor R _i	167 Ω
Load resistance range	
• lower limit	270 Ω
• upper limit	18 kΩ
Trend key points E	
• Voltage U _e (DC)	10.7 V
• Current I _e	40 mA
Output voltage	
• for signal "1", max.	17.4 V
Output current	
• for signal "0" residual current, max.	10 μA
Parallel switching of two outputs	
• for uprating	Yes
• for redundant control of a load	No
Switching frequency	
• with resistive load, max.	30 Hz
• with inductive load, max.	2 Hz
Interrupts/diagnostics/ status information	
Substitute values connectable	Yes
Alarms	
• Diagnostic alarm	Yes; Parameterizable
Diagnoses	
• Diagnostic information readable	Yes
• Wire-break	Yes
• Short-circuit	Yes
Diagnostics indication LED	
• Group error SF (red)	Yes
• Status indicator digital output (green)	Yes
Potential separation	
Potential separation digital outputs	
• between the channels and backplane bus	Yes
Standards, approvals, certificates	
CE mark	Yes
Highest safety class achievable in safety mode	
• Performance level according to ISO 13849-1	PLe
• SIL acc. to IEC 61508	SIL 3
Dimensions	
Width	30 mm
Height	129 mm
Depth	136.5 mm
Weights	
Weight, approx.	285 g

Overview



The watchdog module has two fundamental functions:

- Monitoring of the ET 200iSP remote I/O station for hardware failures (hardware lifebeat); external, applicative failure monitoring is also possible via an I/O address area of the module
- Intrinsically-safe power supply for external actuator switch-off

The watchdog module must be plugged onto a terminal module (order separately). The following terminal modules are suitable for this:

- TM-IM/EM60 terminal modules for one interface module and one watchdog, reserve or electronics module (for versions, see Interface module section)
- TM-EM/EM60 terminal modules with two slots for watchdog module, reserve module or electronics modules (except 2 DO relay):
 - with blue screw-type or spring-loaded terminals for hazardous environments
 - with black screw-type terminals for non-hazardous environments

The first slot directly next to the interface module is provided for the watchdog module.

Ordering data

Article No.

Watchdog module

Watchdog module

For failure monitoring and for the intrinsically safe power supply of an external actuator switch-off

6ES7138-7BB00-0AB0

Terminal modules

ET 200iSP terminal module

TM-EM/EM60

For two modules (reserve module, watchdog module and all electronic modules except 2 DQ relays can be plugged in)

- For hazardous environments
 - TM-EM/EM60S (blue screw-type terminals)
 - TM-EM/EM60C (blue spring-loaded terminals)
- For non-hazardous environments
 - TM-EM/EM60S (black screw-type terminals)

6ES7193-7CA00-0AA0

6ES7193-7CA10-0AA0

6ES7193-7CA20-0AA0

Accessories

Labeling sheet

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

- Petrol
- Yellow

6ES7193-7BH00-0AA0

6ES7193-7BB00-0AA0

Labels, inscribed

For slot numbering, label size H x W (in mm): 5 x 7

- 204 labels, for slots 1 to 20
- 204 labels, for slots 1 to 40

8WA8361-0AB

8WA8361-0AC

Labels, blank

136 labels for slot numbering, label size H x W (in mm): 5 x 7

8WA8348-2AY

Technical specifications

Article number

6ES7138-7BB00-0AB0

ET 200iSP, WATCHDOG MOD.

General information

Product type designation

Watchdog module

Digital inputs

Number of digital inputs

0

Dimensions

Width

30 mm

Height

129 mm

Depth

136.5 mm

I/O systems

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

RS 485-iS coupler

Overview



Tasks of the RS 485-iS coupler

- Conversion of the electrical PROFIBUS DP RS 485 transmission technology into the intrinsically-safe RS 485-iS transmission technology with a transmission rate of 1.5 Mbps
- Required to connect intrinsically-safe PROFIBUS DP stations, e.g. ET 200iSP or devices from other vendors with Ex i DP connection
- Acts as a safety barrier
- Additional use as a repeater in the hazardous area
- Passive bus station (no configuration necessary)
- Certified according to ATEX 100a

Ordering data

RS 485-iS coupler

Isolating transformer for connection of PROFIBUS DP segments with RS 485 and RS 485-iS transmission systems

Accessories

PROFIBUS connection plug with selectable terminating resistor

For connection of IM 152 to PROFIBUS DP with RS 485-iS transmission technology

S7-300 DIN rails

Lengths:

- 160 mm
- 482 mm
- 530 mm
- 830 mm
- 2 000 mm

Article No.

6ES7972-0AC80-0XA0

6ES7972-0DA60-0XA0

6ES7390-1AB60-0AA0

6ES7390-1AE80-0AA0

6ES7390-1AF30-0AA0

6ES7390-1AJ30-0AA0

6ES7390-1BC00-0AA0

Article No.

PROFIBUS FastConnect standard cable, violet

Standard type with special design for fast mounting, 2-wire, shielded, cut-to-length

Specify length in m

Max. delivery unit 1 000 m, minimum order quantity 20 m

Preferred lengths

- 20 m
- 50 m
- 100 m
- 200 m
- 500 m
- 1 000 m

PROFIBUS FastConnect standard cable IS GP, blue

Cable type for use in potentially explosive atmospheres, with special design for fast mounting, 2-wire, shielded, cut-to-length

Specify length in m

Max. delivery unit 1 000 m, minimum order quantity 20 m

6XV1830-0EH10

6XV1830-0EN20

6XV1830-0EN50

6XV1830-0ET10

6XV1830-0ET20

6XV1830-0ET50

6XV1830-0EU10

6XV1831-2A

Technical specifications

Technical specifications - RS 485-iS coupler

Dimensions and weight

Dimensions W x H x D (mm) 80 × 125 × 130

Weight Approx. 500 g

Technical data - General

Degree of protection IP20

Ambient temperature - 20 ... + 60 °C

Technical specifications

Technical specifications - RS 485-iS coupler

Standards and approvals

• PROFIBUS	IEC 61784-1:2002 Ed1 CP 3/1
• EU directive	94/9/EG (ATEX 100a)
• CENELEC	II 3 (2) G EEx nA[ib] IIC T4
• UL and CSA	Class I, Division2, Group A, B, C, D T4 Class I Zone 2, Group IIC T4 AIS Class I, Division 1, Group A, B, C, D [Aexib] IIC, Class I, Zone1, 2, Group IIC
• FM	Class I, Division2, Group A, B, C, D T4 Class I Zone 2, Group IIC T4 AIS Class I, Division 1, Group A, B, C, D [Aexib] IIC, Class I, Zone1, 2, Group IIC
• IEC	IEC61131-2, Part 2
• CE	Conforming with 89/336/EWG Conforming with 73/23/EWG
• Ship-building certification	Classification companies • ABS (American Bureau of Shipping) • BV (Bureau Veritas) • DNV (Det Norske Veritas) • GL (Germanischer Lloyd) • LRD (Lloyds Register of Shipping) • Class NK (Nippon Kaiji Kyokai)

Module-specific data

Transmission rate on PROFIBUS DP, PROFIBUS RS 485-iS	9.6; 19.2; 45.45; 93.75; 187.5; 500 kbps 1.5 Mbps
Bus-Protocol	PROFIBUS DP

Voltages, Currents, Potentials

Rated supply voltage of RS 485-iS coupler	24 V DC (20.4 ... 28.8 V)
• Polarity reversal protection	Yes
• Voltage drop bypass	Min. 5 ms

Electrical isolation of 24 V power supply

• to PROFIBUS DP	Yes
- tested with	500 V DC
• to PROFIBUS RS 485-iS	Yes
- tested with	AC 500 V

Current consumption RS 485-iS coupler (24 V DC), max.	150 mA
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Power loss of the module, typically	3 Watts
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Status, alarms, diagnostics

Status display	no
Alarms	None
Diagnostic functions	Yes
• Bus monitoring PROFIBUS DP (primary)	Yellow LED "DP1"
• Bus monitoring PROFIBUS RS 485-iS (secondary)	Yellow LED "DP2"
• Monitoring 24 V power supply	Green LED "ON"

Technical safety notice

V_{DC}	±4.2 V
I_{SC}	±93 mA
P_0	0.1 Watts
V_{max}	±4.2 V
L_I	0
C_i	0
U_m	AC 250 V
T_a	-25 ... +60 °C

RS 485-iS segment

permitted cable length on a single line	RS 485-iS	DP Ex i
• 9.6 to 187.5 Kbps	1 000 m	200 m
• 500 kbit/s	400 m	200 m
• 1.5 Mbps	200 m	200 m
Number of PROFIBUS DP nodes that can be connected, max.	31	16
PROFIBUS RS 485-iS bus terminator switch	integrated, can be added	

I/O systems

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

Stainless steel wall enclosures

Design



ET 200iSP modules can also be installed in stainless steel wall enclosures designed to meet more exacting degree of protection requirements. The enclosures are available in various sizes. They comply with degree of protection IP65 and can be used in Ex zones 1 and 21.

Delivery can be an empty enclosure or include components, depending on the order.

Send your request to:
cabinets.industry@siemens.com

Ordering data

Stainless steel enclosure IP65 for SIMATIC ET 200iSP		6DL2804-					
I/O enclosure							
Stainless steel enclosure, max. IP66, with mounting plate and equipotential bonding rail, empty enclosure for installation of ET 200iSP components ¹⁾			0				
I/O device consisting of stainless steel enclosure with installed ET 200iSP components ²⁾			1				
I/O device consisting of stainless steel enclosure with installed ET 200iSP and pneumatic components ²⁾⁶⁾			2				
Device group							
Device group II, up to zone 1 and zone 21 (including zone 2 and zone 22)			A				
Enclosure dimensions W × H × D (in mm)							
650 × 450 × 230, for up to 15 ET 200iSP modules				D			
950 × 450 × 230, for up to 25 ET 200iSP modules				E			
Cable entries/number							
M16 cable entries for signals, 3 rows, 39 or 66 units ³⁾ , 2 × M32 for supply voltage, 4 × M20 for bus cables					3		
M20 cable entries for signals, 3 rows, 36 or 57 units ³⁾ , 2 × M32 for supply voltage, 4 × M20 for bus cables					4		
M16 cable entries for signals, 5 rows, 65 or 110 units ³⁾ , 2 × M32 for supply voltage, 4 × M20 for bus cables					5		
M20 cable entries for signals, 5 rows, 60 or 95 units ³⁾ , 2 × M32 for supply voltage, 4 × M20 for bus cables					6		
Cable entries/material							
Cable entry in plastic, black						0	
Ambient operating temperatures: • Surface casing -40...+70 °C • I/O device -40 ... +xx °C ⁴⁾⁵⁾							
Cable entry in metal (nickel-plated brass)						1	
Ambient operating temperatures: • Surface casing -40...+70 °C • I/O device -40 ... +xx °C ⁴⁾⁵⁾							
Cable entry in plastic, blue						2	
Ambient operating temperatures: • Surface casing -40...+70 °C • I/O device -40 ... +xx °C ⁴⁾⁵⁾							

¹⁾ The supplied certificate is only valid for the empty enclosure.

²⁾ The supplied certificate is valid for the supplied enclosure, including the installed components.

³⁾ Number of cable entries/signals depends on enclosure dimensions

⁴⁾ Maximum temperature depends on installed components.

⁵⁾ Minus temperatures down to -40 °C when heater installed. This takes up 2 slots for ET 200iSP modules. The heating (6DL9910-8AA) must be ordered separately.

⁶⁾ Limited to enclosures with 950 mm width and M20 cable entries for signals

Note:

Depending on the cables used, other types and sizes of cable entries can be fitted (on request).