

I/O systems

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

I/O modules > Digital input modules

Overview



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

For different requirements, the digital input modules offer:

- Function classes Basic, Standard, High Feature and High Speed as well as fail-safe DI (see "Fail-safe I/O modules")
- BaseUnits for single or multiple-conductor connection with automatic slot coding
- Potential distribution modules for system-integrated expansion with additional potential terminals
- Individual system-integrated load group formation with self-assembling voltage distribution bars (a separate power module is no longer required for ET 200SP)

- Option of connecting sensors compliant with IEC 61131 type 1, 2 or 3 (module-dependent) for rated voltages of up to 24 V DC or 230 V AC
- PNP (sink input) and NPN (source input) versions
- Clear labeling on front of module
- LEDs for diagnostics, status, supply voltage and faults (e.g. wire break/short-circuit)
- Electronically readable and non-volatile writable rating plate (I&M data 0 to 3)
- Extended functions and additional operating modes in some cases
 - MSI operating mode (simultaneous reading of input data from as many as three other controllers)
 - Counting operating mode (multi-channel counter for pulse generators with 32-bit counting width and up to 10 kHz counting frequency)
 - Oversampling operating mode (n-fold equidistant acquisition of digital values within one PN cycle for increasing the time resolution for slow CPU cycles)
 - Parameterizable input delay time
 - Isochronous mode (simultaneous equidistant reading of all input channels)
 - Hardware interrupts
 - Pulse extension
 - Re-parameterization during operation
 - Firmware update
 - Diagnosis of wire break and short-circuit (on channel or module basis)
 - Value status (optional binary validity information of the input signal in the process image)
 - Supports the PROFlenergy profile
- Optional accessories
 - Labeling strips (film or card)
 - Equipment labeling plate
 - Color-coded label with module-specific CC code
 - Shielding terminal

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

Overview of digital input modules

Digital input	PU	Article No.	CC code	BU type
DI 16 x 24 V DC ST	1	6ES7131-6BH01-0BA0	CC00	A0
DI 16 x 24 V DC ST	10	6ES7131-6BH01-2BA0	CC00	A0
DI 8 x 24 V DC BA	1	6ES7131-6BF01-0AA0	CC01	A0
DI 8 x 24 V DC BA	10	6ES7131-6BF01-2AA0	CC01	A0
DI 8 x 24 V DC SRC BA	1	6ES7131-6BF61-0AA0	CC02	A0
DI 8 x 24 V DC ST	1	6ES7131-6BF01-0BA0	CC01	A0
DI 8 x 24 V DC ST	10	6ES7131-6BF01-2BA0	CC01	A0
DI 8 x 24 V DC HF	1	6ES7131-6BF00-0CA0	CC01	A0
DI 8 x NAMUR HF	1	6ES7131-6TF00-0CA0	CC01	A0
DI 8 x 24 V DC HS	1	6ES7131-6BF00-0DA0	CC01	A0
With three operating modes:				
• High-speed isochronous DI				
• 4 pulse counters, 32-bit, 10 kHz				
• Oversampling				
DI 4 x 120 ... 230 V AC ST	1	6ES7131-6FD01-0BB1	CC41	B1

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Technical specifications (continued)

Article number	6ES7131-6BF01-0AA0 ET 200SP, DI 8x 24V DC Basic, PU 1	6ES7131-6BF61-0AA0 ET 200SP, DI 8x 24V DC SRC BA	6ES7131-6BF01-0BA0 ET 200SP, DI 8x 24V DC ST, PU 1	6ES7131-6BH01-0BA0 ET 200SP, DI 16x 24V DC ST, PU 1
Diagnostics indication LED				
• Monitoring of the supply voltage (PWR-LED)	Yes; green PWR LED	Yes; green PWR LED	Yes; green PWR LED	Yes; green PWR LED
• Channel status display	Yes; Green LED	Yes; Green LED	Yes; Green LED	Yes; Green LED
• for channel diagnostics	No	No	No	No
• for module diagnostics	Yes; green/red DIAG LED	Yes; green/red DIAG LED	Yes; green/red DIAG LED	Yes; green/red DIAG LED
Potential separation				
Potential separation channels				
• between the channels and backplane bus	Yes	Yes	Yes	Yes
Isolation				
Isolation tested with	707 V DC (type test)	707 V DC (type test)	707 V DC (type test)	707 V DC (type test)
Standards, approvals, certificates				
Suitable for safety functions		No		No
Ambient conditions				
Ambient temperature during operation				
• horizontal installation, min.	0 °C		0 °C	0 °C
• horizontal installation, max.	60 °C		60 °C	60 °C
• vertical installation, min.	0 °C		0 °C	0 °C
• vertical installation, max.	50 °C		50 °C	50 °C
Altitude during operation relating to sea level				
• Ambient air temperature-barometric pressure-altitude	On request: Ambient temperatures lower than 0 °C (without condensation) and/or installation altitudes greater than 2 000 m	On request: Ambient temperatures lower than 0 °C (without condensation) and/or installation altitudes greater than 2 000 m	On request: Ambient temperatures lower than 0 °C (without condensation) and/or installation altitudes greater than 2 000 m	On request: Ambient temperatures lower than 0 °C (without condensation) and/or installation altitudes greater than 2 000 m
Dimensions				
Width	15 mm	15 mm	15 mm	15 mm
Height	73 mm	73 mm	73 mm	73 mm
Depth	58 mm	58 mm	58 mm	58 mm
Weights				
Weight, approx.	28 g	28 g	28 g	28 g

Article number	6ES7131-6BF00-0CA0 ET 200SP, DI 8x24VDC HF	6ES7131-6BF00-0DA0 ET 200SP, DI 8x24VDC HIGH SPEED	6ES7131-6TF00-0CA0 ET 200SP, DI 8xNAMUR HF	6ES7131-6FD01-0BB1 ET 200SP, DI 4x 120...230V AC ST
General information				
Product type designation	DI 8x24 V DC HF	DI 8x24 V DC HS	DI 8xNAMUR HF	DI 4x120 ... 230 V AC ST
Product function				
• I&M data	Yes; I&M0 to I&M3	Yes; I&M0 to I&M3	Yes; I&M0 to I&M3	Yes; I&M0 to I&M3
Engineering with				
• STEP 7 TIA Portal configurable/integrated as of version	V13 SP1 / -	V13 SP1	V13 / V13	V14
• STEP 7 configurable/integrated as of version	V5.5 / -	V5.5 SP3 / -	V5.5 SP3 / -	V5.5 SP3
• PCS 7 configurable/integrated as of version	V8.1 SP1			
• PROFIBUS as of GSD version/GSD revision	One GSD file each, Revision 3 and 5 and higher	GSD Revision 5	GSD Revision 5	One GSD file each, Revision 3 and 5 and higher
• PROFINET as of GSD version/GSD revision	GSDML V2.3	GSDML V2.3	GSDML V2.3	GSDML V2.3
Operating mode				
• DI	Yes	Yes	Yes	Yes
• Counter	No	Yes	No	No
• Oversampling	No	Yes	No	No
• MSI	Yes	No	No	No

Technical specifications (continued)

Article number	6ES7131-6BF00-0CA0 ET 200SP, DI 8X24VDC HF	6ES7131-6BF00-0DA0 ET 200SP, DI 8X24VDC HIGH SPEED	6ES7131-6TF00-0CA0 ET 200SP, DI 8XNAMUR HF	6ES7131-6FD01-0BB1 ET 200SP, DI 4x 120...230V AC ST
Supply voltage				
Type of supply voltage	DC	DC	24 V DC	100 - 240 V AC
Rated value (DC)	24 V	24 V	24 V	
Rated value (AC)				230 V
Reverse polarity protection	Yes	Yes	Yes	No
Encoder supply				
Number of outputs	8		8	4
Output voltage encoder supply, min.	19.2 V			
Short-circuit protection	Yes		Yes	No; when using BU type B1, a fuse with 10 A tripping current must be provided
Output current				
• up to 60 °C, max.				10 A
24 V encoder supply				
• 24 V	Yes	Yes	No	
• Short-circuit protection	Yes; per channel, electronic	Yes; per module, electronic	No	
• Output current, max.		700 mA	No	
Digital inputs				
Number of digital inputs	8	8	8; NAMUR	4
Digital inputs, parameterizable	Yes		Yes	
Source/sink input	P-reading	P-reading		
Input characteristic curve in accordance with IEC 61131, type 3	Yes			Yes
Pulse extension	Yes; Pulse duration from 4 µs	Yes	Yes; 0.5 s, 1 s, 2 s	
• Length	2 s; 50 ms, 100 ms, 200 ms, 500 ms, 1 s, 2 s	2 s; 50 ms, 100 ms, 200 ms, 500 ms, 1 s, 2 s		
Edge evaluation	Yes; rising edge, falling edge, edge change		Yes; rising edge, falling edge, edge change	
Signal change flutter			Yes; 2 to 32 signal changes	
Flutter observation window			Yes; 0.5 s, 1 s to 100 s in 1-s steps	
Digital input functions, parameterizable				
• Gate start/stop		Yes		
• Freely usable digital input		Yes		
• Counter		Yes		
- Number, max.		4		
- Counting frequency, max.		10 kHz		
- Counting width		32 bit		
- Counting direction up/down		Yes		
• Digital input with oversampling		Yes		
- Number, max.		8		
- Values per cycle, max.		32		
- Resolution, min.		7.8125 µs		
Input voltage				
• Type of input voltage	DC	DC	DC	120/230 V AC (47 Hz to 63 Hz)
• Rated value (DC)	24 V	24 V	8.2 V	
• Rated value (AC)				230 V
• for signal "0"	-30 to +5V	-30 to +5V		0V AC to 40V AC
• for signal "1"	+11 to +30V	+11 to +30V		74 V AC to 264 V AC

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Technical specifications (continued)

Article number	6ES7131-6BF00-0CA0 ET 200SP, DI 8X24VDC HF	6ES7131-6BF00-0DA0 ET 200SP, DI 8X24VDC HIGH SPEED	6ES7131-6TF00-0CA0 ET 200SP, DI 8XNAMUR HF	6ES7131-6FD01-0BB1 ET 200SP, DI 4x 120...230V AC ST
Input current - for signal "1", typ. for 10 k switched contact - for signal "0" - for signal "1" for unswitched contact - for signal "0", max. (permissible quiescent current) - for signal "1" for NAMUR encoders - for signal "0" - for signal "1"	2.5 mA	6 mA	0.35 to 1.2 mA 2.1 to 7 mA 0.5 mA typ. 8 mA 0.35 to 1.2 mA 2.1 to 7 mA	10.8 mA
Input delay (for rated value of input voltage) - tolerated changeover time for changeover contacts for standard inputs - parameterizable for interrupt inputs - parameterizable for counter/technological functions - parameterizable for NAMUR inputs - at "0" to "1", max. - at "1" to "0", max.	Yes; 0.05 / 0.1 / 0.4 / 0.8 / 1.6 / 3.2 / 12.8 / 20 ms (in each case + delay of 30 to 500 µs, depending on line length)	Yes; none / 0.05 / 0.1 / 0.4 / 0.8 / 1.6 / 3.2 / 12.8 / 20 ms Yes Yes	300 ms No 12 ms 12 ms	No
Cable length - shielded, max. - unshielded, max.	1 000 m 600 m	50 m 50 m	200 m	1 000 m 600 m
Encoder Connectable encoders - NAMUR encoder / changeover contact according to EN 60947 - Single contact / changeover contact unconnected - Single contact / changeover contact connected with 10 kΩ 2-wire sensor - permissible quiescent current (2-wire sensor), max.	Yes 1.5 mA	Yes 1.5 mA	Yes Yes Yes	Yes
Isochronous mode - Isochronous operation (application synchronized up to terminal) - Filtering and processing time (TCI), min. - Bus cycle time (TDP), min.	Yes 420 µs 500 µs	Yes 125 µs	No	No
Interrupts/diagnostics/ status information Diagnostics function	Yes	Yes	Yes	
Alarms - Diagnostic alarm - Hardware interrupt	Yes; channel by channel Yes; Parameterizable, channels 0 to 7	Yes Yes	Yes; channel by channel Yes; Parameterizable, channels 0 to 7	No No

Technical specifications (continued)

Article number	6ES7131-6BF00-0CA0 ET 200SP, DI 8X24VDC HF	6ES7131-6BF00-0DA0 ET 200SP, DI 8X24VDC HIGH SPEED	6ES7131-6TF00-0CA0 ET 200SP, DI 8XNAMUR HF	6ES7131-6FD01-0BB1 ET 200SP, DI 4x 120..230V AC ST
Diagnostic messages				
• Diagnostic information readable	Yes	Yes	Yes	
• Monitoring the supply voltage	Yes	Yes	Yes	No
- parameterizable	Yes	Yes	Yes	
• Monitoring of encoder power supply	Yes; channel by channel	Yes; Module-wise	Yes; channel by channel	
• Wire-break	Yes; Channel by channel, optional protective circuit for preventing wire-break diagnostics in the case of simple encoder contacts: 25 kOhm to 45 kOhm	No	Yes; channel by channel	No
• Short-circuit	Yes; channel by channel	Yes; Module-wise	Yes; channel by channel	No
• Group error			Yes	
Diagnostics indication LED				
• Monitoring of the supply voltage (PWR-LED)	Yes; green PWR LED	Yes; green PWR LED	Yes; green PWR LED	Yes; green PWR LED
• Channel status display	Yes; Green LED	Yes; Green LED	Yes; Green LED	Yes; Green LED
• for channel diagnostics	Yes; Red LED	No	Yes; Red LED	No
• for module diagnostics	Yes; green/red DIAG LED	Yes; green/red DIAG LED	Yes; green/red DIAG LED	Yes; green/red DIAG LED
Potential separation				
Potential separation channels				
• between the channels and backplane bus	Yes	Yes	Yes	Yes
Isolation				
Isolation tested with	707 V DC (type test)	707 V DC (type test)	707 V DC (type test)	2 545 V DC/2 s (routine test)
Standards, approvals, certificates				
Suitable for safety functions	No	No	No	No
Ambient conditions				
Ambient temperature during operation				
• horizontal installation, min.	0 °C			
• horizontal installation, max.	60 °C			
• vertical installation, min.	0 °C			
• vertical installation, max.	50 °C			
Altitude during operation relating to sea level				
• Ambient air temperature-barometric pressure-altitude	On request: Negative ambient temperature down to -30 °C (without condensation), installation altitudes between 2 000 m and 5 000 m			On request: Ambient temperatures lower than 0 °C (without condensation) and/or installation altitudes greater than 2 000 m
Dimensions				
Width	15 mm	15 mm	15 mm	20 mm
Height	73 mm	73 mm	73 mm	73 mm
Depth	58 mm	58 mm	58 mm	58 mm
Weights				
Weight, approx.	28 g	28 g	32 g	36 g

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Ordering data

Article No.

Article No.

Digital input modules

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

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

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

- PU: 1 unit
- PU: 10 units

6ES7131-6BF01-0AA0
6ES7131-6BF01-2AA0
6ES7131-6BF61-0AA0

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

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

- PU: 1 unit
- PU: 10 units

6ES7131-6BF01-0BA0
6ES7131-6BF01-2BA0

Digital input module
DI 16 x 24 V DC Standard, BU type A0, color code CC00

- PU: 1 unit
- PU: 10 units

6ES7131-6BH01-0BA0
6ES7131-6BH01-2BA0
6ES7131-6BF00-0CA0

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

6ES7131-6BF00-0DA0

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

6ES7131-6TF00-0CA0

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

6ES7131-6FD01-0BB1

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

Usable BaseUnits

BU15-P16+A10+2D

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

- 1 unit
- 10 units

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

BU15-P16+A0+2D

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

- 1 unit
- 10 units

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

BU15-P16+A10+2B

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

- 1 unit
- 10 units

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

BU15-P16+A0+2B

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

- 1 unit
- 10 units

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

BU20-P12+A0+4B

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

6ES7193-6BP20-0BB1

Potential distribution modules

PotDis BU

PotDis BU, type P1 (light), 17x P1 potential, 1x P2 potential, for beginning a new load group (max. 10 A)

6ES7193-6UP00-0DP1

PotDis BU, type P1 (dark), 17x P1 potential, 1x P2 potential, for continuing the load group

6ES7193-6UP00-0BP1

PotDis BU, type P2 (light), 1x P1 potential, 17x P2 potential, for beginning a new load group (max. 10 A)

6ES7193-6UP00-0DP2

PotDis BU, type P2 (dark), 1x P1 potential, 17x P2 potential, for continuing the load group

6ES7193-6UP00-0BP2

PotDis TB

PotDis TB, type BR-W, 18x internally jumpered terminals, without connection to P1, P2 or AUX, (total current max. 10 A)

6ES7193-6TP00-0TP0

PotDis TB, type P1-R, 18x P1 potential, (total current max. 10 A)

6ES7193-6TP00-0TP1

PotDis TB, type P2-B, 18x P2 potential, (total current max. 10 A)

6ES7193-6TP00-0TP2

PotDis TB, type n.c.-G, 18x n.c. (not connected) terminals, without reference to P1, P2 or AUX

6ES7193-6TP00-0TN0