

**SIMATIC S7-300 advanced controller**

I/O modules

Digital modules

**SM 321 digital input modules****Overview**

- Digital inputs
- For connecting standard switches and two-wire proximity switches (BERO)

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**Technical specifications**

Article number	<b>6ES7321-1BH02-0AA0</b> SM321, 16DI, DC24V	<b>6ES7321-1BH50-0AA0</b> SM321, 16DI, DC24V, SOURCE INPUT	<b>6ES7321-1BL00-0AA0</b> SM321, 32DI, DC24V	<b>6ES7321-1BP00-0AA0</b> SM321, 64 DI, DC 24V, 3MS, SINK/SOURCE	<b>6ES7321-1BH10-0AA0</b> SM321, 16DI, DC24V, 0.05MS INPUT DELAY.
<b>Product type designation</b>					
<b>Supply voltage</b>					
<b>Load voltage L+</b>					
• Rated value (DC)	24 V	24 V	24 V	24 V	24 V
<b>Input current</b>					
from backplane bus 5 V DC, max.	10 mA	10 mA	15 mA	100 mA	110 mA
<b>Power losses</b>					
Power loss, typ.	3.5 W	3.5 W	6.5 W	7 W	3.8 W
<b>Digital inputs</b>					
Number of digital inputs	16	16	32	64	16
Input characteristic curve in accordance with IEC 61131, type 1	Yes	Yes	Yes	Yes	Yes
<b>Number of simultaneously controllable inputs</b>					
<b>horizontal installation</b>					
- up to 40 °C, max.	16	16	32	64	16
- up to 60 °C, max.	16	16	16	32	16
<b>vertical installation</b>					
- up to 40 °C, max.	16	16	32	32	16
<b>Input voltage</b>					
• Type of input voltage	DC	DC	DC	DC	DC
• Rated value (DC)	24 V	24 V	24 V	24 V	24 V
• for signal "0"	-30 to +5V	-5 to +30V	-30 to +5V	-30 to +5V	-30 to +5V
• for signal "1"	13 to 30V	-13 to -30V	13 to 30V	13 to 30V	13 to 30V
<b>Input current</b>					
• for signal "1", typ.	7 mA	7 mA	7 mA	4.2 mA; Typical	7 mA
<b>Input delay (for rated value of input voltage)</b>					
<b>for standard inputs</b>					
- Parameterizable	No	No	No	No	No
- at "0" to "1", min.	1.2 ms	1.2 ms	1.2 ms	1.2 ms	25 µs
- at "0" to "1", max.	4.8 ms	4.8 ms	4.8 ms	4.8 ms	75 µs
<b>Cable length</b>					
• shielded, max.	1 000 m	1 000 m	1 000 m	1 000 m	1 000 m
• Unshielded, max.	600 m	600 m	600 m	600 m	600 m

## Technical specifications (continued)

Article number	6ES7321-1BH02-0AA0	6ES7321-1BH50-0AA0	6ES7321-1BL00-0AA0	6ES7321-1BP00-0AA0	6ES7321-1BH10-0AA0
	SM321, 16DI, DC24V	SM321, 16DI, DC24V, SOURCE INPUT	SM321, 32DI, DC24V	SM321, 64 DI, DC 24V, 3MS, SINK/SOURCE	SM321, 16DI, DC24V, 0.05MS INPUT DELAY.
<b>Encoder</b>					
<b>Connectable encoders</b>					
• 2-wire sensor	Yes	Yes	Yes	No	Yes
- Permissible quiescent current (2-wire sensor), max.	1.5 mA	1.5 mA	1.5 mA		1.5 mA
<b>Isochronous mode</b>					
Isochronous operation (application synchronized up to terminal)	No	No	No	No	Yes
<b>Interrupts/diagnostics/status information</b>					
<b>Alarms</b>					
• Alarms	No	No	No	No	No
• Diagnostic alarm	No	No	No	No	No
• Hardware interrupt	No	No	No	No	No
<b>Diagnostic messages</b>					
• Diagnostic functions	No	No	No	No	No
<b>Diagnostics indication LED</b>					
• Status indicator digital input (green)	Yes	Yes	Yes	Yes	Yes
<b>Galvanic isolation</b>					
<b>Galvanic isolation digital inputs</b>					
• between the channels	No	No	No	No	No
• between the channels, in groups of	16	16	16	16	16
• between the channels and the backplane bus	Yes; Optocoupler	Yes; Optocoupler	Yes; Optocoupler	Yes; Optocoupler	Yes; Optocoupler
<b>Isolation</b>					
Isolation checked with	500 V DC	500 V DC	500 V DC	500 V DC	500 V DC
<b>Connection method</b>					
required front connector	20-pin	20-pin	40-pin	Cable: 6ES7 392-4Bxx0-0AA0 terminal blocks: 6ES7 392-1xN00-0AA0	20-pin
<b>Dimensions</b>					
Width	40 mm	40 mm	40 mm	40 mm	40 mm
Height	125 mm	125 mm	125 mm	125 mm	125 mm
Depth	120 mm	120 mm	120 mm	112 mm	120 mm
<b>Weights</b>					
Weight, approx.	200 g	200 g	260 g	230 g; approx.	200 g

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**SM 321 digital input modules****Technical specifications** (continued)

Article number	<b>6ES7321-7BH01-0AB0</b> SM321, 16DI, 24V DC	<b>6ES7321-1CH00-0AA0</b> SM321, 16 DI, AC/DC 24-48V, 1CH/COMMON	<b>6ES7321-1CH20-0AA0</b> SM321, 16DI, DC48-125V	<b>6ES7321-1FH00-0AA0</b> SM321, 16 DI, 120/230V AC
<b>Product type designation</b>				
<b>Supply voltage</b>				
<b>Load voltage L+</b>				
• Rated value (DC)	24 V	24 V	48 V	
<b>Load voltage L1</b>				
• Rated value (AC)		24 V		230 V; 120/230 V AC; all load voltages must have the same phase.
<b>Input current</b>				
from load voltage L+ (without load), max.	90 mA			
from backplane bus 5 V DC, max.	130 mA	100 mA	40 mA	29 mA
<b>Power losses</b>				
Power loss, typ.	4 W	1.5 W; at 24 V; 2,8 W at 48 V	4.3 W	4.9 W
<b>Digital inputs</b>				
Number of digital inputs	16	16	16	16
Input characteristic curve in accordance with IEC 61131, type 1		Yes	Yes	Yes
Input characteristic curve in accordance with IEC 61131, type 2	Yes			
<b>Number of simultaneously controllable inputs</b>				
<b>horizontal installation</b>				
- up to 40 °C, max.	16	16	8	16
- up to 60 °C, max.	16	16	8; 6 to U <sub>e</sub> 146 V	16
<b>vertical installation</b>				
- up to 40 °C, max.	16	16	8	16
<b>Input voltage</b>				
• Type of input voltage	DC	AC/DC	DC	AC
• Rated value (AC)		24 V; AC 24 or 48 V		230 V; 120/230V AC
• Rated value (DC)	24 V	24 V; DC 24 or 48 V	48 V; 48V DC to 125V DC	
• for signal "0"	-30 to +5V	-5 to +5 V AC	DC -146V to DC +15V	0 to 40V
• for signal "1"	13 to 30V	14V AC to 60V AC	30V DC to 146V DC	79 to 264V
• Frequency range		0 to 63 Hz		47 ... 63 Hz
<b>Input current</b>				
• for signal "1", typ.	7 mA	2.7 mA	3.5 mA	6.5 mA; (120V, 60Hz), 16mA (230V, 50Hz)
<b>Input delay (for rated value of input voltage) for standard inputs</b>				
- Parameterizable	Yes; 0.1 / 0.5 / 3 / 15 / 20 ms	No	No	No
- at "0" to "1", min.		16 ms	0.1 ms	25 ms
- at "0" to "1", max.		16 ms	3.5 ms	25 ms
<b>Cable length</b>				
• shielded, max.	1 000 m	1 000 m	1 000 m	1 000 m
• Unshielded, max.	600 m	600 m	600 m	600 m
<b>Encoder</b>				
<b>Connectable encoders</b>				
• 2-wire sensor	Yes	Yes	Yes	Yes
- Permissible quiescent current (2-wire sensor), max.	2 mA	1 mA	1 mA	2 mA
<b>Isochronous mode</b>				
Isochronous operation (application synchronized up to terminal)	Yes	No	No	No

**Technical specifications** (continued)

Article number	<b>6ES7321-7BH01-0AB0</b> SM321, 16DI, 24V DC	<b>6ES7321-1CH00-0AA0</b> SM321, 16 DI, AC/DC 24-48V, 1CH/COMMON	<b>6ES7321-1CH20-0AA0</b> SM321, 16DI, DC48-125V	<b>6ES7321-1FH00-0AA0</b> SM321, 16 DI, 120/230V AC
<b>Interrupts/diagnostics/ status information</b>				
<b>Alarms</b>				
• Alarms	Yes	No	No	No
• Diagnostic alarm	Yes; Parameterizable	No	No	No
• Hardware interrupt	Yes; Parameterizable	No	No	No
<b>Diagnostic messages</b>				
• Diagnostic functions	Yes; Parameterizable	No	No	No
<b>Diagnostics indication LED</b>				
• Status indicator digital input (green)	Yes	Yes	Yes	Yes
<b>Galvanic isolation</b>				
<b>Galvanic isolation digital inputs</b>				
• between the channels	No	Yes	No	No
• between the channels, in groups of 16	16	1	8	4
• between the channels and the backplane bus	Yes; Optocoupler	Yes; Optocoupler	Yes; Optocoupler	Yes; Optocoupler
<b>Isolation</b>				
Isolation checked with	500 V DC	1500 V AC	1500 V DC	4000 VDC
<b>Connection method</b>				
required front connector	20-pin	40-pin	20-pin	20-pin
<b>Dimensions</b>				
Width	40 mm	40 mm	40 mm	40 mm
Height	125 mm	125 mm	125 mm	125 mm
Depth	120 mm	120 mm	120 mm	120 mm
<b>Weights</b>				
Weight, approx.	200 g	260 g	200 g	240 g
Article number	<b>6ES7321-1EL00-0AA0</b> SM321, 32DI, AC120V	<b>6ES7321-1FF01-0AA0</b> SM321, 8DI, AC120/230V	<b>6ES7321-1FF10-0AA0</b> SM321, 8 DI, AC/DC 120/230V, 1CH/COMMON	
<b>Product type designation</b>				
<b>Load voltage L1</b>				
• Rated value (AC)	120 V	230 V; 120/230V AC	230 V; 120/230 V AC; all load voltages must have the same phase.	
<b>Input current</b>				
from backplane bus 5 V DC, max.	16 mA	29 mA	100 mA	
<b>Power losses</b>				
Power loss, typ.	4 W	4.9 W	4.9 W	
<b>Digital inputs</b>				
Number of digital inputs	32	8	8	
Input characteristic curve in accordance with IEC 61131, type 1		Yes	Yes	
Input characteristic curve in accordance with IEC 61131, type 2	Yes			
<b>Number of simultaneously controllable inputs</b>				
<b>horizontal installation</b>				
- up to 40 °C, max.	32			
- up to 60 °C, max.	24	8	8	
<b>vertical installation</b>				
- up to 40 °C, max.	32	8	8	

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**SM 321 digital input modules****Technical specifications** (continued)

Article number	<b>6ES7321-1EL00-0AA0</b> SM321, 32DI, AC120V	<b>6ES7321-1FF01-0AA0</b> SM321, 8DI, AC120/230V	<b>6ES7321-1FF10-0AA0</b> SM321, 8 DI, AC/DC 120/230V, 1CH/COMMON
<b>Input voltage</b>			
• Type of input voltage	AC	AC	AC
• Rated value (AC)	120 V	230 V; 120/230V AC	120 V; 120/230V AC
• for signal "0"	0 to 20V	0 to 40V	0 to 40V
• for signal "1"	74 to 132V	79 to 264V	79 to 264V
• Frequency range	47 ... 63 Hz	47 ... 63 Hz	47 ... 63 Hz
<b>Input current</b>			
• for signal "1", typ.	21 mA	6.5 mA; (120 V); 11 mA (230 V)	7.5 mA; (120 V); 17.3 mA (230 V)
<b>Input delay (for rated value of input voltage)</b>			
<b>for standard inputs</b>			
- Parameterizable	No	No	No
- at "0" to "1", max.	15 ms	25 ms	25 ms
<b>Cable length</b>			
• shielded, max.	1 000 m	1 000 m	1 000 m
• Unshielded, max.	600 m	600 m	600 m
<b>Encoder</b>			
<b>Connectable encoders</b>			
• 2-wire sensor	Yes	Yes	Yes
- Permissible quiescent current (2-wire sensor), max.	4 mA	2 mA	2 mA
<b>Isochronous mode</b>			
Isochronous operation (application synchronized up to terminal)	No	No	No
<b>Interrupts/diagnostics/status information</b>			
<b>Alarms</b>			
• Alarms	No	No	No
• Diagnostic alarm	No	No	No
• Hardware interrupt	No	No	No
<b>Diagnostic messages</b>			
• Diagnostic functions	No	No	No
<b>Diagnostics indication LED</b>			
• Status indicator digital input (green)	Yes; per channel	Yes	Yes
<b>Galvanic isolation</b>			
<b>Galvanic isolation digital inputs</b>			
• between the channels	No	No	Yes
• between the channels, in groups of	8	2	1
• between the channels and the backplane bus	Yes; Optocoupler	Yes; Optocoupler	Yes; Optocoupler
<b>Isolation</b>			
Isolation checked with	2500 V DC	4000 VDC	1500 V AC
<b>Connection method</b>			
required front connector	40-pin	20-pin	40-pin
<b>Dimensions</b>			
Width	40 mm	40 mm	40 mm
Height	125 mm	125 mm	125 mm
Depth	120 mm	120 mm	120 mm
<b>Weights</b>			
Weight, approx.	300 g	240 g	240 g

Ordering data	Article No.	Article No.
<b>SM 321 digital input modules</b>		
incl. labeling strips, bus connector		
16 inputs, 24 V DC	6ES7321-1BH02-0AA0	
16 inputs, 24 V DC, active low	6ES7321-1BH50-0AA0	
32 inputs, 24 V DC	6ES7321-1BL00-0AA0	
64 inputs, 24 V DC, active high/low	6ES7321-1BP00-0AA0	
Note: 6ES7392-4...0-0AA0 connection cable and 6ES7392-1.N00-0AA0 terminal blocks necessary.		
16 inputs, 24 to 48 V DC	6ES7321-1CH00-0AA0	
16 inputs, 48 to 125 V DC	6ES7321-1CH20-0AA0	
16 inputs, 24 V DC, for isochronous mode	6ES7321-1BH10-0AA0	
32 inputs, 120 V AC	6ES7321-1EL00-0AA0	
8 inputs, 120/230 V AC	6ES7321-1FF01-0AA0	
8 inputs, 120/230 V AC, single root	6ES7321-1FF10-0AA0	
16 inputs, 120/230 V AC	6ES7321-1FH00-0AA0	
16 inputs, 24 V DC, for isochronous mode, diagnostics-capable	6ES7321-7BH01-0AB0	
<b>Front connectors</b>		
20-pin, with screw contacts		
• 1 unit	6ES7392-1AJ00-0AA0	
• 100 units	6ES7392-1AJ00-1AB0	
20-pin, with spring-loaded contacts		
• 1 unit	6ES7392-1BJ00-0AA0	
• 100 units	6ES7392-1BJ00-1AB0	
40-pin, with screw contacts		
• 1 unit	6ES7392-1AM00-0AA0	
• 100 units	6ES7392-1AM00-1AB0	
40-pin, with spring-loaded contacts		
• 1 unit	6ES7392-1BM01-0AA0	
• 100 units	6ES7392-1BM01-1AB0	
<b>S7-300 connecting cables</b>		
For 64-channel modules; 2 units		
1 m	6ES7392-4BB00-0AA0	
2.5 m	6ES7392-4BC50-0AA0	
5 m	6ES7392-4BF00-0AA0	
<b>Terminal blocks</b>		
For 64-channel modules; 2 units		
With screw contacts	6ES7392-1AN00-0AA0	
With spring-loaded contacts	6ES7392-1BN00-0AA0	
<b>Front door, elevated design</b>	6ES7328-0AA00-7AA0	
e.g. for 32-channel modules; for connecting 1.3 mm <sup>2</sup> /16 AWG conductors; circuit diagram and nameplates in petrol		
<b>SIMATIC TOP connect</b>	See page 5/247	
<b>Bus connectors</b>		6ES7390-0AA00-0AA0
1 unit (spare part)		
<b>Labeling strips</b>		
10 units (spare part)		
for modules with 20-pin front connector		6ES7392-2XX00-0AA0
for modules with 40-pin front connector		6ES7392-2XX10-0AA0
<b>Label cover</b>		
10 units (spare part)		
for modules with 20-pin front connector		6ES7392-2XY00-0AA0
for modules with 40-pin front connector		6ES7392-2XY10-0AA0
<b>Labeling sheets for machine inscription</b>		
for modules with 20-pin front connector, DIN A4, for printing with laser printer; 10 units		
petrol		6ES7392-2AX00-0AA0
light-beige		6ES7392-2BX00-0AA0
yellow		6ES7392-2CX00-0AA0
red		6ES7392-2DX00-0AA0
for modules with 40-pin front connector, DIN A4, for printing with laser printer; 10 units		
petrol		6ES7392-2AX10-0AA0
light-beige		6ES7392-2BX10-0AA0
yellow		6ES7392-2CX10-0AA0
red		6ES7392-2DX10-0AA0
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