

SIMATIC S7-1500 Advanced Controllers

I/O modules

Digital modules

SM 521 digital input modules

Overview



- 16 and 32-channel digital input modules
- For flexible adaptation of the controller to the corresponding task
- For subsequent expansion of the system with additional inputs
- 35 mm wide modules with parameters and diagnostic functions
- 25 mm wide modules for use in tight spaces: particularly economical, without parameters or diagnostic functions

Technical specifications

Article number	6ES7521-1BH00-0AB0 S7-1500, DI 16X24VDC HF	6ES7521-1BL00-0AB0 S7-1500, DI 32X24VDC HF	6ES7521-1BH50-0AA0 S7-1500, DI 16X24VDC SRC BA	6ES7521-1FH00-0AA0 S7-1500, DI 16X230VAC BA	6ES7521-7EH00-0AB0 S7-1500, DI 16 X 24...125V UC HF
General information					
Product type designation	DI 16x24VDC HF	DI 32x24VDC HF	DI 16x24VDC SRC BA	DI 16x230VAC BA	DI 16x24 ... 125VUC HF
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	Yes; I&M0 to I&M3
Engineering with					
• STEP 7 TIA Portal configurable/ integrated as of version	V13 SP1 / -	V13 SP1 / -	V12 / V12	V12 / V12	V13 SP1 / -
• STEP 7 configurable/integrated as of version	V5.5 SP3 / -	V5.5 SP3 / -	V5.5 SP3 / -	V5.5 SP3 / -	V5.5 SP3 / -
• PROFIBUS as of GSD version/ GSD revision	V1.0 / V5.1	V1.0 / V5.1	V1.0 / V5.1	V1.0 / V5.1	V1.0 / V5.1
• PROFINET as of GSD version/ GSD revision	V2.3 / -	V2.3 / -	V2.3 / -	V2.3 / -	V2.3 / -
Operating mode					
• DI	Yes	Yes	Yes	Yes	Yes
• Counter	Yes	Yes	No	No	No
• Oversampling	No				No
• MSI	Yes	Yes	Yes	Yes	Yes
Supply voltage					
Type of supply voltage	DC	DC	DC		
Rated value (DC)	24 V	24 V			
Reverse polarity protection	Yes	Yes			
Digital inputs					
Number of digital inputs	16	32	16	16	16
Digital inputs, parameterizable	Yes	Yes	No	No	Yes
Source/sink input	P-reading	P-reading	m-reading	P-reading	Yes
Input characteristic curve in accordance with IEC 61131, type 1				Yes	
Input characteristic curve in accordance with IEC 61131, type 3	Yes	Yes	Yes		Yes; at 24 V DC
Digital input functions, parameterizable					
• Gate start/stop	Yes	Yes			
• Freely usable digital input	Yes	Yes			
• Counter					
- Number, max.	2	2			
- Counting frequency, max.	1 kHz	1 kHz			
- Counting width	32 bit	32 bit			
- Counting direction up/down	Up	Up			

Technical specifications (continued)

Article number	6ES7521-1BH00-0AB0 S7-1500, DI 16X24VDC HF	6ES7521-1BL00-0AB0 S7-1500, DI 32X24VDC HF	6ES7521-1BH50-0AA0 S7-1500, DI 16X24VDC SRC BA	6ES7521-1FH00-0AA0 S7-1500, DI 16X230VAC BA	6ES7521-7EH00-0AB0 S7-1500, DI 16 X 24...125V UC HF
Input voltage					
• Type of input voltage	DC	DC	DC	AC	AC/DC
• Rated value (DC)	24 V	24 V	24 V		24 V; 48 V, 125 V
• Rated value (AC)				230 V; 120/230V AC, 50/60 Hz	24 V; 48 V, 125 V (50 - 60 Hz)
• for signal "0"	-30 to +5V	-30 to +5V	-5 to +30V	0V AC to 40V AC	-5 ... +5 V
• for signal "1"	+11 to +30V	+11 to +30V	-11 to -30V	79V AC to 264V AC	+11 V DC to +146 V DC
Input current					
• for signal "1", typ.	2.5 mA	2.5 mA	4.5 mA	11 mA; At 230 V AC and 5.5 mA at 120 V AC	3 mA; at 24 V DC
Input delay (for rated value of input voltage) for standard inputs					
- parameterizable	Yes; 0.05 / 0.1 / 0.4 / 1.6 / 3.2 / 12.8 / 20 ms	Yes; 0.05 / 0.1 / 0.4 / 1.6 / 3.2 / 12.8 / 20 ms	No	No	Yes; 0.05 / 0.1 / 0.4 / 1.6 / 3.2 / 12.8 / 20 ms parameterizable with DC, 20 ms fixed with AC
for interrupt inputs					
- parameterizable	Yes	Yes	No	No	Yes
for counter/technological functions					
- parameterizable	Yes	Yes	No	No	No
Cable length					
• 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
Encoder					
Connectable encoders					
• 2-wire sensor	Yes	Yes	Yes	Yes	Yes
- permissible quiescent current (2-wire sensor), max.	1.5 mA	1.5 mA	1.5 mA	2 mA	1.5 mA
Isochronous mode					
Isochronous operation (application synchronized up to terminal)	Yes	Yes	No	No	No
Filtering and processing time (TCI), min.	80 µs; At 50 µs filter time	80 µs; At 50 µs filter time			
Bus cycle time (TDP), min.	250 µs	250 µs			
Interrupts/diagnostics/ status information					
Diagnostics function	Yes	Yes	No	No	Yes
Alarms					
• Diagnostic alarm	Yes	Yes	No	No	Yes
• Hardware interrupt	Yes	Yes	No	No	Yes
Diagnostic messages					
• Monitoring the supply voltage	Yes	Yes	No	No	No
• Wire-break	Yes; to I < 350 µA	Yes; to I < 350 µA	No	No	Yes; To I < 550 µA
• Short-circuit	No	No	No	No	No
Diagnostics indication LED					
• RUN LED	Yes; Green LED	Yes; Green LED	Yes; Green LED	Yes; Green LED	Yes; Green LED
• ERROR LED	Yes; Red LED	Yes; Red LED	Yes; Red LED	Yes; Red LED	Yes; Red LED
• Monitoring of the supply voltage (PWR-LED)	Yes; Green LED	Yes; Green LED	No	No	No
• Channel status display	Yes; Green LED	Yes; Green LED	Yes; Green LED	Yes; Green LED	Yes; Green LED
• for channel diagnostics	Yes; Red LED	Yes; Red LED	No	No	Yes; Red LED
• for module diagnostics	Yes; Red LED	Yes; Red LED	No	Yes; Red LED	Yes; Red LED
Potential separation					
Potential separation channels					
• between the channels and backplane bus	Yes	Yes	Yes	Yes	Yes
Isolation					
Isolation tested with	707 V DC (type test)	707 V DC (type test)	707 V DC (type test)	3 100 V DC	2 000 V DC

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Standards, approvals, certificates					
Suitable for safety functions	No	No	No	No	No
Ambient conditions					
Ambient temperature during operation					
• horizontal installation, min.	0 °C	0 °C	0 °C	0 °C	0 °C
• horizontal installation, max.	60 °C	60 °C	60 °C	60 °C	60 °C
• vertical installation, min.	0 °C	0 °C	0 °C	0 °C	0 °C
• vertical installation, max.	40 °C	40 °C	40 °C	40 °C	40 °C
Decentralized operation					
Prioritized startup	Yes	Yes	Yes	Yes	Yes
Dimensions					
Width	35 mm	35 mm	35 mm	35 mm	35 mm
Height	147 mm	147 mm	147 mm	147 mm	147 mm
Depth	129 mm	129 mm	129 mm	129 mm	129 mm
Weights					
Weight, approx.	240 g	260 g	230 g	300 g	240 g

Article number	6ES7521-1BH10-0AA0 S7-1500, DI 16X24VDC BA	6ES7521-1BL10-0AA0 S7-1500, DI 32X24VDC BA
General information		
Product type designation	DI 16 x 24 V DC BA	DI 32x24VDC BA
Product function		
• I&M data	Yes; I&M0 to I&M3	Yes; I&M0 to I&M3
Engineering with		
• STEP 7 TIA Portal configurable/ integrated as of version	V13 / V13	V13 / V13
• STEP 7 configurable/integrated as of version	V5.5 SP3 / -	V5.5 SP3 / -
• PROFIBUS as of GSD version/ GSD revision	V1.0 / V5.1	V1.0 / V5.1
• PROFINET as of GSD version/ GSD revision	V2.3 / -	V2.3 / -
Operating mode		
• DI	Yes	Yes
• Counter	No	No
• MSI	Yes	Yes
Supply voltage		
Type of supply voltage	DC	DC
Rated value (DC)	24 V	24 V
Digital inputs		
Number of digital inputs	16	32
Digital inputs, parameterizable	No	No
Source/sink input	P-reading	P-reading
Input characteristic curve in accordance with IEC 61131, type 3	Yes	Yes
Input voltage		
• Type of input voltage	DC	DC
• Rated value (DC)	24 V	24 V
• for signal "0"	-30 to +5V	-30 to +5V
• for signal "1"	+11 to +30V	+11 to +30V
Input current		
• for signal "1", typ.	2.7 mA	2.7 mA
Input delay (for rated value of input voltage)		
for standard inputs		
- parameterizable	No	No
for interrupt inputs		
- parameterizable	No	No
for counter/technological functions		
- parameterizable	No	No

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Ordering data

Article No.

SM 521 digital input modules

Module width 35 mm

16 inputs, 24 V DC, isolated, parameterizable diagnostics and hardware interrupts

6ES7521-1BH00-0AB0

32 inputs, 24 V DC, isolated, parameterizable diagnostics and hardware interrupts

6ES7521-1BL00-0AB0

16 inputs, 24 V DC, isolated, input delay 3.2 ms

6ES7521-1BH50-0AA0

16 inputs, 230 V AC, isolated, input delay 20 ms

6ES7521-1FH00-0AA0

16 inputs, 24 ... 125 V UC, input delay 0.05 ... 20 ms, parameterizable diagnostics and hardware interrupts

6ES7521-7EH00-0AB0

Module width 25 mm; front connector (push-in) included in delivery package

16 inputs, 24 V DC, isolated

6ES7521-1BH10-0AA0

32 inputs, 24 V DC, isolated

6ES7521-1BL10-0AA0

Accessories

Front connectors

For 35 mm modules; including four potential bridges, cable ties and individual labeling strips, 40-pin

- Screw terminals
- Push-in

6ES7592-1AM00-0XB0

6ES7592-1BM00-0XB0

For 25 mm modules; including cable ties and individual labeling strips; push-in terminal 40-pin; spare part

6ES7592-1BM00-0XA0

Potential bridges for front connectors

6ES7592-3AA00-0AA0

For 35 mm modules; 20 pieces; spare part

Article No.

DIN A4 labeling sheets

For 35 mm modules; 10 sheets with 10 labeling strips each for I/O modules; perforated, Al gray

6ES7592-2AX00-0AA0

For 25 mm modules; 10 sheets with 20 labeling strips each for I/O modules; perforated, Al gray

6ES7592-1AX00-0AA0

U connector

5 units; spare part

6ES7590-0AA00-0AA0

Universal front door for I/O modules

For 35 mm modules; 5 front doors; with 5 labeling strips (front) and 5 cabling diagrams per front door; spare part

6ES7528-0AA00-7AA0

For 25 mm modules; 5 front doors; with 5 labeling strips (front) and 5 cabling diagrams per front door; spare part

6ES7528-0AA00-0AA0

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6ES7998-8XC01-8YE0

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Overview

- 16 and 32-channel digital input modules
- For flexible adaptation of the controller to the corresponding task
- For subsequent expansion of the system with additional inputs

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

Technical specifications

Article number	6AG1521-1BH00-7AB0	6AG1521-1BL00-7AB0	6AG1521-1BH50-7AA0	6AG1521-1FH00-7AA0
Based on	6ES7521-1BH00-0AB0 SIPLUS S7-1500 DI 16X24VDC HF	6ES7521-1BL00-0AB0 SIPLUS S7-1500 DI 32X24VDC HF	6ES7521-1BH50-0AA0 SIPLUS S7-1500 DI 16X24VDC SRC BA	6ES7521-1FH00-0AA0 SIPLUS S7-1500 DI 16X230VAC BA
Ambient conditions				
Ambient temperature during operation				
• horizontal installation, min.	-40 °C; = Tmin	-40 °C; = Tmin	-40 °C; = Tmin	-40 °C; = Tmin
• horizontal installation, max.	70 °C; = Tmax	70 °C; = Tmax; > +60 °C number of simultaneously controllable inputs max. 16	70 °C; = Tmax; > +60 °C number of simultaneously controllable inputs max. 8	70 °C; = Tmax; > +60 °C number of simultaneously controllable inputs max. 8
• vertical installation, min.	-40 °C; = Tmin	-40 °C; = Tmin	-40 °C; = Tmin	-40 °C; = Tmin
• vertical installation, max.	40 °C; = Tmax	40 °C; = Tmax	40 °C; = Tmax	40 °C; = Tmax
Extended ambient conditions				
• relative to ambient temperature-atmospheric pressure-installation altitude	Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m)	Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m)	Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m)	Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m)
Relative humidity				
- With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation/frost (no commissioning under condensation conditions)	100 %; RH incl. condensation/frost (no commissioning under condensation conditions)	100 %; RH incl. condensation/frost (no commissioning under condensation conditions)	100 %; RH incl. condensation/frost (no commissioning under condensation conditions)
Resistance				
- against biologically active substances / conformity with EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!
- against chemically active substances / conformity with EN 60721-3-3	Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!
- against mechanically active substances / conformity with EN 60721-3-3	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!