

## 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

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## Technical specifications

Article number	6ES7521-1BH0-0AB0 S7-1500, DI 16X24VDC HF	6ES7521-1BL0-0AB0 S7-1500, DI 32x24VDC HF	6ES7521-1BH5-0AA0 S7-1500, DI 16X24VDC SRC BA	6ES7521-1FH0-0AA0 S7-1500, DI 16x230VAC BA	6ES7521-7EH0-0AB0 S7-1500, DI 16 X 24...125V UC HF
<b>Engineering with</b>					
• 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 / -
<b>Operating mode</b>					
• DI	Yes	Yes	Yes	Yes	Yes
• Counter	Yes	Yes	No	No	No
• Oversampling	No	No			No
• MSI	Yes	Yes	Yes	Yes	Yes
<b>Supply voltage</b>					
Rated value (DC)	24 V	24 V			
Reverse polarity protection	Yes	Yes			
<b>Digital inputs</b>					
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	Yes
Input characteristic curve in accordance with IEC 61131, type 1					
Input characteristic curve in accordance with IEC 61131, type 3	Yes	Yes	Yes		Yes; at 24 V DC
<b>Digital input functions, parameterizable</b>					
• Gate start/stop	Yes	Yes			
• Freely usable digital input	Yes	Yes			
<b>Input voltage</b>					
• Rated value (DC)	24 V	24 V	24 V		24 V; 48 V, 125 V
• Rated value (AC)				230 V; 120/230 V 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 ... +146 V

# SIMATIC S7-1500 Advanced Controllers

I/O modules

Digital modules

## SM 521 digital input modules

### 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
<b>Input current</b> • 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
<b>Input delay (for rated value of input voltage) for standard inputs</b> - 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
<b>for interrupt inputs</b> - parameterizable	Yes	Yes	No	No	Yes
<b>for technological functions</b> - parameterizable	Yes	Yes	No	No	No
<b>Encoder</b>					
<b>Connectable encoders</b> • 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
<b>Isochronous mode</b>					
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			
<b>Interrupts/diagnostics/ status information</b>					
Diagnostics function	Yes	Yes	No	No	Yes
<b>Alarms</b>					
• Diagnostic alarm	Yes	Yes	No	No	Yes
• Hardware interrupt	Yes	Yes	No	No	Yes
<b>Diagnostic messages</b>					
• 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
<b>Diagnostics indication LED</b>					
• 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
<b>Potential separation</b>					
<b>Potential separation channels</b> • between the channels and backplane bus					
	Yes	Yes	Yes	Yes	Yes
<b>Standards, approvals, certificates</b>					
Suitable for safety functions	No	No	No	No	No

## 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
<b>Ambient conditions</b>					
<b>Ambient temperature during operation</b>					
• 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
<b>Decentralized operation</b>					
Prioritized startup	Yes	Yes	Yes	Yes	Yes
<b>Dimensions</b>					
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
<b>Weights</b>					
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
<b>Engineering with</b>		
• 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 / -
<b>Operating mode</b>		
• DI	Yes	Yes
• Counter	No	No
• MSI	Yes	Yes
<b>Supply voltage</b>		
Rated value (DC)	24 V	24 V
<b>Digital inputs</b>		
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
<b>Input voltage</b>		
• 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
<b>Input current</b>		
• for signal "1", typ.	2.7 mA	2.7 mA
<b>Input delay (for rated value of input voltage)</b>		
<b>for standard inputs</b>		
- parameterizable	No	No
<b>for interrupt inputs</b>		
- parameterizable	No	No
<b>for technological functions</b>		
- parameterizable	No	No
<b>Encoder</b>		
<b>Connectable encoders</b>		
• 2-wire sensor	Yes	Yes
- permissible quiescent current (2-wire sensor), max.	1.5 mA	1.5 mA

## SIMATIC S7-1500 Advanced Controllers

I/O modules

Digital modules

### SM 521 digital input modules

#### Technical specifications (continued)

Article number	6ES7521-1BH10-0AA0 S7-1500, DI 16X24VDC BA	6ES7521-1BL10-0AA0 S7-1500, DI 32x24VDC BA
<b>Isochronous mode</b>		
Isochronous operation (application synchronized up to terminal)	No	No
<b>Interrupts/diagnostics/status information</b>		
Diagnostics function	No	No
<b>Alarms</b>		
• Diagnostic alarm	No	No
• Hardware interrupt	No	No
<b>Diagnostic messages</b>		
• Monitoring the supply voltage	No	No
• Wire-break	No	No
• Short-circuit	No	No
<b>Diagnostics indication LED</b>		
• RUN LED	Yes; Green LED	Yes; Green LED
• ERROR LED	Yes; Red LED	Yes; Red LED
• Monitoring of the supply voltage (PWR-LED)	No	No
• Channel status display	Yes; Green LED	Yes; Green LED
• for channel diagnostics	No	No
• for module diagnostics	No	No
<b>Potential separation</b>		
<b>Potential separation channels</b>		
• between the channels and backplane bus	Yes	Yes
<b>Standards, approvals, certificates</b>		
Suitable for safety functions	No	No
<b>Ambient conditions</b>		
<b>Ambient temperature during operation</b>		
• horizontal installation, min.	0 °C	0 °C
• horizontal installation, max.	60 °C	60 °C
• vertical installation, min.	0 °C	0 °C
• vertical installation, max.	40 °C	40 °C
<b>Decentralized operation</b>		
Prioritized startup	Yes	Yes
<b>Dimensions</b>		
Width	25 mm	25 mm
Height	147 mm	147 mm
Depth	129 mm	129 mm
<b>Weights</b>		
Weight, approx.	230 g	260 g
<b>Other</b>		
Note:	Supplied incl. 40-pole push-in front connectors	Supplied incl. 40-pole push-in front connectors

# SIMATIC S7-1500 Advanced Controllers

I/O modules  
Digital modules

## SM 521 digital input modules

Ordering data	Article No.	Article No.
<b>SM 521 digital input modules</b> Module width 35 mm 16 inputs, 24 V DC, isolated, parameterizable diagnostics and hardware interrupts 32 inputs, 24 V DC, isolated, parameterizable diagnostics and hardware interrupts 16 inputs, 24 V DC, isolated, input delay 3.2 ms 16 inputs, 230 V AC, isolated, input delay 20 ms 16 inputs, 24 ... 125 V UC, input delay 0.05 ... 20 ms, parameterizable diagnostics and hardware interrupts Module width 25 mm; front connector (push-in) included in delivery package 16 inputs, 24 V DC, isolated 32 inputs, 24 V DC, isolated	<b>6ES7521-1BH00-0AB0</b>  <b>6ES7521-1BL00-0AB0</b>  <b>6ES7521-1BH50-0AA0</b>  <b>6ES7521-1FH00-0AA0</b>  <b>6ES7521-7EH00-0AB0</b>  <b>6ES7521-1BH10-0AA0</b> <b>6ES7521-1BL10-0AA0</b>	<b>Potential bridges for front connectors</b> For 35 mm modules; 20 pieces; spare part  <b>DIN A4 labeling sheets</b> For 35 mm modules; 10 sheets with 10 labeling strips each for I/O modules; perforated, Al gray  For 25 mm modules; 10 sheets with 20 labeling strips each for I/O modules; perforated, Al gray  <b>U connector</b> 5 units; spare part  <b>Universal front door for I/O modules</b> For 35 mm modules; 5 front doors; with 5 labeling strips (front) and 5 cabling diagrams per front door; spare part  For 25 mm modules; 5 front doors; with 5 labeling strips (front) and 5 cabling diagrams per front door; spare part  <b>SIMATIC Manual Collection</b> Electronic manuals on DVD, multi-language: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC Distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC-based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC  <b>SIMATIC Manual Collection update service for 1 year</b> Current "Manual Collection" DVD and the three subsequent updates
<b>Accessories</b>  <b>Front connectors</b> For 35 mm modules; including four potential bridges, cable ties and individual labeling strips, 40-pin <ul style="list-style-type: none"> <li>• Screw terminals</li> <li>• Push-in</li> </ul> For 25 mm modules; including cable ties and individual labeling strips; push-in terminal 40-pin; spare part	<b>6ES7592-3AA00-0AA0</b>  <b>6ES7592-2AX00-0AA0</b>  <b>6ES7592-1AX00-0AA0</b>  <b>6ES7590-0AA00-0AA0</b>  <b>6ES7528-0AA00-7AA0</b>  <b>6ES7528-0AA00-0AA0</b>  <b>6ES7998-8XC01-8YE0</b>  <b>6ES7998-8XC01-8YE2</b>	

## SIMATIC S7-1500 Advanced Controllers

I/O modules

Digital modules

### SM 522 digital output modules

#### Overview



- 8, 16 and 32-channel digital output modules
- For flexible adaptation of the controller to the corresponding task
- For subsequent expansion of the system with additional outputs
- 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

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#### Technical specifications

Article number	6ES7522-1BH01-0AB0 S7-1500, DQ 16x24V DC/0.5A HF	6ES7522-1BL01-0AB0 S7-1500, DQ 32x24VDC/0.5A HF	6ES7522-1BF00-0AB0 S7-1500, DQ 8x24VDC/2A HF	6ES7522-5EH00-0AB0 S7-1500, DQ 16x24...48VUC/ 125VDC/0.5A ST
<b>Engineering with</b>				
• STEP 7 TIA Portal configurable/ integrated as of version	V13 SP1 / -	V13 SP1 / -	V13 SP1 / -	V13 SP1 / -
• 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	V1.0 / V5.1	V1.0 / V5.1
• PROFINET as of GSD version/ GSD revision	V2.3 / -	V2.3 / -	V2.3 / -	V2.3 / -
<b>Operating mode</b>				
• DQ	Yes	Yes	Yes	Yes
• DQ with energy-saving function	No	No	Yes; with an application	No
• PWM	No	No	Yes	No
• Cam control (switching at comparison values)	No	No	No	No
• Oversampling	No	No	No	No
• MSO	Yes	Yes	Yes	Yes
• Integrated operating cycle counter	Yes	Yes	Yes	No
<b>Supply voltage</b>				
Rated value (DC)	24 V	24 V	24 V	
Reverse polarity protection	Yes; through internal protection with 7 A per group	Yes; through internal protection with 7 A per group	Yes; through internal protection with 10 A per group	
<b>Digital outputs</b>				
Type of digital output	Transistor	Transistor	Transistor	Transistor
Number of digital outputs	16	32	8	16
Current-sinking				Yes
Current-sourcing	Yes	Yes	Yes	Yes
Digital outputs, parameterizable	Yes	Yes	Yes	Yes
Short-circuit protection	Yes; Clocked electronically	Yes; Clocked electronically	Yes	
Limitation of inductive shutdown voltage to	L+ (-53 V)	L+ (-53 V)	-17 V	200 V (suppressor diode)
Controlling a digital input	Yes	Yes	Yes	Yes
<b>Digital output functions, parameterizable</b>				
• Freely usable digital output			Yes	
• PWM output			Yes	
- Number, max.			2	

## Technical specifications (continued)

Article number	6ES7522-1BH01-0AB0 S7-1500, DQ 16x24V DC/0.5A HF	6ES7522-1BL01-0AB0 S7-1500, DQ 32x24VDC/0.5A HF	6ES7522-1BF00-0AB0 S7-1500, DQ 8x24VDC/2A HF	6ES7522-5EH00-0AB0 S7-1500, DQ 16x24...48VUC/ 125VDC/0.5A ST
<b>Switching capacity of the outputs</b>				
• with resistive load, max.	0.5 A	0.5 A		0.5 A
• on lamp load, max.	5 W	5 W	10 W	40 W; At 125 V DC, 10 W at 48 V UC, 5 W at 24 V UC
<b>Load resistance range</b>				
• lower limit	48 Ω	48 Ω	12 Ω	
• upper limit	12 kΩ	12 kΩ	4 kΩ	
<b>Output voltage</b>				
• Type of output voltage	DC	DC	DC	UC
• for signal "1", min.	L+ (-0.8 V)	L+ (-0.8 V)	L+ (-0.8 V)	L+ (-1.0 V)
<b>Output current</b>				
• for signal "1" rated value	0.5 A	0.5 A	2 A	0.5 A
• for signal "0" residual current, max.	0.5 mA	0.5 mA	0.5 mA	
<b>Output delay with resistive load</b>				
• "0" to "1", typ.			80 μs	
• "0" to "1", max.	100 μs	100 μs	100 μs	5 ms
• "1" to "0", typ.			300 μs	
• "1" to "0", max.	500 μs	500 μs	500 μs	5 ms
<b>Parallel switching of two outputs</b>				
• for logic links	Yes	Yes	Yes	Yes
• for uprating	No	No	No	No
• for redundant control of a load	Yes	Yes	Yes	Yes
<b>Switching frequency</b>				
• with resistive load, max.	100 Hz	100 Hz	100 Hz; With PWM operation: 500 Hz	25 Hz
• with inductive load, max.	0.5 Hz; According to IEC 60947-5-1, DC-13	0.5 Hz; According to IEC 60947-5-1, DC-13	0.5 Hz; According to IEC 60947-5-1, DC-13; max. 500 Hz with PWM operation only with external circuit; see additional description in the manual	0.5 Hz
• on lamp load, max.	10 Hz	10 Hz	10 Hz	10 Hz
<b>Total current of the outputs</b>				
• Current per channel, max.	0.5 A; see additional description in the manual	0.5 A; see additional description in the manual	2 A; see additional description in the manual	0.5 A
• Current per group, max.	4 A; see additional description in the manual	4 A; see additional description in the manual	8 A; see additional description in the manual	0.5 A
• Current per module, max.	8 A; see additional description in the manual	16 A; see additional description in the manual	16 A; see additional description in the manual	8 A
<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>Isochronous mode</b>				
Isochronous operation (application synchronized up to terminal)	Yes	Yes	No	No
Execution and activation time (TCO), min.	70 μs	70 μs		
Bus cycle time (TDP), min.	250 μs	250 μs		
<b>Interrupts/diagnostics/status information</b>				
Diagnostics function	Yes	Yes	Yes	No
Substitute values connectable	Yes	Yes	Yes	Yes
<b>Alarms</b>				
• Diagnostic alarm	Yes	Yes	Yes	No
• Maintenance interrupt	Yes	Yes	Yes	No

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I/O modules

Digital modules

### SM 522 digital output modules

#### Technical specifications (continued)

Article number	6ES7522-1BH01-0AB0 S7-1500, DQ 16x24V DC/0.5A HF	6ES7522-1BL01-0AB0 S7-1500, DQ 32x24VDC/0.5A HF	6ES7522-1BF00-0AB0 S7-1500, DQ 8x24VDC/2A HF	6ES7522-5EH00-0AB0 S7-1500, DQ 16x24...48VUC/ 125VDC/0.5A ST
<b>Diagnostic messages</b>				
• Monitoring the supply voltage	Yes	Yes	Yes	No
• Wire-break	Yes	Yes	No	No
• Short-circuit	Yes	Yes	Yes	No
• Group error	Yes	Yes	Yes	
<b>Diagnostics indication LED</b>				
• RUN 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
• MAINT LED	Yes; yellow LED	Yes; yellow LED	Yes; yellow LED	
• Monitoring of the supply voltage (PWR-LED)	Yes; Green LED	Yes; Green LED	Yes; Green LED	No
• Channel status display	Yes; Green LED	Yes; Green LED	Yes; Green LED	Yes; Green LED
• for channel diagnostics	Yes; Red LED	Yes; Red LED	Yes; Red LED	No
• for module diagnostics	Yes; Red LED	Yes; Red LED	Yes; Red LED	Yes; Red LED
<b>Potential separation</b>				
<b>Potential separation channels</b>				
• between the channels and backplane bus	Yes	Yes	Yes	Yes
<b>Standards, approvals, certificates</b>				
Suitable for safety functions	No	No	No	No
Suitable for safety-related tripping of standard modules	Yes; From FS02	Yes; From FS02	Yes; From FS03	Yes; From FS02
<b>Highest safety class achievable for safety-related tripping of standard modules</b>				
• Performance level according to ISO 13849-1	PL d	PL d	PL d	PL d
• Category according to ISO 13849-1	Cat. 3	Cat. 3	Cat. 3	Cat. 3
• SILCL according to IEC 62061	SILCL 2	SILCL 2	SILCL 2	SILCL 2
<b>Ambient conditions</b>				
<b>Ambient temperature during operation</b>				
• horizontal installation, min.	0 °C			0 °C
• horizontal installation, max.	60 °C			60 °C
• vertical installation, min.	0 °C			0 °C
• vertical installation, max.	60 °C			40 °C
<b>Decentralized operation</b>				
Prioritized startup	Yes	Yes	Yes	Yes
<b>Dimensions</b>				
Width	35 mm	35 mm	35 mm	35 mm
Height	147 mm	147 mm	147 mm	147 mm
Depth	129 mm	129 mm	129 mm	129 mm
<b>Weights</b>				
Weight, approx.	230 g	280 g	240 g	230 g
Article number	6ES7522-5HF00-0AB0 S7-1500, DQ 8x230VAC/5A ST (Relay)	6ES7522-5HH00-0AB0 S7-1500, DQ 16x230VAC/2A ST (Relay)	6ES7522-5FF00-0AB0 S7-1500, DQ 8x230VAC/2A ST (Triac)	6ES7522-5FH00-0AB0 S7-1500, DQ 16x230VAC/1A ST (Triac)
<b>Engineering with</b>				
• STEP 7 TIA Portal configurable/integrated as of version	V12 / V12	V13 SP1 / -	V12 / V12	V13 SP1 / -
• STEP 7 configurable/integrated as of version	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
• PROFINET as of GSD version/GSD revision	V2.3 / -	V2.3 / -	V2.3 / -	V2.3 / -



## Technical specifications (continued)

Article number	6ES7522-5HF00-0AB0	6ES7522-5HH00-0AB0	6ES7522-5FF00-0AB0	6ES7522-5FH00-0AB0
	S7-1500, DQ 8x230VAC/5A ST (Relay)	S7-1500, DQ 16x230VAC/2A ST (Relay)	S7-1500, DQ 8x230VAC/2A ST (Triac)	S7-1500, DQ 16x230VAC/1A ST (Triac)
<b>Operating mode</b>				
• DQ	Yes	Yes	Yes	Yes
• DQ with energy-saving function	No	No	No	No
• PWM	No	No	No	No
• Oversampling	No	No	No	No
• MSO	Yes	Yes	Yes	Yes
<b>Supply voltage</b>				
Rated value (DC)	24 V	24 V		
Reverse polarity protection	Yes	Yes		
<b>Digital outputs</b>				
Type of digital output	Relays	Relays	Triac	Triac
Number of digital outputs	8	16	8	16
Current-sinking	Yes	Yes		Yes
Current-sourcing	Yes	Yes	Yes	Yes
Digital outputs, parameterizable	Yes	Yes	Yes	Yes
Short-circuit protection	No	No	No	No
Controlling a digital input	possible	Yes		
Size of motor starters according to NEMA, max.	5	5	5	4
<b>Switching capacity of the outputs</b>				
• with resistive load, max.			2 A	1 A
• on lamp load, max.	1 500 W; 10 000 operating cycles	50 W (230 V AC), 5 W (24 V DC)	50 W	50 W
• Low energy/fluorescent lamps with electronic control gear	10x 58 W (25 000 operating cycles)			
• Fluorescent tubes, conventionally compensated	1x 58 W (25 000 operating cycles)			
• Fluorescent tubes, uncompensated	10x 58 W (25 000 operating cycles)			
<b>Output voltage</b>				
• Type of output voltage			AC	AC
• for signal "1", min.			L1 (-1.5 V) at maximum output current; L1 (-8.5 V) at minimum output current	L1 (-1.5 V) at maximum output current; L1 (-8.5 V) at minimum output current
<b>Output current</b>				
• for signal "1" rated value	5 A	2 A	2 A	1 A
• for signal "0" residual current, max.	0 A	0 A	2 mA	2 mA
<b>Output delay with resistive load</b>				
• "0" to "1", max.			1 AC cycle	1 AC cycle
• "1" to "0", max.			1 AC cycle	1 AC cycle
<b>Parallel switching of two outputs</b>				
• for logic links	Yes	Yes	No	No
• for uprating	No	No	No	No
• for redundant control of a load	Yes	Yes	Yes	Yes
<b>Switching frequency</b>				
• with resistive load, max.	2 Hz	1 Hz	10 Hz	10 Hz
• with inductive load, max.	0.5 Hz	0.5 Hz	0.5 Hz	0.5 Hz
• on lamp load, max.	2 Hz	1 Hz	1 Hz	1 Hz
<b>Total current of the outputs</b>				
• Current per channel, max.	8 A; see additional description in the manual	2 A; see additional description in the manual	2 A; see additional description in the manual	1 A; see additional description in the manual
• Current per group, max.	8 A; see additional description in the manual	4 A; see additional description in the manual	2 A; see additional description in the manual	2 A; see additional description in the manual
• Current per module, max.	64 A; see additional description in the manual	32 A; see additional description in the manual	10 A; see additional description in the manual	10 A; see additional description in the manual

# SIMATIC S7-1500 Advanced Controllers

I/O modules

Digital modules

## SM 522 digital output modules

### Technical specifications (continued)

Article number	6ES7522-5HF00-0AB0	6ES7522-5HH00-0AB0	6ES7522-5FF00-0AB0	6ES7522-5FH00-0AB0
	S7-1500, DQ 8x230VAC/5A ST (Relay)	S7-1500, DQ 16x230VAC/2A ST (Relay)	S7-1500, DQ 8x230VAC/2A ST (Triac)	S7-1500, DQ 16x230VAC/1A ST (Triac)
<b>Relay outputs</b>				
• Number of relay outputs	8	16		
• Rated supply voltage of relay coil L+ (DC)	24 V	24 V		
• Current consumption of relays (coil current of all relays), typ.	80 mA	150 mA		
• external protection for relay outputs	With miniature circuit breaker with characteristic B for: cos φ 1.0: 600 A cos φ 0.5 ... 0.7: 900 A with 8 A Diazed fuse: 1 000 A	Miniature circuit breaker B10 ; B16		
• Contact connection (internal)	No	No		
• Number of operating cycles, max.	4 000 000; see additional description in the manual	see additional description in the manual		
• Relay approved acc. to UL 508	Yes; 250 V AC/5 A g.p.; 120 V AC TV-4 tungsten; A300, R300	No		
<b>Switching capacity of contacts</b>				
- with inductive load, max.	see additional description in the manual	2 A; see additional description in the manual		
- with resistive load, max.	see additional description in the manual	2 A; see additional description in the manual		
<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>Isochronous mode</b>				
Isochronous operation (application synchronized up to terminal)	No	No	No	No
<b>Interrupts/diagnostics/status information</b>				
Diagnostics function	Yes	Yes	No	No
Substitute values connectable	Yes	Yes	Yes	Yes
<b>Alarms</b>				
• Diagnostic alarm	Yes	Yes	No	No
• Maintenance interrupt		No	No	No
<b>Diagnostic messages</b>				
• Monitoring the supply voltage	Yes	Yes	No	No
• Wire-break	No	No	No	No
• Short-circuit	No	No	No	No
<b>Diagnostics indication LED</b>				
• RUN 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
• Monitoring of the supply voltage (PWR-LED)	Yes; Green LED	Yes; Green LED	No	No
• 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; Red LED	Yes; Red LED	Yes; Red LED	Yes; Red LED
<b>Potential separation</b>				
<b>Potential separation channels</b>				
• between the channels and backplane bus	Yes	Yes	Yes	Yes
<b>Standards, approvals, certificates</b>				
Suitable for safety functions	No	No	No	No

## Technical specifications (continued)

Article number	6ES7522-5HF00-0AB0	6ES7522-5HH00-0AB0	6ES7522-5FF00-0AB0	6ES7522-5FH00-0AB0
	S7-1500, DQ 8x230VAC/5A ST (Relay)	S7-1500, DQ 16x230VAC/2A ST (Relay)	S7-1500, DQ 8x230VAC/2A ST (Triac)	S7-1500, DQ 16x230VAC/1A ST (Triac)
<b>Ambient conditions</b>				
<b>Ambient temperature during operation</b>				
• horizontal installation, min.	0 °C	0 °C	0 °C	0 °C
• horizontal installation, max.	60 °C	60 °C	60 °C	60 °C
• vertical installation, min.	0 °C	0 °C	0 °C	0 °C
• vertical installation, max.	40 °C	40 °C	40 °C	60 °C
<b>Decentralized operation</b>				
Prioritized startup	Yes	Yes	Yes	Yes
<b>Dimensions</b>				
Width	35 mm	35 mm	35 mm	35 mm
Height	147 mm	147 mm	147 mm	147 mm
Depth	129 mm	129 mm	129 mm	129 mm
<b>Weights</b>				
Weight, approx.	350 g	350 g	290 g	310 g
<hr/>				
Article number	6ES7522-1BH10-0AA0	6ES7522-1BL10-0AA0		
	S7-1500, DQ 16x24VDC/0.5A BA	S7-1500, DQ 32x24VDC/0.5A BA		
<b>Engineering with</b>				
• 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 / -		
<b>Operating mode</b>				
• DQ	Yes	Yes		
• DQ with energy-saving function	No	No		
• PWM	No	No		
• Oversampling	No	No		
• MSO	Yes	Yes		
<b>Supply voltage</b>				
Rated value (DC)	24 V	24 V		
Reverse polarity protection	Yes; through internal protection with 7 A per group	Yes; through internal protection with 7 A per group		
<b>Digital outputs</b>				
Type of digital output	Transistor	Transistor		
Number of digital outputs	16	32		
Current-sourcing	Yes	Yes		
Digital outputs, parameterizable	No	No		
Short-circuit protection	Yes	Yes		
Limitation of inductive shutdown voltage to	L+ (-53 V)	L+ (-53 V)		
Controlling a digital input	Yes	Yes		
<b>Switching capacity of the outputs</b>				
• with resistive load, max.	0.5 A	0.5 A		
• on lamp load, max.	5 W	5 W		
<b>Load resistance range</b>				
• lower limit	48 Ω	48 Ω		
• upper limit	12 kΩ	12 kΩ		
<b>Output voltage</b>				
• Type of output voltage	DC	DC		
• for signal "1", min.	L+ (-0.8 V)	L+ (-0.8 V)		
<b>Output current</b>				
• for signal "1" rated value	0.5 A	0.5 A		
• for signal "0" residual current, max.	0.5 mA	0.5 mA		

## SIMATIC S7-1500 Advanced Controllers

I/O modules

Digital modules

### SM 522 digital output modules

#### Technical specifications (continued)

Article number	6ES7522-1BH10-0AA0 S7-1500, DQ 16X24VDC/0.5A BA	6ES7522-1BL10-0AA0 S7-1500, DQ 32x24VDC/0.5A BA
<b>Output delay with resistive load</b>		
• "0" to "1", max.	100 µs	100 µs
• "1" to "0", max.	500 µs	500 µs
<b>Parallel switching of two outputs</b>		
• for logic links	Yes	Yes
• for uprating	No	No
• for redundant control of a load	Yes	Yes
<b>Switching frequency</b>		
• with resistive load, max.	100 Hz	100 Hz
• with inductive load, max.	0.5 Hz; According to IEC 60947-5-1, DC-13	0.5 Hz; According to IEC 60947-5-1, DC-13
• on lamp load, max.	10 Hz	10 Hz
<b>Total current of the outputs</b>		
• Current per channel, max.	0.5 A; see additional description in the manual	0.5 A; see additional description in the manual
• Current per group, max.	4 A; see additional description in the manual	4 A; see additional description in the manual
• Current per module, max.	8 A; see additional description in the manual	16 A; see additional description in the manual
<b>Cable length</b>		
• shielded, max.	1 000 m	1 000 m
• unshielded, max.	600 m	600 m
<b>Isochronous mode</b>		
Isochronous operation (application synchronized up to terminal)	No	No
<b>Interrupts/diagnostics/status information</b>		
Diagnostics function	No	No
Substitute values connectable	No	No
<b>Alarms</b>		
• Diagnostic alarm	No	No
• Maintenance interrupt	No	No
<b>Diagnostic messages</b>		
• Monitoring the supply voltage	No	No
• Wire-break	No	No
• Short-circuit	No	No
• Group error	No	No
<b>Diagnostics indication LED</b>		
• RUN LED	Yes; Green LED	Yes; Green LED
• ERROR LED	Yes; Red LED	Yes; Red LED
• Monitoring of the supply voltage (PWR-LED)	Yes; Green LED	Yes; Green LED
• Channel status display	Yes; Green LED	Yes; Green LED
• for channel diagnostics	No	No
• for module diagnostics	No	No
<b>Potential separation</b>		
<b>Potential separation channels</b>		
• between the channels and backplane bus	Yes	Yes
<b>Standards, approvals, certificates</b>		
Suitable for safety functions	No	No
<b>Decentralized operation</b>		
Prioritized startup	Yes	Yes
<b>Dimensions</b>		
Width	25 mm	25 mm
Height	147 mm	147 mm
Depth	129 mm	129 mm
<b>Weights</b>		
Weight, approx.	230 g	280 g
<b>Other</b>		
Note:	Supplied incl. 40-pole push-in front connectors	Supplied incl. 40-pole push-in front connectors

Ordering data	Article No.	Article No.
<b>SM 522 digital output modules</b> Module width 35 mm 8 outputs, 24 V DC; 2 A, isolated 16 outputs, 24 V DC; 0.5 A, isolated 32 outputs, 24 V DC; 0.5 A, isolated 8 relay outputs, 230 V AC, 5 A 16 relay outputs, 230 V AC, 2 A 8 outputs (triac), 230 V AC, 2 A 16 outputs (triac), 230 V AC, 1 A 16 outputs, 24 ... 48 V UC, 125 V DC, 0.5 A, isolated Module width 25 mm; <u>front connector (push-in)</u> <u>included in delivery package</u> 16 outputs, 24 V DC; 0.5 A, isolated 32 outputs, 24 V DC; 0.5 A, isolated	<b>6ES7522-1BF00-0AB0</b> <b>6ES7522-1BH01-0AB0</b> <b>6ES7522-1BL01-0AB0</b> <b>6ES7522-5HF00-0AB0</b> <b>6ES7522-5HH00-0AB0</b> <b>6ES7522-5FF00-0AB0</b> <b>6ES7522-5FH00-0AB0</b> <b>6ES7522-5EH00-0AB0</b>	<b>DIN A4 labeling sheets</b> For 35 mm modules; 10 sheets with 10 labeling strips each for I/O modules; perforated, Al gray For 25 mm modules; 10 sheets with 20 labeling strips each for I/O modules; perforated, Al gray
<b>Accessories</b> <b>Front connectors</b> For 35 mm modules; including four potential bridges, cable ties and individual labeling strips, 40-pin • Screw terminals • Push-in For 25 mm modules; including cable ties and individual labeling strips; push-in terminal 40-pin; spare part	<b>6ES7 522-1BH10-0AA0</b> <b>6ES7 522-1BL10-0AA0</b> <b>6ES7592-1AM00-0XB0</b> <b>6ES7592-1BM00-0XB0</b> <b>6ES7592-1BM00-0XA0</b>	<b>U connector</b> 5 units; spare part <b>Universal front door for I/O modules</b> For 35 mm modules; 5 front doors; with 5 labeling strips (front) and 5 cabling diagrams per front door; spare part For 25 mm modules; 5 front doors; with 5 labeling strips (front) and 5 cabling diagrams per front door; spare part
<b>Potential bridges for front connectors</b> For 35 mm modules; 20 pieces; spare part	<b>6ES7592-3AA00-0AA0</b>	<b>SIMATIC Manual Collection</b> Electronic manuals on DVD, multi-language: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC Distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC-based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC
		<b>SIMATIC Manual Collection update service for 1 year</b> Current "Manual Collection" DVD and the three subsequent updates

## SIMATIC S7-1500 Advanced Controllers

I/O modules

Digital modules

### SM 523 digital input/output modules

#### Overview



- 16 digital inputs and 16 digital outputs
- For flexible adaptation of the controller to the corresponding task
- For subsequent expansion of the system with additional inputs and outputs
- For use in the tightest spaces: particularly economical, without parameters or diagnostic functions

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#### Technical specifications

Article number	<b>6ES7523-1BL00-0AA0</b> S7-1500, DI 16x24VDC/ DQ 16x24VDC/0.5A BA
<b>General information</b>	
Product type designation	DI 16x24VDC / DQ16x24VDC/0.5A BA
<b>Product function</b>	
• I&M data	Yes; I&M0 to I&M3
<b>Engineering with</b>	
• STEP 7 TIA Portal configurable/ integrated as of version	V13 / V13
• STEP 7 configurable/integrated as of version	V5.5 SP3 / -
• PROFIBUS as of GSD version/ GSD revision	V1.0 / V5.1
• PROFINET as of GSD version/ GSD revision	V2.3 / -
<b>Operating mode</b>	
• DI	Yes
• Counter	No
• DQ	Yes
• DQ with energy-saving function	No
• PWM	No
• Oversampling	No
• MSI	Yes
• MSO	Yes
<b>Supply voltage</b>	
Rated value (DC)	24 V
Reverse polarity protection	Yes; through internal protection with 7 A per group
<b>Digital inputs</b>	
Number of digital inputs	16
Digital inputs, parameterizable	No
Source/sink input	P-reading
Input characteristic curve in accordance with IEC 61131, type 3	Yes
<b>Input voltage</b>	
• Type of input voltage	DC
• Rated value (DC)	24 V
• for signal "0"	-30 to +5V
• for signal "1"	+11 to +30V
<b>Input current</b>	
• for signal "1", typ.	2.7 mA

Article number	<b>6ES7523-1BL00-0AA0</b> S7-1500, DI 16x24VDC/ DQ 16x24VDC/0.5A BA
<b>Input delay (for rated value of input voltage) for standard inputs</b>	
- parameterizable	No
<b>for interrupt inputs</b>	
- parameterizable	No
<b>Cable length</b>	
• shielded, max.	1 000 m
• unshielded, max.	600 m
<b>Digital outputs</b>	
Type of digital output	Transistor
Number of digital outputs	16
Current-sourcing	Yes
Digital outputs, parameterizable	No
Short-circuit protection	Yes
Limitation of inductive shutdown voltage to	L+ (-53 V)
Controlling a digital input	Yes
<b>Switching capacity of the outputs</b>	
• with resistive load, max.	0.5 A
• on lamp load, max.	5 W
<b>Load resistance range</b>	
• lower limit	48 Ω
• upper limit	12 kΩ
<b>Output voltage</b>	
• Type of output voltage	DC
• for signal "1", min.	L+ (-0.8 V)
<b>Output current</b>	
• for signal "1" rated value	0.5 A
• for signal "0" residual current, max.	0.5 mA
<b>Output delay with resistive load</b>	
• "0" to "1", max.	100 μs
• "1" to "0", max.	500 μs
<b>Parallel switching of two outputs</b>	
• for logic links	Yes
• for uprating	No
• for redundant control of a load	Yes

#### Technical specifications (continued)

Article number	<b>6ES7523-1BL00-0AA0</b> S7-1500, DI 16x24VDC/ DQ 16x24VDC/0.5A BA
<b>Switching frequency</b>	
• with resistive load, max.	100 Hz
• with inductive load, max.	0.5 Hz
• on lamp load, max.	10 Hz
<b>Total current of the outputs</b>	
• Current per channel, max.	0.5 A; see additional description in the manual
• Current per group, max.	4 A; see additional description in the manual
• Current per module, max.	8 A; see additional description in the manual
<b>Cable length</b>	
• shielded, max.	1 000 m
• unshielded, max.	600 m
<b>Encoder</b>	
<b>Connectable encoders</b>	
• 2-wire sensor	Yes
- permissible quiescent current (2-wire sensor), max.	1.5 mA
<b>Isochronous mode</b>	
Isochronous operation (application synchronized up to terminal)	No
<b>Interrupts/diagnostics/status information</b>	
Diagnostics function	No
Substitute values connectable	No
<b>Alarms</b>	
• Diagnostic alarm	No
• Maintenance interrupt	No
• Hardware interrupt	No
<b>Diagnostic messages</b>	
• Monitoring the supply voltage	No
• Wire-break	No
• Short-circuit	No
• Group error	No

Article number	<b>6ES7523-1BL00-0AA0</b> S7-1500, DI 16x24VDC/ DQ 16x24VDC/0.5A BA
<b>Diagnostics indication LED</b>	
• RUN LED	Yes; Green LED
• ERROR LED	Yes; Red LED
• Monitoring of the supply voltage (PWR-LED)	Yes; Green LED
• Channel status display	Yes; Green LED
• for channel diagnostics	No
• for module diagnostics	No
<b>Potential separation</b>	
<b>Potential separation channels</b>	
• between the channels and backplane bus	Yes
<b>Ambient conditions</b>	
<b>Ambient temperature during operation</b>	
• horizontal installation, min.	0 °C
• horizontal installation, max.	60 °C
• vertical installation, min.	0 °C
• vertical installation, max.	40 °C
<b>Decentralized operation</b>	
Prioritized startup	Yes
<b>Dimensions</b>	
Width	25 mm
Height	147 mm
Depth	129 mm
<b>Weights</b>	
Weight, approx.	280 g
<b>Other</b>	
Note:	Supplied incl. 40-pole push-in front connectors

#### Ordering data

	Article No.
<b>SM 523 digital input/output module</b>	
Module width 25 mm; front connector (push-in) included in delivery package	
16 inputs, 24 V DC, isolated; 16 outputs, 24 V DC; 0.5 A, isolated	<b>6ES7523-1BL00-0AA0</b>
<b>Accessories</b>	
<b>Front connectors</b>	
For 25 mm modules; including cable ties and individual labeling strips; push-in terminal 40-pin; spare part	<b>6ES7592-1BM00-0XA0</b>
<b>DIN A4 labeling sheets</b>	
For 25 mm modules; 10 sheets with 20 labeling strips each for I/O modules; perforated, AI gray	<b>6ES7592-1AX00-0AA0</b>
<b>U connector</b>	
5 units; spare part	<b>6ES7590-0AA00-0AA0</b>

	Article No.
<b>Universal front door for I/O modules</b>	
For 25 mm modules; 5 front doors; with 5 labeling strips (front) and 5 cabling diagrams per front door; spare part	<b>6ES7528-0AA00-0AA0</b>
<b>SIMATIC Manual Collection</b>	<b>6ES7998-8XC01-8YE0</b>
Electronic manuals on DVD, multi-language: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC Distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC-based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC	
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## SIMATIC S7-1500 Advanced Controllers

I/O modules  
SIPLUS digital modules

### SIPLUS 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

#### 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.

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#### 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	6ES7521-1BH50-0AAA SIPLUS S7-1500 DI 16X24VDC SRC BA	6ES7521-1FH00-0AAA SIPLUS S7-1500 DI 16X230VAC BA
<b>Ambient conditions</b>				
<b>Ambient temperature during operation</b>				
• horizontal installation, min.	-40 °C; = Tmin (incl. condensation/frost)	-40 °C; = Tmin (incl. condensation/frost)	-40 °C; = Tmin (incl. condensation/frost)	-40 °C; = Tmin (incl. condensation/frost)
• 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
<b>Altitude during operation relating to sea level</b>				
• Installation altitude above sea level, max.	5 000 m	5 000 m	5 000 m	2 000 m
• Ambient air temperature-barometric pressure-altitude	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m) // Tmin ... (Tmax - 10 K) at 795 hPa ... 658 hPa (+2 000 m ... +3 500 m) // Tmin ... (Tmax -20 K) at 658 hPa ... 540 hPa (+3 500 m ... +5 000 m)	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m) // Tmin ... (Tmax - 10 K) at 795 hPa ... 658 hPa (+2 000 m ... +3 500 m) // Tmin ... (Tmax -20 K) at 658 hPa ... 540 hPa (+3 500 m ... +5 000 m)	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m) // Tmin ... (Tmax - 10 K) at 795 hPa ... 658 hPa (+2 000 m ... +3 500 m) // Tmin ... (Tmax -20 K) at 658 hPa ... 540 hPa (+3 500 m ... +5 000 m)	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)
<b>Relative humidity</b>				
• 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)
<b>Resistance</b>				
<b>Coolants and lubricants</b>				
- Resistant to commercially available coolants and lubricants	Yes; Incl. diesel and oil droplets in the air	Yes; Incl. diesel and oil droplets in the air	Yes; Incl. diesel and oil droplets in the air	Yes; Incl. diesel and oil droplets in the air
<b>Use in stationary industrial systems</b>				
- to biologically active substances according to EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request
- to chemically active substances according to EN 60721-3-3	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-3	Yes; Class 3S4 incl. sand, dust, *	Yes; Class 3S4 incl. sand, dust, *	Yes; Class 3S4 incl. sand, dust, *	Yes; Class 3S4 incl. sand, dust, *



## Technical specifications (continued)

Article number	6AG1521-1BH00-7AB0	6AG1521-1BL00-7AB0	6AG1521-1BH50-7AA0	6AG1521-1FH00-7AA0
Based on	6ES7521-1BH00-0AB0	6ES7521-1BL00-0AB0	6ES7521-1BH50-0AA0	6ES7521-1FH00-0AA0
	SIPLUS S7-1500 DI 16X24VDC HF	SIPLUS S7-1500 DI 32X24VDC HF	SIPLUS S7-1500 DI 16X24VDC SRC BA	SIPLUS S7-1500 DI 16X230VAC BA
<b>Use on ships/at sea</b>				
- to biologically active substances according to EN 60721-3-6	Yes; Class 6B2 mold and fungal spores (excluding fauna); Class 6B3 on request	Yes; Class 6B2 mold and fungal spores (excluding fauna); Class 6B3 on request	Yes; Class 6B2 mold and fungal spores (excluding fauna); Class 6B3 on request	Yes; Class 6B2 mold and fungal spores (excluding fauna); Class 6B3 on request
- to chemically active substances according to EN 60721-3-6	Yes; Class 6C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 6C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 6C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 6C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-6	Yes; Class 6S3 incl. sand, dust; *	Yes; Class 6S3 incl. sand, dust; *	Yes; Class 6S3 incl. sand, dust; *	Yes; Class 6S3 incl. sand, dust; *
<b>Remark</b>				
- Note regarding classification of environmental conditions acc. to EN 60721	* The supplied plug covers must remain in place over the unused interfaces during operation!	* The supplied plug covers must remain in place over the unused interfaces during operation!	* The supplied plug covers must remain in place over the unused interfaces during operation!	* The supplied plug covers must remain in place over the unused interfaces during operation!
<b>Conformal coating</b>				
• Coatings for printed circuit board assemblies acc. to EN 61086	Yes; Class 2 for high availability	Yes; Class 2 for high availability	Yes; Class 2 for high availability	Yes; Class 2 for high availability
• Protection against fouling acc. to EN 60664-3	Yes; Type 1 protection	Yes; Type 1 protection	Yes; Type 1 protection	Yes; Type 1 protection
• Military testing according to MIL-I-46058C, Amendment 7	Yes; Discoloration of coating possible during service life	Yes; Discoloration of coating possible during service life	Yes; Discoloration of coating possible during service life	Yes; Discoloration of coating possible during service life
• Qualification and Performance of Electrical Insulating Compound for Printed Board Assemblies according to IPC-CC-830A	Yes; Conformal coating, Class A	Yes; Conformal coating, Class A	Yes; Conformal coating, Class A	Yes; Conformal coating, Class A

## Ordering data

## SIPLUS SM 521 digital input modules

(Extended temperature range and exposure to media)

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

6AG1521-1BH00-7AB0

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

6AG1521-1BL00-7AB0

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

6AG1521-1BH50-7AA0

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

6AG1521-1FH00-7AA0

## Accessories

See SIMATIC S7-1500 SM 521 digital input modules, page 4/89

## SIMATIC S7-1500 Advanced Controllers

I/O modules  
SIPLUS digital modules

### SIPLUS SM 522 digital output modules

#### Overview



- 8, 16 and 32-channel digital output modules
- For flexible adaptation of the controller to the corresponding task
- For subsequent expansion of the system with additional outputs

#### 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 has been added.

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#### Technical specifications

Article number	6AG1522-1BF00-7AB0	6AG1522-1BH01-7AB0	6AG1522-1BL01-7AB0	6AG1522-5HF00-2AB0	6AG1522-5FF00-7AB0
Based on	6ES7522-1BF00-0AB0 SIPLUS S7-1500 DQ 8X24VDC/2A HF	6ES7522-1BH01-0AB0 SIPLUS S7-1500 DQ 16X24VDC/0.5A HF	6ES7522-1BL01-0AB0 SIPLUS S7-1500 DQ 32X24VDC/0.5A HF	6ES7522-5HF00-0AB0 SIPLUS S7-1500 DQ 8X230VAC/5A ST (RELAY)	6ES7522-5FF00-0AB0 SIPLUS S7-1500 DQ 8X230VAC/2A ST (TRIAC)
<b>Ambient conditions</b>					
<b>Ambient temperature during operation</b>					
• horizontal installation, min.	-40 °C; = Tmin (incl. condensation/frost)	-40 °C; = Tmin (incl. condensation/frost)	-40 °C; = Tmin (incl. condensation/frost)	-25 °C; = Tmin (incl. condensation/frost)	-40 °C; = Tmin (incl. condensation/frost)
• horizontal installation, max.	70 °C; = Tmax; > +60 °C Number of simultaneously controllable outputs max. 8x 0.5 A, max. total current per group 2 A	70 °C; = Tmax; see Derating BasedOn (e.g. manual), additionally Tmax > 60 °C max. aggregate current 2 A per group	70 °C; = Tmax; see Derating BasedOn (e.g. manual), additionally Tmax > 60 °C max. aggregate current 2 A per group	60 °C; = Tmax	70 °C; = Tmax; > +60 °C number of simultaneously controllable outputs max. 8x 0.25 A, max. total current 2 A
• vertical installation, min.	-40 °C; = Tmin			-25 °C; = Tmin	-40 °C; = Tmin
• vertical installation, max.	40 °C; = Tmax			40 °C; = Tmax	40 °C; = Tmax
<b>Altitude during operation relating to sea level</b>					
• Installation altitude above sea level, max.	5 000 m	5 000 m	5 000 m	2 000 m	2 000 m
• Ambient air temperature-barometric pressure-altitude	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m) // Tmin ... (Tmax - 10 K) at 795 hPa ... 658 hPa (+2 000 m ... +3 500 m) // Tmin ... (Tmax -20 K) at 658 hPa ... 540 hPa (+3 500 m ... +5 000 m)	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m) // Tmin ... (Tmax - 10 K) at 795 hPa ... 658 hPa (+2 000 m ... +3 500 m) // Tmin ... (Tmax -20 K) at 658 hPa ... 540 hPa (+3 500 m ... +5 000 m)	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m) // Tmin ... (Tmax - 10 K) at 795 hPa ... 658 hPa (+2 000 m ... +3 500 m) // Tmin ... (Tmax -20 K) at 658 hPa ... 540 hPa (+3 500 m ... +5 000 m)	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m) ...	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)
<b>Relative humidity</b>					
• 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 in bedewed state), horizontal installation	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation	100 %; RH incl. condensation/frost (no commissioning under condensation conditions)	100 %; RH incl. condensation/frost (no commissioning under condensation conditions)
<b>Resistance</b>					
<b>Coolants and lubricants</b>					
- Resistant to commercially available coolants and lubricants	Yes; Incl. diesel and oil droplets in the air	Yes; Incl. diesel and oil droplets in the air	Yes; Incl. diesel and oil droplets in the air	Yes; Incl. diesel and oil droplets in the air	Yes; Incl. diesel and oil droplets in the air

## Technical specifications (continued)

Article number	6AG1522-1BF00-7AB0	6AG1522-1BH01-7AB0	6AG1522-1BL01-7AB0	6AG1522-5HF00-2AB0	6AG1522-5FF00-7AB0
Based on	6ES7522-1BF00-0AB0 SIPLUS S7-1500 DQ 8X24VDC/2A HF	6ES7522-1BH01-0AB0 SIPLUS S7-1500 DQ 16X24VDC/0.5A HF	6ES7522-1BL01-0AB0 SIPLUS S7-1500 DQ 32X24VDC/0.5A HF	6ES7522-5HF00-0AB0 SIPLUS S7-1500 DQ 8X230VAC/5A ST (RELAY)	6ES7522-5FF00-0AB0 SIPLUS S7-1500 DQ 8X230VAC/2A ST (TRIAC)
<b>Use in stationary industrial systems</b>					
- to biologically active substances according to EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request
- to chemically active substances according to EN 60721-3-3	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-3	Yes; Class 3S4 incl. sand, dust; *	Yes; Class 3S4 incl. sand, dust; *	Yes; Class 3S4 incl. sand, dust; *	Yes; Class 3S4 incl. sand, dust; *	Yes; Class 3S4 incl. sand, dust; *
<b>Use on ships/at sea</b>					
- to biologically active substances according to EN 60721-3-6	Yes; Class 6B2 mold and fungal spores (excluding fauna); Class 6B3 on request	Yes; Class 6B2 mold and fungal spores (excluding fauna); Class 6B3 on request	Yes; Class 6B2 mold and fungal spores (excluding fauna); Class 6B3 on request	Yes; Class 6B2 mold and fungal spores (excluding fauna); Class 6B3 on request	Yes; Class 6B2 mold and fungal spores (excluding fauna); Class 6B3 on request
- to chemically active substances according to EN 60721-3-6	Yes; Class 6C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 6C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 6C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 6C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 6C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-6	Yes; Class 6S3 incl. sand, dust; *	Yes; Class 6S3 incl. sand, dust; *	Yes; Class 6S3 incl. sand, dust; *	Yes; Class 6S3 incl. sand, dust; *	Yes; Class 6S3 incl. sand, dust; *
<b>Remark</b>					
- Note regarding classification of environmental conditions acc. to EN 60721	* The supplied plug covers must remain in place over the unused interfaces during operation!	* The supplied plug covers must remain in place over the unused interfaces during operation!	* The supplied plug covers must remain in place over the unused interfaces during operation!	* The supplied plug covers must remain in place over the unused interfaces during operation!	* The supplied plug covers must remain in place over the unused interfaces during operation!
<b>Conformal coating</b>					
• Coatings for printed circuit board assemblies acc. to EN 61086	Yes; Class 2 for high availability	Yes; Class 2 for high availability	Yes; Class 2 for high availability	Yes; Class 2 for high availability	Yes; Class 2 for high availability
• Protection against fouling acc. to EN 60664-3	Yes; Type 1 protection	Yes; Type 1 protection	Yes; Type 1 protection	Yes; Type 1 protection	Yes; Type 1 protection
• Military testing according to MIL-I-46058C, Amendment 7	Yes; Discoloration of coating possible during service life	Yes; Discoloration of coating possible during service life	Yes; Discoloration of coating possible during service life	Yes; Discoloration of coating possible during service life	Yes; Discoloration of coating possible during service life
• Qualification and Performance of Electrical Insulating Compound for Printed Board Assemblies according to IPC-CC-830A	Yes; Conformal coating, Class A	Yes; Conformal coating, Class A	Yes; Conformal coating, Class A	Yes; Conformal coating, Class A	Yes; Conformal coating, Class A

## Ordering data

## SIPLUS SM 522 digital output modules

(Extended temperature range and exposure to media)

8 outputs, 24 V DC; 2 A, isolated

16 outputs, 24 V DC; 0.5 A, isolated

32 outputs, 24 V DC; 0.5 A, isolated

8 relay outputs, 230 V AC, 5 A

8 outputs (triac), 230 V AC, 2 A

## Article No.

6AG1522-1BF00-7AB0

6AG1522-1BH01-7AB0

6AG1522-1BL01-7AB0

6AG1522-5HF00-2AB0

6AG1522-5FF00-7AB0

## Article No.

## Accessories

See SIMATIC S7-1500 SM 522 digital output modules, page 4/97

## SIMATIC S7-1500 Advanced Controllers

I/O modules  
Analog modules

### SM 531 analog input modules

#### Overview



- 4 or 8-channel analog input modules
- Optionally with extremely short conversion times
- For the connection of analog sensors without additional amplifiers
- Even solves more complex automation tasks

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#### Technical specifications

Article number	6ES7531-7QD00-0AB0 S7-1500, AI 4xU/I/RTD/TC ST	6ES7531-7QF00-0AB0 S7-1500, AI 8xU/I/R/RTD BA	6ES7531-7KF00-0AB0 S7-1500, AI 8xU/I/RTD/TC ST	6ES7531-7NF10-0AB0 S7-1500, AI 8xU/I HS	6ES7531-7NF00-0AB0 S7-1500, AI 8xU/I HF
<b>General information</b>					
Product type designation	AI 4xU/I/RTD/TC ST	AI 8xU/I/R/RTD BA	AI 8xU/I/RTD/TC ST	AI 8xU/I HS	AI 8xU/I HF
<b>Product function</b>					
• 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
• Measuring range scalable	No		No	No	No
• Scalable measured values	No		No	No	Yes
• Adjustment of measuring range	No		No	No	Yes
<b>Engineering with</b>					
• STEP 7 TIA Portal configurable/ integrated as of version	V13 / V13.0.2	V15.1 / V16	V12 / V12	V14 / -	V14 / -
• 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 / -
<b>Operating mode</b>					
• Oversampling	No	No	No	Yes	No
• MSI	Yes	Yes	Yes	Yes	Yes
<b>Supply voltage</b>					
Rated value (DC)	24 V		24 V	24 V	24 V
Reverse polarity protection	Yes		Yes	Yes	Yes

**Technical specifications** (continued)

Article number	<b>6ES7531-7QD00-0AB0</b> S7-1500, AI 4xU/I/RTD/TC ST	<b>6ES7531-7QF00-0AB0</b> S7-1500, AI 8xU/I/R/RTD BA	<b>6ES7531-7KF00-0AB0</b> S7-1500, AI 8xU/I/RTD/TC ST	<b>6ES7531-7NF10-0AB0</b> S7-1500, AI 8xU/I HS	<b>6ES7531-7NF00-0AB0</b> S7-1500, AI 8xU/I HF
<b>Analog inputs</b>					
Number of analog inputs	4	8	8	8	8
• For current measurement	4	8	8	8	8
• For voltage measurement	4	8	8	8	8
• For resistance/resistance thermometer measurement	2	8	4		
• For thermocouple measurement	4		8		
permissible input voltage for voltage input (destruction limit), max.	28.8 V	12 V; 12 V continuous, 30 V for max. 1 s	28.8 V	28.8 V	28.8 V
permissible input current for current input (destruction limit), max.	40 mA	40 mA	40 mA	40 mA	40 mA
Constant measurement current for resistance-type transmitter, typ.		230 ... 370 µA	150 Ohm, 300 Ohm, 600 Ohm, Pt100, Pt200, Ni100: 1.25 mA; 6 000 Ohm, Pt500, Pt1000, Ni1000, LG-Ni1000: 0.625 mA; PTC: 0.472 mA		
Technical unit for temperature measurement adjustable	Yes; °C/°F/K	Yes; °C/°F/K	Yes; °C/°F/K		
Analog input with oversampling	No				
Standardization of measured values	No				
<b>Input ranges (rated values), voltages</b>					
• 0 to +5 V	No	No	No	No	No
• 0 to +10 V	No	No	No	No	No
• 1 V to 5 V	Yes	Yes	Yes	Yes	Yes
• -1 V to +1 V	Yes	Yes	Yes		
• -10 V to +10 V	Yes	Yes	Yes	Yes	Yes
• -2.5 V to +2.5 V	Yes	No	Yes	No	Yes
• -25 mV to +25 mV	No	No	No	No	No
• -250 mV to +250 mV	Yes	No	Yes	No	No
• -5 V to +5 V	Yes	Yes	Yes	Yes	Yes
• -50 mV to +50 mV	Yes	Yes	Yes	No	No
• -500 mV to +500 mV	Yes	Yes	Yes	No	No
• -80 mV to +80 mV	Yes	No	Yes	No	No
<b>Input ranges (rated values), currents</b>					
• 0 to 10 mA		No			
• 0 to 20 mA	Yes	Yes	Yes	Yes	Yes
• -20 mA to +20 mA	Yes	Yes	Yes	Yes	Yes
• 4 mA to 20 mA	Yes	Yes	Yes	Yes	Yes
<b>Input ranges (rated values), thermocouples</b>					
• Type B	Yes	No	Yes	No	No
• Type C	No	No	No	No	No
• Type E	Yes	No	Yes	No	No
• Type J	Yes	No	Yes	No	No
• Type K	Yes	No	Yes	No	No
• Type L	No	No	No	No	No
• Type N	Yes	No	Yes	No	No
• Type R	Yes	No	Yes	No	No
• Type S	Yes	No	Yes	No	No
• Type T	Yes	No	Yes	No	No
• Type U	No	No			
• Type TXK/TXK(L) to GOST	No	No	No	No	No

# SIMATIC S7-1500 Advanced Controllers

I/O modules

Analog modules

## SM 531 analog input modules

### Technical specifications (continued)

Article number	6ES7531-7QD00-0AB0 S7-1500, AI 4xU/I/RTD/TC ST	6ES7531-7QF00-0AB0 S7-1500, AI 8xU/I/R/RTD BA	6ES7531-7KF00-0AB0 S7-1500, AI 8xU/I/RTD/TC ST	6ES7531-7NF10-0AB0 S7-1500, AI 8xU/I HS	6ES7531-7NF00-0AB0 S7-1500, AI 8xU/I HF
<b>Input ranges (rated values), resistance thermometer</b>					
• Cu 10	No	No	No	No	No
• Cu 10 according to GOST	No	No	No	No	No
• Cu 50	No	No	No	No	No
• Cu 50 according to GOST	No	No	No	No	No
• Cu 100	No	No	No	No	No
• Cu 100 according to GOST	No	No	No	No	No
• Ni 10	No	No	No	No	No
• Ni 10 according to GOST	No	No	No	No	No
• Ni 100	Yes; Standard/climate	Yes; Standard/climate	Yes; Standard/climate	No	No
• Ni 100 according to GOST	No	No	No	No	No
• Ni 1000	Yes; Standard/climate	Yes; Standard/climate	Yes; Standard/climate	No	No
• Ni 1000 according to GOST	No	No	No	No	No
• LG-Ni 1000	Yes; Standard/climate	Yes; Standard/climate	Yes; Standard/climate	No	No
• Ni 120	No	No	No	No	No
• Ni 120 according to GOST	No	No	No	No	No
• Ni 200	No	No	No	No	No
• Ni 200 according to GOST	No	No	No	No	No
• Ni 500	No	No	No	No	No
• Ni 500 according to GOST	No	No	No	No	No
• Pt 10	No	No	No	No	No
• Pt 10 according to GOST	No	No	No	No	No
• Pt 50	No	No	No	No	No
• Pt 50 according to GOST	No	No	No	No	No
• Pt 100	Yes; Standard/climate	Yes; Standard/climate	Yes; Standard/climate	No	No
• Pt 100 according to GOST	No	No	No	No	No
• Pt 1000	Yes; Standard/climate	Yes; Standard/climate	Yes; Standard/climate	No	No
• Pt 1000 according to GOST	No	No	No	No	No
• Pt 200	Yes; Standard/climate	No	Yes; Standard/climate	No	No
• Pt 200 according to GOST	No	No	No	No	No
• Pt 500	Yes; Standard/climate	No	Yes; Standard/climate	No	No
• Pt 500 according to GOST	No	No	No	No	No
<b>Input ranges (rated values), resistors</b>					
• 0 to 150 ohms	Yes	No	Yes	No	No
• 0 to 300 ohms	Yes	No	Yes	No	No
• 0 to 600 ohms	Yes	Yes	Yes	No	No
• 0 to 3000 ohms	No	No	No	No	No
• 0 to 6000 ohms	Yes	Yes	Yes	No	No
• PTC	Yes	Yes	Yes	No	No
<b>Thermocouple (TC)</b>					
<b>Temperature compensation</b>					
- parameterizable	Yes		Yes		
<b>Cable length</b>					
• shielded, max.	800 m; for U/I, 200 m for R/RTD, 50 m for TC	200 m; 50 m at 50 mV	800 m; for U/I, 200 m for R/RTD, 50 m for TC	800 m	800 m

**Technical specifications** (continued)

Article number	<b>6ES7531-7QD00-0AB0</b> S7-1500, AI 4xU/I/RTD/TC ST	<b>6ES7531-7QF00-0AB0</b> S7-1500, AI 8xU/I/R/RTD BA	<b>6ES7531-7KF00-0AB0</b> S7-1500, AI 8xU/I/RTD/TC ST	<b>6ES7531-7NF10-0AB0</b> S7-1500, AI 8xU/I HS	<b>6ES7531-7NF00-0AB0</b> S7-1500, AI 8xU/I HF
<b>Analog value generation for the inputs</b>					
<b>Integration and conversion time/resolution per channel</b>					
• Resolution with overrange (bit including sign), max.	16 bit	16 bit	16 bit	16 bit	24 bit; When using the function "Scaling of the measured values" or "Measuring range adaptation" (32 bit REAL format); 16 bit when using the S7 format (16 bit INTEGER)
• Integration time, parameterizable	Yes	Yes	Yes	Yes	Yes
• Integration time (ms)	2.5 / 16.67 / 20 / 100 ms	2.5 / 16.67 / 20 / 100 ms	2.5 / 16.67 / 20 / 100 ms		Fast mode: 2.5 / 16.67 / 20 / 100 ms, standard mode: 7.5 / 50 / 60 / 300 ms
• Basic conversion time, including integration time (ms)	9 / 23 / 27 / 107 ms	10 / 24 / 27 / 107 ms	9 / 23 / 27 / 107 ms		Fast mode: 4 / 18 / 22 / 102 ms; Standard mode: 9 / 52 / 62 / 302 ms
- additional conversion time for wire-break monitoring	9 ms (to be considered in R/RTD/TC measurement)	4 ms (to be considered in R/RTD/U 1 to 5 V measurement)	9 ms (to be considered in R/RTD/TC measurement)		
- additional conversion time for resistance measurement	150 ohm, 300 ohm, 600 ohm, Pt100, Pt200, Ni100: 2 ms, 6000 ohm, Pt500, Pt1000, Ni1000, LG-Ni1000, PTC: 4 ms	8 ms	150 ohm, 300 ohm, 600 ohm, Pt100, Pt200, Ni100: 2 ms, 6000 ohm, Pt500, Pt1000, Ni1000, LG-Ni1000, PTC: 4 ms		
• Interference voltage suppression for interference frequency f1 in Hz	400 / 60 / 50 / 10	400 / 60 / 50 / 10 Hz	400 / 60 / 50 / 10 Hz		400 / 60 / 50 / 10 Hz
• Basic execution time of the module (all channels released)					Corresponds to the channel with the highest basic conversion time
• Basic execution time of the module (all channels released)				62.5 µs; independent of number of activated channels	
<b>Smoothing of measured values</b>					
• parameterizable	Yes	Yes	Yes	Yes	Yes
<b>Encoder</b>					
<b>Connection of signal encoders</b>					
• for voltage measurement	Yes	Yes	Yes	Yes	Yes
• for current measurement as 2-wire transducer	Yes	Yes; with external supply	Yes	Yes	Yes; with external transmitter supply
- Burden of 2-wire transmitter, max.	820 Ω		820 Ω	820 Ω	
• for current measurement as 4-wire transducer	Yes	Yes	Yes	Yes	Yes
• for resistance measurement with two-wire connection	Yes; Only for PTC	Yes; Only for PTC	Yes; Only for PTC	No	No
• for resistance measurement with three-wire connection	Yes; All measuring ranges except PTC; internal compensation of the cable resistances	Yes; All measuring ranges except PTC; internal compensation of the cable resistances	Yes; All measuring ranges except PTC; internal compensation of the cable resistances	No	No
• for resistance measurement with four-wire connection	Yes; All measuring ranges except PTC		Yes; All measuring ranges except PTC	No	No

## SIMATIC S7-1500 Advanced Controllers

I/O modules

Analog modules

## SM 531 analog input modules

## Technical specifications (continued)

Article number	6ES7531-7QD00-0AB0 S7-1500, AI 4xU/I/RTD/TC ST	6ES7531-7QF00-0AB0 S7-1500, AI 8xU/I/R/RTD BA	6ES7531-7KF00-0AB0 S7-1500, AI 8xU/I/RTD/TC ST	6ES7531-7NF10-0AB0 S7-1500, AI 8xU/I HS	6ES7531-7NF00-0AB0 S7-1500, AI 8xU/I HF
<b>Errors/accuracies</b>					
<b>Basic error limit (operational limit at 25 °C)</b>					
• Voltage, relative to input range, (+/-)	0.1 %	0.3 %	0.1 %	0.2 %	0.05 %
• Current, relative to input range, (+/-)	0.1 %	0.3 %	0.1 %	0.2 %	0.05 %
• Resistance, relative to input range, (+/-)	0.1 %	0.3 %	0.1 %		
• Resistance thermometer, relative to input range, (+/-)	0.1 %; Ptxxx standard: ±0.7 K, Ptxxx climate: ±0.2 K, Nixxx standard: ±0.3 K, Nixxx climate: ±0.15 K	Ptxxx Standard: ±1.0 K, Ptxxx Climate: ±0.5 K, Nixxx Standard: ±0.5 K, Nixxx Climate: ±0.5 K	Ptxxx standard: ±0.7 K, Ptxxx climate: ±0.2 K, Nixxx standard: ±0.3 K, Nixxx climate: ±0.15 K		
• Thermocouple, relative to input range, (+/-)	0.1 %; Type B: > 600 °C ±1.7 K, type E: > -200 °C ±0.7 K, type J: > -210 °C ±0.8 K, type K: > -200 °C ±1.2 K, type N: > -200 °C ±1.2 K, type R: > 0 °C ±1.9 K, type S: > 0 °C ±1.9 K, type T: > -200 °C ±0.8 K		Type B: > 600 °C ±1.7 K, type E: > -200 °C ±0.7 K, type J: > -210 °C ±0.8 K, type K: > -200 °C ±1.2 K, type N: > -200 °C ±1.2 K, type R: > 0 °C ±1.9 K, type S: > 0 °C ±1.9 K, type T: > -200 °C ±0.8 K		
<b>Interference voltage suppression for <math>f = n \times (f_1 \pm 1 \%)</math>, <math>f_1 =</math> interference frequency</b>					
• Series mode interference (peak value of interference < rated value of input range), min.	40 dB	40 dB	40 dB		80 dB; in the Standard operating mode, 40 dB in the Fast operating mode
• Common mode voltage, max.	10 V	4 V	10 V	10 V	60 V DC/30 V AC
• Common mode interference, min.	60 dB	60 dB	60 dB	50 dB at 400 Hz; 60 dB at 60 / 50 / 10 Hz	80 dB
<b>Isochronous mode</b>					
Isochronous operation (application synchronized up to terminal)	No		No	Yes	No
Filtering and processing time (TCI), min.				80 µs	
Bus cycle time (TDP), min.				250 µs	
<b>Interrupts/diagnostics/status information</b>					
Diagnostics function	Yes	Yes	Yes	Yes	Yes
<b>Alarms</b>					
• Diagnostic alarm	Yes	Yes	Yes	Yes	Yes
• Limit value alarm	Yes; two upper and two lower limit values in each case	Yes; two upper and two lower limit values in each case	Yes; two upper and two lower limit values in each case	Yes; two upper and two lower limit values in each case	Yes; two upper and two lower limit values in each case
<b>Diagnostic messages</b>					
• Monitoring the supply voltage	Yes	No	Yes	Yes	Yes
• Wire-break	Yes; Only for 1 to 5 V, 4 to 20 mA, TC, R, and RTD	Yes; Only for 1 ... 5 V, 4 ... 20 mA, R, and RTD	Yes; Only for 1 to 5 V, 4 to 20 mA, TC, R, and RTD	Yes; only for 1 ... 5 V and 4 ... 20 mA	Yes; only for 1 ... 5 V and 4 ... 20 mA
• Short-circuit		No			
• Group error		No			
• Overflow/underflow	Yes	Yes	Yes	Yes	Yes
<b>Diagnostics indication LED</b>					
• 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
• MAINT LED		No			
• Monitoring of the supply voltage (PWR-LED)	Yes; Green LED	No	Yes; Green LED	Yes; Green LED	Yes; Green LED
• 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	Yes; Red LED	Yes; Red LED	Yes; Red LED
• for module diagnostics	Yes; Red LED	Yes; Red LED	Yes; Red LED	Yes; Red LED	Yes; Red LED



## Technical specifications (continued)

Article number	6ES7531-7QD00-0AB0 S7-1500, AI 4xU/I/RTD/TC ST	6ES7531-7QF00-0AB0 S7-1500, AI 8xU/I/R/RTD BA	6ES7531-7KF00-0AB0 S7-1500, AI 8xU/I/RTD/TC ST	6ES7531-7NF10-0AB0 S7-1500, AI 8xU/I HS	6ES7531-7NF00-0AB0 S7-1500, AI 8xU/I HF
<b>Potential separation</b>					
<b>Potential separation channels</b>					
• between the channels and backplane bus	Yes	Yes	Yes	Yes	Yes
<b>Standards, approvals, certificates</b>					
Suitable for applications according to AMS 2750			Yes; Declaration of Conformity, see online support entry 109757262		
Suitable for applications according to CQI-9			Yes; Based on AMS 2750 E		
<b>Ambient conditions</b>					
<b>Ambient temperature during operation</b>					
• 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
<b>Decentralized operation</b>					
Prioritized startup	No	No	No	Yes	Yes
<b>Dimensions</b>					
Width	25 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
<b>Weights</b>					
Weight, approx.	210 g	250 g	310 g	300 g	280 g
<b>Other</b>					
Note:	Supplied incl. 40-pole push-in front connectors. Additional basic error and noise for integration time = 2.5 ms: Voltage: ±250 mV (±0.02%), ±80 mV (±0.05%), ±50 mV (±0.05%); resistance: 150 Ohms (±0.02%); resistance thermometer: Pt100 climate: ±0.08 K, Ni100 climate: ±0.08 K; thermocouple: Type B, R, S: ±3 K, type E, J, K, N, T: ±1 K		Additional basic error and noise for integration time = 2.5 ms: Voltage: ±250 mV (±0.02%), ±80 mV (±0.05%), ±50 mV (±0.05%); resistance: 150 ohms ±0.02%; resistance thermometer: Pt100 climate: ±0.08 K, Ni100 climate: ±0.08 K; thermocouple: Type B, R, S: ±3 K, type E, J, K, N, T: ±1 K		

## SIMATIC S7-1500 Advanced Controllers

I/O modules  
Analog modules

## SM 531 analog input modules

## Technical specifications (continued)

Article number	<b>6ES7531-7PF00-0AB0</b> S7-1500, AI 8 X U/R/RTD/TC HF
<b>General information</b>	
Product type designation	AI 8xU/R/RTD/TC HF
<b>Product function</b>	
• I&M data	Yes; I&M0 to I&M3
• Measuring range scalable	Yes
• Scalable measured values	No
• Adjustment of measuring range	No
<b>Engineering with</b>	
• STEP 7 TIA Portal configurable/ integrated as of version	V14 / -
• STEP 7 configurable/integrated as of version	V5.5 SP3 / -
• PROFIBUS as of GSD version/ GSD revision	V1.0 / V5.1
• PROFINET as of GSD version/ GSD revision	V2.3 / -
<b>Operating mode</b>	
• Oversampling	No
• MSI	Yes
<b>Supply voltage</b>	
Rated value (DC)	24 V
Reverse polarity protection	Yes
<b>Analog inputs</b>	
Number of analog inputs	8; Plus one additional RTD (reference) channel
• For voltage measurement	8; Plus one additional RTD (reference) channel
• For resistance/resistance thermometer measurement	8; Plus one additional RTD (reference) channel
• For thermocouple measurement	8; Plus one additional RTD (reference) channel
permissible input voltage for voltage input (destruction limit), max.	20 V
Constant measurement current for resistance-type transmitter, typ.	150 Ohm, 300 Ohm, 600 Ohm, Cu10, Cu50, Cu100, Ni10, Ni100, Ni120, Ni200, Pt10, Pt50, Pt100, Pt200 climate: 1 mA; 6 kOhm, Ni500, Ni1000, LG-Ni1000, Pt200 standard, Pt500, Pt1000, PTC: 0.25 mA
Technical unit for temperature measurement adjustable	Yes; °C/°F/K
<b>Input ranges (rated values), voltages</b>	
• 0 to +5 V	No
• 0 to +10 V	No
• 1 V to 5 V	No
• -1 V to +1 V	Yes
• -10 V to +10 V	No
• -2.5 V to +2.5 V	No
• -25 mV to +25 mV	Yes
• -250 mV to +250 mV	Yes
• -5 V to +5 V	No
• -50 mV to +50 mV	Yes
• -500 mV to +500 mV	Yes
• -80 mV to +80 mV	Yes
<b>Input ranges (rated values), currents</b>	
• 0 to 20 mA	No
• -20 mA to +20 mA	No
• 4 mA to 20 mA	No

Article number	<b>6ES7531-7PF00-0AB0</b> S7-1500, AI 8 X U/R/RTD/TC HF
<b>Input ranges (rated values), thermocouples</b>	
• Type B	Yes
• Type C	Yes
• Type E	Yes
• Type J	Yes
• Type K	Yes
• Type L	No
• Type N	Yes
• Type R	Yes
• Type S	Yes
• Type T	Yes
• Type TXK/TXK(L) to GOST	Yes
<b>Input ranges (rated values), resistance thermometer</b>	
• Cu 10	Yes; Standard/climate
• Cu 10 according to GOST	Yes; Standard/climate
• Cu 50	Yes; Standard/climate
• Cu 50 according to GOST	Yes; Standard/climate
• Cu 100	Yes; Standard/climate
• Cu 100 according to GOST	Yes; Standard/climate
• Ni 10	Yes; Standard/climate
• Ni 10 according to GOST	Yes; Standard/climate
• Ni 100	Yes; Standard/climate
• Ni 100 according to GOST	Yes; Standard/climate
• Ni 1000	Yes; Standard/climate
• Ni 1000 according to GOST	Yes; Standard/climate
• LG-Ni 1000	Yes; Standard/climate
• Ni 120	Yes; Standard/climate
• Ni 120 according to GOST	Yes; Standard/climate
• Ni 200	Yes; Standard/climate
• Ni 200 according to GOST	Yes; Standard/climate
• Ni 500	Yes; Standard/climate
• Ni 500 according to GOST	Yes; Standard/climate
• Pt 10	Yes; Standard/climate
• Pt 10 according to GOST	Yes; Standard/climate
• Pt 50	Yes; Standard/climate
• Pt 50 according to GOST	Yes; Standard/climate
• Pt 100	Yes; Standard/climate
• Pt 100 according to GOST	Yes; Standard/climate
• Pt 1000	Yes; Standard/climate
• Pt 1000 according to GOST	Yes; Standard/climate
• Pt 200	Yes; Standard/climate
• Pt 200 according to GOST	Yes; Standard/climate
• Pt 500	Yes; Standard/climate
• Pt 500 according to GOST	Yes; Standard/climate
<b>Input ranges (rated values), resistors</b>	
• 0 to 150 ohms	Yes
• 0 to 300 ohms	Yes
• 0 to 600 ohms	Yes
• 0 to 3000 ohms	No
• 0 to 6000 ohms	Yes
• PTC	Yes
<b>Thermocouple (TC)</b>	
<b>Temperature compensation</b>	
- parameterizable	Yes
<b>Cable length</b>	
• shielded, max.	800 m; at U; 200 m at R/RTD/TC

### Technical specifications (continued)

Article number	<b>6ES7531-7PF00-0AB0</b> S7-1500, AI 8 X U/R/RTD/TC HF
<b>Analog value generation for the inputs</b>	
<b>Integration and conversion time/ resolution per channel</b>	
<ul style="list-style-type: none"> <li>Resolution with overrange (bit including sign), max.</li> </ul>	21 bit; For measuring mode RTC and TC when using the function "Scalable temperature measuring range" (32 bit REAL format); 16 bit for measuring mode R and U; 16 bit for all measuring modes when using the S7 format (16 bit INTEGER)
<ul style="list-style-type: none"> <li>Integration time, parameterizable</li> </ul>	Yes
<ul style="list-style-type: none"> <li>Integration time (ms)</li> </ul>	Fast mode: 2.5 / 16.67 / 20 / 100 ms, standard mode: 7.5 / 50 / 60 / 300 ms
<ul style="list-style-type: none"> <li>Basic conversion time, including integration time (ms)</li> <li>- additional conversion time for wire-break monitoring</li> </ul>	Fast mode: 4 / 18 / 22 / 102 ms; Standard mode: 9 / 52 / 62 / 302 ms Thermocouples, 150 Ohm, 300 Ohm, 600 Ohm, Cu10, Cu50, Cu100, Ni10, Ni100, Ni120, Ni200, Pt10, Pt50, Pt100: 4 ms; 6 kOhm, Ni500, Ni1000, LG-Ni1000, Pt200, Pt500, Pt1000: 13 ms
<ul style="list-style-type: none"> <li>Interference voltage suppression for interference frequency f1 in Hz</li> </ul>	400 / 60 / 50 / 10 Hz
<ul style="list-style-type: none"> <li>Basic execution time of the module (all channels released)</li> </ul>	Corresponds to the channel with the highest basic conversion time
<b>Smoothing of measured values</b>	
<ul style="list-style-type: none"> <li>parameterizable</li> </ul>	Yes
<b>Encoder</b>	
<b>Connection of signal encoders</b>	
<ul style="list-style-type: none"> <li>for voltage measurement</li> </ul>	Yes
<ul style="list-style-type: none"> <li>for current measurement as 2-wire transducer</li> </ul>	No
<ul style="list-style-type: none"> <li>for current measurement as 4-wire transducer</li> </ul>	No
<ul style="list-style-type: none"> <li>for resistance measurement with two-wire connection</li> </ul>	Yes
<ul style="list-style-type: none"> <li>for resistance measurement with three-wire connection</li> </ul>	Yes; All measuring ranges except PTC; internal compensation of the cable resistances
<ul style="list-style-type: none"> <li>for resistance measurement with four-wire connection</li> </ul>	Yes; All measuring ranges except PTC
<b>Errors/accuracies</b>	
<b>Basic error limit (operational limit at 25 °C)</b>	
<ul style="list-style-type: none"> <li>Voltage, relative to input range, (+/-)</li> </ul>	0.05 %
<ul style="list-style-type: none"> <li>Resistance, relative to input range, (+/-)</li> </ul>	0.05 %
<ul style="list-style-type: none"> <li>Resistance thermometer, relative to input range, (+/-)</li> </ul>	Cuxxx Standard: ±0.3 K, Cuxxx Klima: ±0.2 K, Ptxxx Standard: ±0.5 K, Ptxxx Klima: ±0.2 K, Nixxx Standard: ±0.3 K, Nixxx Klima: ±0.15 K
<ul style="list-style-type: none"> <li>Thermocouple, relative to input range, (+/-)</li> </ul>	Type B: > 600 °C ±1 K, Type E: > -200 °C ±0.5 K, Type J: > -210 °C ±0.5 K, Type K: > -200 °C ±1 K, Type N: > -200 °C ±1 K, Type R: > 0 °C ±1 K, Type S: > 0 °C ±1 K, Type T: > -200 °C ±0.5 K, Type C: ±2 K, Type TXK/TXK(L): ±0.5 K

Article number	<b>6ES7531-7PF00-0AB0</b> S7-1500, AI 8 X U/R/RTD/TC HF
<b>Interference voltage suppression for f = n x (f1 +/- 1 %), f1 = interference frequency</b>	
<ul style="list-style-type: none"> <li>Series mode interference (peak value of interference &lt; rated value of input range), min.</li> <li>Common mode voltage, max.</li> <li>Common mode interference, min.</li> </ul>	80 dB; in the Standard operating mode, 40 dB in the Fast operating mode 60 V DC/30 V AC 80 dB
<b>Isochronous mode</b>	
Isochronous operation (application synchronized up to terminal)	No
<b>Interrupts/diagnostics/ status information</b>	
Diagnostics function	Yes
<b>Alarms</b>	
<ul style="list-style-type: none"> <li>Diagnostic alarm</li> <li>Limit value alarm</li> </ul>	Yes Yes; two upper and two lower limit values in each case
<b>Diagnostic messages</b>	
<ul style="list-style-type: none"> <li>Monitoring the supply voltage</li> <li>Wire-break</li> <li>Overflow/underflow</li> </ul>	Yes Yes; Only with TC, R, RTD Yes
<b>Diagnostics indication LED</b>	
<ul style="list-style-type: none"> <li>RUN LED</li> <li>ERROR LED</li> <li>Monitoring of the supply voltage (PWR-LED)</li> <li>Channel status display</li> <li>for channel diagnostics</li> <li>for module diagnostics</li> </ul>	Yes; Green LED Yes; Red LED Yes; Green LED Yes; Green LED Yes; Red LED Yes; Red LED
<b>Potential separation</b>	
<b>Potential separation channels</b>	
<ul style="list-style-type: none"> <li>between the channels and backplane bus</li> </ul>	Yes
<b>Standards, approvals, certificates</b>	
Suitable for applications according to AMS 2750	Yes; Declaration of Conformity, see online support entry 109757262
Suitable for applications according to CQI-9	Yes; Based on AMS 2750 E
<b>Ambient conditions</b>	
<b>Ambient temperature during operation</b>	
<ul style="list-style-type: none"> <li>horizontal installation, min.</li> <li>horizontal installation, max.</li> <li>vertical installation, min.</li> <li>vertical installation, max.</li> </ul>	0 °C 60 °C 0 °C 40 °C
<b>Decentralized operation</b>	
Prioritized startup	Yes
<b>Dimensions</b>	
Width	35 mm
Height	147 mm
Depth	129 mm
<b>Weights</b>	
Weight, approx.	290 g
<b>Other</b>	
Note:	For the R/RDT three-wire measurement, the conductor compensation is made alternating with the measurement. This then requires two module cycles for a measured value.

**SIMATIC S7-1500 Advanced Controllers**

I/O modules

Analog modules

**SM 531 analog input modules**

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Ordering data	Article No.	Article No.
<b>SM 531 analog input modules</b> 4 x U/I/RTD/TC 4 analog inputs, $\pm 10$ V, $\pm 5$ V, $\pm 2.5$ V, $\pm 1$ V, $\pm 500$ mV, $\pm 250$ mV, $\pm 80$ mV, $\pm 50$ mV, 1 ... 5 V, 0/4 ... 20 mA, $\pm 20$ mA, thermocouples type B, E, J, K, N, R, S, T, resistance thermometers Ni 100, Ni 1000, LG-Ni 1000, Pt100, Pt1000, Pt250, Pt500, resistors 0 ... 150/300/600/6000 ohms; 16 bits; incl. infeed element, shield bracket, shield terminal, labeling strips, U connector, printed front door	<b>6ES7531-7QD00-0AB0</b>	<b>Accessories</b> <b>Front connectors</b> For 35 mm modules; including four potential bridges, cable ties and individual labeling strips, 40-pin <ul style="list-style-type: none"> <li>• Screw terminals</li> <li>• Push-in</li> </ul> For 25 mm modules; including cable ties and individual labeling strips; push-in terminal 40-pin; spare part
8 x U/I/RTD/ 8 analog inputs $\pm 1$ V, $\pm 10$ V, $\pm 5$ V, $\pm 50$ mV, $\pm 500$ mV, 1 ... 5 V, 0/4 ... 20 mA, $\pm 20$ mA, resistance thermometers Ni 100, Ni 1000, LG-Ni 1000, Pt100, Pt1000, resistors 0 ... 600/6000 ohms, PTC; 16 bits; incl. infeed element, shield bracket, shield terminal, labeling strips, U connector, printed front door	<b>6ES7531-7QF00-0AB0</b>	<b>DIN A4 labeling sheets</b> For 35 mm modules; 10 sheets with 10 labeling strips each for I/O modules; perforated, Al gray For 25 mm modules; 10 sheets with 20 labeling strips each for I/O modules; perforated, Al gray
8 x U/I HS 8 analog inputs, $\pm 10$ V, $\pm 5$ V, 1 ... 5 V or 0/4 ... 20 mA, $\pm 20$ mA, 16 bits + sign; incl. infeed element, shield bracket, shield terminal, labeling strips, U connector, printed front door	<b>6ES7531-7NF10-0AB0</b>	<b>U connector</b> 5 units; spare part
8 x U/I/RTD/TC 8 analog inputs $\pm 10$ V, $\pm 5$ V, $\pm 2.5$ V, $\pm 1$ V, $\pm 500$ mV, $\pm 250$ mV, $\pm 80$ mV, $\pm 50$ mV, 1 ... 5 V, 0/4 ... 20 mA, $\pm 20$ mA, thermocouples type B, E, J, K, N, R, S, T, resistance thermometers Ni 100, Ni 1000, LG-Ni 1000, Pt100, Pt1000, Pt250, Pt500, resistors 0 ... 150/300/600/6000 ohms; 16 bits; incl. infeed element, shield bracket, shield terminal, labeling strips, U connector, printed front door	<b>6ES7531-7KF00-0AB0</b>	<b>Universal front door for I/O modules</b> For 35 mm modules; 5 front doors; with 5 labeling strips (front) and 5 cabling diagrams per front door; spare part For 25 mm modules; 5 front doors; with 5 labeling strips (front) and 5 cabling diagrams per front door; spare part
8 x U/I HF 8 analog inputs, $\pm 10$ V, $\pm 5$ V, 1 ... 5 V or 0/4 ... 20 mA, $\pm 20$ mA, 16 bits + sign; incl. infeed element, shield bracket, shield terminal, labeling strips, U connector, printed front door	<b>6ES7531-7NF00-0AB0</b>	<b>Shielding set I/O</b> For 35 mm modules; infeed element, shield bracket, and shield terminal; 5 units, spare part (one shield set supplied with the module). For 25 mm modules; infeed element, shield bracket, and shield terminal; 4 units, spare part (one shield set supplied with the module).
8 x U/R/RTD/TC 8 analog inputs, $\pm 1$ V, $\pm 500$ mV, $\pm 250$ mV, $\pm 80$ mV, $\pm 50$ mV, $\pm 25$ mV; thermocouples type B, E, J, K, N, R, S, T, TXK/TXK(L) according to GOST; resistance thermometers Cu 10, Cu 50, Cu 100, Ni 10, Ni 100, Ni 120, Ni 200, Ni 500, Ni 1000, LG-Ni 1000, Pt10, Pt50, Pt100, Pt200, Pt500, Pt1000; resistors 0...150/300/600/6000 ohms, PTC; 16 bits; incl. infeed element, shield bracket, shield terminal, labeling strips, U connector, printed front door	<b>6ES7531-7PF00-0AB0</b>	<b>Shield terminal element</b> 10 units; spare part
		<b>SIMATIC Manual Collection</b> Electronic manuals on DVD, multi-language: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC Distributed I/O, SIMATIC HMI, SIMATIC sensors, SIMATIC NET, SIMATIC PC-based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC
		<b>SIMATIC Manual Collection update service for 1 year</b> Current "Manual Collection" DVD and the three subsequent updates

# SIMATIC S7-1500 Advanced Controllers

I/O modules  
Analog modules

## SM 532 analog output modules

### Overview



- 2, 4 and 8-channel analog output modules
- Optionally with extremely short conversion times
- For connecting analog actuators without additional amplifiers
- Even solves more complex automation tasks

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### Technical specifications

Article number	6ES7532-5NB00-0AB0	6ES7532-5HD00-0AB0	6ES7532-5HF00-0AB0	6ES7532-5ND00-0AB0
	S7-1500, AQ 2xU/I ST	S7-1500, AQ 4xU/I ST	S7-1500, AQ 8xU/I HS	S7-1500, AQ 4xU/I HF
<b>General information</b>				
Product type designation	AQ 2xU/I ST	AQ 4xU/I ST	AQ 8xU/I HS	AQ 4xU/I HF
<b>Product function</b>				
• 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
• Output range scalable	No	No	No	No
<b>Engineering with</b>				
• STEP 7 TIA Portal configurable/ integrated as of version	V13 / V13.0.2	V12 / V12	V14 / -	V14 / -
• STEP 7 configurable/integrated as of version	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
• PROFINET as of GSD version/ GSD revision	V2.3 / -	V2.3 / -	V2.3 / -	V2.3 / -
<b>Operating mode</b>				
• Oversampling	No	No	Yes	No
• MSO	Yes	Yes	Yes	Yes
<b>Supply voltage</b>				
Rated value (DC)	24 V	24 V	24 V	24 V
Reverse polarity protection	Yes	Yes	Yes	Yes
<b>Analog outputs</b>				
Number of analog outputs	2	4	8	4
Cycle time (all channels), min.	3.2 ms; independent of number of activated channels	3.2 ms; independent of number of activated channels	125 µs; independent of number of activated channels	125 µs; independent of number of activated channels
<b>Output ranges, voltage</b>				
• 0 to 10 V	Yes	Yes	Yes	Yes
• 1 V to 5 V	Yes	Yes	Yes	Yes
• -5 V to +5 V	No	No	No	No
• -10 V to +10 V	Yes	Yes	Yes	Yes

## SIMATIC S7-1500 Advanced Controllers

I/O modules

Analog modules

## SM 532 analog output modules

## Technical specifications (continued)

Article number	6ES7532-5NB00-0AB0 S7-1500, AQ 2xU/I ST	6ES7532-5HD00-0AB0 S7-1500, AQ 4xU/I ST	6ES7532-5HF00-0AB0 S7-1500, AQ 8xU/I HS	6ES7532-5ND00-0AB0 S7-1500, AQ 4xU/I HF
<b>Output ranges, current</b>				
• 0 to 20 mA	Yes	Yes	Yes	Yes
• -20 mA to +20 mA	Yes	Yes	Yes	Yes
• 4 mA to 20 mA	Yes	Yes	Yes	Yes
<b>Connection of actuators</b>				
• for voltage output two-wire connection	Yes	Yes	Yes	Yes
• for voltage output four-wire connection	Yes	Yes	Yes	Yes
• for current output two-wire connection	Yes	Yes	Yes	Yes
<b>Load impedance (in rated range of output)</b>				
• with voltage outputs, min.	1 k $\Omega$ ; 0.5 k $\Omega$ m at 1 to 5 V	1 k $\Omega$ ; 0.5 k $\Omega$ m at 1 to 5 V	1 k $\Omega$	1 k $\Omega$ ; 0.5 k $\Omega$ m at 1 to 5 V
• with voltage outputs, capacitive load, max.	1 $\mu$ F	1 $\mu$ F	100 nF	1 $\mu$ F
• with current outputs, max.	750 $\Omega$	750 $\Omega$	500 $\Omega$	750 $\Omega$
• with current outputs, inductive load, max.	10 mH	10 mH	1 mH	10 mH
<b>Cable length</b>				
• shielded, max.	800 m; for current, 200 m for voltage	800 m; for current, 200 m for voltage	200 m	800 m; for current, 200 m for voltage
<b>Analog value generation for the outputs</b>				
<b>Integration and conversion time/resolution per channel</b>				
• Resolution with overrange (bit including sign), max.	16 bit	16 bit	16 bit	16 bit
• Conversion time (per channel)	0.5 ms	0.5 ms	50 $\mu$ s; independent of number of activated channels	125 $\mu$ s; independent of number of activated channels
<b>Settling time</b>				
• for resistive load	1.5 ms	1.5 ms	30 $\mu$ s; see additional description in the manual	0.2 ms; see additional description in the manual
• for capacitive load	2.5 ms	2.5 ms	100 $\mu$ s; see additional description in the manual	1.8 ms; see additional description in the manual
• for inductive load	2.5 ms	2.5 ms	100 $\mu$ s; see additional description in the manual	2 ms; see additional description in the manual
<b>Errors/accuracies</b>				
<b>Basic error limit (operational limit at 25 °C)</b>				
• Voltage, relative to output range, (+/-)	0.2 %	0.2 %	0.2 %	0.06 %
• Current, relative to output range, (+/-)	0.2 %	0.2 %	0.2 %	0.1 %
<b>Isochronous mode</b>				
Isochronous operation (application synchronized up to terminal)	No	No	Yes	Yes
Execution and activation time (TCO), min.			100 $\mu$ s	100 $\mu$ s
Bus cycle time (TDP), min.			250 $\mu$ s	250 $\mu$ s
<b>Interrupts/diagnostics/status information</b>				
Diagnostics function	Yes	Yes	Yes	Yes
Substitute values connectable	Yes	Yes	Yes	Yes
<b>Alarms</b>				
• Diagnostic alarm	Yes	Yes	Yes	Yes

**Technical specifications** (continued)

Article number	<b>6ES7532-5NB00-0AB0</b> S7-1500, AQ 2xU/I ST	<b>6ES7532-5HD00-0AB0</b> S7-1500, AQ 4xU/I ST	<b>6ES7532-5HF00-0AB0</b> S7-1500, AQ 8xU/I HS	<b>6ES7532-5ND00-0AB0</b> S7-1500, AQ 4xU/I HF
<b>Diagnostic messages</b>				
• Monitoring the supply voltage	Yes	Yes	Yes	Yes
• Wire-break	Yes; Only for output type "current"	Yes; Only for output type "current"	Yes; Only for output type "current"	Yes; Only for output type "current"
• Short-circuit	Yes; Only for output type "voltage"	Yes; Only for output type "voltage"	Yes; Only for output type "voltage"	Yes; Only for output type "voltage"
• Overflow/underflow	Yes	Yes	Yes	Yes
<b>Diagnostics indication LED</b>				
• RUN 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
• Monitoring of the supply voltage (PWR-LED)	Yes; Green LED	Yes; Green LED	Yes; Green LED	Yes; Green LED
• Channel status display	Yes; Green LED	Yes; Green LED	Yes; Green LED	Yes; Green LED
• for channel diagnostics	Yes; Red LED	Yes; Red LED	Yes; Red LED	Yes; Red LED
• for module diagnostics	Yes; Red LED	Yes; Red LED	Yes; Red LED	Yes; Red LED
<b>Potential separation</b>				
<b>Potential separation channels</b>				
• between the channels and backplane bus	Yes	Yes	Yes	Yes
<b>Ambient conditions</b>				
<b>Ambient temperature during operation</b>				
• horizontal installation, min.	0 °C			
• horizontal installation, max.	60 °C			
• vertical installation, min.	0 °C			
• vertical installation, max.	40 °C			
<b>Decentralized operation</b>				
Prioritized startup	No	No	No	Yes
<b>Dimensions</b>				
Width	25 mm	35 mm	35 mm	35 mm
Height	147 mm	147 mm	147 mm	147 mm
Depth	129 mm	129 mm	129 mm	129 mm
<b>Weights</b>				
Weight, approx.	200 g	310 g	325 g	300 g
<b>Other</b>				
Note:	Supplied incl. 40-pole push-in front connectors			

**SIMATIC S7-1500 Advanced Controllers**

I/O modules

Analog modules

**SM 532 analog output modules**

4

Ordering data	Article No.	Ordering data	Article No.
<b>SM 532 analog output modules</b> Module width 25 mm 2 x U/I ST; 2 analog outputs, ±10 V, 1 ... 5 V, 0 ... 10 V or ±20 mA, 0/4 ... 20 mA, 16-bit; incl. infeed element, shield bracket, shield terminal, labeling strips, U connector, printed front door  Module width 35 mm 4 x U/I ST; 4 analog outputs, ±10 V, 1 ... 5 V, 0 ... 10 V or ±20 mA, 0/4 ... 20 mA, 16-bit; incl. infeed element, shield bracket, shield terminal, labeling strips, U connector, printed front door  8 x U/I HF; 8 analog outputs, ±10 V, 1 ... 5 V, 0 ... 10 V or ±20 mA, 0/4 ... 20 mA, 16-bit; incl. infeed element, shield bracket, shield terminal, labeling strips, U connector, printed front door  4 x U/I HF; 4 analog outputs, ±10 V, 1 ... 5 V, 0 ... 10 V or ±20 mA, 0/4 ... 20 mA, 16-bit; incl. infeed element, shield bracket, shield terminal, labeling strips, U connector, printed front door  <b>Accessories</b> <b>Front connectors</b> For 35 mm modules; including four potential bridges, cable ties and individual labeling strips, 40-pin • Screw terminals • Push-in  For 25 mm modules; including cable ties and individual labeling strips; push-in terminal 40-pin; spare part	<b>6ES7532-5NB00-0AB0</b>  <b>6ES7532-5HD00-0AB0</b>  <b>6ES7532-5HF00-0AB0</b>  <b>6ES7532-5ND00-0AB0</b>	<b>DIN A4 labeling sheets</b> For 35 mm modules; 10 sheets with 10 labeling strips each for I/O modules; perforated, Al gray  For 25 mm modules; 10 sheets with 20 labeling strips each for I/O modules; perforated, Al gray  <b>U connector</b> 5 units; spare part  <b>Universal front door for I/O modules</b> For 35 mm modules; 5 front doors; with 5 labeling strips (front) and 5 cabling diagrams per front door; spare part  For 25 mm modules; 5 front doors; with 5 labeling strips (front) and 5 cabling diagrams per front door; spare part  <b>Shielding set I/O</b> For 35 mm modules; infeed element, shield bracket, and shield terminal; 5 units, spare part (one shield set supplied with the module).  For 25 mm modules; infeed element, shield bracket, and shield terminal; 4 units, spare part (one shield set supplied with the module).  <b>Shield terminal element</b> 10 units; spare part  <b>SIMATIC Manual Collection</b> Electronic manuals on DVD, multi-language: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC Distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC-based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC  <b>SIMATIC Manual Collection update service for 1 year</b> Current "Manual Collection" DVD and the three subsequent updates	<b>6ES7592-2AX00-0AA0</b>  <b>6ES7592-1AX00-0AA0</b>  <b>6ES7590-0AA00-0AA0</b>  <b>6ES7528-0AA00-7AA0</b>  <b>6ES7528-0AA00-0AA0</b>  <b>6ES7590-5CA00-0AA0</b>  <b>6ES7590-5CA10-0XA0</b>  <b>6ES7590-5BA00-0AA0</b>  <b>6ES7998-8XC01-8YE0</b>  <b>6ES7998-8XC01-8YE2</b>



## Overview



- 4 analog inputs/ 2 analog outputs
- For flexible adaptation of the controller to the corresponding task
- For subsequent expansion of the system with additional inputs and outputs
- For use in the tightest spaces

## Technical specifications

Article number	<b>6ES7534-7QE00-0AB0</b> S7-1500, AI 4x U/I/RTD/TC/AQ 2x U/I ST
<b>General information</b>	
Product type designation	AI 4xU/I/RTD/TC /AQ 2xU/I ST
<b>Product function</b>	
• I&M data	Yes; I&M0 to I&M3
• Measuring range scalable	No
• Scalable measured values	No
• Adjustment of measuring range	No
• Output range scalable	No
<b>Engineering with</b>	
• STEP 7 TIA Portal configurable/ integrated as of version	V13 / V13.0.2
• STEP 7 configurable/integrated as of version	V5.5 SP3 / -
• PROFIBUS as of GSD version/ GSD revision	V1.0 / V5.1
• PROFINET as of GSD version/ GSD revision	V2.3 / -
<b>Operating mode</b>	
• Oversampling	No
• MSI	Yes
• MSO	Yes
<b>Supply voltage</b>	
Rated value (DC)	24 V
Reverse polarity protection	Yes
<b>Analog inputs</b>	
Number of analog inputs	4
• For current measurement	4
• For voltage measurement	4
• For resistance/resistance thermometer measurement	2
• For thermocouple measurement	4
permissible input voltage for voltage input (destruction limit), max.	28.8 V
permissible input current for current input (destruction limit), max.	40 mA
Constant measurement current for resistance-type transmitter, typ.	150 Ohm, 300 Ohm, 600 Ohm, Pt100, Pt200, Ni100: 1.25 mA; 6 000 Ohm, Pt500, Pt1000, Ni1000, LG-Ni1000: 0.625 mA; PTC: 0.472 mA

Article number	<b>6ES7534-7QE00-0AB0</b> S7-1500, AI 4x U/I/RTD/TC/AQ 2x U/I ST
Technical unit for temperature measurement adjustable	Yes; °C/°F/K
Analog input with oversampling	No
Standardization of measured values	No
<b>Input ranges (rated values), voltages</b>	
• 0 to +5 V	No
• 0 to +10 V	No
• 1 V to 5 V	Yes
• -1 V to +1 V	Yes
• -10 V to +10 V	Yes
• -2.5 V to +2.5 V	Yes
• -25 mV to +25 mV	No
• -250 mV to +250 mV	Yes
• -5 V to +5 V	Yes
• -50 mV to +50 mV	Yes
• -500 mV to +500 mV	Yes
• -80 mV to +80 mV	Yes
<b>Input ranges (rated values), currents</b>	
• 0 to 20 mA	Yes
• -20 mA to +20 mA	Yes
• 4 mA to 20 mA	Yes
<b>Input ranges (rated values), thermocouples</b>	
• Type B	Yes
• Type C	No
• Type E	Yes
• Type J	Yes
• Type K	Yes
• Type L	No
• Type N	Yes
• Type R	Yes
• Type S	Yes
• Type T	Yes
• Type U	No
• Type TXK/TXK(L) to GOST	No

# SIMATIC S7-1500 Advanced Controllers

I/O modules

Analog modules

## SM 534 analog input/output modules

### Technical specifications (continued)

Article number	6ES7534-7QE00-0AB0
	S7-1500, AI 4x U/I/RTD/TC/AQ 2x U/I ST
<b>Input ranges (rated values), resistance thermometer</b>	
• Cu 10	No
• Cu 10 according to GOST	No
• Cu 50	No
• Cu 50 according to GOST	No
• Cu 100	No
• Cu 100 according to GOST	No
• Ni 10	No
• Ni 10 according to GOST	No
• Ni 100	Yes; Standard/climate
• Ni 100 according to GOST	No
• Ni 1000	Yes; Standard/climate
• Ni 1000 according to GOST	No
• LG-Ni 1000	Yes; Standard/climate
• Ni 120	No
• Ni 120 according to GOST	No
• Ni 200	No
• Ni 200 according to GOST	No
• Ni 500	No
• Ni 500 according to GOST	No
• Pt 10	No
• Pt 10 according to GOST	No
• Pt 50	No
• Pt 50 according to GOST	No
• Pt 100	Yes; Standard/climate
• Pt 100 according to GOST	No
• Pt 1000	Yes; Standard/climate
• Pt 1000 according to GOST	No
• Pt 200	Yes; Standard/climate
• Pt 200 according to GOST	No
• Pt 500	Yes; Standard/climate
• Pt 500 according to GOST	No
<b>Input ranges (rated values), resistors</b>	
• 0 to 150 ohms	Yes
• 0 to 300 ohms	Yes
• 0 to 600 ohms	Yes
• 0 to 3000 ohms	No
• 0 to 6000 ohms	Yes
• PTC	Yes
<b>Thermocouple (TC)</b>	
<b>Temperature compensation</b>	
- parameterizable	Yes
<b>Cable length</b>	
• shielded, max.	800 m; for U/I, 200 m for R/RTD, 50 m for TC
<b>Analog outputs</b>	
Number of analog outputs	2
Cycle time (all channels), min.	3.2 ms; ±0.5 ms, regardless of the number of activated channels
<b>Output ranges, voltage</b>	
• 0 to 10 V	Yes
• 1 V to 5 V	Yes
• -5 V to +5 V	No
• -10 V to +10 V	Yes

Article number	6ES7534-7QE00-0AB0
	S7-1500, AI 4x U/I/RTD/TC/AQ 2x U/I ST
<b>Output ranges, current</b>	
• 0 to 20 mA	Yes
• -20 mA to +20 mA	Yes
• 4 mA to 20 mA	Yes
<b>Connection of actuators</b>	
• for voltage output two-wire connection	Yes
• for voltage output four-wire connection	Yes
• for current output two-wire connection	Yes
<b>Load impedance (in rated range of output)</b>	
• with voltage outputs, min.	1 kΩ; 0.5 kΩ at 1 to 5 V
• with voltage outputs, capacitive load, max.	1 μF
• with current outputs, max.	750 Ω
• with current outputs, inductive load, max.	10 mH
<b>Cable length</b>	
• shielded, max.	800 m; for current, 200 m for voltage
<b>Analog value generation for the inputs</b>	
<b>Integration and conversion time/ resolution per channel</b>	
• Resolution with overrange (bit including sign), max.	16 bit
• Integration time, parameterizable	Yes
• Integration time (ms)	2.5 / 16.67 / 20 / 100 ms
• Basic conversion time, including integration time (ms)	9 / 23 / 27 / 107 ms
- additional conversion time for wire-break monitoring	9 ms
- additional conversion time for resistance measurement	150 ohm, 300 ohm, 600 ohm, Pt100, Pt200, Ni100: 2 ms, 6000 ohm, Pt500, Pt1000, Ni1000, LG-Ni1000, PTC: 4 ms
• Interference voltage suppression for interference frequency f1 in Hz	400 / 60 / 50 / 10
<b>Smoothing of measured values</b>	
• parameterizable	Yes
<b>Analog value generation for the outputs</b>	
<b>Integration and conversion time/ resolution per channel</b>	
• Resolution with overrange (bit including sign), max.	16 bit
• Conversion time (per channel)	0.5 ms
<b>Settling time</b>	
• for resistive load	1.5 ms
• for capacitive load	2.5 ms
• for inductive load	2.5 ms

#### Technical specifications (continued)

Article number	<b>6ES7534-7QE00-0AB0</b> S7-1500, AI 4x U/I/RTD/TC/AQ 2x U/I ST
<b>Encoder</b>	
<b>Connection of signal encoders</b>	
• for voltage measurement	Yes
• for current measurement as 2-wire transducer	Yes
- Burden of 2-wire transmitter, max.	820 Ω
• for current measurement as 4-wire transducer	Yes
• for resistance measurement with two-wire connection	Yes; Only for PTC
• for resistance measurement with three-wire connection	Yes; All measuring ranges except PTC; internal compensation of the cable resistances
• for resistance measurement with four-wire connection	Yes; All measuring ranges except PTC
<b>Errors/accuracies</b>	
<b>Basic error limit (operational limit at 25 °C)</b>	
• Voltage, relative to input range, (+/-)	0.1 %
• Current, relative to input range, (+/-)	0.1 %
• Resistance, relative to input range, (+/-)	0.1 %
• Resistance thermometer, relative to input range, (+/-)	0.1 %; Ptxxx standard: ±0.7 K, Ptxxx climate: ±0.2 K, Nixxx standard: ±0.3 K, Nixxx climate: ±0.15 K
• Thermocouple, relative to input range, (+/-)	0.1 %; Type B: > 600 °C ±1.7 K, type E: > -200 °C ±0.7 K, type J: > -210 °C ±0.8 K, type K: > -200 °C ±1.2 K, type N: > -200 °C ±1.2 K, type R: > 0 °C ±1.9 K, type S: > 0 °C ±1.9 K, type T: > -200 °C ±0.8 K
• Voltage, relative to output range, (+/-)	0.2 %
• Current, relative to output range, (+/-)	0.2 %
<b>Interference voltage suppression for <math>f = n \times (f_1 \pm 1 \%)</math>, <math>f_1 =</math> interference frequency</b>	
• Series mode interference (peak value of interference < rated value of input range), min.	40 dB
• Common mode voltage, max.	10 V
• Common mode interference, min.	60 dB
<b>Isochronous mode</b>	
Isochronous operation (application synchronized up to terminal)	No

Article number	<b>6ES7534-7QE00-0AB0</b> S7-1500, AI 4x U/I/RTD/TC/AQ 2x U/I ST
<b>Interrupts/diagnostics/status information</b>	
Diagnostics function	Yes
Substitute values connectable	Yes
<b>Alarms</b>	
• Diagnostic alarm	Yes
• Limit value alarm	Yes; two upper and two lower limit values in each case
<b>Diagnostic messages</b>	
• Monitoring the supply voltage	Yes
• Wire-break	Yes; only for input type 1 ... 5 V, 4 ... 20 mA, TC, R, RTD and output type current
• Short-circuit	Yes; Only for output type 'voltage'
• Overflow/underflow	Yes
<b>Diagnostics indication LED</b>	
• RUN LED	Yes; Green LED
• ERROR LED	Yes; Red LED
• Monitoring of the supply voltage (PWR-LED)	Yes; Green LED
• Channel status display	Yes; Green LED
• for channel diagnostics	Yes; Red LED
• for module diagnostics	Yes; Red LED
<b>Potential separation</b>	
<b>Potential separation analog inputs</b>	
• between the channels and backplane bus	Yes
<b>Potential separation analog outputs</b>	
• between the channels and backplane bus	Yes
<b>Ambient conditions</b>	
<b>Ambient temperature during operation</b>	
• horizontal installation, min.	0 °C
• horizontal installation, max.	60 °C
• vertical installation, min.	0 °C
• vertical installation, max.	40 °C
<b>Decentralized operation</b>	
Prioritized startup	No
<b>Dimensions</b>	
Width	25 mm
Height	147 mm
Depth	129 mm
<b>Weights</b>	
Weight, approx.	250 g
<b>Other</b>	
Note:	Supplied incl. 40-pole push-in front connectors. Additional basic error and noise for integration time = 2.5 ms: Voltage: ±250 mV (±0.02%), ±80 mV (±0.05%), ±50 mV (±0.05%); resistance: 150 Ohms (±0.02%); resistance thermometer: Pt100 climate: ±0.08 K, Ni100 climate: ±0.08 K; thermolement: Type B, R, S: ±3 K, type E, J, K, N, T: ±1 K

## SIMATIC S7-1500 Advanced Controllers

I/O modules

Analog modules

### SM 534 analog input/output modules

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Ordering data	Article No.	Article No.
<b>SM 534 analog input/output module</b> Module width 25 mm 4 analog inputs $\pm 10$ V, $\pm 5$ V, $\pm 2.5$ V, $\pm 1$ V, $\pm 500$ mV, $\pm 250$ mV, $\pm 80$ mV, $\pm 50$ mV, 1 ... 5 V, 0/4 ... 20 mA, $\pm 20$ mA, thermocouples type B, E, J, K, N, R, S, T, resistance thermometers Ni 100, Ni 1000, LG-Ni 1000, Pt 100, Pt 1000, Pt 250, Pt 500, resistors 0...150/300/600/6000 Ohm, 16 bits; 2 analog outputs, $\pm 10$ V, 1 ... 5 V, 0 ... 10 V or $\pm 20$ mA, 0/4 ... 20 mA, 16 bits; incl. infeed element, shield bracket, shield terminal, labeling strips, U connector, printed front door	<b>6ES7534-7QE00-0AB0</b>	<b>Universal front door for I/O modules</b> For 25 mm modules; 5 front doors; with 5 labeling strips (front) and 5 cabling diagrams per front door; spare part <b>6ES7528-0AA00-0AA0</b>
<b>Accessories</b> <b>Front connectors</b> For 25 mm modules; including cable ties and individual labeling strips; push-in terminal 40-pin; spare part	<b>6ES7592-1BM00-0XA0</b>	<b>Shielding set I/O</b> For 25 mm modules; infeed element, shield bracket, and shield terminal; 4 units, spare part (one shield set supplied with the module). <b>6ES7590-5CA10-0XA0</b>
<b>DIN A4 labeling sheets</b> For 25 mm modules; 10 sheets with 20 labeling strips each for I/O modules; perforated, Al gray	<b>6ES7592-1AX00-0AA0</b>	<b>Shield terminal element</b> 10 units; spare part <b>6ES7590-5BA00-0AA0</b>
<b>U connector</b> 5 units; spare part	<b>6ES7590-0AA00-0AA0</b>	<b>SIMATIC Manual Collection</b> Electronic manuals on DVD, multi-language: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC Distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC-based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC <b>6ES7998-8XC01-8YE0</b>
		<b>SIMATIC Manual Collection update service for 1 year</b> Current "Manual Collection" DVD and the three subsequent updates <b>6ES7998-8XC01-8YE2</b>

## Overview



- 8-channel analog input modules
- Optionally with extremely short conversion times
- For the connection of analog sensors without additional amplifiers
- Even solves more complex automation tasks

### 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	6AG1531-7NF10-7AB0	6AG1531-7KF00-7AB0
Based on	6ES7531-7NF10-0AB0 SIPLUS S7-1500 AI 8XU/I HS	6ES7531-7KF00-0AB0 SIPLUS S7-1500 AI 8XU//RTD/TC ST
<b>Ambient conditions</b>		
<b>Ambient temperature during operation</b>		
• horizontal installation, min.	-40 °C; = Tmin (incl. condensation/frost)	-40 °C; = Tmin (incl. condensation/frost)
• horizontal installation, max.	70 °C; = Tmax	70 °C; = Tmax
• vertical installation, min.	-40 °C; = Tmin	-40 °C; = Tmin
• vertical installation, max.	40 °C; = Tmax	40 °C; = Tmax
<b>Altitude during operation relating to sea level</b>		
• Installation altitude above sea level, max.	5 000 m	5 000 m
• Ambient air temperature-barometric pressure-altitude	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m) // Tmin ... (Tmax - 10 K) at 795 hPa ... 658 hPa (+2 000 m ... +3 500 m) // Tmin ... (Tmax -20 K) at 658 hPa ... 540 hPa (+3 500 m ... +5 000 m)	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m) // Tmin ... (Tmax - 10 K) at 795 hPa ... 658 hPa (+2 000 m ... +3 500 m) // Tmin ... (Tmax -20 K) at 658 hPa ... 540 hPa (+3 500 m ... +5 000 m)
<b>Relative humidity</b>		
• 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)
<b>Resistance</b>		
<b>Coolants and lubricants</b>		
- Resistant to commercially available coolants and lubricants	Yes; Incl. diesel and oil droplets in the air	Yes; Incl. diesel and oil droplets in the air
<b>Use in stationary industrial systems</b>		
- to biologically active substances according to EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request
- to chemically active substances according to EN 60721-3-3	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-3	Yes; Class 3S4 incl. sand, dust, *	Yes; Class 3S4 incl. sand, dust, *

## SIMATIC S7-1500 Advanced Controllers

I/O modules

SIPLUS analog modules

### SIPLUS SM 531 analog input modules

#### Technical specifications (continued)

Article number	6AG1531-7NF10-7AB0	6AG1531-7KF00-7AB0
Based on	6ES7531-7NF10-0AB0 SIPLUS S7-1500 AI 8XU/I HS	6ES7531-7KF00-0AB0 SIPLUS S7-1500 AI 8XU/I/RTD/TC ST
<b>Use on ships/at sea</b>		
- to biologically active substances according to EN 60721-3-6	Yes; Class 6B2 mold and fungal spores (excluding fauna); Class 6B3 on request	Yes; Class 6B2 mold and fungal spores (excluding fauna); Class 6B3 on request
- to chemically active substances according to EN 60721-3-6	Yes; Class 6C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 6C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-6	Yes; Class 6S3 incl. sand, dust; *	Yes; Class 6S3 incl. sand, dust; *
<b>Remark</b>		
- Note regarding classification of environmental conditions acc. to EN 60721	* The supplied plug covers must remain in place over the unused interfaces during operation!	* The supplied plug covers must remain in place over the unused interfaces during operation!
<b>Conformal coating</b>		
• Coatings for printed circuit board assemblies acc. to EN 61086	Yes; Class 2 for high availability	Yes; Class 2 for high availability
• Protection against fouling acc. to EN 60664-3	Yes; Type 1 protection	Yes; Type 1 protection
• Military testing according to MIL-I-46058C, Amendment 7	Yes; Discoloration of coating possible during service life	Yes; Discoloration of coating possible during service life
• Qualification and Performance of Electrical Insulating Compound for Printed Board Assemblies according to IPC-CC-830A	Yes; Conformal coating, Class A	Yes; Conformal coating, Class A

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#### Ordering data

##### SIPLUS SM 531 analog input modules

(Extended temperature range and exposure to media)

8 analog inputs,  $\pm 10$  V,  $\pm 5$  V, 1 ... 5 V or 0/4 ... 20 mA,  $\pm 20$  mA, 16 bits + sign; incl. infeed element, shield clamp, shield terminal, labeling strips, U connector, printed front door

8 analog inputs  
 $\pm 10$  V,  $\pm 5$  V,  $\pm 2.5$  V,  $\pm 1$  V,  $\pm 500$  mV,  $\pm 250$  mV,  $\pm 80$  mV,  $\pm 50$  mV, 1 ... 5 V, 0/4 ... 20 mA,  $\pm 20$  mA, thermocouples type B, E, J, K, N, R, S, T, resistance thermometers Ni 100, Ni 1000, LG-Ni 1000, Pt 100, Pt 1000, Pt 250, Pt 500, resistors 0...150/300/600/6000 Ohm, 16 bits

#### Article No.

6AG1531-7NF10-7AB0

6AG1531-7KF00-7AB0

#### Accessories

#### Article No.

See SIMATIC S7-1500 SM 531 analog input modules, page 4/112

#### Overview



- 4 and 8-channel analog output modules
- Optionally with extremely short conversion times
- For connecting analog actuators without additional amplifiers
- Even solves more complex automation tasks

#### 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	6AG1532-5HD00-7AB0	6AG1532-5HF00-7AB0
Based on	6ES7532-5HD00-0AB0 SIPLUS S7-1500 AQ 4XU/I ST	6ES7532-5HF00-0AB0 SIPLUS S7-1500 AQ 8XU/I HS
<b>Ambient conditions</b>		
<b>Ambient temperature during operation</b>		
• horizontal installation, min.	-40 °C; = Tmin (incl. condensation/frost)	-40 °C; = Tmin (incl. condensation/frost); start-up @ -25 °C
• horizontal installation, max.	70 °C; = Tmax	70 °C; = Tmax; > +60 °C max. 4x ±10 V permissible
• vertical installation, min.	-40 °C; = Tmin	-40 °C; = Tmin; Startup @ -25 °C
• vertical installation, max.	40 °C; = Tmax	40 °C; = Tmax
<b>Altitude during operation relating to sea level</b>		
• Installation altitude above sea level, max.	5 000 m	5 000 m
• Ambient air temperature-barometric pressure-altitude	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m) // Tmin ... (Tmax - 10 K) at 795 hPa ... 658 hPa (+2 000 m ... +3 500 m) // Tmin ... (Tmax -20 K) at 658 hPa ... 540 hPa (+3 500 m ... +5 000 m)	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m) // Tmin ... (Tmax - 10 K) at 795 hPa ... 658 hPa (+2 000 m ... +3 500 m) // Tmin ... (Tmax -20 K) at 658 hPa ... 540 hPa (+3 500 m ... +5 000 m)
<b>Relative humidity</b>		
• 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)
<b>Resistance</b>		
<b>Coolants and lubricants</b>		
- Resistant to commercially available coolants and lubricants	Yes; Incl. diesel and oil droplets in the air	Yes; Incl. diesel and oil droplets in the air
<b>Use in stationary industrial systems</b>		
- to biologically active substances according to EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request
- to chemically active substances according to EN 60721-3-3	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-3	Yes; Class 3S4 incl. sand, dust, *	Yes; Class 3S4 incl. sand, dust, *

**SIMATIC S7-1500 Advanced Controllers**

I/O modules

SIPLUS analog modules

**SIPLUS SM 532 analog output modules****Technical specifications** (continued)

Article number	<b>6AG1532-5HD00-7AB0</b>	<b>6AG1532-5HF00-7AB0</b>
Based on	<b>6ES7532-5HD00-0AB0</b> SIPLUS S7-1500 AQ 4XU/I ST	<b>6ES7532-5HF00-0AB0</b> SIPLUS S7-1500 AQ 8XU/I HS
<b>Use on ships/at sea</b>		
- to biologically active substances according to EN 60721-3-6	Yes; Class 6B2 mold and fungal spores (excluding fauna); Class 6B3 on request	Yes; Class 6B2 mold and fungal spores (excluding fauna); Class 6B3 on request
- to chemically active substances according to EN 60721-3-6	Yes; Class 6C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 6C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-6	Yes; Class 6S3 incl. sand, dust; *	Yes; Class 6S3 incl. sand, dust; *
<b>Remark</b>		
- Note regarding classification of environmental conditions acc. to EN 60721	* The supplied plug covers must remain in place over the unused interfaces during operation!	* The supplied plug covers must remain in place over the unused interfaces during operation!
<b>Conformal coating</b>		
• Coatings for printed circuit board assemblies acc. to EN 61086	Yes; Class 2 for high availability	Yes; Class 2 for high availability
• Protection against fouling acc. to EN 60664-3	Yes; Type 1 protection	Yes; Type 1 protection
• Military testing according to MIL-I-46058C, Amendment 7	Yes; Discoloration of coating possible during service life	Yes; Discoloration of coating possible during service life
• Qualification and Performance of Electrical Insulating Compound for Printed Board Assemblies according to IPC-CC-830A	Yes; Conformal coating, Class A	Yes; Conformal coating, Class A

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**Ordering data****SIPLUS SM 532 analog output modules**

(Extended temperature range and exposure to media)

4 analog outputs,  $\pm 10$  V, 1 ... 5 V, 0 ... 10 V or  $\pm 20$  mA, 0/4 ... 20 mA, 16 bits8 analog outputs,  $\pm 10$  V, 1 ... 5 V, 0 ... 10 V or  $\pm 20$  mA, 0/4 ... 20 mA, 16 bits; incl. infeed element, shield clamp, shield terminal, labeling strips, U connector, printed front door**Article No.****6AG1532-5HD00-7AB0****6AG1532-5HF00-7AB0****Accessories****Article No.**

See SIMATIC S7-1500 SM 532 analog output modules, page 4/116