

## SM 1221 digital input modules

### Overview

- Digital inputs as supplement to the integral I/O of the CPUs
- For flexible adaptation of the controller to the relevant task
- For subsequent expansion of the system with additional inputs

### Application

Digital input modules allow the connection of the controller to digital signals of the process.

This provides users with the following advantages:

- Optimum adaptation:  
With signal modules which can be mixed as desired, users can adapt their controllers exactly to the relevant task. This avoids superfluous investments. Modules with 8, 16, and 32 input/output channels are available.
- Flexibility:  
If the task is expanded subsequently, the controller can be upgraded. Updating of the user program is extremely simple.

### Function

The SM 1221 digital input signal modules convert the level of the external digital signals from the process into the internal signal level of the S7-1200 controller.

### Technical specifications

Article number	6ES7221-1BF32-0XB0 Digital Input SM 1221, 8DI, 24V DC	6ES7221-1BH32-0XB0 Digital Input SM 1221, 16DI, 24V DC
<b>General information</b>		
Product type designation	SM 1221, DI 8x24 V DC	SM 1221, DI 16x24 V DC
<b>Supply voltage</b>		
Rated value (DC)	24 V	24 V
permissible range, lower limit (DC)	20.4 V	20.4 V
permissible range, upper limit (DC)	28.8 V	28.8 V
<b>Input current</b>		
from backplane bus 5 V DC, max.	105 mA	130 mA
<b>Digital inputs</b>		
• from load voltage L+ (without load), max.	4 mA; per channel	4 mA; per channel
<b>output voltage / header</b>		
<b>supply voltage of the transmitters / header</b>		
• product function / supply voltage for transmitters	Yes	Yes
<b>Power loss</b>		
Power loss, typ.	1.5 W	2.5 W
<b>Digital inputs</b>		
Number of digital inputs	8	16
• in groups of	2	4
Input characteristic curve in accordance with IEC 61131, type 1	Yes	Yes
<b>Number of simultaneously controllable inputs</b>		
<b>all mounting positions</b>		
— up to 40 °C, max.	8	16
<b>horizontal installation</b>		
— up to 40 °C, max.	8	16
— up to 50 °C, max.	8	16
<b>vertical installation</b>		
— up to 40 °C, max.	8	16
<b>Input voltage</b>		
• Rated value (DC)	24 V	24 V
• for signal "0"	5 V DC at 1 mA	5 V DC at 1 mA
• for signal "1"	15 V DC at 2.5 mA	15 V DC at 2.5 mA
<b>Input current</b>		
• for signal "0", max. (permissible quiescent current)	1 mA	1 mA
• for signal "1", min.	2.5 mA	2.5 mA
• for signal "1", typ.	4 mA	4 mA
<b>Input delay (for rated value of input voltage)</b>		
<b>for standard inputs</b>		
— parameterizable	Yes; 0.2 ms, 0.4 ms, 0.8 ms, 1.6 ms, 3.2 ms, 6.4 ms and 12.8 ms, selectable in groups of four	Yes; 0.2 ms, 0.4 ms, 0.8 ms, 1.6 ms, 3.2 ms, 6.4 ms and 12.8 ms, selectable in groups of four
<b>for interrupt inputs</b>		
— parameterizable	Yes	Yes
<b>Cable length</b>		
• shielded, max.	500 m	500 m
• unshielded, max.	300 m	300 m
<b>Interrupts/diagnostics/status information</b>		
<b>Alarms</b>		
• Diagnostic alarm	Yes	Yes

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	Digital Input SM 1221, 8DI, 24V DC	Digital Input SM 1221, 16DI, 24V DC
<b>Diagnostics indication LED</b>		
• for status of the inputs	Yes	Yes
<b>Potential separation</b>		
<b>Potential separation digital inputs</b>		
• between the channels, in groups of	2	4
<b>Degree and class of protection</b>		
IP degree of protection	IP20	IP20
<b>Standards, approvals, certificates</b>		
CE mark	Yes	Yes
CSA approval	Yes	Yes
UL approval	Yes	Yes
cULus	Yes	Yes
FM approval	Yes	Yes
RCM (formerly C-TICK)	Yes	Yes
KC approval	Yes	Yes
Marine approval	Yes	Yes
<b>Ambient conditions</b>		
<b>Free fall</b>		
• Fall height, max.	0.3 m; five times, in product package	0.3 m; five times, in product package
<b>Ambient temperature during operation</b>		
• min.	-20 °C	-20 °C
• max.	60 °C	60 °C
• horizontal installation, min.	-20 °C	
• horizontal installation, max.	60 °C	
• vertical installation, min.	-20 °C	
• vertical installation, max.	50 °C	
• permissible temperature change	5°C to 55°C, 3°C / minute	5°C to 55°C, 3°C / minute
<b>Ambient temperature during storage/transportation</b>		
• min.	-40 °C	-40 °C
• max.	70 °C	70 °C
<b>Air pressure acc. to IEC 60068-2-13</b>		
• Storage/transport, min.	660 hPa	660 hPa
• Storage/transport, max.	1 080 hPa	1 080 hPa
<b>Relative humidity</b>		
• Operation at 25 °C without condensation, max.	95 %	95 %
<b>connection method / header</b>		
required front connector	Yes	Yes
<b>Mechanics/material</b>		
Enclosure material (front)		
• Plastic	Yes	Yes
<b>Dimensions</b>		
Width	45 mm	45 mm
Height	100 mm	100 mm
Depth	75 mm	75 mm
<b>Weights</b>		
Weight, approx.	170 g	210 g