

## Data sheet

## 6ES7231-4HF32-0XB0



Figure similar

SIMATIC S7-1200, Analog input, SM 1231, 8 AI, +/-10 V, +/-5 V, +/-2.5 V, or 0-20 mA/4-20 mA, 12 bit+sign or (13 bit ADC)

General information	
Product type designation	SM 1231, AI 8x13 bit
Supply voltage	
Rated value (DC)	24 V
Input current	
Current consumption, typ.	60 mA
from backplane bus 5 V DC, typ.	90 mA
Power loss	
Power loss, typ.	1.5 W
Analog inputs	
Number of analog inputs	8; Current or voltage differential inputs
permissible input voltage for voltage input (destruction limit), max.	35 V
permissible input current for current input (destruction limit), max.	40 mA
Cycle time (all channels) max.	625 $\mu$ s
Input ranges	
• Voltage	Yes; $\pm 10$ V, $\pm 5$ V, $\pm 2.5$ V
• Current	Yes; 4 to 20 mA, 0 to 20 mA
• Thermocouple	No
• Resistance thermometer	No
• Resistance	No
Input ranges (rated values), voltages	
• -10 V to +10 V	Yes
— Input resistance (-10 V to +10 V)	$\geq 9$ MOhm
• -2.5 V to +2.5 V	Yes
— Input resistance (-2.5 V to +2.5 V)	$\geq 9$ MOhm
• -5 V to +5 V	Yes
— Input resistance (-5 V to +5 V)	$\geq 9$ MOhm
Input ranges (rated values), currents	
• 0 to 20 mA	Yes
— Input resistance (0 to 20 mA)	280 $\Omega$
• 4 mA to 20 mA	Yes
— Input resistance (4 mA to 20 mA)	280 $\Omega$
Thermocouple (TC)	
Temperature compensation	
— parameterizable	No
Analog value generation for the inputs	
Integration and conversion time/resolution per channel	

<ul style="list-style-type: none"> <li>Resolution with overrange (bit including sign), max.</li> <li>Integration time, parameterizable</li> <li>Interference voltage suppression for interference frequency <math>f_1</math> in Hz</li> </ul>	12 bit; + sign Yes 40 dB, DC to 60 V for interference frequency 50 / 60 Hz
<b>Smoothing of measured values</b>	
<ul style="list-style-type: none"> <li>parameterizable</li> <li>Step: None</li> <li>Step: low</li> <li>Step: Medium</li> <li>Step: High</li> </ul>	Yes Yes Yes Yes Yes
<b>Errors/accuracies</b>	
Temperature error (relative to input range), (+/-)	25 °C $\pm 0.1\%$ , to 55 °C $\pm 0.2\%$ total measurement range
<b>Basic error limit (operational limit at 25 °C)</b>	
<ul style="list-style-type: none"> <li>Voltage, relative to input range, (+/-)</li> <li>Current, relative to input range, (+/-)</li> </ul>	0.1 % 0.1 %
<b>Interference voltage suppression for <math>f = n \times (f_1 \pm 1 \%)</math>, <math>f_1</math> = interference frequency</b>	
<ul style="list-style-type: none"> <li>Common mode voltage, max.</li> </ul>	12 V
<b>Interrupts/diagnostics/status information</b>	
Alarms	Yes
Diagnostics function	Yes
<b>Alarms</b>	
<ul style="list-style-type: none"> <li>Diagnostic alarm</li> </ul>	Yes
<b>Diagnoses</b>	
<ul style="list-style-type: none"> <li>Monitoring the supply voltage</li> <li>Wire-break</li> </ul>	Yes Yes
<b>Diagnostics indication LED</b>	
<ul style="list-style-type: none"> <li>for status of the inputs</li> <li>for maintenance</li> </ul>	Yes Yes
<b>Degree and class of protection</b>	
IP degree of protection	IP20
<b>Standards, approvals, certificates</b>	
CE mark	Yes
CSA approval	Yes
UL approval	Yes
cULus	Yes
FM approval	Yes
RCM (formerly C-TICK)	Yes
KC approval	Yes
Marine approval	Yes
<b>Ecological footprint</b>	
<ul style="list-style-type: none"> <li>environmental product declaration</li> </ul>	Yes
<b>Global warming potential</b>	
— global warming potential, (total) [CO <sub>2</sub> eq]	43.1 kg
— global warming potential, (during production) [CO <sub>2</sub> eq]	7.62 kg
— global warming potential, (during operation) [CO <sub>2</sub> eq]	36 kg
— global warming potential, (after end of life cycle) [CO <sub>2</sub> eq]	-0.544 kg
<b>Ambient conditions</b>	
<b>Free fall</b>	
<ul style="list-style-type: none"> <li>Fall height, max.</li> </ul>	0.3 m; five times, in product package
<b>Ambient temperature during operation</b>	
<ul style="list-style-type: none"> <li>min.</li> <li>max.</li> <li>horizontal installation, min.</li> <li>horizontal installation, max.</li> <li>vertical installation, min.</li> <li>vertical installation, max.</li> </ul>	-20 °C 60 °C -20 °C 60 °C -20 °C 50 °C
<b>Ambient temperature during storage/transportation</b>	
<ul style="list-style-type: none"> <li>min.</li> <li>max.</li> </ul>	-40 °C 70 °C

Air pressure acc. to IEC 60068-2-13	
• Operation, min.	795 hPa
• Operation, max.	1 080 hPa
• Storage/transport, min.	660 hPa
• Storage/transport, max.	1 080 hPa
Relative humidity	
• Operation at 25 °C without condensation, max.	95 %
Pollutant concentrations	
• SO2 at RH < 60% without condensation	SO2: < 0.5 ppm; H2S: < 0.1 ppm; RH < 60 % condensation-free
<b>connection method</b>	
required front connector	Yes
<b>Mechanics/material</b>	
Enclosure material (front)	
• Plastic	Yes
<b>Dimensions</b>	
Width	45 mm
Height	100 mm
Depth	75 mm
<b>Weights</b>	
Weight, approx.	180 g

	Version	Classification
eClass	14	27-24-22-01
eClass	12	27-24-22-01
eClass	9.1	27-24-22-01
eClass	9	27-24-22-01
eClass	8	27-24-22-01
eClass	7.1	27-24-22-01
eClass	6	27-24-22-01
ETIM	10	EC001420
ETIM	9	EC001420
ETIM	8	EC001420
ETIM	7	EC001420
IDEA	4	3562
UNSPSC	15	32-15-17-05

**Approvals / Certificates**

**General Product Approval**

[Miscellaneous](#)

[Manufacturer Declaration](#)



[Metrological Approval](#)

**General Product Approval**    **EMV**    **For use in hazardous locations**



[FM](#)



**For use in hazardous locations**    **Maritime application**



[CCC-Ex](#)



Maritime application

Environment

[CCS \(China Classification Society\)](#)



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5/16/2025 

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