



SIMATIC S7-400, analog input SM 431, 8 AI, resolution 16 bit, U/I/Thermocouple, isolated with single routing, diagnostics, alarm, 20 ms conversion time

Figure similar

| Input current | |
|---|---|
| from backplane bus 5 V DC, max. | 1 200 mA |
| Power loss | |
| Power loss, typ. | 4.6 W |
| Analog inputs | |
| Number of analog inputs | 8 |
| • For voltage/current measurement | 8 |
| permissible input voltage for voltage input (destruction limit), max. | 35 V; 35 V continuous, 75 V for max. 1 s (mark to space ratio 1:20) |
| permissible input current for current input (destruction limit), max. | 32 mA |
| Input ranges | |
| • Voltage | Yes |
| • Current | Yes |
| • Thermocouple | Yes |
| • Resistance thermometer | No |
| • Resistance | No |
| Input ranges (rated values), voltages | |
| • 1 V to 5 V | Yes |
| — Input resistance (1 V to 5 V) | > 2 000 ohms |
| • -1 V to +1 V | Yes |
| • -10 V to +10 V | Yes |
| • -100 mV to +100 mV | Yes |
| • -2.5 V to +2.5 V | Yes |
| • -20 mV to +20 mV | Yes |
| • -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 |
| Input ranges (rated values), currents | |
| • 0 to 20 mA | Yes |
| • -10 mA to +10 mA | Yes |
| • -20 mA to +20 mA | Yes |
| • -3.2 mA to +3.2 mA | Yes |
| • 4 mA to 20 mA | Yes |
| — Input resistance (4 mA to 20 mA) | 50 Ω |
| • -5 mA to +5 mA | Yes |
| Input ranges (rated values), thermocouples | |

| | |
|--|---|
| <ul style="list-style-type: none"> • type B <ul style="list-style-type: none"> — Input resistance (Type B) • Type E • Type J • Type K • Type L • Type N <ul style="list-style-type: none"> — Input resistance (Type N) • Type R • Type S • Type T • Type U | <p>Yes</p> <p>> 2 000 ohms</p> <p>Yes</p> <p>Yes</p> <p>Yes</p> <p>Yes</p> <p>Yes</p> <p>> 2 000 ohms</p> <p>Yes</p> <p>Yes</p> <p>Yes</p> <p>Yes</p> |
| Thermocouple (TC) | |
| Temperature compensation | |
| <ul style="list-style-type: none"> — connection for compensating the cold junction — Parameterizable — internal temperature compensation — external temperature compensation with compensations socket — dynamic reference temperature value | <p>6ES7431-7KF00-6AA0</p> <p>Yes</p> <p>Yes</p> <p>Yes</p> <p>Yes</p> |
| Characteristic linearization | |
| <ul style="list-style-type: none"> • Parameterizable <ul style="list-style-type: none"> — for thermocouples | <p>Yes</p> <p>Type B, E, J, K, L, N, R, S, T, U</p> |
| Cable length | |
| <ul style="list-style-type: none"> • shielded, max. | 200 m |
| Analog value generation for the inputs | |
| Integration and conversion time/resolution per channel | |
| <ul style="list-style-type: none"> • Resolution with overrange (bit including sign), max. • Integration time, parameterizable • Basic conversion time (ms) • Integration time (ms) • Interference voltage suppression for interference frequency f1 in Hz | <p>16 bit</p> <p>Yes</p> <p>10 / 16,7 / 20 / 100</p> <p>2,5 / 16,7 / 20 / 100</p> <p>400 / 60 / 50 / 10 Hz</p> |
| Encoder | |
| Connection of signal encoders | |
| <ul style="list-style-type: none"> • for voltage measurement • for current measurement as 4-wire transducer • for resistance measurement with four-wire connection | <p>Yes; possible</p> <p>Yes</p> <p>Yes</p> |
| Errors/accuracies | |
| Operational error limit in overall temperature range | |
| <ul style="list-style-type: none"> • Voltage, relative to input range, (+/-) • Current, relative to input range, (+/-) | <p>0.3 %</p> <p>0.5 %</p> |
| Basic error limit (operational limit at 25 °C) | |
| <ul style="list-style-type: none"> • Voltage, relative to input range, (+/-) • Current, relative to input range, (+/-) | <p>0.1 %</p> <p>0.17 %</p> |
| Interrupts/diagnostics/status information | |
| Diagnostics function | Yes; Parameterizable |
| Alarms | |
| <ul style="list-style-type: none"> • Diagnostic alarm • Limit value alarm • Hardware interrupt | <p>Yes; Parameterizable</p> <p>Yes</p> <p>Yes; Parameterizable</p> |
| Diagnoses | |
| <ul style="list-style-type: none"> • Diagnostic information readable | Yes; possible |
| Potential separation | |
| Potential separation analog inputs | |
| <ul style="list-style-type: none"> • Potential separation analog inputs • between the channels • between the channels and backplane bus | <p>Yes; internal/external</p> <p>Yes</p> <p>Yes</p> |
| Isolation | |

| | |
|------------------------|------------|
| Isolation tested with | 1 500 V DC |
| Dimensions | |
| Width | 25 mm |
| Height | 290 mm |
| Depth | 210 mm |
| Weights | |
| Weight, approx. | 650 g |
| Classifications | |

| | 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



[Manufacturer Declaration](#)

[Miscellaneous](#)



[Metrological Approval](#)

General Product Approval

EMV



[China RoHS](#)

[Miscellaneous](#)



For use in hazardous locations



[FM](#)



[Type Examination Certificate](#)

For use in hazardous locations

Maritime application



[NK / Nippon Kaiji Kyokai](#)

Maritime application



PRS



RINA



RMRS

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

last modified:

6/7/2025