## **SIEMENS**

## **Data sheet**

6ES7431-1KF00-0AB0



SIMATIC S7-400, analog input SM 431, isolated 8 AI, resolution 13 bit, U/IResistor

Figure similar

Supply voltage		
Load voltage L+		
• Rated value (DC)	not necessary	
Input current		
from backplane bus 5 V DC, max.	350 mA	
Power loss		
Power loss, typ.	1.8 W	
Analog inputs		
Number of analog inputs	8	
<ul> <li>For voltage/current measurement</li> </ul>	8	
For resistance measurement	4	
permissible input voltage for voltage input (destruction limit), max.	50 V	
permissible input current for current input (destruction limit), max.	50 mA; 40 mA continuous	
Constant measurement current for resistance-type transmitter, typ.	1.67 mA	
Input ranges		
<ul><li>Voltage</li></ul>	Yes	
Current	Yes	
Thermocouple	No	
Resistance thermometer	No	
Resistance	Yes	
Input ranges (rated values), voltages		
• 1 V to 5 V	Yes	
— Input resistance (1 V to 5 V)	200 kΩ	
• -1 V to +1 V	Yes	
— Input resistance (-1 V to +1 V)	200 kΩ	
• -10 V to +10 V	Yes	
<ul><li>— Input resistance (-10 V to +10 V)</li></ul>	200 kΩ	
Input ranges (rated values), currents		
• -20 mA to +20 mA	Yes	
— Input resistance (-20 mA to +20 mA)	80 Ω	
• 4 mA to 20 mA	Yes	
— Input resistance (4 mA to 20 mA)	80 Ω	
Input ranges (rated values), resistors		
• 0 to 600 ohms	Yes	
— Input resistance (0 to 600 ohms)	usable up to 500 ohms	
Cable length		
• shielded, max.	200 m	

integration and conversion time/resolution per channel  Resolution with overrange (bit including sign), max.  Integration time, parameterizable  Basic conversion time (ms)  Integration time, parameterizable  Potential separation  Potential separation  Potential separation  Potential separation  Integration time, parameterizable  Yes  Yes  So / 60 Hz  To ms  So / 60 Hz  Yes; possible  Yes; with external transmitter supply  Yes  Yes  Yes  Yes  So / 60 Hz  Yes; with external transmitter supply  Yes  Yes  Yes  Yes  Yes  One; the At / 200 ms  Potential separation and time the transducer  Yes; Line resistances are also measured  Yes; Line resistance measuring range; ±0.007 % in all other measuring range;  Yes  One; At 20.02 %/K in impedance measuring range; ±0.007 % in all other measuring range;  Yes  Operational error limit in overall temperature range  Yes  Yes  Yes  The resistance measuring range; ±0.007 % in all other measuring range;  Yes  Yes  Yes  Yes  Yes  Yes  Yes  Y	Analog value generation for the inputs		
Integration time, parameterizable Basic conversion time (ms) Interference voltage suppression for interference frequency filin htz Basic execution time of the module (all channels released) Interference voltage suppression for interference frequency filin htz Basic execution time of the module (all channels released)  Fincoder  Connection of signal encoders  for our our measurement for current measurement as 2-wire transducer for current measurement as 2-wire transducer for resistance measurement with thour-wire connection for resistance measurement with thour-wire connection for resistance measurement with thour-wire connection for resistance measurement with two-wire connection for resistance measurement with two-wire connection for resistance measurement with two-wire connection  Firors/accuracies  Temperature error (relative to input range, (+/-) Current, relative to input range, (+/-) Current, relative to input range, (+/-) Resistance, relative to input range, (+/-)  Resistance, relative to input range, (+/-) Current, relati	Integration and conversion time/resolution per channel		
Basic conversion time (ms) Integration (ms) Integration time (ms) Integration (m	Resolution with overrange (bit including sign), max.	13 bit	
Interference votage suppression for interference frequency f1 in Hz Basic execution time of the module (all channels released)  Frootfar  Connection of signal encoders  for current measurement as 2-wire transducer for current measurement as 2-wire transducer for current measurement as 2-wire transducer for current measurement as 4-wire transducer for resistance measurement with two-wire connection for resistance measurement with two-wire connection for resistance measurement with free-wire connection for resistance measurement with four-wire connection for sestance m	<ul> <li>Integration time, parameterizable</li> </ul>	Yes	
Interference voltage suppression for interference frequency f1 in Hz  Basic execution time of the module (all channels released)  Encodor  Connection of signal encoders  • for voltage measurement • for current measurement as 2-wire transducer • for current measurement as 2-wire transducer • for current measurement with tree-wire connection • for resistance measurement with tree-wire connection • for resistance measurement with four-wire connection • for resistance measurement with frow-wire connection  Errorsiaccuracies  Temperature error (relative to input range), (+/-) • Current, relative to input range, (+/-) • Current, relative to input range, (+/-) • Resistance, relative to input range, (+/-) • Current, relative to input range, (+/-) • Resistance, relative to input range, (+/-) • Current, relative to input range, (+/-) • Current, relative to input range, (+/-) • Resistance, relative to input range, (+/-) • Current, relative to input range, (+/-) • Current, relative to input range, (+/-) • Resistance, relative to input range, (+/-) • Current, relative to input range, (+/-) • Current, relative to input range, (+/-) • Resistance, relative to input range, (+/-) • Current, rel	Basic conversion time (ms)	23 / 25 ms	
Frequency f1 in Hz  Basic execution time of the module (all channels released)  Frequency f2 in Hz  Connection of signal encoders  • for voltage measurement • for current measurement as 2-wire transducer • for current measurement as 4-wire transducer • for resistance measurement with two-wire connection • for resistance measurement with two-wire connection • for resistance measurement with four-wire connection • for resistance realise to input range, (+/-) • Voltage, relative to input range, (+/-) • Voltage, relative to input range, (+/-) • Current, relative to input range, (+/-) • Potential separation analog inputs • Potential separation analog inputs • Determine separation analog inputs • Determine	Integration time (ms)	16,7 / 20 ms	
released)  Encoder  Connection of signal encoders  • for voltage measurement as 2-wire transducer • for current measurement as 4-wire transducer • for relative to input range, (+/-) • Resistance measurement with three-wire connection • for resistance measurement with four-wire connection • for resistance are also measured • Yes; Line resistances are	•	50 / 60 Hz	
of correction of signal encoders  • for vollage measurement • for current measurement as 2-wire transducer • for current measurement as 4-wire transducer • for cresistance measurement with two-wire connection • for resistance measurement with three-wire connection • for resistance measurement with four-wire connection • for resistance measurement with four-wire connection • for resistance measurement with four-wire connection  Errors/accuracios  Temperature error (relative to input range), (*/-) • Outperficional error limit in overall temperature range • Voltage, relative to input range, (*/-) • Current, relative to input range, (*/-) • Resistance, relative to input range, (*/-) • Voltage, relative to input range, (*/-) • Voltage, relative to input range, (*/-) • Current, relative to input range, (*/-) • Resistance, relative to input range, (*/-) • Resistan	,	200 ms; 184 / 200 ms	
• for voltage measurement  • for current measurement as 2-wire transducer  • for current measurement as 4-wire transducer  • for resistance measurement with two-wire connection  • for resistance measurement with two-wire connection  • for resistance measurement with four-wire connection  • for suitance sear also measured  • for the four connection  • for suitance sear also measured  • for current error (relative to input range, the four four four four four four four four	Encoder		
• for current measurement as 2-wire transducer • for current measurement as 4-wire transducer • for resistance measurement with two-wire connection • for resistance measurement with two-wire connection • for resistance measurement with tree-wire connection • for resistance measurement with four-wire connection  **Terrors/accuracies**  Temperature error (relative to input range, (+/-) • Voltage, relative to input range, (+/-) • Current, relative to input range, (+/-) • Resistance, relative to input range, (+/-) • Voltage, relative to input range, (+/-) • Voltage, relative to input range, (+/-) • Voltage, relative to input range, (+/-) • Resistance, relative to input range, (+/-) • Voltage, relative to input range, (+/-) • Voltage, relative to input range, (+/-) • Resistance, relative to input range, (+/-) • Current, relativ	Connection of signal encoders		
• for current measurement as 4-wire transducer • for resistance measurement with two-wire connection • for resistance measurement with three-wire connection • for resistance measurement with four-wire connection • for resistance measurement with four-wire connection • for resistance measurement with four-wire connection  Ferrors/accuracies  Temperature error (relative to input range), (+/-)  Operational error limit in overall temperature range • Voltage, relative to input range, (+/-) • Current, relative to input range, (+/-) • Resistance, relative to input range, (+/-) • Resistance, relative to input range, (+/-) • Voltage, relative to input range, (+/-) • Resistance, relative to input range, (+/-) • Voltage, relative to input range, (+/-) • Resistance, relative to input range, (+/-) •	<ul> <li>for voltage measurement</li> </ul>	Yes; possible	
• for resistance measurement with two-wire connection • for resistance measurement with three-wire connection • for resistance measurement with four-wire connection • for resistance measurement with four-wire connection  Ferrors/accuracles  Temperature error (relative to input range), (+/-)  Operational error limit in overall temperature range • Voltage, relative to input range, (+/-) • Current, relative to input range, (+/-) • Resistance, relative to input range, (+/-) • Resistance, relative to input range, (+/-) • Voltage, relative to input range, (+/-) • Current, relative to input range, (+/-) • Voltage, relative to input range, (+/-) • Voltage, relative to input range, (+/-) • Resistance, relative to input range, (+/-) • Voltage,	<ul> <li>for current measurement as 2-wire transducer</li> </ul>	Yes; with external transmitter supply	
• for resistance measurement with furee-wire connection • for resistance measurement with four-wire connection  Errors/accuracles  Temperature error (relative to input range), (+/-)  Operational error limit in overall temperature range  • Voltage, relative to input range, (+/-)  • Current, relative to input range, (+/-)  • Resistance, relative to input range, (+/-)  • Voltage, relative to input range, (+/-)  • Resistance, relative to input range, (+/-)  • Current, relative to input range, (+/-)  • Resistance, relative to input range, (+/-)  • Current, relative to input range, (+/-)  • Resistance, relative to input range, (+/	<ul> <li>for current measurement as 4-wire transducer</li> </ul>	Yes	
• for resistance measurement with four-wire connection  Errors/accuracies  Temperature error (relative to input range), (+/-)  Oureational error limit in overall temperature range  • Voltage, relative to input range, (+/-)  • Current, relative to input range, (+/-)  • Resistance, relative to input range, (+/-)  • Voltage, relative to input range, (+/-)  • Resistance, relative to input range, (+/-)  • Voltage, relative to input range, (+/-)  • Resistance, relative to input range, (+/-)  • Voltage, relative to input range, (+/-)  • Voltage, relative to input range, (+/-)  • Ourrent, relative to input range, (+/-)  • Resistance, relative to input range, (+/-)	• for resistance measurement with two-wire connection	Yes; Line resistances are also measured	
Temperature error (relative to input range), (+/-)  Temperature error (relative to input range), (+/-)  Operational error limit in overall temperature range  • Voltage, relative to input range, (+/-)  • Current, relative to input range, (+/-)  • Resistance, relative to input range, (+/-)  • Voltage, relative to input range, (+/-)  • Resistance, relative to input range, (+/-)  • Voltage, relative to input range, (+/-)  • Current, relative to input range, (+/-)  • Voltage, relative to input range, (+/-)  • Current, relative to input range, (+/-)  • Current, relative to input range, (+/-)  • Current, relative to input range, (+/-)  • Resistance, relative to input range,	• for resistance measurement with three-wire connection	Yes; Line resistances are also measured	
Temperature error (relative to input range), (+/-)  Operational error limit in overall temperature range  • Voltage, relative to input range, (+/-)  • Current, relative to input range, (+/-)  • Voltage, relative to input range, (+/-)  • Resistance, relative to input range, (+/-)  • Voltage, relative to input range, (+/-)  • Resistance, relative to input range, (+/-)  • Voltage, relative to input range, (+/-)  • Voltage, relative to input range, (+/-)  • Voltage, relative to input range, (+/-)  • Current, relative to input range, (+/-)  • Resistance, relative to input	• for resistance measurement with four-wire connection	Yes	
Operational error limit in overall temperature range  • Voltage, relative to input range, (+/-) • Current, relative to input range, (+/-) • Voltage, relative to input range, (+/-) • Resistance, relative to input range, (+/-) • Resistance, relative to input range, (+/-) • Voltage, relative to input range, (+/-) • Voltage, relative to input range, (+/-) • Voltage, relative to input range, (+/-) • Current, relative to input range, (+/-) • Resistance, relative to input r	Errors/accuracies		
Voltage, relative to input range, (+/-)     Current, relative to input range, (+/-)     Resistance, relative to input range, (+/-)     Voltage, relative to input range, (+/-)     Voltage, relative to input range, (+/-)     Current, relative to input range, (+/-)     Resistance, relative to input range of 600 ohms)  Interrupts/diagnostics/status information  Diagnostics/status information  No  Potential separation  Potential separation analog inputs     Petential separation analog inputs     Petential separation analog inputs     Petential separation analog inputs     Petential separation analog inputs     Potential separation     Potential separation      Potential separation  Potential separation  Potential separation  Potential separation  Potential separation  Potential separation  Potential separation  Potential separation  Potential separation  Potential separation  Potential separation  Potential separation  Potential separation  Potential separation  Potential separation  Potent	Temperature error (relative to input range), (+/-)		
Current, relative to input range, (+/-) Resistance, relative to input range, (+/-) Resistance, relative to input range, (+/-) Resistance, relative to input range, (+/-) Voltage, relative to input range, (+/-) Current, relative to input range, (+/-) Resistance, relative to input range, telative to 5 V Resistance, relative to input range, telative to 15 V Resistance, relative to input range, telative to 5 V Resistance, relative to input range, telative to 5 V Resistance, relative to input range, telative to 15 V Resistance, relative to 10 V Resistance, relative	Operational error limit in overall temperature range		
Resistance, relative to input range, (+/-)  Basic error limit (operational limit at 25 °C)  Voltage, relative to input range, (+/-)  Current, relative to input range, (+/-)  Resistance, relative to 10 0.7 %; at ±20 mA, 4 to 20 mA  Resistance, relative to 5 W on 500 ohms (4-conductor measurement, in range of 600 ohms)  Resistance, relative to 5 W on 500 ohms (4-conductor	<ul> <li>Voltage, relative to input range, (+/-)</li> </ul>	1 %; ±1.0 % at ±1 V; ±0.6 % at ±10 V; ±0.7 % at 1 to 5 V	
Basic error limit (operational limit at 25 °C)  • Voltage, relative to input range, (+/-) • Current, relative to input range, (+/-) • Resistance, relative to input sat ±10 V, 0.5% at ±10	<ul> <li>Current, relative to input range, (+/-)</li> </ul>	1 %; at ±20 mA, 4 to 20 mA	
Voltage, relative to input range, (+/-)     Current, relative to input range, (+/-)     Resistance, relative to input range, (+/-)      Resistance, relative to input range, (+/-)      Resistance, relative to input range, (+/-)      Resistance, relative to input range, (+/-)      Resistance, relative to input range, (+/-)      Resistance, relative to input range, (+/-)      Resistance, relative to input range, (+/-)      Resistance, relative to input range, (+/-)      Resistance, relative to input range, (+/-)      Resistance, relative to input range, (+/-)      Resistance, relative to input range, (+/-)      Resistance, relative to input range, (+/-)      Resistance, relative to input range, (+/-)      Resistance, relative to 20 mA      Resistance, relative to 20 mA      No      Potential separation      Potential separation      No  Potential separation      No  Potential separation analog inputs      Yes; internal/external      No      Yes  Isolation  Isolation  Isolation tested with      2 120 V DC between bus and analog part; 500 V DC between bus and local ground; 2 120 V DC between analog part and local ground  Dimensions  Width  25 mm  Height  290 mm  Depth  Weights	<ul> <li>Resistance, relative to input range, (+/-)</li> </ul>	1.25 %; 0 to 500 ohms (4-conductor measurement, in range of 600 ohms)	
Current, relative to input range, (+/-) Resistance, relative to input range, (+/-) No.8 %; 0 to 500 ohms (4-conductor measurement, in range of 600 ohms)  Interrupts/diagnostics/status information  Diagnostics function No  Potential separation  Potential separation analog inputs Potential separation Po	Basic error limit (operational limit at 25 °C)		
Resistance, relative to input range, (+/-)  Interrupts/diagnostics/status information  Diagnostics function  Potential separation  Potential separation analog inputs  Potential separation  No  2 120 V DC between bus and analog part; 500 V DC between bus and local ground; 2 120 V DC between analog part and local ground  Dimensions  Width  25 mm  Height  290 mm  Depth  Potential separation  No  210 mm  Weights	<ul> <li>Voltage, relative to input range, (+/-)</li> </ul>	0.7 %; 0.7% at ±1 V; 0.4% at ±10 V; 0.5% at 1 to 5 V	
Interrupts/diagnostics/status information  Diagnostics function  Potential separation  Potential separation analog inputs  • Potential separation analog inputs  • Potential separation analog inputs  • between the channels  • between the channels and backplane bus  Isolation  Isolation tested with  2 120 V DC between bus and analog part; 500 V DC between bus and local ground; 2 120 V DC between analog part and local ground  Dimensions  Width  25 mm  Height  290 mm  Depth  210 mm  Weights	<ul> <li>Current, relative to input range, (+/-)</li> </ul>	0.7 %; at ±20 mA, 4 to 20 mA	
Diagnostics function  Potential separation  Potential separation analog inputs  Potential separation a	<ul> <li>Resistance, relative to input range, (+/-)</li> </ul>	0.8 %; 0 to 500 ohms (4-conductor measurement, in range of 600 ohms)	
Potential separation  Potential separation analog inputs  • Potential separation analog inputs  • between the channels • between the channels and backplane bus  Isolation  Isolation tested with  2 120 V DC between bus and analog part; 500 V DC between bus and local ground; 2 120 V DC between analog part and local ground  Dimensions  Width  25 mm  Height  290 mm  Depth  210 mm	Interrupts/diagnostics/status information		
Potential separation analog inputs  No  Yes  Isolation  Isolation  Isolation tested with  Potential separation analog inputs  Yes  Isolation  Isolation  Isolation tested with  Potential separation analog inputs  Yes; internal/external  No  Yes  Isolation  Potential separation analog inputs  Yes; internal/external  No  Yes  Isolation  Potential separation analog inputs  Yes; internal/external  No  Yes  Isolation  Potential separation analog inputs  Yes; internal/external  No  Yes  Isolation  Potential separation analog inputs  Yes; internal/external  No  Yes  Isolation  Potential separation analog inputs  Yes; internal/external  No  Yes  Isolation  Potential separation analog inputs  Yes; internal/external  No  Yes  Isolation  Potential separation analog inputs  Yes; internal/external  No  Yes  Isolation  Potential separation analog inputs  Yes  Isolation  Potential separation analog part; 500 V DC between bus and local ground  Potential separation analog part; 500 V DC between bus and local ground  Potential separation analog part; 500 V DC between bus and local ground  Potential separation analog part; 500 V DC between bus and local ground  Potential separation analog part; 500 V DC between bus and local ground  Potential separation analog part; 500 V DC between bus and local ground  Potential separation analog part; 500 V DC between analog part; 500 V DC between bus and local ground  Potential separation	Diagnostics function	No	
Potential separation analog inputs  between the channels  between the channels and backplane bus  Yes  Isolation  Isolation tested with  2 120 V DC between bus and analog part; 500 V DC between bus and local ground; 2 120 V DC between analog part and local ground  Dimensions  Width  25 mm  Height  290 mm  Depth  210 mm  Weights	Potential separation		
● between the channels  ● between the channels and backplane bus  Isolation  Isolation tested with  2 120 V DC between bus and analog part; 500 V DC between bus and local ground; 2 120 V DC between analog part and local ground  Dimensions  Width  25 mm  Height  290 mm  Depth  210 mm	Potential separation analog inputs		
● between the channels and backplane bus  Isolation  Isolation tested with 2 120 V DC between bus and analog part; 500 V DC between bus and local ground; 2 120 V DC between analog part and local ground  Dimensions  Width 25 mm  Height 290 mm  Depth 210 mm  Weights	<ul> <li>Potential separation analog inputs</li> </ul>	Yes; internal/external	
Isolation Isolation tested with  2 120 V DC between bus and analog part; 500 V DC between bus and local ground; 2 120 V DC between analog part and local ground  Dimensions  Width  25 mm  Height  290 mm  Depth  210 mm  Weights	<ul> <li>between the channels</li> </ul>	No	
Isolation tested with  2 120 V DC between bus and analog part; 500 V DC between bus and local ground; 2 120 V DC between analog part and local ground  Dimensions  Width  25 mm  Height  290 mm  Depth  210 mm	<ul> <li>between the channels and backplane bus</li> </ul>	Yes	
Dimensions  Width 25 mm  Height 290 mm  Depth 210 mm  Weights	Isolation		
Width         25 mm           Height         290 mm           Depth         210 mm           Weights	Isolation tested with		
Height         290 mm           Depth         210 mm           Weights	Dimensions		
Depth 210 mm Weights	Width	25 mm	
Weights	Height	290 mm	
	Depth	210 mm	
Weight, approx. 500 g	Weights		
	Weight, approx.	500 g	

last modified:

8/7/2023