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Data sheet 6ES7144-5KD50-0BA0

	SIMATIC ET 200AL, AI 4xRTD/TC, 4x M12, degree of protection IP67
General information	
Product type designation	AI 4xRTD/TC
HW functional status	FS03
Firmware version	V2.0.x
Product function	
● I&M data	Yes; I&M0 to I&M3
Engineering with	
● STEP 7 TIA Portal configurable/integrated from version	STEP 7 V16 or higher
● STEP 7 configurable/integrated from version	V5.5 SP4 and higher
● PROFIBUS from GSD version/GSD revision	GSD as of Revision 5
● PROFINET from GSD version/GSD revision	GSDML V2.34
Supply voltage	
power supply according to NEC Class 2 required	No
Load voltage 1L+	
● Rated value (DC)	24 V
● permissible range, lower limit (DC)	20.4 V
● permissible range, upper limit (DC)	28.8 V
● Reverse polarity protection	Yes; against destruction
Input current	
Current consumption (rated value)	30 mA; without load
from load voltage 1L+ (unswitched voltage)	4 A; Maximum value
from load voltage 2L+, max.	4 A; Maximum value
Power loss	
Power loss, typ.	1.5 W
Analog inputs	
Number of analog inputs	4
● For voltage measurement	4
● For resistance/resistance thermometer measurement	4
● For thermocouple measurement	4
permissible input voltage for voltage input (destruction limit), max.	15 V
Constant measurement current for resistance-type transmitter, typ.	230 ... 300 µA
Cycle time (all channels), min.	90 ms
Technical unit for temperature measurement adjustable	Yes; Degrees Celsius / degrees Fahrenheit / Kelvin
Input ranges (rated values), voltages	
● -80 mV to +80 mV	Yes; 16 bit incl. sign
— Input resistance (-80 mV to +80 mV)	10 MΩ
Input ranges (rated values), thermocouples	
● Type B	Yes; 16 bit incl. sign
— Input resistance (Type B)	10 MΩ
● Type C	Yes; 16 bit incl. sign
— Input resistance (Type C)	10 MΩ
● Type E	Yes; 16 bit incl. sign
— Input resistance (Type E)	10 MΩ
● Type J	Yes; 16 bit incl. sign
— Input resistance (type J)	10 MΩ
● Type K	Yes; 16 bit incl. sign
— Input resistance (Type K)	10 MΩ
● Type L	Yes; 16 bit incl. sign

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— Input resistance (Type L)	10 MΩ
● Type N	Yes; 16 bit incl. sign
— Input resistance (Type N)	10 MΩ
● Type R	Yes; 16 bit incl. sign
— Input resistance (Type R)	10 MΩ
● Type S	Yes; 16 bit incl. sign
— Input resistance (Type S)	10 MΩ
● Type T	Yes; 16 bit incl. sign
— Input resistance (Type T)	10 MΩ
● Type U	Yes; 16 bit incl. sign
— Input resistance (Type U)	10 MΩ
Input ranges (rated values), resistance thermometer	
● Ni 100	Yes; Standard/climate
— Input resistance (Ni 100)	10 MΩ
● Ni 1000	Yes; Standard/climate
— Input resistance (Ni 1000)	10 MΩ
● Pt 100	Yes; Standard/climate
— Input resistance (Pt 100)	10 MΩ
● Pt 1000	Yes; Standard/climate
— Input resistance (Pt 1000)	10 MΩ
Input ranges (rated values), resistors	
● 0 to 150 ohms	Yes
— Input resistance (0 to 150 ohms)	10 MΩ
● 0 to 300 ohms	Yes
— Input resistance (0 to 300 ohms)	10 MΩ
Thermocouple (TC)	
Temperature compensation	
— Parameterizable	Yes
— internal temperature compensation	Yes
— external temperature compensation with compensations socket	Yes
— dynamic reference temperature value	Yes
— fixed reference temperature	Yes
Cable length	
● shielded, max.	30 m
Analog value generation for the inputs	
Measurement principle	integrating
Integration and conversion time/resolution per channel	
● Resolution with overrange (bit including sign), max.	16 bit
● Integration time, parameterizable	Yes; channel by channel
● Integration time (ms)	16.7 / 20 / 60
● Basic conversion time, including integration time (ms)	18 / 21 / 61 ms
— additional conversion time for wire-break monitoring	4 ms
— additional conversion time for resistance measurement	2 ms
● Interference voltage suppression for interference frequency f1 in Hz	60 / 50 / 16.7
Smoothing of measured values	
● parameterizable	Yes
● Step: None	Yes; 1x cycle time
● Step: low	Yes; 4x cycle time
● Step: Medium	Yes; 16x cycle time
● Step: High	Yes; 32x cycle time
Encoder	
Connection of signal encoders	
● for resistance measurement with two-wire connection	Yes
● for resistance measurement with three-wire connection	Yes
● for resistance measurement with four-wire connection	Yes
Errors/accuracies	
Linearity error (relative to input range), (+/-)	0.025 %

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Temperature error (relative to input range), (+/-)	0.01 %/K
Crosstalk between the inputs, max.	-70 dB
Repeat accuracy in steady state at 25 °C (relative to input range), (+/-)	0.01 %; 0.02% for Pt1000
Temperature error of internal compensation	±4 °C
Operational error limit in overall temperature range	
● Voltage, relative to input range, (+/-)	0.35 %
● Resistance, relative to input range, (+/-)	0.25 %
● Resistance thermometer, relative to input range, (+/-)	0.25 %
● Thermocouple, relative to input range, (+/-)	TC type E, J, K, N, C, U, L: 0.35 %; TC type R, S, T: 0.4 %; TC type B: 0.45 %
Basic error limit (operational limit at 25 °C)	
● Voltage, relative to input range, (+/-)	0.25 %
● Resistance, relative to input range, (+/-)	0.15 %
● Resistance thermometer, relative to input range, (+/-)	0.15 %
● Thermocouple, relative to input range, (+/-)	0.25 %
Interference voltage suppression for f = n x (f1 +/- 0.5 %), f1 = interference frequency	
● Series mode interference (peak value of interference < rated value of input range), min.	40 dB
Interrupts/diagnostics/status information	
Alarms	
● Diagnostic alarm	Yes; Parameterizable
● Limit value alarm	Yes; Parameterizable
Diagnoses	
● Wire break	Yes; Not for ±80 mV
● Overflow/Underflow	Yes
Diagnostics indication LED	
● Channel status display	Yes; green LED
● for module diagnostics	Yes; green/red LED
Potential separation	
between the load voltages	Yes
Potential separation channels	
● between the channels	No
● between the channels and backplane bus	Yes
● between the channels and the power supply of the electronics	No
Isolation	
Isolation tested with	707 V DC (type test)
Degree and class of protection	
IP degree of protection	IP65/67
Standards, approvals, certificates	
Suitable for safety-related tripping of standard modules	Yes; from FS01
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
Highest safety class achievable for safety-related tripping of standard modules	
● Performance level according to ISO 13849-1	PL d
● Category according to ISO 13849-1	Cat. 3
● SIL acc. to IEC 62061	SIL 2
● remark on safety-oriented shutdown	https://support.industry.siemens.com/cs/de/en/view/39198632
Security	
signed firmware update	Yes
data integrity	Yes
Ambient conditions	
Ambient temperature during operation	
● min.	-30 °C
● max.	55 °C
Altitude during operation relating to sea level	
● Ambient air temperature-barometric pressure-altitude	Up to max. 5 000 m, at installation height > 2 000 m additional restrictions
Connection method	
Design of electrical connection for the inputs and outputs	M12, 5-pole

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Design of electrical connection for supply voltage	M8, 4-pole
ET-Connection	
● ET-Connection	M8, 4-pin, shielded
Dimensions	
Width	30 mm
Height	159 mm
Depth	40 mm
Weights	
Weight, approx.	168 g

Classifications

	Version	Classification
eClass	16	27-24-26-01
eClass	14	27-24-26-01
eClass	12	27-24-26-01
eClass	9.1	27-24-26-01
eClass	9	27-24-26-01
eClass	8	27-24-26-01
eClass	7.1	27-24-26-01
eClass	6	27-24-26-01
ETIM	10	EC001596
ETIM	9	EC001596
ETIM	8	EC001596
ETIM	7	EC001596
IDEA	4	3562
UNSPSC	15	32-15-17-05

Approvals / Certificates

General Product Approval

Miscellaneous | Manufacturer Declaration | Declaration of Conformity

General Product Approval | **Functional Saftey**

China RoHS | TUEV

Maritime application

ABS | BUREAU VERITAS | DNV | LRS | NK / Nippon Kaiji Kyokai | RINA

Maritime application | **other**

CCS (China Classification Society) | KR (Korean Register of Shipping)

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