

Data sheet

6ES7650-8AR60-1AA0

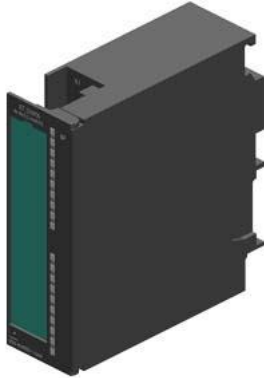


Figure similar

ET 200PA SMART, analog input isolated 8 AI thermocouples/4 AI Pt100 diagnostics-capable, 1 x 20-pole IM 650-8PH required; conformal coating ISA-S71.04 severity level G1; G2; G3

General information	
Product function	
• Isochronous mode	No
Input current	
from backplane bus 5 V DC, max.	120 mA
Power loss	
Power loss, typ.	0.6 W
Analog inputs	
Number of analog inputs	8; 8x thermocouples; 4x RTD thermoresistors
permissible input voltage for voltage input (destruction limit), max.	35 V; max. 35 V continuous, 75 V for max. 1 s (pulse duty ratio 1:10)
Constant measurement current for resistance-type transmitter, typ.	0.5 mA
Input ranges (rated values), voltages	
• -1 V to +1 V	Yes
— Input resistance (-1 V to +1 V)	10 MΩ
• -25 mV to +25 mV	Yes
— Input resistance (-25 mV to +25 mV)	10 MΩ
• -250 mV to +250 mV	Yes
— Input resistance (-250 mV to +250 mV)	10 MΩ
• -50 mV to +50 mV	Yes
— Input resistance (-50 mV to +50 mV)	10 MΩ
• -500 mV to +500 mV	Yes
— Input resistance (-500 mV to +500 mV)	10 MΩ
• -80 mV to +80 mV	Yes
— Input resistance (-80 mV to +80 mV)	10 MΩ
Input ranges (rated values), thermocouples	
• Type B	Yes
— Input resistance (Type B)	10 MΩ
• Type E	Yes
— Input resistance (Type E)	10 MΩ
• Type J	Yes
— Input resistance (type J)	10 MΩ
• Type K	Yes
— Input resistance (Type K)	10 MΩ
• Type L	Yes
— Input resistance (Type L)	10 MΩ
• Type N	Yes

— Input resistance (Type N)	10 MΩ
• Type R	Yes
— Input resistance (Type R)	10 MΩ
• Type S	Yes
— Input resistance (Type S)	10 MΩ
• Type T	Yes
— Input resistance (Type T)	10 MΩ
• Type U	Yes
— Input resistance (Type U)	10 MΩ
• Type TXK/TXK(L) to GOST	No
Input ranges (rated values), resistance thermometer	
• Ni 100	Yes
— Input resistance (Ni 100)	10 MΩ
• Ni 200	Yes
— Input resistance (Ni 200)	10 MΩ
• Pt 100	Yes
— Input resistance (Pt 100)	10 MΩ
• Pt 200	Yes
— Input resistance (Pt 200)	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
• 0 to 600 ohms	Yes
— Input resistance (0 to 600 ohms)	10 MΩ
Thermocouple (TC)	
Temperature compensation	
— parameterizable	Yes
— internal temperature compensation	Yes
— external temperature compensation with Pt100	Yes
— external temperature compensation with compensations socket	Yes
— for definable comparison point temperature	Yes; Compensation for 0 °C and 50 °C reference point temperature
Characteristic linearization	
• parameterizable	Yes
— for thermocouples	Type B, E, J, K, L, N, R, S, T, U
— for resistance thermometer	Pt100, Pt200, Ni100 (standard range and climate range)
Cable length	
• shielded, max.	200 m; 50 m with thermocouples and input ranges ≤ 80 mV
Analog value generation for the inputs	
Measurement principle	Sigma Delta
Integration and conversion time/resolution per channel	
• Resolution with overrange (bit including sign), max.	16 bit; 9 to 15 bit + sign
• Integration time, parameterizable	Yes
• Integration time (ms)	2,5 / 16,67 / 20 / 100 ms
• Basic conversion time, including integration time (ms)	
— additional conversion time for wire-break monitoring	2.5 ms
• Interference voltage suppression for interference frequency f1 in Hz	400 / 60 / 50 / 10
Smoothing of measured values	
• parameterizable	No
Encoder	
Connection of signal encoders	
• for voltage measurement	Yes
• for resistance measurement with two-wire connection	Yes; Without compensation of the line resistances
• for resistance measurement with three-wire connection	Yes; Without compensation of the line resistances
• for resistance measurement with four-wire connection	Yes
Errors/accuracies	

Linearity error (relative to input range), (+/-)	0.003 %	
Temperature error (relative to input range), (+/-)	0.002 %/K; Temperature error: 0.001 to 0.002 %/K	
Crosstalk between the inputs, min.	70 dB; Crosstalk attenuation between the inputs (UISO < 60 V)	
Repeat accuracy in steady state at 25 °C (relative to input range), (+/-)	0.003 %	
Operational error limit in overall temperature range		
<ul style="list-style-type: none"> Voltage, relative to input range, (+/-) 	0.09 % (±25 mV), 0.06 % (±50 mV), 0.05 % (±80 mV), 0.04 % (±250 mV / ±500 mV / ±1 V)	
Basic error limit (operational limit at 25 °C)		
<ul style="list-style-type: none"> Voltage, relative to input range, (+/-) Resistance, relative to input range, (+/-) Resistance thermometer, relative to input range, (+/-) Thermocouple, relative to input range, (+/-) 	0.018 % (±25 mV), 0.014 % (±50 mV), 0.011 % (±80 mV), 0.008 % (±250 mV / ±500 mV / ±1 V) 0.006 %; 150, 300, 600 Ohm 0.1 %; Ptxxx standard: ±0.2 K, Ptxxx climate: ±0.05 K, Ni100 standard: ±0.1 K, Ni100 climate: ±0.05 K Type T: > -150 °C ±0.2 K, Type U: > -50 °C ±0.2 K, Type E: > -100 °C ±0.2 K, Type J: > -150 °C ±0.2 K, Type L: > -50 °C ±0.2 K, Type K: > -100 °C ±0.2 K, Type N: > -50 °C ±0.2 K, Type R: > +200 °C ±0.3 K, Type S: > +100 °C ±0.3 K, Type B: > +700 °C ±0.3 K	
Interference voltage suppression for $f = n \times (f_1 \pm 1 \%)$, f_1 = interference frequency		
<ul style="list-style-type: none"> Series mode interference (peak value of interference < rated value of input range), min. Common mode interference, min. 	40 dB 130 dB	
Interrupts/diagnostics/status information		
Status indicator	No	
Diagnostics function	Yes; Parameterizable	
Alarms		
<ul style="list-style-type: none"> Diagnostic alarm Hardware interrupt 	Yes; Parameterizable No	
Diagnoses		
<ul style="list-style-type: none"> Diagnostic information readable Overrange Wire-break in signal transmitter cable Group error 	Yes Yes; Group diagnostics for overrange and underrange Yes; Parameterizable Yes	
Diagnostics indication LED		
<ul style="list-style-type: none"> Group error SF (red) 	Yes	
Potential separation		
Potential separation analog inputs		
<ul style="list-style-type: none"> between the channels between the channels and backplane bus 	No Yes	
Permissible potential difference		
between the inputs (UCM)	75 V DC/60 V AC	
between MANA and M internally (UISO)	75 V DC/60 V AC	
Isolation		
Isolation tested with	500 V AC/707 V DC, type test	
Connection method		
required front connector	20-pin	
Dimensions		
Width	40 mm	
Height	125 mm	
Depth	120 mm	
Weights		
Weight, approx.	210 g	
Classifications		
	Version	Classification
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	For use in hazardous locations
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[China RoHS](#)

[Manufacturer Declaration](#)



last modified:

10/23/2025

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