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Data sheet 6ES7531-7NF10-0AB0



SIMATIC S7-1500/ET 200MP, analog input module, AI 8xU/I HS (35 mm); 16-bit resolution; accuracy 0.3%; 8 channels in one group; common mode voltage 10 V; diagnostics; hardware interrupts; oversampling with 8 channels in 0.0625 ms; incl. U-connector and complete infeed and shielding set (without front connector)

General information	
Product type designation	AI 8xU/I HS
HW functional status	FS01
Firmware version	V2.1.0
● FW update possible	Yes
Product function	
● I&M data	Yes; I&M0 to I&M3
● Isochronous mode	Yes
● Prioritized startup	Yes
● Measuring range scalable	No
● Scalable measured values	No
● Adjustment of measuring range	No
Engineering with	
● STEP 7 TIA Portal configurable/integrated from version	V14 / -
● STEP 7 configurable/integrated from version	V5.5 SP3 / -
● PROFIBUS from GSD version/GSD revision	V1.0 / V5.1
● PROFINET from GSD version/GSD revision	V2.3 / -
Operating mode	
● Oversampling	Yes
● MSI	Yes
CiR - Configuration in RUN	
Reparameterization possible in RUN	Yes
Calibration possible in RUN	Yes
Supply voltage	
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
Input current	
Current consumption, max.	240 mA; with 24 V DC supply
Encoder supply	
24 V encoder supply	
● Short-circuit protection	Yes
● Output current, max.	20 mA; Max. 47 mA per channel for a duration < 10 s
Power	
Power consumption from the backplane bus	1.15 W
Power loss	
Power loss, typ.	3.4 W
Analog inputs	

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Number of analog inputs	8
● For current measurement	8
● For voltage measurement	8
permissible input voltage for voltage input (destruction limit), max.	28.8 V
permissible input current for current input (destruction limit), max.	40 mA
Input ranges (rated values), voltages	
● 0 to +5 V	No
● 0 to +10 V	No
● 1 V to 5 V	Yes
— Input resistance (1 V to 5 V)	50 kΩ
● -10 V to +10 V	Yes
— Input resistance (-10 V to +10 V)	100 kΩ
● -2.5 V to +2.5 V	No
● -25 mV to +25 mV	No
● -250 mV to +250 mV	No
● -5 V to +5 V	Yes
— Input resistance (-5 V to +5 V)	50 kΩ
● -50 mV to +50 mV	No
● -500 mV to +500 mV	No
● -80 mV to +80 mV	No
Input ranges (rated values), currents	
● 0 to 20 mA	Yes
— Input resistance (0 to 20 mA)	41 Ω; Plus approx. 42 ohms for overvoltage protection by PTC
● -20 mA to +20 mA	Yes
— Input resistance (-20 mA to +20 mA)	41 Ω; Plus approx. 42 ohms for overvoltage protection by PTC
● 4 mA to 20 mA	Yes
— Input resistance (4 mA to 20 mA)	41 Ω; Plus approx. 42 ohms for overvoltage protection by PTC
Input ranges (rated values), thermocouples	
● Type B	No
● Type C	No
● Type E	No
● Type J	No
● Type K	No
● Type L	No
● Type N	No
● Type R	No
● Type S	No
● Type T	No
● Type TXK/TXK(L) to GOST	No
Input ranges (rated values), resistance thermometer	
● Cu 10	No
● Cu 10 according to GOST	No
● Cu 50	No
● Cu 50 according to GOST	No
● Cu 100	No
● Cu 100 according to GOST	No
● Ni 10	No
● Ni 10 according to GOST	No
● Ni 100	No
● Ni 100 according to GOST	No
● Ni 1000	No
● Ni 1000 according to GOST	No
● LG-Ni 1000	No
● Ni 120	No
● Ni 120 according to GOST	No
● Ni 200	No
● Ni 200 according to GOST	No

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● Ni 500	No
● Ni 500 according to GOST	No
● Pt 10	No
● Pt 10 according to GOST	No
● Pt 50	No
● Pt 50 according to GOST	No
● Pt 100	No
● Pt 100 according to GOST	No
● Pt 1000	No
● Pt 1000 according to GOST	No
● Pt 200	No
● Pt 200 according to GOST	No
● Pt 500	No
● Pt 500 according to GOST	No
Input ranges (rated values), resistors	
● 0 to 150 ohms	No
● 0 to 300 ohms	No
● 0 to 600 ohms	No
● 0 to 3000 ohms	No
● 0 to 6000 ohms	No
● PTC	No
Cable length	
● shielded, max.	800 m
Analog value generation for the inputs	
Integration and conversion time/resolution per channel	
● Resolution with overrange (bit including sign), max.	16 bit
● Basic execution time of the module (all channels released)	62.5 µs; independent of number of activated channels
Smoothing of measured values	
● parameterizable	Yes
● Step: None	Yes
● Step: low	Yes
● Step: Medium	Yes
● Step: High	Yes
Encoder	
Connection of signal encoders	
● for voltage measurement	Yes
● for current measurement as 2-wire transducer	Yes
— Burden of 2-wire transmitter, max.	820 Ω
● for current measurement as 4-wire transducer	Yes
● for resistance measurement with two-wire connection	No
● for resistance measurement with three-wire connection	No
● for resistance measurement with four-wire connection	No
Errors/accuracies	
Linearity error (relative to input range), (+/-)	0.02 %
Temperature error (relative to input range), (+/-)	0.005 %/K
Crosstalk between the inputs, max.	-60 dB
Repeat accuracy in steady state at 25 °C (relative to input range), (+/-)	0.02 %
Operational error limit in overall temperature range	
● Voltage, relative to input range, (+/-)	0.3 %
● Current, relative to input range, (+/-)	0.3 %
Basic error limit (operational limit at 25 °C)	
● Voltage, relative to input range, (+/-)	0.2 %
● Current, relative to input range, (+/-)	0.2 %
Interference voltage suppression for f = n x (f1 +/- 1 %), f1 = interference frequency	
● Common mode voltage, max.	10 V
● Common mode interference, min.	50 dB at 400 Hz; 60 dB at 60 / 50 / 10 Hz
Isochronous mode	

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Filtering and processing time (TCI), min.	80 µs
Bus cycle time (TDP), min.	250 µs
Interrupts/diagnostics/status information	
Diagnostics function	Yes
Alarms	
● Diagnostic alarm	Yes
● Limit value alarm	Yes; two upper and two lower limit values in each case
Diagnoses	
● Monitoring the supply voltage	Yes
● Wire break	Yes; only for 1 ... 5 V and 4 ... 20 mA
● Overflow/Underflow	Yes
Diagnostics indication LED	
● RUN LED	Yes; green LED
● ERROR LED	Yes; red LED
● Monitoring of the supply voltage (PWR-LED)	Yes; green LED
● Channel status display	Yes; green LED
● for channel diagnostics	Yes; red LED
● for module diagnostics	Yes; red LED
Potential separation	
Potential separation channels	
● between the channels	No
● between the channels, in groups of	8
● between the channels and backplane bus	Yes
● between the channels and the power supply of the electronics	Yes
Permissible potential difference	
between the inputs (UCM)	20 V DC
Between the inputs and MANA (UCM)	10 V DC
Isolation	
Isolation tested with	707 V DC (type test)
Security	
signed firmware update	No
data integrity	No
Ambient conditions	
Ambient temperature during operation	
● horizontal installation, min.	0 °C
● horizontal installation, max.	60 °C
● vertical installation, min.	0 °C
● vertical installation, max.	40 °C
Altitude during operation relating to sea level	
● Installation altitude above sea level, max.	5 000 m; Restrictions for installation altitudes > 2 000 m, see manual
Dimensions	
Width	35 mm
Height	147 mm
Depth	129 mm
Weights	
Weight, approx.	300 g

Classifications

	Version	Classification
eClass	16	27-24-22-01
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

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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

Metrological Approval

General Product Approval

Manufacturer Declaration

China RoHS

For use in hazardous locations

FM

FM

CCC-Ex

For use in hazardous locations

Type Examination Certificate

Miscellaneous

CCC-Ex

Maritime application

NK / Nippon Kaiji Kyokai

CCS (China Classification Society)

KR (Korean Register of Shipping)

Environment

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