



SIMATIC DP, electronics module ET 200SP, F-AI 4xU 0..10V HF, fail-safe analog inputs, up to PL E (ISO 13849), up to SIL 3 (IEC 61508)

General information	
Product type designation	F-AI 4XU 0..10V HF
Firmware version	
• FW update possible	Yes
usable BaseUnits	BU type A0, A1
Color code for module-specific color-coded label	CC00
Product function	
• I&M data	Yes; I&M0 to I&M3
Engineering with	
• STEP 7 TIA Portal configurable/integrated from version	V16 with HSP 308
Operating mode	
• cyclic measurement	Yes
• Oversampling	No
• MSI	No
CiR - Configuration in RUN	
Reparameterization possible in RUN	No
Calibration possible in RUN	No
Supply voltage	
Rated value (DC)	24 V
permissible range, lower limit (DC)	19.2 V
permissible range, upper limit (DC)	28.8 V
Reverse polarity protection	Yes
power supply according to NEC Class 2 required	No
Input current	
Current consumption (rated value)	0.38 A
Current consumption, max.	0.4 A
Encoder supply	
24 V encoder supply	
• 24 V	Yes; min. L+ (-1.5 V)
• Short-circuit protection	Yes
• Output current, max.	300 mA; total current of all encoders/channels
Power	
Power consumption from the backplane bus	70 mW
Power loss	
Power loss, typ.	2 W
Address area	
Address space per module	
• Inputs	14 byte; S7-300/400F CPU, 13 byte
• Outputs	5 byte; S7-300/400F CPU, 4 byte

Hardware configuration	
Automatic encoding	Yes
<ul style="list-style-type: none"> Electronic coding element type H 	Yes
Analog inputs	
Number of analog inputs	4
<ul style="list-style-type: none"> For voltage measurement 	4
permissible input voltage for voltage input (destruction limit), max.	36 V
Input ranges (rated values), voltages	
<ul style="list-style-type: none"> 0 to +10 V 	Yes
<ul style="list-style-type: none"> — Input resistance (0 to 10 V) 	16 kΩ
Cable length	
<ul style="list-style-type: none"> shielded, max. 	200 m
Analog value generation for the inputs	
Measurement principle	Sigma Delta
Integration and conversion time/resolution per channel	
<ul style="list-style-type: none"> Resolution with overrange (bit including sign), max. 	16 bit
<ul style="list-style-type: none"> Integration time, parameterizable 	Yes
<ul style="list-style-type: none"> Integration time (ms) 	20 / 16,667
<ul style="list-style-type: none"> Interference voltage suppression for interference frequency f_1 in Hz 	50 / 60 Hz
Smoothing of measured values	
<ul style="list-style-type: none"> Number of smoothing levels 	7
<ul style="list-style-type: none"> parameterizable 	Yes
<ul style="list-style-type: none"> Step: None 	Yes; 1x conversion cycle time
<ul style="list-style-type: none"> Step: low 	Yes; 2x / 4x conversion cycle time
<ul style="list-style-type: none"> Step: Medium 	Yes; 8x / 16x conversion cycle time
<ul style="list-style-type: none"> Step: High 	Yes; 32x / 64x conversion cycle time
<ul style="list-style-type: none"> Average value filter 	Yes
Encoder	
Connection of signal encoders	
<ul style="list-style-type: none"> for voltage measurement 	Yes
Errors/accuracies	
Linearity error (relative to input range), (+/-)	0.1 %
Temperature error (relative to input range), (+/-)	0.023 %/K
Repeat accuracy in steady state at 25 °C (relative to input range), (+/-)	0.1 %
Operational error limit in overall temperature range	
<ul style="list-style-type: none"> Voltage, relative to input range, (+/-) 	2 %
Basic error limit (operational limit at 25 °C)	
<ul style="list-style-type: none"> Voltage, relative to input range, (+/-) 	0.1 %
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. 	40 dB
<ul style="list-style-type: none"> Common mode voltage, max. 	10 V
<ul style="list-style-type: none"> Common mode interference, min. 	70 dB
Interrupts/diagnostics/status information	
Diagnostics function	Yes
Alarms	
<ul style="list-style-type: none"> Diagnostic alarm 	Yes
<ul style="list-style-type: none"> Limit value alarm 	No
Diagnoses	
<ul style="list-style-type: none"> Monitoring the supply voltage 	Yes
<ul style="list-style-type: none"> Wire break 	Yes
Diagnostics indication LED	
<ul style="list-style-type: none"> RUN LED 	Yes; green LED
<ul style="list-style-type: none"> ERROR LED 	Yes; red LED
<ul style="list-style-type: none"> Monitoring of the supply voltage (PWR-LED) 	Yes; green PWR LED
<ul style="list-style-type: none"> Channel status display 	Yes; green LED
<ul style="list-style-type: none"> for channel diagnostics 	Yes; red LED

• for module diagnostics	Yes; green/red DIAG LED
Potential separation	
Potential separation channels	
• between the channels	No
• 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)	10 Vpp
Isolation	
Isolation tested with	707 V DC (type test)
Standards, approvals, certificates	
Ecological footprint	
• environmental product declaration	Yes
Global warming potential	
— global warming potential, (total) [CO2 eq]	88.3 kg
— global warming potential, (during production) [CO2 eq]	13.1 kg
— global warming potential, (during operation) [CO2 eq]	76.6 kg
— global warming potential, (after end of life cycle) [CO2 eq]	-1.37 kg
Highest safety class achievable in safety mode	
• Performance level according to ISO 13849-1	PLe
• Category according to ISO 13849-1	Cat. 4
• SIL acc. to IEC 61508	SIL 3
Probability of failure (for service life of 20 years and repair time of 100 hours)	
— Low demand mode: PFDavg in accordance with SIL3	< 5.00E-05
— High demand/continuous mode: PFH in accordance with SIL3	< 1.00E-09 1/h
Ambient conditions	
Ambient temperature during operation	
• horizontal installation, min.	0 °C
• horizontal installation, max.	60 °C
• vertical installation, min.	0 °C
• vertical installation, max.	50 °C
Dimensions	
Width	15 mm
Height	73 mm
Depth	58 mm
Weights	
Weight, approx.	48 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



EG-Konf.

[Miscellaneous](#)



[Manufacturer Declaration](#)



UL



RCM

General Product Approval

For use in hazardous locations



IECEX



UL

[CCC-Ex](#)

[EM](#)

[Type Examination Certificate](#)

For use in hazardous locations

Functional Safety



IECEX



ATEX

[Miscellaneous](#)

[CCC-Ex](#)

[Type Examination Certificate](#)

[TUEV](#)

Functional Safety

Maritime application



UL



ABS



BUREAU VERITAS



DNV



LRS

[NK / Nippon Kaiji Kyokai](#)

Maritime application

Industrial Communication



RINA

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

[KR \(Korean Register of Shipping\)](#)

[PROFIsafe](#)

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