

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	
<ul style="list-style-type: none"> <li>FW update possible</li> </ul>	Yes
usable BaseUnits	BU type A0, A1
Color code for module-specific color identification plate	CC00

### Product function

<ul style="list-style-type: none"> <li>I&amp;M data</li> </ul>	Yes; I&M0 to I&M3
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### Engineering with

<ul style="list-style-type: none"> <li>STEP 7 TIA Portal configurable/integrated as of version</li> </ul>	V16 with HSP 308
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### Operating mode

<ul style="list-style-type: none"> <li>cyclic measurement</li> </ul>	Yes
<ul style="list-style-type: none"> <li>Oversampling</li> </ul>	No
<ul style="list-style-type: none"> <li>MSI</li> </ul>	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

### Input current

Current consumption (rated value)	0.38 A
Current consumption, max.	0.4 A

### Encoder supply

24 V encoder supply	
<ul style="list-style-type: none"> <li>24 V</li> </ul>	Yes; min. L+ (-1.5 V)
<ul style="list-style-type: none"> <li>Short-circuit protection</li> </ul>	Yes
<ul style="list-style-type: none"> <li>Output current, max.</li> </ul>	300 mA; total current of all encoders/channels

### Power

Power available from the backplane bus	70 mW
<b>Power loss</b>	
Power loss, typ.	2 W
<b>Address area</b>	
Address space per module	
• Inputs	14 byte; S7-300/400F CPU, 13 byte
• Outputs	5 byte; S7-300/400F CPU, 4 byte
<b>Hardware configuration</b>	
Automatic encoding	Yes
• Electronic coding element type H	Yes
<b>Analog inputs</b>	
Number of analog inputs	4
• For voltage measurement	4
permissible input voltage for voltage input (destruction limit), max.	35 V
<b>Input ranges (rated values), voltages</b>	
• 0 to +10 V	Yes
— Input resistance (0 to 10 V)	16 kΩ
<b>Cable length</b>	
• shielded, max.	200 m
<b>Analog value generation for the inputs</b>	
Measurement principle	Sigma Delta
<b>Integration and conversion time/resolution per channel</b>	
• Resolution with overrange (bit including sign), max.	16 bit
• Integration time, parameterizable	Yes
• Integration time (ms)	20 / 16,667
• Interference voltage suppression for interference frequency f1 in Hz	50 / 60 Hz
<b>Smoothing of measured values</b>	
• Number of smoothing levels	7
• parameterizable	Yes
• Step: None	Yes; 1x conversion cycle time
• Step: low	Yes; 2x / 4x conversion cycle time
• Step: Medium	Yes; 8x / 16x conversion cycle time
• Step: High	Yes; 32x / 64x conversion cycle time
• Average value filter	Yes
<b>Encoder</b>	
<b>Connection of signal encoders</b>	
• 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	
• Voltage, relative to input range, (+/-)	2 %
Basic error limit (operational limit at 25 °C)	
• Voltage, relative to input range, (+/-)	0.1 %
Interference voltage suppression for $f = n \times (f_1 \pm 1 \%)$ , $f_1 =$ interference frequency	
• Series mode interference (peak value of interference < rated value of input range), min.	40 dB
• Common mode voltage, max.	10 V
• Common mode interference, min.	70 dB
Interrupts/diagnostics/status information	
Diagnostics function	Yes
Alarms	
• Diagnostic alarm	Yes
• Limit value alarm	No
Diagnostic messages	
• Monitoring the supply voltage	Yes
• Wire-break	Yes
Diagnostics indication LED	
• RUN LED	Yes; green LED
• ERROR LED	Yes; red LED
• Monitoring of the supply voltage (PWR-LED)	Yes; green PWR LED
• Channel status display	Yes; green LED
• for channel diagnostics	Yes; red LED
• for module diagnostics	Yes; green/red 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	

#### Highest safety class achievable in safety mode

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|--|--------|
| • 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)

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|--|----------------|
| — 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

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|---------------------------------|-------|
| • 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
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**last modified:** 04/03/2020