



SIMATIC DP, electronic module ET 200SP, F-AI 4xI0(4)..20 mA HF fail-safe analog inputs up to PL e (ISO 13849) up to SIL 3 (IEC 61508)

General information	
Product type designation	F-AI 4xI 0(4)..20mA 2-/4-wire 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
Engineering with	
<ul style="list-style-type: none"> <li>STEP 7 TIA Portal configurable/integrated from version</li> </ul>	V15 with HSP 203
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	
<ul style="list-style-type: none"> <li>24 V</li> <li>Short-circuit protection</li> <li>Output current, max.</li> </ul>	Yes; min. L+ (-1.5 V) Yes 300 mA; total current of all encoders/channels
Power	
Power available from the backplane bus	70 mW
Power loss	
Power loss, typ.	2 W
Address area	
Address space per module	
<ul style="list-style-type: none"> <li>Inputs</li> <li>Outputs</li> </ul>	14 byte; S7-300/400F CPU, 13 byte 5 byte; S7-300/400F CPU, 4 byte
Hardware configuration	
Automatic encoding	Yes
<ul style="list-style-type: none"> <li>Electronic coding element type F</li> </ul>	Yes
Analog inputs	
Number of analog inputs	4

<ul style="list-style-type: none"> <li>For current measurement</li> </ul>	4
permissible input current for current input (destruction limit), max.	35 mA
<b>Input ranges (rated values), currents</b>	
<ul style="list-style-type: none"> <li>0 to 20 mA <ul style="list-style-type: none"> <li>Input resistance (0 to 20 mA)</li> </ul> </li> <li>4 mA to 20 mA <ul style="list-style-type: none"> <li>Input resistance (4 mA to 20 mA)</li> </ul> </li> </ul>	Yes 125 Ω Yes 125 Ω
<b>Cable length</b>	
<ul style="list-style-type: none"> <li>shielded, max.</li> </ul>	1 000 m
<b>Analog value generation for the inputs</b>	
Measurement principle	Sigma Delta
<b>Integration and conversion time/resolution per channel</b>	
<ul style="list-style-type: none"> <li>Resolution with overrange (bit including sign), max.</li> <li>Integration time, parameterizable</li> <li>Integration time (ms)</li> <li>Interference voltage suppression for interference frequency <math>f_1</math> in Hz</li> </ul>	16 bit Yes 20 / 16,667 50 / 60 Hz
<b>Smoothing of measured values</b>	
<ul style="list-style-type: none"> <li>Number of smoothing levels</li> <li>parameterizable</li> <li>Step: None</li> <li>Step: low</li> <li>Step: Medium</li> <li>Step: High</li> </ul>	7 Yes Yes; 1x conversion cycle time Yes; 2x / 4x conversion cycle time Yes; 8x / 16x conversion cycle time Yes; 32x / 64x conversion cycle time
<b>Encoder</b>	
<b>Connection of signal encoders</b>	
<ul style="list-style-type: none"> <li>for current measurement as 2-wire transducer <ul style="list-style-type: none"> <li>Burden of 2-wire transmitter, max.</li> </ul> </li> <li>for current measurement as 4-wire transducer</li> </ul>	Yes 650 Ω Yes
<b>Errors/accuracies</b>	
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 %
<b>Operational error limit in overall temperature range</b>	
<ul style="list-style-type: none"> <li>Current, relative to input range, (+/-)</li> </ul>	2 %
<b>Basic error limit (operational limit at 25 °C)</b>	
<ul style="list-style-type: none"> <li>Current, relative to input range, (+/-)</li> </ul>	0.1 %
<b>Interference voltage suppression for <math>f = n \times (f_1 \pm 1 \%)</math>, <math>f_1 =</math> interference frequency</b>	
<ul style="list-style-type: none"> <li>Series mode interference (peak value of interference &lt; rated value of input range), min.</li> <li>Common mode interference, min.</li> </ul>	40 dB 70 dB
<b>Interrupts/diagnostics/status information</b>	
Diagnostics function	Yes
<b>Alarms</b>	
<ul style="list-style-type: none"> <li>Diagnostic alarm</li> <li>Limit value alarm</li> </ul>	Yes No
<b>Diagnoses</b>	
<ul style="list-style-type: none"> <li>Monitoring the supply voltage</li> <li>Wire-break</li> <li>Short-circuit</li> </ul>	Yes Yes Yes
<b>Diagnostics indication LED</b>	
<ul style="list-style-type: none"> <li>RUN LED</li> <li>ERROR LED</li> <li>Monitoring of the supply voltage (PWR-LED)</li> <li>Channel status display</li> <li>for channel diagnostics</li> <li>for module diagnostics</li> </ul>	Yes; green LED Yes; red LED Yes; green PWR LED Yes; green LED Yes; red LED Yes; green/red DIAG LED
<b>Potential separation</b>	
<b>Potential separation channels</b>	
<ul style="list-style-type: none"> <li>between the channels</li> </ul>	No

<ul style="list-style-type: none"> <li>• between the channels and backplane bus</li> </ul>	Yes
<ul style="list-style-type: none"> <li>• between the channels and the power supply of the electronics</li> </ul>	Yes
<b>Permissible potential difference</b>	
between the inputs (UCM)	10 Vpp
<b>Isolation</b>	
Isolation tested with	707 V DC (type test)
<b>Standards, approvals, certificates</b>	
Highest safety class achievable in safety mode	
<ul style="list-style-type: none"> <li>• Performance level according to ISO 13849-1</li> </ul>	PLe
<ul style="list-style-type: none"> <li>• Category according to ISO 13849-1</li> </ul>	Cat. 4
<ul style="list-style-type: none"> <li>• SIL acc. to IEC 61508</li> </ul>	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
<b>Ambient conditions</b>	
Ambient temperature during operation	
<ul style="list-style-type: none"> <li>• horizontal installation, min.</li> </ul>	0 °C
<ul style="list-style-type: none"> <li>• horizontal installation, max.</li> </ul>	60 °C
<ul style="list-style-type: none"> <li>• vertical installation, min.</li> </ul>	0 °C
<ul style="list-style-type: none"> <li>• vertical installation, max.</li> </ul>	50 °C
<b>Dimensions</b>	
Width	15 mm
Height	73 mm
Depth	58 mm
<b>Weights</b>	
Weight, approx.	48 g
<b>last modified:</b>	12/28/2021 