




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  |  |
| • FW update possible                                      | Yes  |
| usable BaseUnits  | BU type A0, A1                                 |
| Color code for module-specific color identification plate | CC00   |
| Product function  |  |
| • I&M data  | Yes; I&M0 to I&M3                              |
| Engineering with  |  |
| • STEP 7 TIA Portal configurable/integrated from version  | 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                                       |  |
| • 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 available 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  |
| • Electronic coding element type F                        | Yes  |
| Analog inputs   |  |
| Number of analog inputs                                   | 4  |

|  |                                      |
|--|--------------------------------------|
| • For current measurement  | 4                                    |
| permissible input current for current input (destruction limit), max.  | 35 mA                                |
| <b>Input ranges (rated values), currents</b>   |                                      |
| • 0 to 20 mA   | Yes                                  |
| — Input resistance (0 to 20 mA)  | 125 Ω                                |
| • 4 mA to 20 mA  | Yes                                  |
| — Input resistance (4 mA to 20 mA)   | 125 Ω                                |
| <b>Cable length</b>  |                                      |
| • shielded, max.   | 1 000 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 |
| <b>Encoder</b>   |                                      |
| <b>Connection of signal encoders</b>   |                                      |
| • for current measurement as 2-wire transducer   | Yes                                  |
| — Burden of 2-wire transmitter, max.   | 650 Ω                                |
| • for current measurement as 4-wire transducer   | 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>  |                                      |
| • Current, relative to input range, (+/-)  | 2 %                                  |
| <b>Basic error limit (operational limit at 25 °C)</b>  |                                      |
| • Current, relative to input range, (+/-)  | 0.1 %                                |
| <b>Interference voltage suppression for <math>f = n \times (f1 \pm 1 \%)</math>, f1 = interference frequency</b> |                                      |
| • Series mode interference (peak value of interference < rated value of input range), min.                       | 40 dB                                |
| • Common mode interference, min.   | 70 dB                                |
| <b>Interrupts/diagnostics/status information</b>   |                                      |
| Diagnostics function   | Yes                                  |
| <b>Alarms</b>  |                                      |
| • Diagnostic alarm   | Yes                                  |
| • Limit value alarm  | No                                   |
| <b>Diagnoses</b>   |                                      |
| • Monitoring the supply voltage  | Yes                                  |
| • Wire-break   | Yes                                  |
| • Short-circuit  | Yes                                  |
| <b>Diagnostics indication LED</b>  |                                      |
| • 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 DIAG LED              |
| <b>Potential separation</b>  |                                      |
| <b>Potential separation channels</b>   |                                      |
| • between the channels   | No                                   |

|  |  |
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| • between the channels and backplane bus   | Yes  |
| • between the channels and the power supply of the electronics                     | 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                                     |  |
| • 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   |
| <b>Ambient conditions</b>  |  |
| Ambient temperature during operation   |  |
| • horizontal installation, min.  | 0 °C   |
| • horizontal installation, max.  | 60 °C  |
| • vertical installation, min.  | 0 °C   |
| • vertical installation, max.  | 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  |