




SIMATIC S7-1500 analog input module AI 8xU/I HF, up to 24 bit resolution, accuracy 0.1%, 8 channels in groups of 1; common mode voltage: 30 V AC/60 V DC, Diagnostics; Hardware interrupts Measured values scalable, measuring range adjustment, Calibrate in RUN; Delivery including infeed element, shield bracket and shield terminal: Front connector (screw terminals or push-in) to be ordered separately

| General information  |                            |
|--|----------------------------|
| Product type designation   | AI 8xU/I HF                |
| HW functional status   | From FS01                  |
| Firmware version   | V1.1.0                     |
| <ul style="list-style-type: none"> <li>FW update possible</li> </ul>                                     | Yes                        |
| Product function   |                            |
| <ul style="list-style-type: none"> <li>I&amp;M data</li> </ul>   | Yes; I&M0 to I&M3          |
| <ul style="list-style-type: none"> <li>Isochronous mode</li> </ul>                                       | No                         |
| <ul style="list-style-type: none"> <li>Prioritized startup</li> </ul>                                    | Yes                        |
| <ul style="list-style-type: none"> <li>Measuring range scalable</li> </ul>                               | No                         |
| <ul style="list-style-type: none"> <li>Scalable measured values</li> </ul>                               | Yes                        |
| <ul style="list-style-type: none"> <li>Adjustment of measuring range</li> </ul>                          | Yes                        |
| Engineering with   |                            |
| <ul style="list-style-type: none"> <li>STEP 7 TIA Portal configurable/integrated from version</li> </ul> | V14 / -                    |
| <ul style="list-style-type: none"> <li>STEP 7 configurable/integrated from version</li> </ul>            | V5.5 SP3 / -               |
| <ul style="list-style-type: none"> <li>PROFIBUS from GSD version/GSD revision</li> </ul>                 | V1.0 / V5.1                |
| <ul style="list-style-type: none"> <li>PROFINET from GSD version/GSD revision</li> </ul>                 | V2.3 / -                   |
| Operating mode   |                            |
| <ul style="list-style-type: none"> <li>Oversampling</li> </ul>   | No                         |
| <ul style="list-style-type: none"> <li>MSI</li> </ul>  | 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)  | 19.2 V                     |
| permissible range, upper limit (DC)  | 28.8 V                     |
| Reverse polarity protection  | Yes                        |
| Input current  |                            |
| Current consumption, max.  | 50 mA; with 24 V DC supply |
| Power  |                            |
| Power available from the backplane bus   | 0.85 W                     |
| Power loss   |                            |
| Power loss, typ.   | 1.9 W                      |
| Analog inputs  |                            |
| Number of analog inputs  | 8                          |
| <ul style="list-style-type: none"> <li>For current measurement</li> </ul>                                | 8                          |
| <ul style="list-style-type: none"> <li>For voltage measurement</li> </ul>                                | 8                          |

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|---|--|
| permissible input voltage for voltage input (destruction limit), max. | 28.8 V   |
| permissible input current for current input (destruction limit), max. | 40 mA  |
| <b>Input ranges (rated values), voltages</b>                          |  |
| • 0 to +5 V   | No   |
| • 0 to +10 V  | No   |
| • 1 V to 5 V  | Yes  |
| — Input resistance (1 V to 5 V)                                       | 100 kΩ   |
| • -10 V to +10 V  | Yes  |
| — Input resistance (-10 V to +10 V)                                   | 100 kΩ   |
| • -2.5 V to +2.5 V  | Yes  |
| — Input resistance (-2.5 V to +2.5 V)                                 | 100 kΩ   |
| • -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)                                     | 100 kΩ   |
| • -50 mV to +50 mV  | No   |
| • -500 mV to +500 mV  | No   |
| • -80 mV to +80 mV  | No   |
| <b>Input ranges (rated values), currents</b>                          |  |
| • 0 to 20 mA  | Yes  |
| — Input resistance (0 to 20 mA)                                       | 25 Ω; Plus approx. 42 ohms for overvoltage protection by PTC |
| • -20 mA to +20 mA  | Yes  |
| — Input resistance (-20 mA to +20 mA)                                 | 25 Ω; Plus approx. 42 ohms for overvoltage protection by PTC |
| • 4 mA to 20 mA   | Yes  |
| — Input resistance (4 mA to 20 mA)                                    | 25 Ω; Plus approx. 42 ohms for overvoltage protection by PTC |
| <b>Input ranges (rated values), thermocouples</b>                     |  |
| • 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   |
| <b>Input ranges (rated values), resistance thermometer</b>            |  |
| • 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   |
| • 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  |
| <b>Input ranges (rated values), resistors</b>                             |   |
| • 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  |
| <b>Cable length</b>   |   |
| • shielded, max.  | 800 m   |
| <b>Analog value generation for the inputs</b>                             |   |
| <b>Integration and conversion time/resolution per channel</b>             |   |
| • Resolution with overrange (bit including sign), max.                    | 24 bit; When using the function "Scaling of the measured values" or "Measuring range adaptation" (32 bit REAL format); 16 bit when using the S7 format (16 bit INTEGER) |
| • Integration time, parameterizable                                       | Yes   |
| • Integration time (ms)   | Fast mode: 2.5 / 16.67 / 20 / 100 ms, standard mode: 7.5 / 50 / 60 / 300 ms   |
| • Basic conversion time, including integration time (ms)                  | Fast mode: 4 / 18 / 22 / 102 ms; Standard mode: 9 / 52 / 62 / 302 ms  |
| • Interference voltage suppression for interference frequency f1 in Hz    | 400 / 60 / 50 / 10 Hz   |
| • Basic execution time of the module (all channels released)              | Corresponds to the channel with the highest basic conversion time   |
| <b>Smoothing of measured values</b>                                       |   |
| • parameterizable   | Yes   |
| • Step: None  | Yes   |
| • Step: low   | Yes   |
| • Step: Medium  | Yes   |
| • Step: High  | Yes   |
| <b>Encoder</b>  |   |
| <b>Connection of signal encoders</b>                                      |   |
| • for voltage measurement   | Yes   |
| • for current measurement as 2-wire transducer                            | Yes; with external transmitter supply   |
| • 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  |
| <b>Errors/accuracies</b>  |   |
| Linearity error (relative to input range), (+/-)                          | 0.02 %  |
| Temperature error (relative to input range), (+/-)                        | 0.005 %/K   |
| Crosstalk between the inputs, max.  | -80 dB  |
| Repeat accuracy in steady state at 25 °C (relative to input range), (+/-) | 0.02 %  |
| note regarding accuracy   | at temperatures below 0 °C, the figures for operating error and temperature error are doubled   |
| <b>Operational error limit in overall temperature range</b>               |   |
| • Voltage, relative to input range, (+/-)                                 | 0.1 %   |
| • Current, relative to input range, (+/-)                                 | 0.1 %   |
| <b>Basic error limit (operational limit at 25 °C)</b>                     |   |

|   |   |
|---|---|
| <ul style="list-style-type: none"> <li>• Voltage, relative to input range, (+/-)</li> </ul>   | 0.05 %  |
| <ul style="list-style-type: none"> <li>• Current, relative to input range, (+/-)</li> </ul>   | 0.05 %  |
| <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> </ul> | 80 dB; in the Standard operating mode, 40 dB in the Fast operating mode   |
| <ul style="list-style-type: none"> <li>• Common mode voltage, max.</li> </ul>   | 60 V DC/30 V AC   |
| <ul style="list-style-type: none"> <li>• Common mode interference, min.</li> </ul>  | 80 dB   |
| <b>Interrupts/diagnostics/status information</b>  |   |
| Diagnostics function  | Yes   |
| <b>Alarms</b>   |   |
| <ul style="list-style-type: none"> <li>• Diagnostic alarm</li> </ul>  | Yes   |
| <ul style="list-style-type: none"> <li>• Limit value alarm</li> </ul>   | Yes; two upper and two lower limit values in each case  |
| <b>Diagnoses</b>  |   |
| <ul style="list-style-type: none"> <li>• Monitoring the supply voltage</li> </ul>   | Yes   |
| <ul style="list-style-type: none"> <li>• Wire-break</li> </ul>  | Yes; only for 1 ... 5 V and 4 ... 20 mA   |
| <ul style="list-style-type: none"> <li>• Overflow/underflow</li> </ul>  | Yes   |
| <b>Diagnostics indication LED</b>   |   |
| <ul style="list-style-type: none"> <li>• RUN LED</li> </ul>   | Yes; green LED  |
| <ul style="list-style-type: none"> <li>• ERROR LED</li> </ul>   | Yes; red LED  |
| <ul style="list-style-type: none"> <li>• Monitoring of the supply voltage (PWR-LED)</li> </ul>  | Yes; green LED  |
| <ul style="list-style-type: none"> <li>• Channel status display</li> </ul>  | Yes; green LED  |
| <ul style="list-style-type: none"> <li>• for channel diagnostics</li> </ul>   | Yes; red LED  |
| <ul style="list-style-type: none"> <li>• for module diagnostics</li> </ul>  | Yes; red LED  |
| <b>Potential separation</b>   |   |
| <b>Potential separation channels</b>  |   |
| <ul style="list-style-type: none"> <li>• between the channels</li> </ul>  | Yes   |
| <ul style="list-style-type: none"> <li>• between the channels, in groups of</li> </ul>  | 1   |
| <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 different circuits  | 60 V DC/30 V AC; insulation rated for 120 V AC basic insulation: between the channels and the supply voltage L+; between the channels and the backplane bus; between the channels   |
| <b>Isolation</b>  |   |
| Isolation tested with   | 2 000 V DC between the channels and the supply voltage L+; 2 000 V DC between the channels and the backplane bus; 2 000 V DC between the channels; 707 V DC (type test) between the supply voltage L+ and the backplane bus |
| <b>Ambient conditions</b>   |   |
| <b>Ambient temperature during operation</b>   |   |
| <ul style="list-style-type: none"> <li>• horizontal installation, min.</li> </ul>   | -30 °C; From FS02   |
| <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>   | -30 °C; From FS02   |
| <ul style="list-style-type: none"> <li>• vertical installation, max.</li> </ul>   | 40 °C   |
| <b>Dimensions</b>   |   |
| Width   | 35 mm   |
| Height  | 147 mm  |
| Depth   | 129 mm  |
| <b>Weights</b>  |   |
| Weight, approx.   | 280 g   |
| <b>last modified:</b>   | 9/22/2021    |