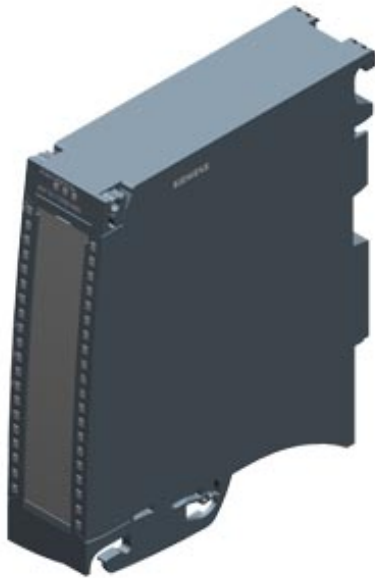


SIMATIC S7-1500 Analog input module, AI 8xU/I/R/RTD BA, 16 bit resolution, Accuracy 0.5%, 8 channels in groups of 8; Common mode voltage 4 V DC, Diagnostics; Hardware interrupts; Delivery including infeed element, shield bracket and shield terminal: Front connector (screw terminals or push-in) to be ordered separately



| General information   |                   |
|---|-------------------|
| Product type designation  | AI 8xU/I/R/RTD BA |
| HW functional status  | FS01              |
| Firmware version  | V1.0.0            |
| <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>Prioritized startup</li> </ul>                                     | No                |
| Engineering with  |                   |
| <ul style="list-style-type: none"> <li>STEP 7 TIA Portal configurable/integrated as of version</li> </ul> | V15.1 / V16       |
| <ul style="list-style-type: none"> <li>STEP 7 configurable/integrated as of version</li> </ul>            | V5.5 SP3 / -      |
| <ul style="list-style-type: none"> <li>PROFIBUS as of GSD version/GSD revision</li> </ul>                 | V1.0 / V5.1       |
| <ul style="list-style-type: none"> <li>PROFINET as of 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   | No   |
| <b>Power</b>  |  |
| Power available from the backplane bus  | 0.85 W   |
| <b>Power loss</b>   |  |
| Power loss, typ.  | 0.9 W  |
| <b>Analog inputs</b>  |  |
| Number of analog inputs   | 8  |
| <ul style="list-style-type: none"> <li>• For current measurement</li> <li>• For voltage measurement</li> <li>• For resistance/resistance thermometer measurement</li> </ul>   | 8<br>8<br>8  |
| permissible input voltage for voltage input (destruction limit), max.   | 12 V; 12 V continuous, 30 V for max. 1 s   |
| permissible input current for current input (destruction limit), max.   | 40 mA  |
| Technical unit for temperature measurement adjustable   | Yes; °C/°F/K   |
| <b>Input ranges (rated values), voltages</b>  |  |
| <ul style="list-style-type: none"> <li>• 0 to +5 V</li> <li>• 0 to +10 V</li> <li>• 1 V to 5 V <ul style="list-style-type: none"> <li>— Input resistance (1 V to 5 V)</li> </ul> </li> <li>• -1 V to +1 V <ul style="list-style-type: none"> <li>— Input resistance (-1 V to +1 V)</li> </ul> </li> <li>• -10 V to +10 V <ul style="list-style-type: none"> <li>— Input resistance (-10 V to +10 V)</li> </ul> </li> <li>• -2.5 V to +2.5 V</li> <li>• -25 mV to +25 mV</li> <li>• -250 mV to +250 mV</li> <li>• -5 V to +5 V <ul style="list-style-type: none"> <li>— Input resistance (-5 V to +5 V)</li> </ul> </li> <li>• -50 mV to +50 mV <ul style="list-style-type: none"> <li>— Input resistance (-50 mV to +50 mV)</li> </ul> </li> <li>• -500 mV to +500 mV <ul style="list-style-type: none"> <li>— Input resistance (-500 mV to +500 mV)</li> </ul> </li> <li>• -80 mV to +80 mV</li> </ul> | No<br>No<br>Yes<br>10 MΩ<br>Yes<br>10 MΩ<br>Yes<br>10 MΩ<br>No<br>No<br>No<br>Yes<br>10 MΩ<br>Yes<br>10 MΩ<br>Yes<br>10 MΩ<br>No |
| <b>Input ranges (rated values), currents</b>  |  |
| <ul style="list-style-type: none"> <li>• 0 to 10 mA</li> <li>• 0 to 20 mA <ul style="list-style-type: none"> <li>— Input resistance (0 to 20 mA)</li> </ul> </li> </ul>   | No<br>Yes<br>25 Ω; Plus approx. 42 ohms for overvoltage protection by PTC  |

- -20 mA to +20 mA
  - Input resistance (-20 mA to +20 mA)
- 4 mA to 20 mA
  - Input resistance (4 mA to 20 mA)

Yes  
25 Ω; Plus approx. 42 ohms for overvoltage protection by PTC

Yes  
25 Ω; Plus approx. 42 ohms for overvoltage protection by PTC

**Input ranges (rated values), thermocouples**

- Type B
- Type C
- Type E
- Type J
- Type K
- Type L
- Type N
- Type R
- Type S
- Type T
- Type U
- Type TXK/TXK(L) to GOST

No

No

No

No

No

No

No

No

No

No

No

No

**Input ranges (rated values), resistance thermometer**

- Cu 10
- Cu 10 according to GOST
- Cu 50
- Cu 50 according to GOST
- Cu 100
- Cu 100 according to GOST
- Ni 10
- Ni 10 according to GOST
- Ni 100
  - Input resistance (Ni 100)
- Ni 100 according to GOST
- Ni 1000
  - Input resistance (Ni 1000)
- Ni 1000 according to GOST
- LG-Ni 1000
  - Input resistance (LG-Ni 1000)
- Ni 120
- Ni 120 according to GOST
- Ni 200
- Ni 200 according to GOST
- Ni 500
- Ni 500 according to GOST
- Pt 10

No

No

No

No

No

No

No

No

No

No

Yes; Standard/climate

10 MΩ

No

Yes; Standard/climate

10 MΩ

No

Yes; Standard/climate

10 MΩ

No

No

No

No

No

No

No

No

|  |   |
|--|---|
| • Pt 10 according to GOST  | No  |
| • Pt 50  | No  |
| • Pt 50 according to GOST  | No  |
| • Pt 100   | Yes; Standard/climate                                   |
| — Input resistance (Pt 100)  | 10 M $\Omega$   |
| • Pt 100 according to GOST   | No  |
| • Pt 1000  | Yes; Standard/climate                                   |
| — Input resistance (Pt 1000)   | 10 M $\Omega$   |
| • 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  | Yes   |
| — Input resistance (0 to 600 ohms)                                     | 10 M $\Omega$   |
| • 0 to 3000 ohms   | No  |
| • 0 to 6000 ohms   | Yes   |
| — Input resistance (0 to 6000 ohms)                                    | 10 M $\Omega$   |
| • PTC  | Yes   |
| — Input resistance (PTC)   | 10 M $\Omega$   |
| <b>Cable length</b>  |   |
| • shielded, max.   | 200 m; 50 m at 50 mV                                    |
| <b>Analog value generation for the inputs</b>                          |   |
| Measurement principle  | integrating   |
| <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)  | 2,5 / 16,67 / 20 / 100 ms                               |
| • Basic conversion time, including integration time (ms)               | 10 / 24 / 27 / 107 ms                                   |
| — additional conversion time for wire-break monitoring                 | 4 ms (to be considered in R/RTD/U 1 to 5 V measurement) |
| — additional conversion time for resistance measurement                | 8 ms  |
| • Interference voltage suppression for interference frequency f1 in Hz | 400 / 60 / 50 / 10 Hz                                   |
| <b>Smoothing of measured values</b>                                    |   |
| • parameterizable  | Yes   |

- Step: None
- Step: low
- Step: Medium
- Step: High

Yes  
Yes  
Yes  
Yes

## Encoder

### Connection of signal encoders

- for voltage measurement
- for current measurement as 2-wire transducer
- for current measurement as 4-wire transducer
- for resistance measurement with two-wire connection
- for resistance measurement with three-wire connection

Yes  
Yes; with external supply  
Yes  
Yes; Only for PTC  
Yes; All measuring ranges except PTC; internal compensation of the cable resistances

## Errors/accuracies

|   |           |
|---|-----------|
| Linearity error (relative to input range), (+/-)                          | 0.1 %     |
| Temperature error (relative to input range), (+/-)                        | 0.006 %/K |
| Crosstalk between the inputs, max.  | -50 dB    |
| 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, (+/-)
- Current, relative to input range, (+/-)
- Resistance, relative to input range, (+/-)
- Resistance thermometer, relative to input range, (+/-)

0.5 %  
0.5 %  
0.5 %  
Ptxxx Standard: ±1.2 K, Ptxxx Climate: ±0.8 K, Nixxx Standard: ±0.8 K, Nixxx Climate: ±0.8 K

### Basic error limit (operational limit at 25 °C)

- Voltage, relative to input range, (+/-)
- Current, relative to input range, (+/-)
- Resistance, relative to input range, (+/-)
- Resistance thermometer, relative to input range, (+/-)

0.3 %  
0.3 %  
0.3 %  
Ptxxx Standard: ±1.0 K, Ptxxx Climate: ±0.5 K, Nixxx Standard: ±0.5 K, Nixxx Climate: ±0.5 K

### 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.
- Common mode voltage, max.
- Common mode interference, min.

40 dB  
4 V  
60 dB

## Interrupts/diagnostics/status information

|                            |  |
|----------------------------|--|
| Diagnostics function       | Yes  |
| <b>Alarms</b>              |  |
| • Diagnostic alarm         | Yes  |
| • Limit value alarm        | Yes; two upper and two lower limit values in each case |
| <b>Diagnostic messages</b> |  |

- |                                 |  |
|---------------------------------|--|
| • Monitoring the supply voltage | No   |
| • Wire-break                    | Yes; Only for 1 ... 5 V, 4 ... 20 mA, R, and RTD |
| • Short-circuit                 | No   |
| • Group error                   | No   |
| • Overflow/underflow            | Yes  |

#### Diagnostics indication LED

- |  |                |
|--|----------------|
| • RUN LED                                    | Yes; green LED |
| • ERROR LED                                  | Yes; red LED   |
| • MAINT LED                                  | No             |
| • Monitoring of the supply voltage (PWR-LED) | No             |
| • Channel status display                     | Yes; green LED |
| • for channel diagnostics                    | Yes; red LED   |
| • for module diagnostics                     | Yes; red LED   |

#### Potential separation

##### Potential separation channels

- |  |     |
|--|-----|
| • between the channels                   | No  |
| • between the channels, in groups of     | 8   |
| • between the channels and backplane bus | Yes |

#### Isolation

|                       |                      |
|-----------------------|----------------------|
| Isolation tested with | 707 V DC (type test) |
|-----------------------|----------------------|

#### Ambient conditions

##### Ambient temperature during operation

- |                                 |       |
|---------------------------------|-------|
| • horizontal installation, min. | 0 °C  |
| • horizontal installation, max. | 60 °C |
| • vertical installation, min.   | 0 °C  |
| • vertical installation, max.   | 40 °C |

##### Altitude during operation relating to sea level

- |   |  |
|---|--|
| • Installation altitude above sea level, max. | 5 000 m; Restrictions for installation altitudes > 2 000 m, see manual |
|---|--|

#### Dimensions

|        |        |
|--------|--------|
| Width  | 35 mm  |
| Height | 147 mm |
| Depth  | 129 mm |

#### Weights

|                 |       |
|-----------------|-------|
| Weight, approx. | 250 g |
|-----------------|-------|

|                       |            |
|-----------------------|------------|
| <b>last modified:</b> | 04/15/2020 |
|-----------------------|------------|