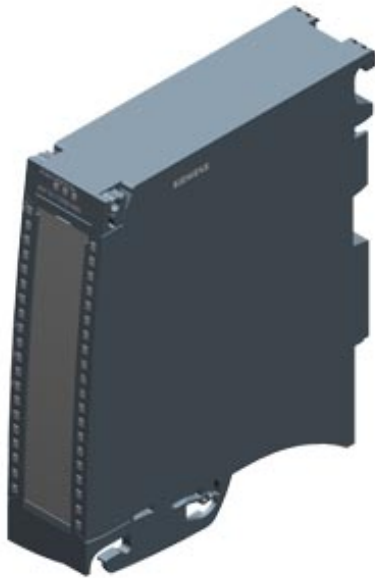


SIMATIC S7-1500 Analog input module, AI 8xU/I/R/RTD BA, 16 bit resolution, Accuracy 0.5%, 8 channels in groups of 8; Common mode voltage 4 V DC, Diagnostics; Hardware interrupts; Delivery including infeed element, shield bracket and shield terminal: Front connector (screw terminals or push-in) to be 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
• For current measurement	8
• For voltage measurement	8
• For resistance/resistance thermometer measurement	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>	
• 0 to +5 V	No
• 0 to +10 V	No
• 1 V to 5 V	Yes
— Input resistance (1 V to 5 V)	10 MΩ
• -1 V to +1 V	Yes
— Input resistance (-1 V to +1 V)	10 MΩ
• -10 V to +10 V	Yes
— Input resistance (-10 V to +10 V)	10 MΩ
• -2.5 V to +2.5 V	No
• -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)	10 MΩ
• -50 mV to +50 mV	Yes
— Input resistance (-50 mV to +50 mV)	10 MΩ
• -500 mV to +500 mV	Yes
— Input resistance (-500 mV to +500 mV)	10 MΩ
• -80 mV to +80 mV	No
<b>Input ranges (rated values), currents</b>	
• 0 to 10 mA	No
• 0 to 20 mA	Yes
— Input resistance (0 to 20 mA)	25 Ω; Plus approx. 42 ohms for overvoltage protection by PTC



• 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
-----------------	-------

**last modified:** 04/15/2020