



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"> FW update possible 	Yes
Product function	
<ul style="list-style-type: none"> I&M data 	Yes; I&M0 to I&M3
<ul style="list-style-type: none"> Prioritized startup 	No
Engineering with	
<ul style="list-style-type: none"> STEP 7 TIA Portal configurable/integrated from version 	V15.1 / V16
<ul style="list-style-type: none"> STEP 7 configurable/integrated from version 	V5.5 SP3 / -
<ul style="list-style-type: none"> PROFIBUS from GSD version/GSD revision 	V1.0 / V5.1
<ul style="list-style-type: none"> PROFINET from GSD version/GSD revision 	V2.3 / -
Operating mode	
<ul style="list-style-type: none"> Oversampling 	No
<ul style="list-style-type: none"> MSI 	Yes
CiR - Configuration in RUN	
Reparameterization possible in RUN	Yes
Calibration possible in RUN	No
Power	
Power available from the backplane bus	0.85 W
Power loss	
Power loss, typ.	0.9 W
Analog inputs	
Number of analog inputs	8
<ul style="list-style-type: none"> For current measurement 	8
<ul style="list-style-type: none"> For voltage measurement 	8
<ul style="list-style-type: none"> 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
Constant measurement current for resistance-type transmitter, typ.	230 ... 370 μ A
Technical unit for temperature measurement adjustable	Yes; °C/°F/K
Input ranges (rated values), voltages	
<ul style="list-style-type: none"> 0 to +5 V 	No
<ul style="list-style-type: none"> 0 to +10 V 	No
<ul style="list-style-type: none"> 1 V to 5 V 	Yes
— Input resistance (1 V to 5 V)	10 M Ω

• -1 V to +1 V — Input resistance (-1 V to +1 V)	Yes 10 MΩ
• -10 V to +10 V — Input resistance (-10 V to +10 V)	Yes 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 — Input resistance (-5 V to +5 V)	Yes 10 MΩ
• -50 mV to +50 mV — Input resistance (-50 mV to +50 mV)	Yes 10 MΩ
• -500 mV to +500 mV — Input resistance (-500 mV to +500 mV)	Yes 10 MΩ
• -80 mV to +80 mV	No
Input ranges (rated values), currents	
• 0 to 20 mA — Input resistance (0 to 20 mA)	Yes 25 Ω; Plus approx. 42 ohms for overvoltage protection by PTC
• -20 mA to +20 mA — Input resistance (-20 mA to +20 mA)	Yes 25 Ω; Plus approx. 42 ohms for overvoltage protection by PTC
• 4 mA to 20 mA — Input resistance (4 mA to 20 mA)	Yes 25 Ω; Plus approx. 42 ohms for overvoltage protection by PTC
Input ranges (rated values), thermocouples	
• 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 U	No
• Type TXK/TXK(L) to GOST	No
Input ranges (rated values), resistance thermometer	
• 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 — Input resistance (Ni 100)	Yes; Standard/climate 10 MΩ
• Ni 100 according to GOST	No
• Ni 1000 — Input resistance (Ni 1000)	Yes; Standard/climate 10 MΩ
• Ni 1000 according to GOST	No
• LG-Ni 1000 — Input resistance (LG-Ni 1000)	Yes; Standard/climate 10 MΩ
• 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 — Input resistance (Pt 100)	Yes; Standard/climate 10 MΩ
• Pt 100 according to GOST	No

<ul style="list-style-type: none"> ● Pt 1000 — Input resistance (Pt 1000) ● Pt 1000 according to GOST ● Pt 200 ● Pt 200 according to GOST ● Pt 500 ● Pt 500 according to GOST 	Yes; Standard/climate 10 MΩ No No No No No
Input ranges (rated values), resistors	
<ul style="list-style-type: none"> ● 0 to 150 ohms ● 0 to 300 ohms ● 0 to 600 ohms — Input resistance (0 to 600 ohms) ● 0 to 3000 ohms ● 0 to 6000 ohms — Input resistance (0 to 6000 ohms) ● PTC — Input resistance (PTC) 	No No Yes 10 MΩ No Yes 10 MΩ Yes 10 MΩ
Cable length	
<ul style="list-style-type: none"> ● shielded, max. 	200 m; 50 m at 50 mV
Analog value generation for the inputs	
Measurement principle	integrating
Integration and conversion time/resolution per channel	
<ul style="list-style-type: none"> ● Resolution with overrange (bit including sign), max. ● Integration time, parameterizable ● Integration time (ms) ● Basic conversion time, including integration time (ms) — additional conversion time for wire-break monitoring — additional conversion time for resistance measurement ● Interference voltage suppression for interference frequency f1 in Hz 	16 bit Yes 2,5 / 16,67 / 20 / 100 ms 10 / 24 / 27 / 107 ms 4 ms (to be considered in R/RTD/U 1 to 5 V measurement) 8 ms 400 / 60 / 50 / 10 Hz
Smoothing of measured values	
<ul style="list-style-type: none"> ● parameterizable ● Step: None ● Step: low ● Step: Medium ● Step: High 	Yes Yes Yes Yes Yes
Encoder	
Connection of signal encoders	
<ul style="list-style-type: none"> ● 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	
<ul style="list-style-type: none"> ● 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)	
<ul style="list-style-type: none"> ● 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	
<ul style="list-style-type: none"> • Series mode interference (peak value of interference < rated value of input range), min. 	40 dB
<ul style="list-style-type: none"> • Common mode voltage, max. 	4 V
<ul style="list-style-type: none"> • Common mode interference, min. 	60 dB
Interrupts/diagnostics/status information	
Diagnostics function	Yes
Alarms	
<ul style="list-style-type: none"> • Diagnostic alarm 	Yes
<ul style="list-style-type: none"> • Limit value alarm 	Yes; two upper and two lower limit values in each case
Diagnoses	
<ul style="list-style-type: none"> • Monitoring the supply voltage 	No
<ul style="list-style-type: none"> • Wire-break 	Yes; Only for 1 ... 5 V, 4 ... 20 mA, R, and RTD
<ul style="list-style-type: none"> • Short-circuit 	No
<ul style="list-style-type: none"> • Group error 	No
<ul style="list-style-type: none"> • Overflow/underflow 	Yes
Diagnostics indication LED	
<ul style="list-style-type: none"> • RUN LED 	Yes; green LED
<ul style="list-style-type: none"> • ERROR LED 	Yes; red LED
<ul style="list-style-type: none"> • MAINT LED 	No
<ul style="list-style-type: none"> • Monitoring of the supply voltage (PWR-LED) 	No
<ul style="list-style-type: none"> • Channel status display 	Yes; green LED
<ul style="list-style-type: none"> • for channel diagnostics 	Yes; red LED
<ul style="list-style-type: none"> • for module diagnostics 	Yes; red LED
Potential separation	
Potential separation channels	
<ul style="list-style-type: none"> • between the channels 	No
<ul style="list-style-type: none"> • between the channels, in groups of 	8
<ul style="list-style-type: none"> • between the channels and backplane bus 	Yes
Permissible potential difference	
between the inputs (UCM)	8 V DC
Between the inputs and MANA (UCM)	4 V DC
Isolation	
Isolation tested with	707 V DC (type test)
Ambient conditions	
Ambient temperature during operation	
<ul style="list-style-type: none"> • horizontal installation, min. 	0 °C
<ul style="list-style-type: none"> • horizontal installation, max. 	60 °C
<ul style="list-style-type: none"> • vertical installation, min. 	0 °C
<ul style="list-style-type: none"> • vertical installation, max. 	40 °C
Altitude during operation relating to sea level	
<ul style="list-style-type: none"> • 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:	1/19/2021 