



SIMATIC ET 200SP HA, analog input module, safety-oriented, F-AI 8xI 2-wire/4-wire HART HA, 16-bit, 2-wire/4-wire, SIL3 (IEC 61508), up to PL e (ISO 13849-1), suitable for terminal block H1, F1, color code CC00, channel diagnostics

General information	
Product type designation	F-AI 8xI 2-/4-wire HART HA
Firmware version	V1.0
• FW update possible	Yes
Usable terminal block	TB type H1, F1, H0 and N0
Color code for module-specific color identification plate	CC00
Product function	
• I&M data	Yes; I&M0 to I&M3
Engineering with	
• STEP 7 configurable/integrated from version	V5.6 SP2 (with S7 F Systems V6.4)
• PCS 7 configurable/integrated from version	V9.0 SP3 + UC04 (with F Systems V6.4)
• PROFINET from GSD version/GSD revision	GSDML V2.42 2023.01
Redundancy	
• Redundancy capability	Yes; with TB type F1
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 (rated value)	90 mA; without sensor supply
Encoder supply	
Number of outputs	8
Short-circuit protection	Yes
24 V encoder supply	
• 24 V	Yes
• Short-circuit protection	Yes
• Output current per channel, max.	30 mA
Power	
Power consumption from the backplane bus	90 mW
Power loss	
Power loss, typ.	2.8 W
Address area	
Address space per module	
• Inputs	22 byte
• Outputs	5 byte
Analog inputs	
Number of analog inputs	8
• For current measurement	8
permissible input current for current input (destruction limit),	35 mA

max.	
Input ranges (rated values), currents	
• 0 to 20 mA	Yes
— Input resistance (0 to 20 mA)	150 Ω
• 4 mA to 20 mA	Yes
— Input resistance (4 mA to 20 mA)	150 Ω
HART communication	
• Primary Master	Yes
• Secondary Master	No
• input resistance (with HART communication)	150 Ω; for operation with an external secondary master (e.g. communicator), an external load may be necessary to achieve a total impedance of 230 - 600 Ω.
Cable length	
• shielded, max.	1 000 m; shielded, twisted pair
Analog value generation for the inputs	
Measurement principle	Sigma Delta
Integration and conversion time/resolution per channel	
• Resolution with overrange (bit including sign), max.	16 bit
• Integration time, parameterizable	Yes
• Integration time (ms)	20 ms (at 50 Hz); 16.66 ms (at 60 Hz)
• Interference voltage suppression for interference frequency f1 in Hz	50 / 60 Hz
Smoothing of measured values	
• parameterizable	Yes; in 4 stages (1, 4, 16, 64 conversion cycles), channel-by-channel
Encoder	
Connection of signal encoders	
• for current measurement as 2-wire transducer	Yes
• for current measurement as 4-wire transducer	Yes
Errors/accuracies	
Crosstalk between the inputs, min.	-70 dB
Repeat accuracy in steady state at 25 °C (relative to input range), (+/-)	0.008 %
safety-relevant accuracy	
• up to 40 °C, max.	0.6 %; (0.7% in vertical installation)
• up to 70 °C, max.	0.9 %
note regarding accuracy	the safety-relevant accuracy consists of a basic error, a temperature-dependent drift, aging and internal safety measures
Influence of a HART signal modulated on the input signal in relation to input range	
• error at 16.6 ms integration time	0.11 %
• error at 20 ms integration time	0.11 %
Interference voltage suppression for $f = n \times (f1 \pm 1 \%)$, f1 = interference frequency	
• Series mode interference (peak value of interference < rated value of input range), min.	40 dB
• Common mode voltage, max.	35 V
• Common mode interference, min.	80 dB
Protocols	
HART protocol	Yes
• Protocol version	up to Revision 7
Interrupts/diagnostics/status information	
Alarms	
• Diagnostic alarm	Yes
Diagnoses	
• Monitoring the supply voltage	Yes
• Wire-break	Yes
• Short-circuit	Yes
• Overflow/underflow	Yes
Diagnostics indication LED	
• MAINT LED	Yes; Yellow 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
Potential separation	

Potential separation channels	
• between the channels	No
• between the channels and backplane bus	Yes
• Between the channels and load voltage L+	No
Permissible potential difference	
between the inputs (UCM)	30 V DC / 25 V AC
Isolation	
tested with	
• between backplane bus and load voltage	1 500 V DC (load voltage L+ and channels I+n bridged)
• between the backplane bus and functional ground (FE)	1 500 V DC
• between load voltage and functional ground (FE)	1 500 V DC (load voltage L+ and channels I+n bridged)
• between the channels and load voltage	370 V AC
• between the potential groups of the channels	370 V AC
Standards, approvals, certificates	
Highest safety class achievable in safety mode	
• Performance level according to ISO 13849-1	PLd (PLe for 1oo2 voting on the F-CPU)
• Category according to ISO 13849-1	cat. 3 (cat. 4 for 1oo2 voting on the F-CPU)
• 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	< 27E-05 (< 9E-05 for 1oo2 voting on the F-CPU)
— High demand/continuous mode: PFH in accordance with SIL3	< 4E-09 1/h (< 1E-09 1/h for 1oo2 voting on the F-CPU)
Ambient conditions	
Ambient temperature during operation	
• horizontal installation, min.	-40 °C
• horizontal installation, max.	70 °C
• vertical installation, min.	-40 °C
• vertical installation, max.	60 °C
Dimensions	
Width	22.5 mm
Height	115 mm
Depth	138 mm
Weights	
Weight, approx.	220 g
Classifications	

	Version	Classification
eClass	14	27-24-26-01
eClass	12	27-24-26-01
eClass	9.1	27-24-26-01
eClass	9	27-24-26-01
eClass	8	27-24-26-01
eClass	7.1	27-24-26-01
eClass	6	27-24-26-01
ETIM	9	EC001596
ETIM	8	EC001596
ETIM	7	EC001596
IDEA	4	3562
UNSPSC	15	32-15-17-05

Approvals / Certificates	
General Product Approval	



KC



For use in hazardous locations

[Declaration of Con-
formity](#)



[Miscellaneous](#)

Functional Safety

Maritime application



[NK / Nippon Kaiji Ky-
okai](#)

Maritime application

Environment

Industrial Communication



[CCS \(China Classifica-
tion Society\)](#)

Siemens
EcoTech



[PROFIsafe](#)

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