

SIPLUS ET 200SP F-AI 4xI 2-/4-wire HF -25...+60°C with conformal coating based on 6ES7136-6AA00-0CA1. electronic module ET 200SP, F-AI 4xI(0)4..20mA HF FAILSAFE ANALOG INPUTS up to PL E (ISO 13849) up to SIL 3 (IEC 61508)



Figure similar

General information	
Product type designation	F-AI 4xI 0(4)..20mA 2-/4-wire HF
Firmware version	
<ul style="list-style-type: none"> <li>FW update possible</li> </ul>	Yes
usable BaseUnits	BU type A0, A1
Color code for module-specific color identification plate	CC00
Product function	
<ul style="list-style-type: none"> <li>I&amp;M data</li> </ul>	Yes; I&M0 to I&M3
CiR – Configuration in RUN	
Reparameterization possible in RUN	No
Calibration possible in RUN	No
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)	0.38 A
Current consumption, max.	0.4 A
Encoder supply	
24 V encoder supply	
<ul style="list-style-type: none"> <li>• 24 V</li> </ul>	Yes; min. L+ (-1.5 V)
<ul style="list-style-type: none"> <li>• Short-circuit protection</li> </ul>	Yes
<ul style="list-style-type: none"> <li>• Output current, max.</li> </ul>	300 mA; total current of all encoders/channels
Power	
Power available from the backplane bus	70 mW
Power loss	
Power loss, typ.	2 W
Address area	
Address space per module	
<ul style="list-style-type: none"> <li>• Inputs</li> </ul>	14 byte; S7-300/400F CPU, 13 byte
<ul style="list-style-type: none"> <li>• Outputs</li> </ul>	5 byte; S7-300/400F CPU, 4 byte
Hardware configuration	
Automatic encoding	
<ul style="list-style-type: none"> <li>• Electronic coding element type F</li> </ul>	Yes
Analog inputs	
Number of analog inputs	4
<ul style="list-style-type: none"> <li>• For current measurement</li> </ul>	4
permissible input current for current input (destruction limit), max.	35 mA
Input ranges (rated values), currents	
<ul style="list-style-type: none"> <li>• 0 to 20 mA</li> </ul>	Yes
— Input resistance (0 to 20 mA)	125 Ω
<ul style="list-style-type: none"> <li>• 4 mA to 20 mA</li> </ul>	Yes
— Input resistance (4 mA to 20 mA)	125 Ω
Cable length	
<ul style="list-style-type: none"> <li>• shielded, max.</li> </ul>	1 000 m
Analog value generation for the inputs	
Measurement principle	Sigma Delta
Integration and conversion time/resolution per channel	
<ul style="list-style-type: none"> <li>• Resolution with overrange (bit including sign), max.</li> </ul>	16 bit
<ul style="list-style-type: none"> <li>• Integration time, parameterizable</li> </ul>	Yes
<ul style="list-style-type: none"> <li>• Integration time (ms)</li> </ul>	20 / 16,667

<ul style="list-style-type: none"> <li>• Interference voltage suppression for interference frequency f1 in Hz</li> </ul>	50 / 60 Hz
<b>Smoothing of measured values</b>	
<ul style="list-style-type: none"> <li>• Number of smoothing levels</li> </ul>	7
<ul style="list-style-type: none"> <li>• parameterizable</li> </ul>	Yes
<ul style="list-style-type: none"> <li>• Step: None</li> </ul>	Yes; 1x conversion cycle time
<ul style="list-style-type: none"> <li>• Step: low</li> </ul>	Yes; 2x / 4x conversion cycle time
<ul style="list-style-type: none"> <li>• Step: Medium</li> </ul>	Yes; 8x / 16x conversion cycle time
<ul style="list-style-type: none"> <li>• Step: High</li> </ul>	Yes; 32x / 64x conversion cycle time
<b>Encoder</b>	
<b>Connection of signal encoders</b>	
<ul style="list-style-type: none"> <li>• for current measurement as 2-wire transducer</li> </ul>	Yes
<ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li>— Burden of 2-wire transmitter, max.</li> </ul> </li> </ul>	650 Ω
<ul style="list-style-type: none"> <li>• for current measurement as 4-wire transducer</li> </ul>	Yes
<b>Errors/accuracies</b>	
Linearity error (relative to input range), (+/-)	0.1 %
Temperature error (relative to input range), (+/-)	0.023 %/K
Repeat accuracy in steady state at 25 °C (relative to input range), (+/-)	0.1 %
<b>Operational error limit in overall temperature range</b>	
<ul style="list-style-type: none"> <li>• Current, relative to input range, (+/-)</li> </ul>	2.6 %
<b>Basic error limit (operational limit at 25 °C)</b>	
<ul style="list-style-type: none"> <li>• Current, relative to input range, (+/-)</li> </ul>	0.1 %
<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>	40 dB
<ul style="list-style-type: none"> <li>• Common mode interference, min.</li> </ul>	70 dB
<b>Interrupts/diagnostics/status information</b>	
<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
<b>Diagnostic messages</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; Measuring range 4 to 20 mA only
<ul style="list-style-type: none"> <li>• Short-circuit</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 PWR 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

- for module diagnostics

Yes; green/red LED

## Potential separation

### Potential separation channels

- between the channels
- between the channels and backplane bus
- between the channels and the power supply of the electronics

No

Yes

Yes

## Permissible potential difference

between the inputs (UCM)

10 Vpp

## Isolation

Isolation tested with

707 V DC (type test)

## Standards, approvals, certificates

### Highest safety class achievable in safety mode

- Performance level according to ISO 13849-1
- Category according to ISO 13849-1
- SIL acc. to IEC 61508

PLe

Cat. 4

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

< 5.00E-05

— High demand/continuous mode: PFH in accordance with SIL3

< 1.00E-09 1/h

## Ambient conditions

### Ambient temperature during operation

- horizontal installation, min.
- horizontal installation, max.
- vertical installation, min.
- vertical installation, max.

-25 °C; = Tmin (incl. condensation/frost)

60 °C; = Tmax; +70 °C with configured empty slots to the left and right of the module

-25 °C; = Tmin

50 °C

### Altitude during operation relating to sea level

- Installation altitude above sea level, max.
- Ambient air temperature-barometric pressure-altitude

2 000 m

Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)

### Relative humidity

- With condensation, tested in accordance with IEC 60068-2-38, max.

100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation

## Resistance

### Coolants and lubricants

— Resistant to commercially available coolants and lubricants

Yes; Incl. diesel and oil droplets in the air

Use in stationary industrial systems

— to biologically active substances according to EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request
— to chemically active substances according to EN 60721-3-3	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
— to mechanically active substances according to EN 60721-3-3	Yes; Class 3S4 incl. sand, dust, *

#### Use on ships/at sea

— to biologically active substances according to EN 60721-3-6	Yes; Class 6B2 mold, fungal and dry rot spores (excluding fauna)
— to chemically active substances according to EN 60721-3-6	Yes; Class 6C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
— to mechanically active substances according to EN 60721-3-6	Yes; Class 6S3 incl. sand, dust; *

#### Remark

— Note regarding classification of environmental conditions acc. to EN 60721, EN 60654-4 and ANSI/ISA-71.04	* The supplied plug covers must remain in place over the unused interfaces during operation!
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#### Conformal coating

<ul style="list-style-type: none"> <li>• Coatings for printed circuit board assemblies acc. to EN 61086</li> <li>• Protection against fouling acc. to EN 60664-3</li> <li>• Military testing according to MIL-I-46058C, Amendment 7</li> <li>• Qualification and Performance of Electrical Insulating Compound for Printed Board Assemblies according to IPC-CC-830A</li> </ul>	<p>Yes; Class 2 for high reliability</p> <p>Yes; Type 1 protection</p> <p>Yes; Discoloration of coating possible during service life</p> <p>Yes; Conformal coating, Class A</p>
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#### Dimensions

Width	15 mm
Height	73 mm
Depth	58 mm

#### Weights

Weight, approx.	48 g
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**last modified:** 05/12/2020