



SIMATIC ET 200SP HA, digital input module, safety-oriented F-DI 16x24VDC HA, SIL3 (IEC 61508), up to PL E (ISO 13849-1) suitable for terminal block H1, M1, color code CC01, channel diagnostics

General information	
Product type designation	F-DI 16x24VDC HA
Firmware version	V1.0
<ul style="list-style-type: none"> <li>FW update possible</li> </ul>	Yes
Usable terminal block	TB type H1, M1, H0 and N0
Color code for module-specific color identification plate	CC01
Product function	
<ul style="list-style-type: none"> <li>I&amp;M data</li> </ul>	Yes; I&M0 to I&M3
Engineering with	
<ul style="list-style-type: none"> <li>PCS 7 configurable/integrated from version</li> </ul>	V9.0 SP3
Operating mode	
<ul style="list-style-type: none"> <li>DI</li> </ul>	Yes
Redundancy	
<ul style="list-style-type: none"> <li>Redundancy capability</li> </ul>	Yes; With TB type M1
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)	80 mA
Current consumption, max.	150 mA
Encoder supply	
Number of outputs	16
24 V encoder supply	
<ul style="list-style-type: none"> <li>24 V</li> <li>Short-circuit protection</li> </ul>	Yes; Min. L+ (-1 V) Yes; electronic (response threshold 0.7 A to 1.5 A; for IO redundancy up to 3 A). Ensure sufficient cable cross-section to attain the response threshold. Depending on the cable cross-section used, there may be constraints regarding the usable length of cable
<ul style="list-style-type: none"> <li>Output current per channel, max.</li> <li>Output current per module, max.</li> </ul>	0.5 A 8 A
Power	
Power available from the backplane bus	90 mW
Power loss	
Power loss, typ.	3.2 W; All channels equipped with internal encoder supply and switch contacts, at rated voltage and ambient temperature
Address area	
Address space per module	
<ul style="list-style-type: none"> <li>Inputs</li> <li>Outputs</li> </ul>	9 byte 5 byte

Hardware configuration	
Automatic encoding	Yes
Digital inputs	
Number of digital inputs	16
Digital inputs, parameterizable	Yes
Source/sink input	Yes; P-reading
Input characteristic curve in accordance with IEC 61131, type 1	Yes
Input characteristic curve in accordance with IEC 61131, type 2	No
Input characteristic curve in accordance with IEC 61131, type 3	No
Pulse extension	Yes
• Length	off, 50 ms, 100 ms, 200 ms, 500 ms, 1 s, 2 s
Time stamping	Yes; Resolution 10 ms
Signal change flutter	Yes
Flutter observation window	Yes
Input voltage	
• Rated value (DC)	24 V
• for signal "0"	-30 to +5 V
• for signal "1"	+15 to +30 V
Input current	
• for signal "1", typ.	2.5 mA
Input delay (for rated value of input voltage)	
for standard inputs	
— parameterizable	Yes
Cable length	
• shielded, max.	1 000 m
• unshielded, max.	600 m
Encoder	
Connectable encoders	
• 2-wire sensor	Yes
— permissible quiescent current (2-wire sensor), max.	1.5 mA
Interrupts/diagnostics/status information	
Diagnostics function	Yes
Alarms	
• Diagnostic alarm	Yes
• Maintenance interrupt	Yes
Diagnoses	
• Diagnostic information readable	Yes
• Monitoring the supply voltage	Yes; Module-wise
— parameterizable	Yes
• Monitoring of encoder power supply	Yes; channel by channel
• Wire-break	Yes; channel by channel, optional protective circuit for preventing wire-break diagnostics in the case of simple encoder contacts: 18 kOhm to 30 kOhm, typical 26 kOhm
• Short-circuit to M	Yes; Encoder supply to M, channel by channel
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 LED
Potential separation	
Potential separation channels	
• between the channels	No
• between the channels and backplane bus	Yes
• between the channels and the power supply of the electronics	No
Isolation	
Isolation tested with	1 500 V DC/1 min, type test
Standards, approvals, certificates	
Suitable for safety functions	Yes
Highest safety class achievable in safety mode	

<ul style="list-style-type: none"> <li>• Performance level according to ISO 13849-1</li> <li>• Category according to ISO 13849-1</li> <li>• SIL acc. to IEC 61508</li> </ul>	<p>Up to PLe</p> <p>Cat. 4</p> <p>Up to SIL 3</p>
<b>Probability of failure (for service life of 20 years and repair time of 100 hours)</b>	
— Low demand mode: PFDavg in accordance with SIL3	< 3.00E-05
— High demand/continuous mode: PFH in accordance with SIL3	< 2.00E-09 1/h
<b>Ambient conditions</b>	
<b>Ambient temperature during operation</b>	
<ul style="list-style-type: none"> <li>• horizontal installation, min.</li> <li>• horizontal installation, max.</li> <li>• vertical installation, min.</li> <li>• vertical installation, max.</li> </ul>	<p>-40 °C</p> <p>70 °C</p> <p>-40 °C</p> <p>60 °C</p>
<b>Dimensions</b>	
Width	22.5 mm
Height	115 mm
Depth	138 mm
<b>Weights</b>	
Weight, approx.	210 g

**last modified:** 5/4/2023 