

## Data sheet

## 6ES7288-1ST20-0AA0

\*\*\* spare part \*\*\* SIMATIC S7-200 SMART, CPU ST20, standard CPU, DC/DC/DC, onboard I/O: 12 DI 24 V DC; 8 DO 24 V DC; power supply: DC 20.4-28.8V DC, program/data memory 20 KB

General information	
Product type designation	CPU ST20 DC/DC/DC
Engineering with	
<ul style="list-style-type: none"> <li>Programming package</li> </ul>	STEP 7 Micro/WIN SMART
Installation type/mounting	
Rail mounting	Yes; Standard - DIN rail
Supply voltage	
permissible range, lower limit (DC)	20.4 V
permissible range, upper limit (DC)	28.8 V
Input current	
Current consumption, max.	720 mA; 24 V DC
Inrush current, max.	11.7 A; at 28.8 V
Output current	
Current output, max.	300 mA; 24 V DC Sensor Power
for backplane bus (5 V DC), max.	1.4 A; max. 5 V DC for EM bus
Power loss	
Power loss, max.	20 W
Memory	
Type of memory	DDR
Flash	Yes
RAM	Yes
Memory available for user data	8 kbyte
Memory size	12 kbyte; Program memory
Micro Memory Card	Yes; microSDHC Card (optional)
Backup	
<ul style="list-style-type: none"> <li>present</li> </ul>	Yes; Maintenance free, RTC requires 7 days.
CPU processing times	
for bit operations, typ.	150 ns; / instruction
for word operations, typ.	1.2 µs; / instruction
for floating point arithmetic, typ.	3.6 µs; / instruction
Address area	
I/O address area	
<ul style="list-style-type: none"> <li>Inputs</li> </ul>	144 byte; 256 bit of digital inputs & 56 words of analog inputs
<ul style="list-style-type: none"> <li>Outputs</li> </ul>	144 byte; 256 bit of digital outputs & 56 words of analog outputs
Time of day	
Clock	
<ul style="list-style-type: none"> <li>Type</li> </ul>	Hardware clock, no battery backup
<ul style="list-style-type: none"> <li>Hardware clock (real-time)</li> </ul>	Yes
<ul style="list-style-type: none"> <li>Backup time</li> </ul>	7 d
<ul style="list-style-type: none"> <li>Deviation per day, max.</li> </ul>	120 s; within 120s/month at 25 °C
Digital inputs	
Number of digital inputs	12
Input voltage	
<ul style="list-style-type: none"> <li>Type of input voltage</li> </ul>	DC
<ul style="list-style-type: none"> <li>Rated value (DC)</li> </ul>	24 V
<ul style="list-style-type: none"> <li>for signal "0"</li> </ul>	10.0 to 10.3 < 1 V DC; 10.4 to 12.7 < 5 V DC
<ul style="list-style-type: none"> <li>for signal "1"</li> </ul>	10.0 to 10.3 > 4V; 10.4 to 12.7 > 15V
Input current	

• for signal "0", max. (permissible quiescent current)	1 mA
• for signal "1", typ.	4 mA
<b>Input delay (for rated value of input voltage)</b>	
for standard inputs	
— parameterizable	Yes; 0.2 ms, 0.4 ms, 0.8 ms, 1.6 ms, 3.2 ms, 6.4 ms and 12.8 ms, selectable in groups of four
— at "0" to "1", min.	0.2 ms
— at "0" to "1", max.	12.8 ms
for interrupt inputs	
— parameterizable	Yes
for technological functions	
— parameterizable	Yes; 6 Single phase: 4 HSCs at 200 kHz; 2 HSCs at 30 kHz 4 A/B phase: 2 HSCs at 100 kHz; 2 HSCs at 20 kHz
<b>Cable length</b>	
• shielded, max.	500 m; 50 m for technological functions
• unshielded, max.	300 m; for technological functions: No
<b>Digital outputs</b>	
Number of digital outputs	8; Transistor
• of which high-speed outputs	3; 100 kHz Pulse Train Output
Short-circuit protection	No
<b>Switching capacity of the outputs</b>	
• with resistive load, max.	0.5 A
• on lamp load, max.	5 W
<b>Output voltage</b>	
• for signal "1", min.	20 V DC
<b>Output current</b>	
• for signal "1" rated value	0.5 A
• for signal "0" residual current, max.	10 µA
<b>Output delay with resistive load</b>	
• "0" to "1", max.	3 µs; of the standard outputs, max. 3 µs; of the pulse outputs, max. (Q a.0 to Q a.3) 1 µs
• "1" to "0", max.	200 µs; of the standard outputs, max. 200 µs; of the pulse outputs, max. (Q a.0 to Q a.3) 50 µs
<b>Switching frequency</b>	
• of the pulse outputs, with resistive load, max.	100 kHz
<b>Relay outputs</b>	
• Number of relay outputs	0
<b>Cable length</b>	
• shielded, max.	500 m
• unshielded, max.	150 m
<b>Interfaces</b>	
Number of industrial Ethernet interfaces	1
Number of RS 485 interfaces	1
<b>1. Interface</b>	
Interface type	PROFINET
Isolated	Yes; Transformer isolated, 1,500V AC
automatic detection of transmission rate	Yes; 10/100 Mbit/s
Autonegotiation	Yes
Autocrossing	Yes
<b>Interface types</b>	
• RJ 45 (Ethernet)	Yes
<b>Protocols</b>	
• PROFINET IO Controller	Yes; Since V2.4
• PROFINET IO Device	Yes; I-Device since V2.5
<b>PROFINET IO Controller</b>	
• Transmission rate, max.	100 Mbit/s
<b>Services</b>	
— Number of connectable IO Devices, max.	8
— Updating time	4 ms; The minimum value of the update time also depends on the communication component set for PROFINET IO, on the number of IO devices

	and the quantity of configured user data.
<b>Address area</b>	
— Inputs, max.	128 byte; Per device
— Outputs, max.	128 byte; Per device
<b>2. Interface</b>	
Interface type	RS 485 (max. 187.5 kbps)
<b>Interface types</b>	
• RS 485	Yes
<b>PROFIBUS DP master</b>	
<b>Services</b>	
— S7 communication	Yes
<b>Protocols</b>	
Supports protocol for PROFINET IO	Yes; RT Controller (since FW V2.4) & I-Device (since FW V2.5)
PROFIBUS	Yes; Via CM DP module
<b>Protocols (Ethernet)</b>	
• TCP/IP	Yes
<b>Communication functions</b>	
<b>S7 communication</b>	
• supported	Yes
• as server	Yes
• as client	Yes
<b>Test commissioning functions</b>	
<b>Forcing</b>	
• Forcing	Yes
<b>Integrated Functions</b>	
<b>Counter</b>	
• Number of counters	6
PID controller	Yes; PID closed-loop control function: Continuous controller outputs, binary controller outputs, automatic/manual mode, max. 8 loops
Number of pulse outputs	3
<b>EMC</b>	
<b>Interference immunity against discharge of static electricity</b>	
• Interference immunity against discharge of static electricity acc. to IEC 61000-4-2	Yes
— Test voltage at air discharge	8 kV
— Test voltage at contact discharge	4 kV
<b>Interference immunity against high-frequency electromagnetic fields</b>	
• Interference immunity against high-frequency radiation acc. to IEC 61000-4-3	Yes; 10 V/m, 80 to 1 000 MHz (to IEC 61000-4-3); 10 V/m, 900 MHz, 1.89 GHz, 50% ED (to IEC 61000-4-3)
<b>Interference immunity to cable-borne interference</b>	
• Interference immunity on supply lines acc. to IEC 61000-4-4	Yes; 2 kV acc. to IEC 61000-4-4, burst
• Interference immunity on signal cables acc. to IEC 61000-4-4	Yes; ±2 kV acc. to IEC 61000-4-4, Burst
<b>Interference immunity against conducted variable disturbance induced by high-frequency fields</b>	
• Interference immunity against high frequency current feed acc. to IEC 61000-4-6	Yes; 10 V, 150 kHz to 80 MHz (to IEC 61000-4-6)
<b>Emission of radio interference acc. to EN 55 011</b>	
• Limit class A, for use in industrial areas	Yes; EN 61000-6-4, interference emission: Intended for use in industrial areas.
<b>Emission of conducted and non-conducted interference</b>	
• Interference emission via line/AC current cables	EN 61000-6-4, interference emission: Intended for use in industrial areas.
<b>Degree and class of protection</b>	
IP degree of protection	IP20
<b>Standards, approvals, certificates</b>	
CE mark	Yes
<b>Ambient conditions</b>	
<b>Free fall</b>	
• Fall height, max.	0.3 m; five times, in product package
<b>Ambient temperature during operation</b>	
• min.	0 °C

• max.	55 °C
• horizontal installation, min.	0 °C
• horizontal installation, max.	55 °C
• vertical installation, min.	0 °C
• vertical installation, max.	45 °C
<b>Ambient temperature during storage/transportation</b>	
• min.	-40 °C
• max.	70 °C
<b>Air pressure acc. to IEC 60068-2-13</b>	
• Storage/transport, min.	660 hPa
• Storage/transport, max.	1 080 hPa
<b>Altitude during operation relating to sea level</b>	
• Installation altitude, min.	-1 000 m
• Installation altitude, max.	2 000 m
<b>Relative humidity</b>	
• Operation at 25 °C without condensation, max.	95 %
<b>Configuration</b>	
<b>Programming</b>	
Programming language	
— LAD	Yes
— FBD	Yes
— STL	Yes
<b>Dimensions</b>	
Width	90 mm
Height	100 mm
Depth	81 mm
<b>Weights</b>	
Weight, approx.	320 g

	Version	Classification
eClass	14	27-24-22-07
eClass	12	27-24-22-07
eClass	9.1	27-24-22-07
eClass	9	27-24-22-07
eClass	8	27-24-22-07
eClass	7.1	27-24-22-07
eClass	6	27-24-22-07
ETIM	10	EC000236
ETIM	9	EC000236
ETIM	8	EC000236
ETIM	7	EC000236
IDEA	4	3565
UNSPSC	15	32-15-17-05

**Approvals / Certificates**

**General Product Approval**



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