## **SIEMENS**

## **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

Product type designation CPU ST20 DC/DC/DC  Engineering with  • Programming package STEP 7 Micro/WIN SMART  Installation type/mounting  Rail mounting Yes; Standard - DIN rail		28.8V DC, program/data memory 20 KB
Engineering with  Programming package STEP 7 Micro/WIN SMART  Rail mounting Wes, Standard - DIN rail Stoudy voltage permissible range, upper limit (DC) permissible range, upp	General information	
Programming package   STEP 7 MicroWIN SMART	Product type designation	CPU ST20 DC/DC/DC
Nationaling   Yes; Standard - DIN rail	Engineering with	
Rail mounting   Yes; Standard - DIN rail	<ul> <li>Programming package</li> </ul>	STEP 7 Micro/WIN SMART
Supply voltage   parmisable range, lower limit (DC)   28.8 V	Installation type/mounting	
permissible range, toper limit (DC)   28.8 V	Rail mounting	Yes; Standard - DIN rail
permissible range, upper limit (DC)   28.8 V	Supply voltage	
Table   Current   Curren	permissible range, lower limit (DC)	20.4 V
Current consumption, max.	permissible range, upper limit (DC)	28.8 V
Current consumption, max.	Input current	
Inrush current, max.		720 mA; 24 V DC
Output current Current output, max for backplane bus (6 V DC), max. Power loss. Power loss, max.  Power loss, max.  Type of memory Type of memory Type of memory Type of memory Pakham Memory available for user data Memory size Present Person Present Present Present Prof bid operations, typ. For bid operations, typ. For for flading point arithmetic, typ.  Address area  I/O address area  I/		11.7 A; at 28.8 V
Current output, max.         300 mA; 24 V DC Sensor Power           for backplane bus (6 V DC), max.         1.4 Ar max. 5 V DC for EM bus           Power loss, max.         20 W           Momory         Type of memory           Flash         Yes           RAM         Yes           Memory available for user data         8 kbyte           Memory available for user data         8 kbyte           Memory card         12 kbyte; Program memory           Micro Memory Card         Yes; microSDHC Card (optional)           Backup         • present           • present         Yes; Maintenance free, RTC requires 7 days.           CPU processing times         12 kg; instruction           for bit operations, typ.         150 ns; / instruction           Address area         10 pouts           • Inputs         14 byte; 256 bit of digital inputs & 56 words of analog inputs           • Outputs         144 byte; 256 bit of digital inputs & 56 words of analog outputs           Time of day           Clock           • Type         Hardware clock, no battery backup           • Hardware clock (real-time)         Yes           • Backup time         7 d           • Deviation per day, max.         120 s; within 120s/month at 25 °C           D		
To backplane bus (5 V DC), max.		300 mA: 24 V DC Sensor Power
Power loss   Pow		
Power loss, max.   20 W   Momory   Type of memory   DDR   Flash   Yes   Yes   Memory available for user data   8 kbyte   Memory size   12 kbyte; Program memory   Micro Memory Card   Yes; microSDHC Card (optional)   Memory Size   12 kbyte; Program memory   Micro Memory Card   Yes; Maintenance free, RTC requires 7 days.   Power land   Power		,
Type of memory Type of memory Flash Yes RAM Yes Memory available for user data Memory size Micro Memory Card Memory Size Yes; microSDHC Card (optional) Backup **present **prese		20 W
Type of memory		
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  • present Yes; Maintenance free, RTC requires 7 days.  CPU processing times  for bit operations, typ. 150 ns; / instruction  for word operations, typ. 150 ns; / instruction  for floating point arithmetic, typ. 3.6 µs; / instruction  Address area  I/O a		DDR
RAM       Yes         Memory available for user data       8 kbyte         Memory size       12 kbyte; Program memory         Micro Memory Card       Yes; microSDHC Card (optional)         Backup       ***Processing times***         6 price perations, typ.       150 ns; / instruction         for bit operations, typ.       1.2 μs; / instruction         for floating point arithmetic, typ.       3.6 μs; / instruction         Address area         I/O address area         • Inputs       144 byte; 256 bit of digital inputs & 56 words of analog inputs         *** Type         • Hardware clock (real-time)       Yes         • Backup time       7 d         • Deviation per day, max.       120 s; within 120s/month at 25 °C         Digital inputs         Number of digital inputs       12         • Type of input voltage       DC         • Backup time       7 d         • Deviation per day, max.       120 s; within 120s/month at 25 °C         Digital inputs       1         • Fype of input voltage       DC         • Rated value (DC)       24 V         • for signal "0"       10.0 to 10.3 < 1 V DC; 10.4 to 12.7 < 5 V DC		
Memory available for user data 8 kbyte  Memory size 12 kbyte; Program memory  Micro Memory Card Yes; microSDHC Card (optional)  Backup  • present Yes; Maintenance free, RTC requires 7 days.  CPU processing times  for bit operations, typ. 150 ns; / instruction  for word operations, typ. 12 µs; / instruction  for floating point arithmetic, typ. 3.6 µs; / instruction  Address area  • Inputs 144 byte; 256 bit of digital inputs & 56 words of analog inputs  • Outputs 144 byte; 256 bit of digital outputs & 56 words of analog outputs  Time of day  Clock  • Type		
Memory size 12 kbyte; Program memory  Micro Memory Card Yes; microSDHC Card (optional)  Backup		
Micro Memory Card Yes; microSDHC Card (optional)  Backup  • present 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  • Inputs • Outputs 144 byte; 256 bit of digital inputs & 56 words of analog inputs • Outputs 144 byte; 256 bit of digital outputs & 56 words of analog outputs  Time of day  Clock  • Type • Hardware clock (real-time) Yes • Backup time • Deviation per day, max. 120 s; within 120s/month at 25 °C  Digital inputs  Number of digital inputs 12  • Type of input voltage • Type of		
e present  Processing times  for bit operations, typ. for floating point arithmetic, typ.  1.2 μs; / instruction for floating point arithmetic, typ.  2.6 μs; / instruction  3.6 μs; / instruction  4.6 μs; / instruction  4.7 α address area  1/O ad		
• present Yes; Maintenance free, RTC requires 7 days.  CPU processing times  for bit operations, typ. for word operations, typ. 1.2 µs; / instruction  for floating point arithmetic, typ. 3.6 µs; / instruction  Address area  I/O	·	res, microsono cara (optional)
for bit operations, typ.  for word operations, typ.  for floating point arithmetic, typ.  Address area  I/O address area	·	Voc. Maintanance free DTC requires 7 days
for bit operations, typ.  for word operations, typ.  1.2 µs; / instruction  3.6 µs; / instruction  3.6 µs; / instruction  3.6 µs; / instruction  3.6 µs; / instruction  Address area  VO address area  I/O address	· · · · · · · · · · · · · · · · · · ·	res, Maintenance free, RTC requires 7 days.
for word operations, typ.  for floating point arithmetic, typ.  Address area  // O address area  // O address area  // O address area  // O uputs  //		450 (1) 1 11
for floating point arithmetic, typ.  Address area  I/O address are		
Address area  I/O address area  Inputs Outputs 144 byte; 256 bit of digital inputs & 56 words of analog inputs Outputs 144 byte; 256 bit of digital outputs & 56 words of analog outputs  Imme of day  Clock I Hardware clock, no battery backup Hardware clock (real-time) Hardware clock, no battery backup Hardware clock (real-time) Hardware clock, no battery backup  Hardware clock, no battery backup  Hardware clock, no battery backup  Yes Backup time Deviation per day, max. 120 s; within 120s/month at 25 °C  Digital inputs  Number of digital inputs  12  Input voltage Type of input voltage Rated value (DC) For signal "0" Input corrent For signal "1" Input current For signal "0", max. (permissible quiescent current)  I mA		·
l/O address area  Inputs Inputs Outputs  144 byte; 256 bit of digital inputs & 56 words of analog inputs Outputs  Itherefore day  Clock  Itherefore Type Hardware clock, no battery backup Hardware clock (real-time) Backup time Deviation per day, max.  Poeviation per day, max.  Number of digital inputs  Number of digital inputs  Itherefore Type of input voltage Rated value (DC) Stated value (DC) Store Type of or signal "0" Store Type of input voltage Input current Input curr		3.6 µs; / instruction
<ul> <li>Inputs Outputs 144 byte; 256 bit of digital inputs &amp; 56 words of analog inputs 144 byte; 256 bit of digital outputs &amp; 56 words of analog outputs</li> <li>Time of day</li> <li>Clock  Type Hardware clock, no battery backup Hardware clock (real-time) Yes Backup time To d Deviation per day, max. 120 s; within 120s/month at 25 °C</li> <li>Digital inputs Number of digital inputs 12 Input voltage Type of input voltage Rated value (DC) for signal "0" for signal "1" Input current for signal "0", max. (permissible quiescent current)</li> <li>1 mA</li> </ul>		
Outputs  144 byte; 256 bit of digital outputs & 56 words of analog outputs  Time of day  Clock  Type Hardware clock (real-time) Hardware clock, no battery backup Hardware clock (real-time) Hardware clock (real-time) Hardware clock, no battery backup Hardware clock (real-time) Hardware clock, no battery backup  Possible clock  Type  Possible clock  Possible clock  Possible clock  Dos to lo.3 < 1 V DC; lo.4 to lo.7 < 5 V DC  Possible clock  Input current For signal "0" For signal "0", max. (permissible quiescent current)  Possible clock  Type of injut voltage For signal "0", max. (permissible quiescent current)  Type of injut current  Possible quiescent current  Type of injut voltage For signal "0", max. (permissible quiescent current)  Type of injut voltage For signal "0", max. (permissible quiescent current)  Type of injut voltage For signal "0", max. (permissible quiescent current)  Type of injut voltage For signal "0", max. (permissible quiescent current)  Type of injut voltage For signal "0", max. (permissible quiescent current)  Type of injut voltage For signal "0", max. (permissible quiescent current)  Type of injut voltage For signal "0", max. (permissible quiescent current)  Type of injut voltage For signal "0", max. (permissible quiescent current)  Type of injut voltage For signal "0", max. (permissible quiescent current)  Type of injut voltage For signal "0", max. (permissible quiescent current)  For signal "0", max. (permissible quiescent current)		
Clock  Type Hardware clock, no battery backup Hardware clock (real-time) Hardware clock (real-time) Hardware clock (real-time) Hardware clock, no battery backup  Hardware clock, no battery backup  Pes Hardware clock, no battery backup  To Descript the second to the se		
Clock  Type Hardware clock, no battery backup  Hardware clock (real-time) Yes Backup time Deviation per day, max. 120 s; within 120s/month at 25 °C  Digital inputs  Number of digital inputs 12  Input voltage Type of input voltage Rated value (DC) For signal "0" For signal "1" Duo to 10.3 < 1 V DC; 10.4 to 12.7 < 5 V DC Digital input current For signal "0", max. (permissible quiescent current)  Time  Time  Hardware clock, no battery backup  Yes  To backup  To backup  To d  To backup  To d  To d	·	144 byte; 256 bit of digital outputs & 56 words of analog outputs
<ul> <li>Type</li> <li>Hardware clock (real-time)</li> <li>Yes</li> <li>Backup time</li> <li>Deviation per day, max.</li> <li>120 s; within 120s/month at 25 °C</li> </ul> Digital inputs Number of digital inputs <ul> <li>12</li> </ul> Input voltage <ul> <li>Type of input voltage</li> <li>Rated value (DC)</li> <li>for signal "0"</li> <li>for signal "1"</li> <li>Inout current</li> <li>for signal "0", max. (permissible quiescent current)</li> <li>1 mA</li> </ul>	Time of day	
<ul> <li>Hardware clock (real-time)</li> <li>Backup time</li> <li>Deviation per day, max.</li> <li>120 s; within 120s/month at 25 °C</li> </ul> Digital inputs Number of digital inputs 12 Input voltage <ul> <li>Type of input voltage</li> <li>Rated value (DC)</li> <li>for signal "0"</li> <li>for signal "1"</li> <li>Input current</li> <li>for signal "0", max. (permissible quiescent current)</li> <li>1 mA</li> </ul> 1 Manual M	Clock	
<ul> <li>Backup time</li> <li>Deviation per day, max.</li> <li>120 s; within 120s/month at 25 °C</li> </ul> Digital inputs Number of digital inputs 12 Input voltage <ul> <li>Type of input voltage</li> <li>Rated value (DC)</li> <li>for signal "0"</li> <li>for signal "1"</li> <li>Input current</li> <li>for signal "0", max. (permissible quiescent current)</li> <li>1 mA</li> </ul>	**	Hardware clock, no battery backup
Deviation per day, max.  120 s; within 120s/month at 25 °C  Digital inputs  Number of digital inputs  12  Input voltage  Type of input voltage  Rated value (DC)  for signal "0"  for signal "1"  Input current  for signal "0", max. (permissible quiescent current)  120 s; within 120s/month at 25 °C  120 signal "0" voltage  120 s; within 120s/month at 25 °C  120 signal "0" voltage  120 signal "0" volta	<ul> <li>Hardware clock (real-time)</li> </ul>	Yes
Number of digital inputs  Input voltage  Type of input voltage  Rated value (DC)  for signal "0"  for signal "1"  Input current  for signal "0", max. (permissible quiescent current)  12  12  12  12  12  12  12  12  10  10	·	
Number of digital inputs  Input voltage  Type of input voltage Rated value (DC) for signal "0" for signal "1"  Input current for signal "0", max. (permissible quiescent current)  12  12  12  12  12  12  12  12  12  1		120 s; within 120s/month at 25 °C
Input voltage		
<ul> <li>Type of input voltage</li> <li>Rated value (DC)</li> <li>for signal "0"</li> <li>for signal "1"</li> <li>l0.0 to l0.3 &lt; 1 V DC; l0.4 to l2.7 &lt; 5 V DC</li> <li>for signal "1"</li> <li>l0.0 to l0.3 &gt; 4V; l0.4 to l2.7 &gt; 15V</li> </ul> Input current <ul> <li>for signal "0", max. (permissible quiescent current)</li> <li>1 mA</li> </ul>		12
<ul> <li>Rated value (DC)</li> <li>for signal "0"</li> <li>for signal "1"</li> <li>l0.0 to l0.3 &lt; 1 V DC; l0.4 to l2.7 &lt; 5 V DC</li> <li>for signal "1"</li> <li>l0.0 to l0.3 &gt; 4V; l0.4 to l2.7 &gt; 15V</li> </ul> Input current <ul> <li>for signal "0", max. (permissible quiescent current)</li> <li>1 mA</li> </ul>	Input voltage	
• for signal "0"	<ul> <li>Type of input voltage</li> </ul>	DC
• for signal "1" I0.0 to I0.3 > 4V; I0.4 to I2.7 > 15V  Input current • for signal "0", max. (permissible quiescent current) 1 mA	<ul> <li>Rated value (DC)</li> </ul>	24 V
Input current  • for signal "0", max. (permissible quiescent current)  1 mA	• for signal "0"	10.0 to 10.3 < 1 V DC; 10.4 to 12.7 < 5 V DC
• for signal "0", max. (permissible quiescent current) 1 mA	• for signal "1"	10.0 to 10.3 > 4V; 10.4 to 12.7 > 15V
	Input current	
• for signal "1", typ. 4 mA	• for signal "0", max. (permissible quiescent current)	1 mA
	• for signal "1", typ.	4 mA

Input delay (for rated value of input voltage)	
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
paramotonzabio	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
Cable length	
• shielded, max.	500 m; 50 m for technological functions
• unshielded, max.	300 m; for technological functions: No
Digital outputs	
Number of digital outputs	8; Transistor
of which high-speed outputs	3; 100 kHz Pulse Train Output
Short-circuit protection	No
Switching capacity of the outputs	
with resistive load, max.	0.5 A
on lamp load, max.	5 W
Output voltage	U 11
· · · · · ·	20 V DC
• for signal "1", min.	20 V DC
Output current	0.5.4
for signal "1" rated value	0.5 A
for signal "0" residual current, max.	10 μΑ
Output delay with resistive load	
• "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
o i to o , max.	to Q a.3) 50 µs
Switching frequency	
<ul> <li>of the pulse outputs, with resistive load, max.</li> </ul>	100 kHz
Relay outputs	
Number of relay outputs	0
Cable length	
• shielded, max.	500 m
• unshielded, max.	150 m
Interfaces	
Number of industrial Ethernet interfaces	1
Number of RS 485 interfaces	1
1. Interface	PROFILET
Interface type	PROFINET
Isolated	Yes; Transformer isolated, 1,500V AC
automatic detection of transmission rate	Yes; 10/100 Mbit/s
Autonegotiation	Yes
Autocrossing	Yes
Interface types	
RJ 45 (Ethernet)	Yes
Protocols	
<ul> <li>PROFINET IO Controller</li> </ul>	Yes; Since V2.4
PROFINET IO Device	Yes; I-Device since V2.5
PROFINET IO Controller	
Transmission rate, max.	100 Mbit/s
Services	
Number of connectable IO Devices, max.	8
— Updating time	4 ms; The minimum value of the update time also depends on the
-passing time	communication component set for PROFINET IO, on the number of IO devices
	and the quantity of configured user data.
Address area	
— Inputs, max.	128 byte; Per device
— Inputo, max.	120 byte, 1 of device

2. Interface	
Interface type	RS 485 (max. 187.5 kbps)
Interface types	
• RS 485	Yes
PROFIBUS DP master	
Services	
— S7 communication	Yes
Protocols	
Supports protocol for PROFINET IO	Yes; RT Controller (since FW V2.4) & I-Device (since FW V2.5)
PROFIBUS	Yes; Via CM DP module
Protocols (Ethernet)	
• TCP/IP	Yes
communication functions / header	
S7 communication	
• supported	Yes
as server	Yes
• as client	Yes
Test commissioning functions	
Forcing	
• Forcing	Yes
Integrated Functions	
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
EMC	
Interference immunity against discharge of static electricity	
<ul> <li>Interference immunity against discharge of static electricity acc. to IEC 61000-4-2</li> </ul>	Yes
<ul> <li>Test voltage at air discharge</li> </ul>	8 kV
Test voltage at contact discharge	4 kV
Interference immunity against high-frequency electromagnetic fields	
<ul> <li>Interference immunity against high-frequency radiation acc. to IEC 61000-4-3</li> </ul>	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)
Interference immunity to cable-borne interference	
<ul> <li>Interference immunity on supply lines acc. to IEC 61000- 4-4</li> </ul>	Yes; 2 kV acc. to IEC 61000-4-4, burst
	Yes; ±2 kV acc. to IEC 61000-4-4, Burst
Interference immunity against conducted variable disturbance induc	ced by high-frequency fields
<ul> <li>Interference immunity against high frequency current feed acc. to IEC 61000-4-6</li> </ul>	Yes; 10 V, 150 kHz to 80 MHz (to IEC 61000-4-6)
Emission of radio interference acc. to EN 55 011	
Limit class A, for use in industrial areas	Yes; EN 61000-6-4, interference emission: Intended for use in industrial areas.
Emission of conducted and non-conducted interference	
Interference emission via line/AC current cables	EN 61000-6-4, interference emission: Intended for use in industrial areas.
Degree and class of protection	
IP degree of protection	IP20
Standards, approvals, certificates	
CE mark	Yes
Ambient conditions	
Free fall	
● Fall height, max.	0.3 m; five times, in product package
Ambient temperature during operation	
• min.	0°C
• max.	55 °C
<ul> <li>horizontal installation, min.</li> </ul>	0°C
<ul> <li>horizontal installation, max.</li> </ul>	55 °C
<ul> <li>vertical installation, min.</li> </ul>	0°C
• vertical installation, max.	45 °C
Ambient temperature during storage/transportation	
• min.	-40 °C
• max.	70 °C

Air pressure acc. to IEC 60068-2-13	
	000 L D
<ul> <li>Storage/transport, min.</li> </ul>	660 hPa
Storage/transport, max.	1 080 hPa
Altitude during operation relating to sea level	
<ul> <li>Installation altitude, min.</li> </ul>	-1 000 m
<ul> <li>Installation altitude, max.</li> </ul>	2 000 m
Relative humidity	
<ul> <li>Operation at 25 °C without condensation, max.</li> </ul>	95 %
configuration / header	
configuration / programming / header	
Programming language	
— LAD	Yes
— FBD	Yes
— STL	Yes
Dimensions	
Width	90 mm
Height	100 mm
Depth	81 mm
Weights	
Weight, approx.	320 g

3/12/2024

last modified: