

# SIEMENS

## Product data sheet

## 6ES7214-2BD23-0XB0

SIMATIC S7-200, CPU 224XP COMPACT UNIT,  
AC POWER SUPPLY 14DI DC/10DO RELAY,  
2AI, 1AO, 12/16 KB CODE/10 KB DATA,  
2 PPI/FREEPORT PORTS



| Supply voltage                           |                         |
|------------------------------------------|-------------------------|
| 120 V AC                                 | Yes                     |
| 230 V AC                                 | Yes                     |
| Line frequency                           |                         |
| Frequency of the supply voltage          | 63 Hz                   |
| Load voltage L+                          |                         |
| Rated value (DC)                         | 24 V                    |
| permissible range, lower limit (DC)      | 5 V                     |
| permissible range, upper limit (DC)      | 30 V                    |
| Load voltage L1                          |                         |
| Rated value (AC)                         | 100 V ; 100 to 230 V AC |
| permissible range, lower limit (AC)      | 5 V                     |
| permissible range, upper limit (AC)      | 250 V                   |
| permissible frequency range, lower limit | 47 Hz                   |
| permissible frequency range, upper limit | 63 Hz                   |

|                                        |                                                                                                                                                                                                                                                                                                                                                            |
|----------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Input current                          |                                                                                                                                                                                                                                                                                                                                                            |
| Inrush current, max.                   | 20 A ; at 264 V                                                                                                                                                                                                                                                                                                                                            |
| from supply voltage L1, max.           | 220 mA ; 35 to 100 mA (240 V); 70 to 220 mA (120 V);<br>output current for expansion modules (5 V DC) 600 mA                                                                                                                                                                                                                                               |
| Encoder supply                         |                                                                                                                                                                                                                                                                                                                                                            |
| 24 V encoder supply                    |                                                                                                                                                                                                                                                                                                                                                            |
| 24 V                                   | Yes ; Permissible range: 20.4 to 28.8 V                                                                                                                                                                                                                                                                                                                    |
| Short-circuit protection               | Yes ; electronic at 280 mA                                                                                                                                                                                                                                                                                                                                 |
| Output current, max.                   | 280 mA                                                                                                                                                                                                                                                                                                                                                     |
| Backup battery                         |                                                                                                                                                                                                                                                                                                                                                            |
| Battery operation                      |                                                                                                                                                                                                                                                                                                                                                            |
| Backup time, max.                      | 100 h ; (min. 70 h at 40 °C); 200 days (typ.) with<br>optional battery module                                                                                                                                                                                                                                                                              |
| Memory                                 |                                                                                                                                                                                                                                                                                                                                                            |
| Number of memory modules (optional)    | 1 ; pluggable memory module, content identical with<br>integral EEPROM; can additionally store recipes, data<br>logs and other files                                                                                                                                                                                                                       |
| Data and program memory                |                                                                                                                                                                                                                                                                                                                                                            |
| Data memory, max.                      | 10 kbyte                                                                                                                                                                                                                                                                                                                                                   |
| Program memory, max.                   | 16 kbyte ; 12 KB with active run-time edit                                                                                                                                                                                                                                                                                                                 |
| Backup                                 |                                                                                                                                                                                                                                                                                                                                                            |
| present                                | Yes ; Program: Entire program maintenance-free on<br>integral EEPROM, programmable via CPU; data:<br>Entire DB 1 loaded from PG/PC maintenance-free on<br>integral EEPROM, current values of DB 1 in RAM,<br>retentive memory bits, timers, counters, etc.<br>maintenance-free via high-performance capacitor;<br>optional battery for long-term buffering |
| CPU processing times                   |                                                                                                                                                                                                                                                                                                                                                            |
| for bit operations, max.               | 0.22 µs                                                                                                                                                                                                                                                                                                                                                    |
| Counters, timers and their retentivity |                                                                                                                                                                                                                                                                                                                                                            |
| S7 counter                             |                                                                                                                                                                                                                                                                                                                                                            |
| Number                                 | 256                                                                                                                                                                                                                                                                                                                                                        |
| of which retentive with battery        |                                                                                                                                                                                                                                                                                                                                                            |
| adjustable                             | Yes ; via high-performance capacitor or battery                                                                                                                                                                                                                                                                                                            |
| lower limit                            | 1                                                                                                                                                                                                                                                                                                                                                          |

|                                     |                                                                                                                                              |
|-------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| upper limit                         | 256                                                                                                                                          |
| Counting range                      |                                                                                                                                              |
| lower limit                         | 0                                                                                                                                            |
| upper limit                         | 32767                                                                                                                                        |
| S7 times                            |                                                                                                                                              |
| Number                              | 256                                                                                                                                          |
| of which retentive with battery     |                                                                                                                                              |
| adjustable                          | Yes ; via high-performance capacitor or battery                                                                                              |
| upper limit                         | 64                                                                                                                                           |
| Time range                          |                                                                                                                                              |
| lower limit                         | 1 ms                                                                                                                                         |
| upper limit                         | 54 min ; 4 timers: 1 ms to 30 s; 16 timers: 10 ms to 5 min; 236 timers: 100 ms to 54 min                                                     |
| Data areas and their retentivity    |                                                                                                                                              |
| Flag                                |                                                                                                                                              |
| Number, max.                        | 32 byte                                                                                                                                      |
| Retentivity available               | Yes ; M 0.0 to M 31.7                                                                                                                        |
| of which retentive with battery     | 0 to 255, via high-performance capacitor or battery, adjustable                                                                              |
| of which retentive without battery  | 0 to 112 in EEPROM, adjustable                                                                                                               |
| Hardware configuration              |                                                                                                                                              |
| Expansion devices, max.             | 7 ; Only expansion modules of the S7-22x series can be used. Due to the limited output current, the use of expansion modules may be limited. |
| Connectable programming devices/PCs | SIMATIC PG/PC, standard PC                                                                                                                   |
| Expansion modules                   |                                                                                                                                              |
| Analog inputs/outputs, max.         | 38 ; 2 onboard inputs and 1 output, also max. 28 inputs and 7 outputs (EM) or max. 0 inputs and 14 outputs (EM)                              |
| Digital inputs/outputs, max.        | 168 ; max. 94 inputs and 74 outputs (CPU + EM)                                                                                               |
| AS-Interface inputs/outputs max.    | 62 ; AS-Interface A/B slaves (CP 243-2)                                                                                                      |
| Digital inputs                      |                                                                                                                                              |
| Number/binary inputs                | 14                                                                                                                                           |
| m/p-reading                         | Yes ; optionally, per group                                                                                                                  |
| Input voltage                       |                                                                                                                                              |

|                                                |                                                          |
|------------------------------------------------|----------------------------------------------------------|
| Rated value, DC                                | 24 V                                                     |
| for signal "0"                                 | 0 to 5 V; 0 to 1 V (I 0.3 to I 0.5)                      |
| for signal "1"                                 | min. 15 V; min. 4 V (I 0.3 to I 0.5)                     |
| Input current                                  |                                                          |
| for signal "1", typ.                           | 2.5 mA ; 8 mA for I0.3 to I0.5                           |
| Input delay (for rated value of input voltage) |                                                          |
| for standard inputs                            |                                                          |
| Parameterizable                                | Yes ; all                                                |
| at "0" to "1", min.                            | 0.2 ms                                                   |
| at "0" to "1", max.                            | 12.8 ms                                                  |
| for interrupt inputs                           |                                                          |
| Parameterizable                                | Yes ; I 0.0 to I 0.3                                     |
| for counter/technological functions            |                                                          |
| Parameterizable                                | Yes ; (E0.0 to E1.5) up to 200 kHz                       |
| Cable length                                   |                                                          |
| Cable length, shielded, max.                   | 500 m ; Standard input: 500 m, high-speed counters: 50 m |
| Cable length unshielded, max.                  | 300 m ; not for high-speed signals                       |
| Digital outputs                                |                                                          |
| Number/binary outputs                          | 10 ; Relay                                               |
| Functionality/short-circuit strength           | No ; to be provided externally                           |
| Switching capacity of the outputs              |                                                          |
| with resistive load, max.                      | 2 A                                                      |
| on lamp load, max.                             | 200 W ; 30 W DC; 200 W AC                                |
| Output voltage                                 |                                                          |
| for signal "1", min.                           | L+/L1                                                    |
| Output current                                 |                                                          |
| for signal "1" rated value                     | 2 A                                                      |
| for signal "0" residual current, max.          | 0 mA                                                     |
| Output delay with resistive load               |                                                          |
| "0" to "1", max.                               | 10 ms ; all outputs                                      |
| "1" to "0", max.                               | 10 ms ; all outputs                                      |
| Parallel switching of 2 outputs                |                                                          |
| for increased power                            | No                                                       |

|                                                     |                                                                                                                                                                                                                                         |
|-----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Switching frequency                                 |                                                                                                                                                                                                                                         |
| of the pulse outputs, with resistive load, max.     | 1 Hz                                                                                                                                                                                                                                    |
| Aggregate current of outputs (per group)            |                                                                                                                                                                                                                                         |
| all mounting positions                              |                                                                                                                                                                                                                                         |
| up to 40 °C, max.                                   | 10 A                                                                                                                                                                                                                                    |
| horizontal installation                             |                                                                                                                                                                                                                                         |
| up to 55 °C, max.                                   | 10 A                                                                                                                                                                                                                                    |
| Relay outputs                                       |                                                                                                                                                                                                                                         |
| Number of operating cycles, max.                    | 10000000 ; mechanically 10 million, at rated load voltage 100,000                                                                                                                                                                       |
| Cable length                                        |                                                                                                                                                                                                                                         |
| Cable length, shielded, max.                        | 500 m                                                                                                                                                                                                                                   |
| Cable length unshielded, max.                       | 150 m                                                                                                                                                                                                                                   |
| Analog inputs                                       |                                                                                                                                                                                                                                         |
| Number of analog potentiometers                     | 2 ; Analog potentiometer; resolution 8 bit                                                                                                                                                                                              |
| Encoder                                             |                                                                                                                                                                                                                                         |
| Connectable encoders                                |                                                                                                                                                                                                                                         |
| 2-wire sensor                                       | Yes                                                                                                                                                                                                                                     |
| Permissible quiescent current (2-wire sensor), max. | 1 mA                                                                                                                                                                                                                                    |
| 1st interface                                       |                                                                                                                                                                                                                                         |
| Type of interface                                   | Integrated RS 485 interface                                                                                                                                                                                                             |
| Physics                                             | RS 485                                                                                                                                                                                                                                  |
| Functionality                                       |                                                                                                                                                                                                                                         |
| MPI                                                 | Yes ; As MPI slave for data exchange with MPI masters (S7-300/S7-400 CPUs, OPs, TDs, Push Button Panels); S7-200-internal CPU/CPU communication is possible in the MPI network with restrictions; transmission rates: 19.2/187.5 kbit/s |
| PPI                                                 | Yes ; with PPI protocol for program functions, HMI functions (TD 200, OP), S7-200-internal CPU/CPU communication ; transmission rates 9.6/19.2/187.5 kbit/s                                                                             |

|                                  |                                                                                                                                                                                                                                                                                                                                                                                                                        |
|----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Serial data exchange             | Yes ; As freely programmable interface with interrupt facility for serial data exchange with third-party devices with ASCII protocol transfer rates: 1.2 / 2.4 / 4.8 / 9.6 / 19.2 / 38.4 / 57.6 / 115.2 kbit/s; the PC/PPI cable can also be used as RS232/RS485 converter                                                                                                                                             |
| <b>MPI</b>                       |                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Transmission rate, max.          | 187.5 kbit/s                                                                                                                                                                                                                                                                                                                                                                                                           |
| Transmission rate, min.          | 19.2 kbit/s                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>2nd interface</b>             |                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Type of interface                | Integrated RS 485 interface                                                                                                                                                                                                                                                                                                                                                                                            |
| Physics                          | RS 485                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Functionality</b>             |                                                                                                                                                                                                                                                                                                                                                                                                                        |
| MPI                              | Yes ; As MPI slave for data exchange with MPI masters (S7-300/S7-400 CPUs, OPs, TDs, Push Button Panels); S7-200-internal CPU/CPU communication is possible in the MPI network with restrictions; transmission rates: 19.2/187.5 kbit/s                                                                                                                                                                                |
| PPI                              | Yes ; with PPI protocol for program functions, HMI functions (TD 200, OP), S7-200-internal CPU/CPU communication ; transmission rates 9.6/19.2/187.5 kbit/s                                                                                                                                                                                                                                                            |
| serial data exchange             | Yes ; As freely programmable interface with interrupt facility for serial data exchange with third-party devices with ASCII protocol transfer rates: 1.2 / 2.4 / 4.8 / 9.6 / 19.2 / 38.4 / 57.6 / 115.2 kbit/s; the PC/PPI cable can also be used as RS232/RS485 converter                                                                                                                                             |
| <b>MPI</b>                       |                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Transmission rate, max.          | 187.5 kbit/s                                                                                                                                                                                                                                                                                                                                                                                                           |
| Transmission rates, min.         | 19.2 kbit/s                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Integrated Functions</b>      |                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Number of counters               | 6 ; High-speed counters (2 to 200 kHz and 4 to 30 kHz), 32 bits (incl. sign), can be used as up/down counters or for connecting incremental encoders with 2 pulse trains offset by 90° (max. 1 to 100 kHz and 3 to 20 kHz (A/B counters)); parameterizable enable and reset input; interrupt facilities (incl. call of subroutine with any content) when the setpoint is reached; reversal in counting direction, etc. |
| Counter frequency (counter) max. | 200 kHz                                                                                                                                                                                                                                                                                                                                                                                                                |

|                                    |                                                                                     |
|------------------------------------|-------------------------------------------------------------------------------------|
| Number of alarm inputs             | 4 ; 4 rising edges and/or 4 falling edges                                           |
| Galvanic isolation                 |                                                                                     |
| Galvanic isolation digital inputs  |                                                                                     |
| between the channels               | Yes                                                                                 |
| between the channels, in groups of | 6 and 8                                                                             |
| Galvanic isolation digital outputs |                                                                                     |
| between the channels               | Yes ; Relay                                                                         |
| between the channels, in groups of | 3 and 4                                                                             |
| Permissible potential difference   |                                                                                     |
| between different circuits         | 500 V DC between 24 V DC and 5 V DC; 1500 V AC between 24 V DC and 230 V AC         |
| Degree and class of protection     |                                                                                     |
| IP20                               | Yes                                                                                 |
| Ambient conditions                 |                                                                                     |
| Environmental conditions           | For further environmental conditions, see "Automation System S7-200, System Manual" |
| Operating temperature              |                                                                                     |
| vertical installation, min.        | 0 °C                                                                                |
| vertical installation, max.        | 45 °C                                                                               |
| horizontal installation, min.      | 0 °C                                                                                |
| horizontal installation, max.      | 55 °C                                                                               |
| Air pressure                       |                                                                                     |
| permissible range, min.            | 860 hPa                                                                             |
| permissible range, max.            | 1080 hPa                                                                            |
| Relative humidity                  |                                                                                     |
| Operation, min.                    | 5 %                                                                                 |
| Operation, max.                    | 95 % ; RH class 2 in accordance with IEC 1131-2                                     |
| Configuration                      |                                                                                     |
| programming                        |                                                                                     |
| Programming language               |                                                                                     |
| LAD                                | Yes                                                                                 |
| FBD                                | Yes                                                                                 |
| STL                                | Yes                                                                                 |

|                                             |                                                                                                                                                                                                                                                                                                                                                                                                                 |
|---------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Command set                                 | Bit logic instructions, compare instructions, timer instructions, counter instructions, clock instructions, transmissions instructions, table instructions, logic instructions, shift and rotate instructions, conversion instructions, program control instructions, interrupt and communications instructions, logic stack instructions, integer maths, floating-point math instructions, numerical functions |
| Program processing                          | free cycle (OB 1), interrupt-controller, time-controlled (1 to 255 ms)                                                                                                                                                                                                                                                                                                                                          |
| Program organization                        | 1 OB, 1 DB, 1 SDB subroutines with/without parameter transfer                                                                                                                                                                                                                                                                                                                                                   |
| Number of subroutines, max.                 | 64                                                                                                                                                                                                                                                                                                                                                                                                              |
| Know-how protection                         |                                                                                                                                                                                                                                                                                                                                                                                                                 |
| User program protection/password protection | Yes ; 3-stage password protection                                                                                                                                                                                                                                                                                                                                                                               |
| Connection method                           |                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Plug-in I/O terminals                       | Yes                                                                                                                                                                                                                                                                                                                                                                                                             |
| Dimensions                                  |                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Width                                       | 140 mm                                                                                                                                                                                                                                                                                                                                                                                                          |
| Height                                      | 80 mm                                                                                                                                                                                                                                                                                                                                                                                                           |
| Depth                                       | 62 mm                                                                                                                                                                                                                                                                                                                                                                                                           |
| Weight                                      |                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Weight, approx.                             | 440 g                                                                                                                                                                                                                                                                                                                                                                                                           |
| Status                                      | Jul 17, 2012                                                                                                                                                                                                                                                                                                                                                                                                    |