

Data sheet
 VIPA CPU 312SC (312-5BE23)

Technical data

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|------------------|------------------|
| Order no. | 312-5BE23 |
| Type | VIPA CPU 312SC |

General information

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|-----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Note | - |
| Features | Powered by SPEED7 Work memory [KB]: 128...1.024 Onboard 16x DI / 8x DO / 2x Counter / 2x PWM Interface [RJ45]: Ethernet PG/OP communication Interface [2x RS485]: MPI, PtP: ASCII, STX/ETX, 3964(R), USS master, Modbus master/slave Including front connector SD/MMC card slot with locking, up to 8 modules stackable, programmable with WinPLC7, SIMATIC Manager and TIA Portal |
| SPEED-Bus | - |

Technical data power supply

| | |
|-----------------------------------------|----------------------|
| Power supply (rated value) | DC 24 V |
| Power supply (permitted range) | DC 20.4...28.8 V |
| Reverse polarity protection | yes |
| Current consumption (no-load operation) | 135 mA |
| Current consumption (rated value) | 500 mA |
| Inrush current | 11 A |
| I^2t | 0.7 A ² s |
| Max. current drain at backplane bus | 3 A |
| Max. current drain load supply | - |
| Power loss | 8 W |

Technical data digital inputs

| | |
|---------------------------------------------------------|----------------|
| Number of inputs | 16 |
| Cable length, shielded | 1000 m |
| Cable length, unshielded | 600 m |
| Rated load voltage | DC 24 V |
| Reverse polarity protection of rated load voltage | yes |
| Current consumption from load voltage L+ (without load) | 70 mA |
| Rated value | DC 24 V |
| Input voltage for signal "0" | DC 0...5 V |
| Input voltage for signal "1" | DC 15...28.8 V |
| Input voltage hysteresis | - |
| Signal logic input | Sinking input |
| Frequency range | - |
| Input resistance | - |
| Input current for signal "1" | 6 mA |
| Connection of Two-Wire-BEROs possible | yes |
| Max. permissible BERO quiescent current | 1.5 mA |
| Input delay of "0" to "1" | 0.1 / 0.35 ms |
| Input delay of "1" to "0" | 0.1 / 0.35 ms |

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|---------------------------------------------------------------------|---------------------|
| Number of simultaneously utilizable inputs horizontal configuration | 16 |
| Number of simultaneously utilizable inputs vertical configuration | 16 |
| Input characteristic curve | IEC 61131-2, type 1 |
| Initial data size | 2 Byte |

Technical data digital outputs

| | |
|---------------------------------------------------------------|-----------------|
| Number of outputs | 8 |
| Cable length, shielded | 1000 m |
| Cable length, unshielded | 600 m |
| Rated load voltage | DC 24 V |
| Reverse polarity protection of rated load voltage | - |
| Current consumption from load voltage L+ (without load) | 100 mA |
| Total current per group, horizontal configuration, 40°C | 3 A |
| Total current per group, horizontal configuration, 60°C | 2 A |
| Total current per group, vertical configuration | 2 A |
| Output voltage signal "1" at min. current | L+ (-0.8 V) |
| Output voltage signal "1" at max. current | L+ (-0.8 V) |
| Output current at signal "1", rated value | 0.5 A |
| Signal logic output | Sinking output |
| Output current, permitted range to 40°C | 5 mA to 0.6 A |
| Output current, permitted range to 60°C | 5 mA to 0.6 A |
| Output current at signal "0" max. (residual current) | 0.5 mA |
| Output delay of "0" to "1" | 100 µs |
| Output delay of "1" to "0" | 100 µs |
| Minimum load current | - |
| Lamp load | 5 W |
| Parallel switching of outputs for redundant control of a load | possible |
| Parallel switching of outputs for increased power | not possible |
| Actuation of digital input | yes |
| Switching frequency with resistive load | max. 2.5 kHz |
| Switching frequency with inductive load | max. 0.5 Hz |
| Switching frequency on lamp load | max. 2.5 kHz |
| Internal limitation of inductive shut-off voltage | L+ (-52 V) |
| Short-circuit protection of output | yes, electronic |
| Trigger level | 1 A |
| Number of operating cycle of relay outputs | - |
| Switching capacity of contacts | - |
| Output data size | 1 Byte |

Technical data analog inputs

| | |
|---------------------------------------------------------|---|
| Number of inputs | - |
| Cable length, shielded | - |
| Rated load voltage | - |
| Reverse polarity protection of rated load voltage | - |
| Current consumption from load voltage L+ (without load) | - |
| Voltage inputs | - |
| Min. input resistance (voltage range) | - |
| Input voltage ranges | - |
| Operational limit of voltage ranges | - |

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|-------------------------------------------------------------|---|
| Operational limit of voltage ranges with SFU | - |
| Basic error limit voltage ranges | - |
| Basic error limit voltage ranges with SFU | - |
| Destruction limit voltage | - |
| Current inputs | - |
| Max. input resistance (current range) | - |
| Input current ranges | - |
| Operational limit of current ranges | - |
| Operational limit of current ranges with SFU | - |
| Basic error limit current ranges | - |
| Radical error limit current ranges with SFU | - |
| Destruction limit current inputs (electrical current) | - |
| Destruction limit current inputs (voltage) | - |
| Resistance inputs | - |
| Resistance ranges | - |
| Operational limit of resistor ranges | - |
| Operational limit of resistor ranges with SFU | - |
| Basic error limit | - |
| Basic error limit with SFU | - |
| Destruction limit resistance inputs | - |
| Resistance thermometer inputs | - |
| Resistance thermometer ranges | - |
| Operational limit of resistance thermometer ranges | - |
| Operational limit of resistance thermometer ranges with SFU | - |
| Basic error limit thermoresistor ranges | - |
| Basic error limit thermoresistor ranges with SFU | - |
| Destruction limit resistance thermometer inputs | - |
| Thermocouple inputs | - |
| Thermocouple ranges | - |
| Operational limit of thermocouple ranges | - |
| Operational limit of thermocouple ranges with SFU | - |
| Basic error limit thermoelement ranges | - |
| Basic error limit thermoelement ranges with SFU | - |
| Destruction limit thermocouple inputs | - |
| Programmable temperature compensation | - |
| External temperature compensation | - |
| Internal temperature compensation | - |
| Technical unit of temperature measurement | - |
| Resolution in bit | - |
| Measurement principle | - |
| Basic conversion time | - |
| Noise suppression for frequency | - |
| Initial data size | - |
| Technical data analog outputs | |
| Number of outputs | - |
| Cable length, shielded | - |
| Rated load voltage | - |
| Reverse polarity protection of rated load voltage | - |

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|---------------------------------------------------------|---|
| Current consumption from load voltage L+ (without load) | - |
| Voltage output short-circuit protection | - |
| Voltage outputs | - |
| Min. load resistance (voltage range) | - |
| Max. capacitive load (current range) | - |
| Max. inductive load (current range) | - |
| Output voltage ranges | - |
| Operational limit of voltage ranges | - |
| Basic error limit voltage ranges with SFU | - |
| Destruction limit against external applied voltage | - |
| Current outputs | - |
| Max. in load resistance (current range) | - |
| Max. inductive load (current range) | - |
| Typ. open circuit voltage current output | - |
| Output current ranges | - |
| Operational limit of current ranges | - |
| Radical error limit current ranges with SFU | - |
| Destruction limit against external applied voltage | - |
| Settling time for ohmic load | - |
| Settling time for capacitive load | - |
| Settling time for inductive load | - |
| Resolution in bit | - |
| Conversion time | - |
| Substitute value can be applied | - |
| Output data size | - |

Technical data counters

| | |
|--------------------------|--------|
| Number of counters | 2 |
| Counter width | 32 Bit |
| Maximum input frequency | 10 kHz |
| Maximum count frequency | 10 kHz |
| Mode incremental encoder | yes |
| Mode pulse / direction | yes |
| Mode pulse | yes |
| Mode frequency counter | yes |
| Mode period measurement | yes |
| Gate input available | yes |
| Latch input available | yes |
| Reset input available | - |
| Counter output available | yes |

Load and working memory

| | |
|------------------------------------------|----------------------------|
| Load memory, integrated | 1024 KB |
| Load memory, maximum | 1024 KB |
| Work memory, integrated | 128 KB |
| Work memory, maximal | 1024 KB |
| Memory divided in 50% program / 50% data | yes |
| Memory card slot | SD/MMC-Card with max. 2 GB |

Hardware configuration

| | |
|------------------------------------|---|
| Racks, max. | 1 |
| Modules per rack, max. | 8 |
| Number of integrated DP master | 0 |
| Number of DP master via CP | 4 |
| Operable function modules | 8 |
| Operable communication modules PtP | 8 |
| Operable communication modules LAN | 8 |

Status information, alarms, diagnostics

| | |
|----------------------------------|-------------------|
| Status display | yes |
| Interrupts | yes |
| Process alarm | yes |
| Diagnostic interrupt | yes |
| Diagnostic functions | no |
| Diagnostics information read-out | possible |
| Supply voltage display | green LED |
| Group error display | red SF LED |
| Channel error display | red LED per group |

Isolation

| | |
|-------------------------------------------------------------|------------------|
| Between channels | yes |
| Between channels of groups to | 16 |
| Between channels and backplane bus | yes |
| Between channels and power supply | - |
| Max. potential difference between circuits | DC 75 V/ AC 50 V |
| Max. potential difference between inputs (Ucm) | - |
| Max. potential difference between Mana and Mintern (Uiso) | - |
| Max. potential difference between inputs and Mana (Ucm) | - |
| Max. potential difference between inputs and Mintern (Uiso) | - |
| Max. potential difference between Mintern and outputs | - |
| Insulation tested with | DC 500 V |

Command processing times

| | |
|---------------------------------|---------|
| Bit instructions, min. | 0.02 µs |
| Word instruction, min. | 0.02 µs |
| Double integer arithmetic, min. | 0.02 µs |
| Floating-point arithmetic, min. | 0.12 µs |

Timers/Counters and their retentive characteristics

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|---------------------------------|------------------------|
| Number of S7 counters | 512 |
| S7 counter remanence | adjustable 0 up to 128 |
| S7 counter remanence adjustable | C0 .. C7 |
| Number of S7 times | 512 |
| S7 times remanence | adjustable 0 up to 128 |
| S7 times remanence adjustable | not retentive |

Data range and retentive characteristic

| | |
|--------------------------------------------------|------------------------|
| Number of flags | 8192 Byte |
| Bit memories retentive characteristic adjustable | adjustable 0 up to 128 |
| Bit memories retentive characteristic preset | MB0 .. MB15 |
| Number of data blocks | 4095 |
| Max. data blocks size | 64 KB |

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|------------------------------------------|----------|
| Max. local data size per execution level | 510 Byte |
|------------------------------------------|----------|

Blocks

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|-----------------------------------------------------|------|
| Number of OBs | 15 |
| Number of FBs | 2048 |
| Number of FCs | 2048 |
| Maximum nesting depth per priority class | 8 |
| Maximum nesting depth additional within an error OB | 4 |

Time

| | |
|------------------------------------|--------------|
| Real-time clock buffered | yes |
| Clock buffered period (min.) | 6 w |
| Accuracy (max. deviation per day) | 10 s |
| Number of operating hours counter | 8 |
| Clock synchronization | yes |
| Synchronization via MPI | Master/Slave |
| Synchronization via Ethernet (NTP) | no |

Address areas (I/O)

| | |
|------------------------------|-----------|
| Input I/O address area | 1024 Byte |
| Output I/O address area | 1024 Byte |
| Input process image maximal | 128 Byte |
| Output process image maximal | 128 Byte |
| Digital inputs | 272 |
| Digital outputs | 264 |
| Digital inputs central | 272 |
| Digital outputs central | 264 |
| Integrated digital inputs | 16 |
| Integrated digital outputs | 8 |
| Analog inputs | 64 |
| Analog outputs | 64 |
| Analog inputs, central | 64 |
| Analog outputs, central | 64 |
| Integrated analog inputs | 0 |
| Integrated analog outputs | 0 |

Communication functions

| | |
|-------------------------------------------|----------|
| PG/OP channel | yes |
| Global data communication | yes |
| Number of GD circuits, max. | 4 |
| Size of GD packets, max. | 22 Byte |
| S7 basic communication | yes |
| S7 basic communication, user data per job | 76 Byte |
| S7 communication | yes |
| S7 communication as server | yes |
| S7 communication as client | - |
| S7 communication, user data per job | 160 Byte |
| Number of connections, max. | 32 |

PWM data

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|--------------|---|
| PWM channels | 2 |
|--------------|---|

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|---------------------|-----------------------------------|
| PWM time basis | 0.1 ms / 1 ms |
| Period length | 4...65535 / 1...65535 * time base |
| Minimum pulse width | 0...0.5 * Period duration |
| Type of output | Highside with 1.1kOhm pulldown |

Functionality Sub-D interfaces

| | |
|-------------------------------|--------------------------|
| Type | X2 |
| Type of interface | RS485 |
| Connector | Sub-D, 9-pin, female |
| Electrically isolated | - |
| MPI | yes |
| MP ² l (MPI/RS232) | - |
| DP master | - |
| DP slave | - |
| Point-to-point interface | - |
| 5V DC Power supply | max. 90mA, non-isolated |
| 24V DC Power supply | max. 100mA, non-isolated |

| | |
|-------------------------------|--------------------------|
| Type | X3 |
| Type of interface | RS485 |
| Connector | Sub-D, 9-pin, female |
| Electrically isolated | yes |
| MPI | - |
| MP ² l (MPI/RS232) | - |
| DP master | - |
| DP slave | - |
| Point-to-point interface | yes |
| 5V DC Power supply | max. 90mA, isolated |
| 24V DC Power supply | max. 100mA, non-isolated |

Functionality MPI

| | |
|-----------------------------|--------------|
| Number of connections, max. | 32 |
| PG/OP channel | yes |
| Routing | - |
| Global data communication | yes |
| S7 basic communication | yes |
| S7 communication | yes |
| S7 communication as server | yes |
| S7 communication as client | - |
| Transmission speed, min. | 19.2 kbit/s |
| Transmission speed, max. | 187.5 kbit/s |

Functionality PROFIBUS master

| | |
|--------------------------------------|---|
| Number of connections, max. | - |
| PG/OP channel | - |
| Routing | - |
| S7 basic communication | - |
| S7 communication | - |
| S7 communication as server | - |
| S7 communication as client | - |
| Activation/deactivation of DP slaves | - |

| | |
|-----------------------------------------------------|---|
| Direct data exchange (slave-to-slave communication) | - |
| DPV1 | - |
| Transmission speed, min. | - |
| Transmission speed, max. | - |
| Number of DP slaves, max. | - |
| Address range inputs, max. | - |
| Address range outputs, max. | - |
| User data inputs per slave, max. | - |
| User data outputs per slave, max. | - |

Functionality PROFIBUS slave

| | |
|-----------------------------------------------------|---|
| Number of connections, max. | - |
| PG/OP channel | - |
| Routing | - |
| S7 communication | - |
| S7 communication as server | - |
| S7 communication as client | - |
| Direct data exchange (slave-to-slave communication) | - |
| DPV1 | - |
| Transmission speed, min. | - |
| Transmission speed, max. | - |
| Automatic detection of transmission speed | - |
| Transfer memory inputs, max. | - |
| Transfer memory outputs, max. | - |
| Address areas, max. | - |
| User data per address area, max. | - |

Functionality RJ45 interfaces

| | |
|-----------------------------|----------------------|
| Type | X5 |
| Type of interface | Ethernet 10/100 MBit |
| Connector | RJ45 |
| Electrically isolated | yes |
| PG/OP channel | yes |
| Number of connections, max. | 4 |
| Productive connections | - |

Point-to-point communication

| | |
|--------------------------|----------------------|
| PtP communication | yes |
| Interface isolated | yes |
| RS232 interface | - |
| RS422 interface | - |
| RS485 interface | yes |
| Connector | Sub-D, 9-pin, female |
| Transmission speed, min. | 150 bit/s |
| Transmission speed, max. | 115.5 kbit/s |
| Cable length, max. | 500 m |

Point-to-point protocol

| | |
|------------------|-----|
| ASCII protocol | yes |
| STX/ETX protocol | yes |

| | |
|---------------------------------|-------------------------|
| 3964(R) protocol | yes |
| RK512 protocol | - |
| USS master protocol | yes |
| Modbus master protocol | yes |
| Modbus slave protocol | - |
| Special protocols | - |
| Housing | |
| Material | PPE |
| Mounting | Rail System 300 |
| Mechanical data | |
| Dimensions (WxHxD) | 80 mm x 125 mm x 120 mm |
| Net weight | 410 g |
| Weight including accessories | - |
| Gross weight | - |
| Environmental conditions | |
| Operating temperature | 0 °C to 60 °C |
| Storage temperature | -25 °C to 70 °C |
| Certifications | |
| UL certification | yes |
| KC certification | yes |