

**Data sheet**

VIPA CPU 314ST (314-6CF23)

## Technical data

|                  |                  |
|------------------|------------------|
| <b>Order no.</b> | <b>314-6CF23</b> |
| Type             | VIPA CPU 314ST   |

**General information**

|      |   |
|------|---|
| Note | - |
|------|---|

|          |  |
|----------|--|
| Features | Powered by SPEED7<br>Work memory [KB]: 512...2.048<br>Onboard 8x DI / 8x DIO / 5x AI [current/voltage] / 2x AO / 1x Pt100 / 4x Counter<br>SPEED-Bus<br>Interface [RJ45]: Ethernet PG/OP communication<br>Interface [2x RS485]: MPI, PROFIBUS master/slave, PtP:<br>ASCII, STX/ETX, 3964 (R), USS master, Modbus master/slave<br>Including front connector<br>SD/MMC card slot with locking, up to 32 modules stackable,<br>programmable with WinPLC7, SIMATIC Manager and TIA Portal |
|----------|--|

|           |     |
|-----------|-----|
| SPEED-Bus | yes |
|-----------|-----|

**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) | 300 mA               |
| Current consumption (rated value)       | 1 A                  |
| Inrush current                          | 5 A                  |
| $I_{\Delta t}$                          | 0.5 A <sup>2</sup> s |
| Max. current drain at backplane bus     | 2.5 A                |
| Max. current drain load supply          | -                    |
| Power loss                              | 14 W                 |

**Technical data digital inputs**

|   |                               |
|---|-------------------------------|
| Number of inputs  | 8                             |
| 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"                               | parameterizable 2.56µs - 40ms |

|   |                               |
|---|-------------------------------|
| Input delay of "1" to "0"   | parameterizable 2.56µs - 40ms |
| Number of simultaneously utilizable inputs horizontal configuration | 8                             |
| Number of simultaneously utilizable inputs vertical configuration   | 8                             |
| Input characteristic curve  | IEC 61131-2, type 1           |
| Initial data size   | 34 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)       | 30 mA           |
| Total current per group, horizontal configuration, 40°C       | 4 A             |
| Total current per group, horizontal configuration, 60°C       | 3 A             |
| Total current per group, vertical configuration               | 3 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   | Sourcing 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)          | 100 µA          |
| 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  | 18 Byte         |

### Technical data analog inputs

|   |          |
|---|----------|
| Number of inputs  | 5        |
| Cable length, shielded                                  | 200 m    |
| Rated load voltage                                      | DC 24 V  |
| Reverse polarity protection of rated load voltage       | yes      |
| Current consumption from load voltage L+ (without load) | 85 mA    |
| Voltage inputs  | yes      |
| Min. input resistance (voltage range)                   | 120 kOhm |

|   |  |
|---|--|
| Input voltage ranges  | -10 V ... +10 V<br>0 V ... +10 V                         |
| Operational limit of voltage ranges                         | +/-0.3%  |
| Operational limit of voltage ranges with SFU                | -  |
| Basic error limit voltage ranges                            | +/-0.3%  |
| Basic error limit voltage ranges with SFU                   | -  |
| Destruction limit voltage                                   | max. 15V   |
| Current inputs  | yes  |
| Max. input resistance (current range)                       | 85 Ohm   |
| Input current ranges  | -20 mA ... +20 mA<br>0 mA ... +20 mA<br>+4 mA ... +20 mA |
| Operational limit of current ranges                         | +/-0.3%  |
| Operational limit of current ranges with SFU                | -  |
| Basic error limit current ranges                            | +/-0.2%  |
| Radical error limit current ranges with SFU                 | -  |
| Destruction limit current inputs (electrical current)       | max. 50mA  |
| Destruction limit current inputs (voltage)                  | max. 15V   |
| Resistance inputs   | yes  |
| Resistance ranges   | 0 ... 600 Ohm  |
| Operational limit of resistor ranges                        | +/-0.4%  |
| Operational limit of resistor ranges with SFU               | -  |
| Basic error limit   | +/-0.2%  |
| Basic error limit with SFU                                  | -  |
| Destruction limit resistance inputs                         | max. 15V   |
| Resistance thermometer inputs                               | yes  |
| Resistance thermometer ranges                               | Pt100<br>Pt1000<br>Ni100<br>Ni1000                       |
| Operational limit of resistance thermometer ranges          | +/-0.6%  |
| Operational limit of resistance thermometer ranges with SFU | -  |
| Basic error limit thermoresistor ranges                     | +/-0.4%  |
| Basic error limit thermoresistor ranges with SFU            | -  |
| Destruction limit resistance thermometer inputs             | max. 15V   |
| 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                   | °C   |
| Resolution in bit   | 12   |
| Measurement principle                                       | Sigma-Delta  |
| Basic conversion time                                       | 6 ms   |
| Noise suppression for frequency                             | 80 dB  |
| Initial data size   | 10 Byte  |

**Technical data analog outputs**

|   |  |
|---|--|
| Number of outputs                                       | 2  |
| Cable length, shielded                                  | 200 m  |
| Rated load voltage                                      | DC 24 V  |
| Reverse polarity protection of rated load voltage       | yes  |
| Current consumption from load voltage L+ (without load) | -  |
| Voltage output short-circuit protection                 | -  |
| Voltage outputs   | yes  |
| Min. load resistance (voltage range)                    | 1 kOhm   |
| Max. capacitive load (current range)                    | 1 µF   |
| Max. inductive load (current range)                     | 30 mA  |
| Output voltage ranges                                   | -10 V ... +10 V<br>0 V ... +10 V                         |
| Operational limit of voltage ranges                     | +/-0.4%  |
| Basic error limit voltage ranges with SFU               | +/-0.3%  |
| Destruction limit against external applied voltage      | max. 15V   |
| Current outputs   | yes  |
| Max. in load resistance (current range)                 | 500 Ohm  |
| Max. inductive load (current range)                     | 10 mH  |
| Typ. open circuit voltage current output                | 16 V   |
| Output current ranges                                   | -20 mA ... +20 mA<br>0 mA ... +20 mA<br>+4 mA ... +20 mA |
| Operational limit of current ranges                     | +/-0.4%  |
| Radical error limit current ranges with SFU             | +/-0.3%  |
| Destruction limit against external applied voltage      | max. 15V   |
| Settling time for ohmic load                            | 0.2 ms   |
| Settling time for capacitive load                       | 0.5 ms   |
| Settling time for inductive load                        | 0.75 ms  |
| Resolution in bit                                       | 12   |
| Conversion time   | 1 ms   |
| Substitute value can be applied                         | yes  |
| Output data size  | 4 Byte   |

**Technical data counters**

|                          |         |
|--------------------------|---------|
| Number of counters       | 4       |
| Counter width            | 32 Bit  |
| Maximum input frequency  | 100 kHz |
| Maximum count frequency  | 100 kHz |
| Mode incremental encoder | yes     |
| Mode pulse / direction   | yes     |
| Mode pulse               | yes     |
| Mode frequency counter   | -       |
| Mode period measurement  | -       |
| Gate input available     | yes     |
| Latch input available    | yes     |
| Reset input available    | yes     |
| Counter output available | yes     |

**Load and working memory**

|  |                            |
|--|----------------------------|
| Load memory, integrated                  | 2 MB                       |
| Load memory, maximum                     | 2 MB                       |
| Work memory, integrated                  | 512 KB                     |
| Work memory, maximal                     | 2 MB                       |
| Memory divided in 50% program / 50% data | yes                        |
| Memory card slot                         | SD/MMC-Card with max. 2 GB |

### Hardware configuration

|                                    |   |
|------------------------------------|---|
| Racks, max.                        | 4   |
| Modules per rack, max.             | 8 in multiple-, 32 in a single-rack configuration |
| Number of integrated DP master     | 1   |
| 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, parameterizable |
| Diagnostic interrupt             | yes, parameterizable |
| Diagnostic functions             | yes                  |
| 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                               | 8                |
| 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.          | 0.01 µs |
| Word instruction, min.          | 0.01 µs |
| Double integer arithmetic, min. | 0.01 µs |
| Floating-point arithmetic, min. | 0.06 µs |

### Timers/Counters and their retentive characteristics

|                                 |          |
|---------------------------------|----------|
| Number of S7 counters           | 512      |
| S7 counter remanence            | 0 .. 512 |
| S7 counter remanence adjustable | C0 .. C7 |
| Number of S7 times              | 512      |
| S7 times remanence              | 0 .. 512 |

S7 times remanence adjustable not retentive

### Data range and retentive characteristic

|  |             |
|--|-------------|
| Number of flags                                  | 8192 Byte   |
| Bit memories retentive characteristic adjustable | 0 .. 8192   |
| Bit memories retentive characteristic preset     | MB0 .. MB15 |
| Number of data blocks                            | 4095        |
| Max. data blocks size                            | 64 KB       |
| Max. local data size per execution level         | 1024 Byte   |

### Blocks

|   |      |
|---|------|
| Number of OBs                                       | 23   |
| 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       | 8192 Byte |
| Output I/O address area      | 8192 Byte |
| Input process image maximal  | 2048 Byte |
| Output process image maximal | 2048 Byte |
| Digital inputs               | 65536     |
| Digital outputs              | 65536     |
| Digital inputs central       | 1032      |
| Digital outputs central      | 1032      |
| Integrated digital inputs    | 8         |
| Integrated digital outputs   | 8         |
| Analog inputs                | 1024      |
| Analog outputs               | 1024      |
| Analog inputs, central       | 261       |
| Analog outputs, central      | 258       |
| Integrated analog inputs     | 5         |
| Integrated analog outputs    | 2         |

### 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**

|                     |   |
|---------------------|---|
| PWM channels        | - |
| PWM time basis      | - |
| Period length       | - |
| Minimum pulse width | - |
| Type of output      | - |

**Functionality Sub-D interfaces**

|                               |                          |
|-------------------------------|--------------------------|
| Type                          | X2                       |
| Type of interface             | RS485                    |
| Connector                     | Sub-D, 9-pin, female     |
| Electrically isolated         | yes                      |
| MPI                           | yes                      |
| MP <sup>2</sup> I (MPI/RS232) | -                        |
| DP master                     | -                        |
| DP slave                      | -                        |
| Point-to-point interface      | -                        |
| 5V DC Power supply            | max. 90mA, 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 <sup>2</sup> I (MPI/RS232) | -                        |
| DP master                     | yes                      |
| DP slave                      | yes                      |
| 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                     | yes         |
| 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.    | 12 Mbit/s   |

**Functionality PROFIBUS master**

|   |            |
|---|------------|
| Number of connections, max.                         | 32         |
| PG/OP channel                                       | yes        |
| Routing   | yes        |
| S7 basic communication                              | yes        |
| S7 communication                                    | yes        |
| S7 communication as server                          | yes        |
| S7 communication as client                          | -          |
| Activation/deactivation of DP slaves                | yes        |
| Direct data exchange (slave-to-slave communication) | -          |
| DPV1  | yes        |
| Transmission speed, min.                            | 9.6 kbit/s |
| Transmission speed, max.                            | 12 Mbit/s  |
| Number of DP slaves, max.                           | 124        |
| Address range inputs, max.                          | 1 KB       |
| Address range outputs, max.                         | 1 KB       |
| User data inputs per slave, max.                    | 244 Byte   |
| User data outputs per slave, max.                   | 244 Byte   |

#### Functionality PROFIBUS slave

|   |            |
|---|------------|
| Number of connections, max.                         | 32         |
| PG/OP channel                                       | yes        |
| Routing   | yes        |
| S7 communication                                    | yes        |
| S7 communication as server                          | yes        |
| S7 communication as client                          | -          |
| Direct data exchange (slave-to-slave communication) | -          |
| DPV1  | yes        |
| Transmission speed, min.                            | 9.6 kbit/s |
| Transmission speed, max.                            | 12 Mbit/s  |
| Automatic detection of transmission speed           | -          |
| Transfer memory inputs, max.                        | 244 Byte   |
| Transfer memory outputs, max.                       | 244 Byte   |
| Address areas, max.                                 | 32         |
| User data per address area, max.                    | 32 Byte    |

#### 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                   | 480 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 |