

Data sheet CPU 314ST (314-6CF23)

Technical data

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| Order no. | 314-6CF23 |
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| Type | CPU 314ST |
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General information

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

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| Power supply (rated value) | DC 24 V |
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|--------------------------------|------------------|
| Power supply (permitted range) | DC 20.4...28.8 V |
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| Reverse polarity protection | yes |
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| Current consumption (no-load operation) | 300 mA |
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| Current consumption (rated value) | 1 A |
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| Inrush current | 5 A |
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| I ² t | 0.5 A ² s |
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| Max. current drain at backplane bus | 2.5 A |
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| Max. current drain load supply | - |
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| Power loss | 14 W |
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Technical data digital inputs

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|------------------|---|
| Number of inputs | 8 |
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|------------------------|--------|
| Cable length, shielded | 1000 m |
|------------------------|--------|

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| Cable length, unshielded | 600 m |
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| Rated load voltage | DC 24 V |
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| Reverse polarity protection of rated load voltage | yes |
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| Current consumption from load voltage L+ (without load) | 70 mA |
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| Rated value | DC 24 V |
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| Input voltage for signal "0" | DC 0...5 V |
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| Input voltage for signal "1" | DC 15...28.8 V |
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| Input voltage hysteresis | - |
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| Signal logic input | Sinking input |
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| Frequency range | - |
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| Input resistance | - |
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| Input current for signal "1" | 6 mA |
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| Connection of Two-Wire-BEROs possible | yes |
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| Max. permissible BERO quiescent current | 1.5 mA |
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| Input delay of "0" to "1" | parameterizable 2.56µs - 40ms |
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|---------------------------|-------------------------------|
| Input delay of "1" to "0" | parameterizable 2.56µs - 40ms |
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| 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 0 V ... +10 V |
| Operational limit of voltage ranges | +/-0.3% |

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| 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 0 mA ... +20 mA +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 Pt1000 Ni100 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 thermocouple ranges | - |
| Basic error limit thermocouple 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 |

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| 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 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 0 mA ... +20 mA +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

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|--|--------|
| 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

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|------------------------------------|---|
| 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

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|----------------------------------|----------------------|
| 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

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|---|------------------|
| 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

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| Number of flags | 8192 Byte |
| Bit memories retentive characteristic adjustable | 0 .. 8192 |
| Bit memories retentive characteristic preset | MB0 .. MB15 |

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| Number of data blocks | 4095 |
| Max. data blocks size | 64 KB |
| Max. local data size per execution level | 1024 Byte |

Blocks

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| 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

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

Functionality Sub-D interfaces

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|--------------------------|--------------------------|
| Type | X2 |
| Type of interface | RS485 |
| Connector | Sub-D, 9-pin, female |
| Electrically isolated | yes |
| MPI | yes |
| MP2I (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 | - |
| MP2I (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 |

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|---|------------|
| 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

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|------------------|-----|
| ASCII protocol | yes |
| STX/ETX protocol | yes |
| 3964(R) protocol | yes |
| RK512 protocol | - |

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|------------------------|-----|
| USS master protocol | yes |
| Modbus master protocol | yes |
| Modbus slave protocol | - |
| Special protocols | - |

Housing

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|----------|-----------------|
| Material | PPE |
| Mounting | Rail System 300 |

Mechanical data

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|------------------------------|-------------------------|
| Dimensions (WxHxD) | 80 mm x 125 mm x 120 mm |
| Net weight | 480 g |
| Weight including accessories | - |
| Gross weight | - |

Environmental conditions

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|-----------------------|-----------------|
| Operating temperature | 0 °C to 60 °C |
| Storage temperature | -25 °C to 70 °C |

Certifications

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|------------------|-----|
| UL certification | yes |
| KC certification | yes |