

## Data sheet

### CPU 014 (014-CEF0R01)

#### Technical data

|                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Order no.                                | 014-CEF0R01                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Type                                     | CPU 014                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Module ID                                | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| General information                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Note                                     | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Features                                 | Powered by SPEED7<br>Work memory [KB]: 128...256<br>Integrated: PROFINET IO Controller (8 Devices) / I-Device<br>Optional: PROFIBUS master/slave<br>Interface [2x RJ45]: active Ethernet PG/OP communication with DHCP support, switch, ModbusTCP master/slave, openCommunication, I-Device, PROFINET IO controller<br>Interface [2x RS485]: MPI, PtP: ASCII, STX/ETX, 3964(R), USS master, Modbus master/slave<br>OPC UA (from HW 02) / Web Server<br>SD card slot with locking, up to 64 expansion modules, configurable with SPEED7 Studio, SIMATIC Manager and TIA Portal |
| 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)  | 120 mA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Current consumption (rated value)        | 1 A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Inrush current                           | 3 A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| I <sup>2</sup> t                         | 0.1 A <sup>2</sup> s                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Max. current drain at backplane bus      | 3 A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Max. current drain load supply           | 10 A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Power loss                               | 6 W                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Load and working memory                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Load memory, integrated                  | 256 KB                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Load memory, maximum                     | 256 KB                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Work memory, integrated                  | 128 KB                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Work memory, maximal                     | 256 KB                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Memory divided in 50% program / 50% data | yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Memory card slot                         | SD/MMC-Card with max. 2 GB                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Hardware configuration                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Racks, max.                              | 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Modules per rack, max.                   | total max. 64 minus number line extensions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Number of integrated DP master           | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Number of DP master via CP               | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Operable function modules                | 64                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Operable communication modules PtP       | 64                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Operable communication modules LAN       | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Status information, alarms, diagnostics  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Status display                           | yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Interrupts                               | no                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Process alarm                            | no                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

|                                  |            |
|----------------------------------|------------|
| Diagnostic interrupt             | no         |
| Diagnostic functions             | yes        |
| Diagnostics information read-out | possible   |
| Supply voltage display           | green LED  |
| Group error display              | red SF LED |
| Channel error display            | none       |

## 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

|                                 |                        |
|---------------------------------|------------------------|
| Number of S7 counters           | 512                    |
| S7 counter remanence            | adjustable 0 up to 512 |
| S7 counter remanence adjustable | C0 .. C7               |
| Number of S7 times              | 512                    |
| S7 times remanence              | adjustable 0 up to 512 |
| 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 8192 |
| Bit memories retentive characteristic preset     | MB0 .. MB15             |
| Number of data blocks                            | 1024                    |
| Max. data blocks size                            | 64 KB                   |
| Number range DBs                                 | 1 ... 8191              |
| Max. local data size per execution level         | 4096 Byte               |
| Max. local data size per block                   | 4096 Byte               |

## Blocks

|                                                     |            |
|-----------------------------------------------------|------------|
| Number of OBs                                       | 22         |
| Maximum OB size                                     | 64 KB      |
| Total number DBs, FBs, FCs                          | 1024       |
| Number of FBs                                       | 1024       |
| Maximum FB size                                     | 64 KB      |
| Number range FBs                                    | 0 ... 8191 |
| Number of FCs                                       | 1024       |
| Maximum FC size                                     | 64 KB      |
| Number range FCs                                    | 0 ... 8191 |
| Maximum nesting depth per priority class            | 16         |
| Maximum nesting depth additional within an error OB | 4          |

## Time

|                                     |         |
|-------------------------------------|---------|
| Real-time clock buffered            | yes     |
| Clock buffered period (min.)        | 30 d    |
| Type of buffering                   | Goldcap |
| Load time for 50% buffering period  | 15 min  |
| Load time for 100% buffering period | 1 h     |
| 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       | 2048 Byte |
| Output I/O address area      | 2048 Byte |
| Process image adjustable     | yes       |
| Input process image preset   | 128 Byte  |
| Output process image preset  | 128 Byte  |
| Input process image maximal  | 2048 Byte |
| Output process image maximal | 2048 Byte |
| Digital inputs               | 16384     |
| Digital outputs              | 16384     |
| Digital inputs central       | 512       |
| Digital outputs central      | 512       |
| Integrated digital inputs    | -         |
| Integrated digital outputs   | -         |
| Analog inputs                | 1024      |
| Analog outputs               | 1024      |
| Analog inputs, central       | 256       |
| Analog outputs, central      | 256       |
| Integrated analog inputs     | -         |
| Integrated analog outputs    | -         |

## Communication functions

|                                           |          |
|-------------------------------------------|----------|
| PG/OP channel                             | yes      |
| Global data communication                 | yes      |
| Number of GD circuits, max.               | 8        |
| 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       |

## Functionality Sub-D interfaces

|                          |                          |
|--------------------------|--------------------------|
| 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 | yes                      |
| 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                      | yes                      |
| MP2I (MPI/RS232)         | -                        |
| DP master                | optional                 |
| DP slave                 | optional                 |
| Point-to-point interface | -                        |
| 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.                          | 2 KB       |
| Address range outputs, max.                         | 2 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                        | X1                          |
| Type of interface           | Ethernet 10/100 MBit Switch |
| Connector                   | RJ45                        |
| Electrically isolated       | yes                         |
| PG/OP channel               | yes                         |
| Number of connections, max. | 4                           |
| Productive connections      | yes                         |

## 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. | 1200 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  | yes |
| Special protocols      | -   |

## Properties PROFINET I/O-Controller via PG/OP

|                             |                |
|-----------------------------|----------------|
| Realtime Class              | -              |
| Conformance Class           | PROFINET IO    |
| Number of PN IO devices     | 8              |
| IRT support                 | -              |
| Shared Device supported     | yes            |
| MRP Client supported        | yes            |
| Prioritized start-up        | -              |
| Number of PN IO lines       | 1              |
| Address range inputs, max.  | 2 KB           |
| Address range outputs, max. | 2 KB           |
| Transmitting clock          | 1 ms           |
| Update time                 | 1 ms .. 512 ms |

|                                                          |                                                                       |
|----------------------------------------------------------|-----------------------------------------------------------------------|
| Isochronous mode                                         | -                                                                     |
| Parallel operation as controller and I-Device            | yes                                                                   |
| <b>Properties PROFINET I-Device via PG/OP</b>            |                                                                       |
| I/O Data range, max.                                     | 768 Byte                                                              |
| Update time                                              | 1 ms .. 512 ms                                                        |
| Mode as Shared I-Device                                  | -                                                                     |
| <b>Management &amp; diagnosis via PG/OP</b>              |                                                                       |
| Protocols                                                | ICMP<br>DCP<br>LLDP / SNMP<br>NTP                                     |
| Web based diagnosis                                      | yes                                                                   |
| NCM diagnosis                                            | -                                                                     |
| <b>Ethernet communication via PG/OP</b>                  |                                                                       |
| Number of productive connections via PG/OP, max.         | 4                                                                     |
| Number of productive connections by Siemens NetPro, max. | 4                                                                     |
| S7 connections                                           | BSEND, BRCV, GET, PUT, Connection of active and passive data handling |
| User data per S7 connection, max.                        | 64 KB                                                                 |
| TCP-connections                                          | FETCH PASSIV, WRITE PASSIV, Connection of passive data handling       |
| User data per TCP connection, max.                       | 8 KB                                                                  |
| ISO on TCP connections (RFC 1006)                        | FETCH PASSIV, WRITE PASSIV, Connection of passive data handling       |
| User data per ISO connection, max.                       | 8 KB                                                                  |
| <b>Ethernet open communication via PG/OP</b>             |                                                                       |
| Number of configurable connections, max.                 | 4                                                                     |
| ISO on TCP connections (RFC 1006)                        | TSEND, TRCV, TCON, TDISCON                                            |
| User data per ISO on TCP connection, max.                | 32 KB                                                                 |
| TCP-Connections native                                   | TSEND, TRCV, TCON, TDISCON                                            |
| User data per native TCP connection, max.                | 32 KB                                                                 |
| User data per ad hoc TCP connection, max.                | 1460 Byte                                                             |
| UDP-connections                                          | TUSEND, TURCV                                                         |
| User data per UDP connection, max.                       | 1472 KB                                                               |
| <b>WebVisu via PG/OP</b>                                 |                                                                       |
| WebVisu is supported                                     | yes                                                                   |
| Max. number of connections WebVisu                       | 4                                                                     |
| WebVisu supports HTTP                                    | yes                                                                   |
| WebVisu supports HTTPS                                   | yes                                                                   |
| <b>OPC UA server via PG/OP</b>                           |                                                                       |
| OPC UA server is supported                               | yes                                                                   |
| Max. number of connections per interface                 | 4                                                                     |
| Services                                                 | Data Access (Read, Write, Subscribe)                                  |
| Security policies                                        | None, Basic128Rsa15, Basic256, Basic256Sha256                         |
| Authentication                                           | Anonymous, username and password                                      |
| <b>Housing</b>                                           |                                                                       |
| Material                                                 | PPE / PPE GF10                                                        |
| Mounting                                                 | Profile rail 35 mm                                                    |
| <b>Mechanical data</b>                                   |                                                                       |
| Dimensions (WxHxD)                                       | 131.5 mm x 109 mm x 83 mm                                             |

|                              |       |
|------------------------------|-------|
| Net weight                   | 290 g |
| Weight including accessories | 290 g |
| Gross weight                 | 325 g |

## Environmental conditions

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

## Certifications

|                         |     |
|-------------------------|-----|
| UL certification        | yes |
| KC certification        | yes |
| UKCA certification      | -   |
| ChinaRoHS certification | yes |