



\*\*\*\*\* Replacement part \*\*\*\*\* SIMATIC S7-400, CPU414F-3 PN/DP Central processing unit with: work memory 4 MB, (2 MB code, 2 MB data), Interfaces: 1st interface MPI/DP 12 Mbit/s, (X1), 2nd interface Ethernet/PROFINET (X5), 3rd interface IF 964-DP plug-in (IF1)

| General information                         |                                                                         |
|---------------------------------------------|-------------------------------------------------------------------------|
| Product type designation                    | CPU 414F-3 PN/DP                                                        |
| HW functional status                        | 01                                                                      |
| Firmware version                            | V6.0                                                                    |
| Product function                            |                                                                         |
| • Isochronous mode                          | Yes; Via PROFIBUS DP or PROFINET interface                              |
| Engineering with                            |                                                                         |
| • Programming package                       | STEP 7 V5.5 or higher/iMap V3.0 + iMap STEP 7 Add-on V3.0 SP5 or higher |
| CiR - Configuration in RUN                  |                                                                         |
| CiR synchronization time, basic load        | 100 ms                                                                  |
| CiR synchronization time, time per I/O byte | 15 µs; Time per I/O byte                                                |
| Supply voltage                              |                                                                         |
| Rated value (DC)                            | Power supply via system power supply                                    |
| Input current                               |                                                                         |
| from backplane bus 5 V DC, typ.             | 1.3 A                                                                   |
| from backplane bus 5 V DC, max.             | 1.5 A                                                                   |
| from backplane bus 24 V DC, max.            | 300 mA; 150 mA per DP interface                                         |
| from interface 5 V DC, max.                 | 90 mA; At each DP interface                                             |
| Power loss                                  |                                                                         |
| Power loss, typ.                            | 6.5 W                                                                   |
| Memory                                      |                                                                         |
| Type of memory                              | RAM                                                                     |
| Work memory                                 |                                                                         |
| • integrated                                | 4 Mbyte                                                                 |
| • integrated (for program)                  | 2 Mbyte                                                                 |
| • integrated (for data)                     | 2 Mbyte                                                                 |
| • expandable                                | No                                                                      |
| Load memory                                 |                                                                         |
| • expandable FEPR0M                         | Yes; with Memory Card (FLASH)                                           |
| • expandable FEPR0M, max.                   | 64 Mbyte                                                                |
| • integrated RAM, max.                      | 512 kbyte                                                               |
| • expandable RAM                            | Yes; with Memory Card (RAM)                                             |
| • expandable RAM, max.                      | 64 Mbyte                                                                |
| Backup                                      |                                                                         |
| • present                                   | Yes                                                                     |
| • with battery                              | Yes; all data                                                           |
| • without battery                           | No                                                                      |
| Battery                                     |                                                                         |
| Backup battery                              |                                                                         |
| • Backup current, typ.                      | 125 µA; up to 40 °C                                                     |

|                                             |                                                                                                 |
|---------------------------------------------|-------------------------------------------------------------------------------------------------|
| • Backup current, max.                      | 450 µA                                                                                          |
| • Backup time, max.                         | Dealt with in the module data manual with the secondary conditions and the factors of influence |
| • Feeding of external backup voltage to CPU | 5 V DC to 15 V DC                                                                               |

#### CPU processing times

|                                     |        |
|-------------------------------------|--------|
| for bit operations, typ.            | 45 ns  |
| for word operations, typ.           | 45 ns  |
| for fixed point arithmetic, typ.    | 45 ns  |
| for floating point arithmetic, typ. | 135 ns |

#### CPU-blocks

|                                    |                                                                |
|------------------------------------|----------------------------------------------------------------|
| DB                                 |                                                                |
| • Number, max.                     | 6 000; Number range: 1 to 16000                                |
| • Size, max.                       | 64 kbyte                                                       |
| FB                                 |                                                                |
| • Number, max.                     | 3 000; Number range: 0 to 7999                                 |
| • Size, max.                       | 64 kbyte                                                       |
| FC                                 |                                                                |
| • Number, max.                     | 3 000; Number range: 0 to 7999                                 |
| • Size, max.                       | 64 kbyte                                                       |
| OB                                 |                                                                |
| • Number, max.                     | see instruction list                                           |
| • Size, max.                       | 64 kbyte                                                       |
| • Number of free cycle OBs         | 1; OB 1                                                        |
| • Number of time alarm OBs         | 4; OB 10-13                                                    |
| • Number of delay alarm OBs        | 4; OB 20-23                                                    |
| • Number of cyclic interrupt OBs   | 4; OB 32, 33, 34, 35 (shortest cycle that can be set = 500 µs) |
| • Number of process alarm OBs      | 4; OB 40-43                                                    |
| • Number of DPV1 alarm OBs         | 3; OB 55-57                                                    |
| • Number of isochronous mode OBs   | 3; OB 61-63                                                    |
| • Number of multicomputing OBs     | 1; OB 60                                                       |
| • Number of background OBs         | 1; OB 90                                                       |
| • Number of startup OBs            | 2; OB 100, 102                                                 |
| • Number of asynchronous error OBs | 9; OB 80-88                                                    |
| • Number of synchronous error OBs  | 2; OB 121, 122                                                 |
| Nesting depth                      |                                                                |
| • per priority class               | 24                                                             |
| • additional within an error OB    | 1                                                              |

#### Counters, timers and their retentivity

|                |                                          |
|----------------|------------------------------------------|
| S7 counter     |                                          |
| • Number       | 2 048                                    |
| Retentivity    |                                          |
| — adjustable   | Yes                                      |
| — preset       | Z 0 to Z 7                               |
| Counting range |                                          |
| — lower limit  | 0                                        |
| — upper limit  | 999                                      |
| IEC counter    |                                          |
| • present      | Yes                                      |
| • Type         | SFB                                      |
| • Number       | Unlimited (limited only by RAM capacity) |
| S7 times       |                                          |
| • Number       | 2 048                                    |
| Retentivity    |                                          |
| — adjustable   | Yes                                      |
| — preset       | No times retentive                       |
| Time range     |                                          |
| — lower limit  | 10 ms                                    |
| — upper limit  | 9 990 s                                  |
| IEC timer      |                                          |
| • present      | Yes                                      |
| • Type         | SFB                                      |

|                                                                                |                                                                                                                                                 |
|--------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| • Number                                                                       | Unlimited (limited only by RAM capacity)                                                                                                        |
| <b>Data areas and their retentivity</b>                                        |                                                                                                                                                 |
| Retentive data area (incl. timers, counters, flags), max.                      | Total working and load memory (with backup battery)                                                                                             |
| <b>Flag</b>                                                                    |                                                                                                                                                 |
| • Size, max.                                                                   | 8 kbyte; Size of bit memory address area                                                                                                        |
| • Retentivity available                                                        | Yes                                                                                                                                             |
| • Retentivity preset                                                           | MB 0 to MB 15                                                                                                                                   |
| • Number of clock memories                                                     | 8; in 1 memory byte                                                                                                                             |
| <b>Local data</b>                                                              |                                                                                                                                                 |
| • adjustable, max.                                                             | 16 kbyte                                                                                                                                        |
| • preset                                                                       | 8 kbyte                                                                                                                                         |
| <b>Address area</b>                                                            |                                                                                                                                                 |
| <b>I/O address area</b>                                                        |                                                                                                                                                 |
| • Inputs                                                                       | 8 kbyte                                                                                                                                         |
| • Outputs                                                                      | 8 kbyte                                                                                                                                         |
| <b>Process image</b>                                                           |                                                                                                                                                 |
| • Inputs, adjustable                                                           | 8 kbyte                                                                                                                                         |
| • Outputs, adjustable                                                          | 8 kbyte                                                                                                                                         |
| • Inputs, default                                                              | 256 byte                                                                                                                                        |
| • Outputs, default                                                             | 256 byte                                                                                                                                        |
| • consistent data, max.                                                        | 244 byte                                                                                                                                        |
| • Access to consistent data in process image                                   | Yes                                                                                                                                             |
| <b>Subprocess images</b>                                                       |                                                                                                                                                 |
| • Number of subprocess images, max.                                            | 15                                                                                                                                              |
| <b>Digital channels</b>                                                        |                                                                                                                                                 |
| • Inputs                                                                       | 65 536                                                                                                                                          |
| — of which central                                                             | 65 536                                                                                                                                          |
| • Outputs                                                                      | 65 536                                                                                                                                          |
| — of which central                                                             | 65 536                                                                                                                                          |
| <b>Analog channels</b>                                                         |                                                                                                                                                 |
| • Inputs                                                                       | 4 096                                                                                                                                           |
| — of which central                                                             | 4 096                                                                                                                                           |
| • Outputs                                                                      | 4 096                                                                                                                                           |
| — of which central                                                             | 4 096                                                                                                                                           |
| <b>Hardware configuration</b>                                                  |                                                                                                                                                 |
| Number of expansion units, max.                                                | 21                                                                                                                                              |
| connectable OPs                                                                | 63                                                                                                                                              |
| Multicomputing                                                                 | Yes; 4 CPUs max. (with UR1 or UR2)                                                                                                              |
| <b>Interface modules</b>                                                       |                                                                                                                                                 |
| • Number of connectable IMs (total), max.                                      | 6                                                                                                                                               |
| • Number of connectable IM 460s, max.                                          | 6                                                                                                                                               |
| • Number of connectable IM 463s, max.                                          | 4; IM 463-2                                                                                                                                     |
| <b>Number of DP masters</b>                                                    |                                                                                                                                                 |
| • integrated                                                                   | 1                                                                                                                                               |
| • via CP                                                                       | 10; CP 443-5 Extended                                                                                                                           |
| • via IM 467                                                                   | 4                                                                                                                                               |
| • Mixed mode IM + CP permitted                                                 | No; IM 467 not suitable for use with CP 443-5 Ext. and CP 443-1 EX4x, EX20, GX20 (in PROFINET IO mode)                                          |
| • via interface module                                                         | 1; IF 964-DP                                                                                                                                    |
| • Number of pluggable S5 modules (via adapter capsule in central device), max. | 6                                                                                                                                               |
| <b>Number of IO Controllers</b>                                                |                                                                                                                                                 |
| • integrated                                                                   | 1                                                                                                                                               |
| • via CP                                                                       | 4; No mixed operation of CP443-1 EX40 and CP443-1 EX 41/EX20/GX20, max. 4 in central controller                                                 |
| <b>Number of operable FMs and CPs (recommended)</b>                            |                                                                                                                                                 |
| • FM                                                                           | Limited by number of slots and number of connections                                                                                            |
| • CP, PtP                                                                      | CP 440: Limited by number of slots; CP 441: Limited by number of slots and number of connections                                                |
| • PROFIBUS and Ethernet CPs                                                    | 14; In total max. 10 CPs as DP master and PROFINET controller, of which up to 10 IMs or CPs as DP master and up to 4 CPs as PROFINET controller |
| <b>Slots</b>                                                                   |                                                                                                                                                 |

|                                                         |                                                                                                                   |
|---------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| • required slots                                        | 2                                                                                                                 |
| <b>Time of day</b>                                      |                                                                                                                   |
| <b>Clock</b>                                            |                                                                                                                   |
| • Hardware clock (real-time)                            | Yes                                                                                                               |
| • retentive and synchronizable                          | Yes                                                                                                               |
| • Resolution                                            | 1 ms                                                                                                              |
| • Deviation per day (buffered), max.                    | 1.7 s; Power off                                                                                                  |
| • Deviation per day (unbuffered), max.                  | 8.6 s; For power On                                                                                               |
| <b>Operating hours counter</b>                          |                                                                                                                   |
| • Number                                                | 16                                                                                                                |
| • Number/Number range                                   | 0 to 15                                                                                                           |
| • Range of values                                       | SFCs 2, 3 and 4: 0 to 32767 hours SFC 101: 0 to 2 <sup>31</sup> - 1 hours                                         |
| • Granularity                                           | 1 h                                                                                                               |
| • retentive                                             | Yes                                                                                                               |
| <b>Clock synchronization</b>                            |                                                                                                                   |
| • supported                                             | Yes                                                                                                               |
| • to MPI, master                                        | Yes                                                                                                               |
| • on MPI, device                                        | Yes                                                                                                               |
| • to DP, master                                         | Yes                                                                                                               |
| • on DP, device                                         | Yes                                                                                                               |
| • in AS, master                                         | Yes                                                                                                               |
| • in AS, device                                         | Yes                                                                                                               |
| • on Ethernet via NTP                                   | Yes; As client                                                                                                    |
| • to IF 964 DP                                          | Yes                                                                                                               |
| <b>Time difference in system when synchronizing via</b> |                                                                                                                   |
| • Ethernet, max.                                        | 10 ms                                                                                                             |
| • MPI, max.                                             | 200 ms                                                                                                            |
| <b>Interfaces</b>                                       |                                                                                                                   |
| Number of RS 485 interfaces                             | 2                                                                                                                 |
| Number of other interfaces                              | 0                                                                                                                 |
| Optical interface                                       | No                                                                                                                |
| <b>1. Interface</b>                                     |                                                                                                                   |
| Interface type                                          | MPI/PROFIBUS DP                                                                                                   |
| Isolated                                                | Yes                                                                                                               |
| <b>Interface types</b>                                  |                                                                                                                   |
| • RS 485                                                | Yes                                                                                                               |
| • Output current of the interface, max.                 | 150 mA                                                                                                            |
| <b>Protocols</b>                                        |                                                                                                                   |
| • MPI                                                   | Yes                                                                                                               |
| • PROFIBUS DP master                                    | Yes                                                                                                               |
| • PROFIBUS DP device                                    | Yes                                                                                                               |
| <b>MPI</b>                                              |                                                                                                                   |
| • Number of connections                                 | 32; If a diagnostics repeater is used on the line, the number of connection resources on the line is reduced by 1 |
| • Transmission rate, max.                               | 12 Mbit/s                                                                                                         |
| <b>Services</b>                                         |                                                                                                                   |
| — PG/OP communication                                   | Yes                                                                                                               |
| — Routing                                               | Yes                                                                                                               |
| — Global data communication                             | Yes                                                                                                               |
| — S7 basic communication                                | Yes                                                                                                               |
| — S7 communication                                      | Yes                                                                                                               |
| — S7 communication, as client                           | Yes                                                                                                               |
| — S7 communication, as server                           | Yes                                                                                                               |
| <b>PROFIBUS DP master</b>                               |                                                                                                                   |
| • Number of connections, max.                           | 16; If a diagnostics repeater is used on the line, the number of connection resources on the line is reduced by 1 |
| • Transmission rate, max.                               | 12 Mbit/s                                                                                                         |
| • max. number of DP devices                             | 32                                                                                                                |
| <b>Services</b>                                         |                                                                                                                   |
| — PG/OP communication                                   | Yes                                                                                                               |
| — Routing                                               | Yes                                                                                                               |

|                                                                        |                                                                                                                               |
|------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|
| — Global data communication                                            | No                                                                                                                            |
| — S7 basic communication                                               | Yes                                                                                                                           |
| — S7 communication                                                     | Yes                                                                                                                           |
| — S7 communication, as client                                          | Yes                                                                                                                           |
| — S7 communication, as server                                          | Yes                                                                                                                           |
| — Equidistance                                                         | Yes                                                                                                                           |
| — Isochronous mode                                                     | Yes                                                                                                                           |
| — SYNC/FREEZE                                                          | Yes                                                                                                                           |
| — activation/deactivation of DP devices                                | Yes                                                                                                                           |
| — Direct data exchange (slave-to-slave communication)                  | Yes                                                                                                                           |
| — DPV1                                                                 | Yes                                                                                                                           |
| <b>Address area</b>                                                    |                                                                                                                               |
| — Inputs, max.                                                         | 2 kbyte                                                                                                                       |
| — Outputs, max.                                                        | 2 kbyte                                                                                                                       |
| <b>1st interface / DP master / payload data per DP Device / header</b> |                                                                                                                               |
| — user data per DP device, max.                                        | 244 byte                                                                                                                      |
| — Inputs, max.                                                         | 244 byte                                                                                                                      |
| — Outputs, max.                                                        | 244 byte                                                                                                                      |
| — Slots, max.                                                          | 244                                                                                                                           |
| — per slot, max.                                                       | 128 byte                                                                                                                      |
| <b>1st interface / PROFIBUS DP device / header</b>                     |                                                                                                                               |
| • Number of connections                                                | 16                                                                                                                            |
| • GSD file                                                             | <a href="http://support.automation.siemens.com/WW/view/en/113652">http://support.automation.siemens.com/WW/view/en/113652</a> |
| • Transmission rate, max.                                              | 12 Mbit/s                                                                                                                     |
| • automatic baud rate search                                           | No                                                                                                                            |
| • Address area, max.                                                   | 32; Virtual slots                                                                                                             |
| • User data per address area, max.                                     | 32 byte                                                                                                                       |
| — of which consistent, max.                                            | 32 byte                                                                                                                       |
| <b>Services</b>                                                        |                                                                                                                               |
| — PG/OP communication                                                  | Yes; with interface active                                                                                                    |
| — Routing                                                              | Yes; with interface active                                                                                                    |
| — Global data communication                                            | No                                                                                                                            |
| — S7 basic communication                                               | No                                                                                                                            |
| — S7 communication                                                     | Yes                                                                                                                           |
| — S7 communication, as client                                          | Yes                                                                                                                           |
| — S7 communication, as server                                          | Yes                                                                                                                           |
| — Direct data exchange (slave-to-slave communication)                  | No                                                                                                                            |
| — DPV1                                                                 | No                                                                                                                            |
| <b>Transfer memory</b>                                                 |                                                                                                                               |
| — Inputs                                                               | 244 byte                                                                                                                      |
| — Outputs                                                              | 244 byte                                                                                                                      |
| <b>2. Interface</b>                                                    |                                                                                                                               |
| Interface type                                                         | PROFINET                                                                                                                      |
| Isolated                                                               | Yes                                                                                                                           |
| automatic detection of transmission rate                               | Yes; Autosensing                                                                                                              |
| Autonegotiation                                                        | Yes                                                                                                                           |
| Autocrossing                                                           | Yes                                                                                                                           |
| Change of IP address at runtime, supported                             | Yes; Assignment by higher-level IO-Controller or by the user program with SFB104 "IP_CONF"                                    |
| <b>Interface types</b>                                                 |                                                                                                                               |
| • RJ 45 (Ethernet)                                                     | Yes                                                                                                                           |
| • Number of ports                                                      | 2                                                                                                                             |
| • integrated switch                                                    | Yes                                                                                                                           |
| <b>Protocols</b>                                                       |                                                                                                                               |
| • PROFINET IO Controller                                               | Yes                                                                                                                           |
| • PROFINET IO Device                                                   | Yes                                                                                                                           |
| • PROFINET CBA                                                         | Yes                                                                                                                           |
| • PROFIBUS DP master                                                   | No                                                                                                                            |
| • PROFIBUS DP device                                                   | No                                                                                                                            |
| • Open IE communication                                                | Yes                                                                                                                           |

|                                                                               |                                                                                                                                                                                               |
|-------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| • Web server                                                                  | Yes                                                                                                                                                                                           |
| • Point-to-point connection                                                   | No                                                                                                                                                                                            |
| • Media redundancy                                                            | Yes                                                                                                                                                                                           |
| <b>PROFINET IO Controller</b>                                                 |                                                                                                                                                                                               |
| • Transmission rate, max.                                                     | 100 Mbit/s                                                                                                                                                                                    |
| <b>Services</b>                                                               |                                                                                                                                                                                               |
| — PG/OP communication                                                         | Yes                                                                                                                                                                                           |
| — S7 communication                                                            | Yes                                                                                                                                                                                           |
| — Isochronous mode                                                            | Yes; Only with IRT and the High Performance option                                                                                                                                            |
| — Shared device                                                               | Yes                                                                                                                                                                                           |
| — Prioritized startup                                                         | Yes                                                                                                                                                                                           |
| — Number of IO devices with prioritized startup, max.                         | 32                                                                                                                                                                                            |
| — Number of connectable IO Devices, max.                                      | 256                                                                                                                                                                                           |
| — Of which IO devices with IRT, max.                                          | 64                                                                                                                                                                                            |
| — of which in line, max.                                                      | 64                                                                                                                                                                                            |
| — Number of IO Devices with IRT and the option "high flexibility"             | 256                                                                                                                                                                                           |
| — of which in line, max.                                                      | 61                                                                                                                                                                                            |
| — Number of connectable IO Devices for RT, max.                               | 256                                                                                                                                                                                           |
| — of which in line, max.                                                      | 256                                                                                                                                                                                           |
| — Activation/deactivation of IO Devices                                       | Yes                                                                                                                                                                                           |
| — Number of IO Devices that can be simultaneously activated/deactivated, max. | 8                                                                                                                                                                                             |
| — IO Devices changing during operation (partner ports), supported             | Yes                                                                                                                                                                                           |
| — Number of IO Devices per tool, max.                                         | 8; 8 parallel calls of the SFC 12 "D_ACT_DP" possible per line. Max. 32 IO Devices changing during operation (partner ports) are supported                                                    |
| — Device replacement without swap medium                                      | Yes                                                                                                                                                                                           |
| — Send cycles                                                                 | 250 µs, 500 µs, 1 ms, 2 ms, 4 ms additionally with IRT with high performance: 250 µs to 4 ms in 125 µs frame                                                                                  |
| — Updating time                                                               | 250 µs to 512 ms; minimum value depends on preset communication share for PROFINET IO, on the number of IO Devices and on the amount of configured user data, see PROFINET system description |
| <b>Address area</b>                                                           |                                                                                                                                                                                               |
| — Inputs, max.                                                                | 8 kbyte                                                                                                                                                                                       |
| — Outputs, max.                                                               | 8 kbyte                                                                                                                                                                                       |
| — User data consistency, max.                                                 | 1 024 byte                                                                                                                                                                                    |
| <b>PROFINET IO Device</b>                                                     |                                                                                                                                                                                               |
| <b>Services</b>                                                               |                                                                                                                                                                                               |
| — PG/OP communication                                                         | Yes                                                                                                                                                                                           |
| — S7 communication                                                            | Yes                                                                                                                                                                                           |
| — Isochronous mode                                                            | No                                                                                                                                                                                            |
| — IRT                                                                         | Yes                                                                                                                                                                                           |
| — Prioritized startup                                                         | Yes                                                                                                                                                                                           |
| — Shared device                                                               | Yes                                                                                                                                                                                           |
| — Number of IO Controllers with shared device, max.                           | 2                                                                                                                                                                                             |
| <b>Transfer memory</b>                                                        |                                                                                                                                                                                               |
| — Inputs, max.                                                                | 1 440 byte; Per IO Controller with shared device                                                                                                                                              |
| — Outputs, max.                                                               | 1 440 byte; Per IO Controller with shared device                                                                                                                                              |
| <b>Submodules</b>                                                             |                                                                                                                                                                                               |
| — Number, max.                                                                | 64                                                                                                                                                                                            |
| — User data per submodule, max.                                               | 1 024 byte                                                                                                                                                                                    |
| <b>PROFINET CBA</b>                                                           |                                                                                                                                                                                               |
| • acyclic transmission                                                        | Yes                                                                                                                                                                                           |
| • cyclic transmission                                                         | Yes                                                                                                                                                                                           |
| <b>Open IE communication</b>                                                  |                                                                                                                                                                                               |
| • Number of connections, max.                                                 | 62                                                                                                                                                                                            |
| • Local port numbers used at the system end                                   | 0, 20, 21, 25, 80, 102, 135, 161, 34962, 34963, 34964, 65532, 65533, 65534, 65535                                                                                                             |
| • Keep-alive function, supported                                              | Yes                                                                                                                                                                                           |
| <b>3. Interface</b>                                                           |                                                                                                                                                                                               |
| Interface type                                                                | Pluggable interface module (IF)                                                                                                                                                               |
| Plug-in interface modules                                                     | IF 964-DP (MLFB: 6ES7964-2AA04-0AB0)                                                                                                                                                          |

|                                                                                                               |                                                                                                                               |
|---------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|
| Isolated                                                                                                      | Yes                                                                                                                           |
| automatic detection of transmission rate                                                                      | No                                                                                                                            |
| Interface types                                                                                               |                                                                                                                               |
| • RS 485                                                                                                      | Yes                                                                                                                           |
| • Output current of the interface, max.                                                                       | 150 mA                                                                                                                        |
| Protocols                                                                                                     |                                                                                                                               |
| • MPI                                                                                                         | No                                                                                                                            |
| • PROFIBUS DP master                                                                                          | Yes                                                                                                                           |
| • PROFIBUS DP device                                                                                          | Yes                                                                                                                           |
| PROFIBUS DP master                                                                                            |                                                                                                                               |
| • Number of connections, max.                                                                                 | 16                                                                                                                            |
| • Transmission rate, max.                                                                                     | 12 Mbit/s                                                                                                                     |
| • max. number of DP devices                                                                                   | 96                                                                                                                            |
| Services                                                                                                      |                                                                                                                               |
| — PG/OP communication                                                                                         | Yes                                                                                                                           |
| — Routing                                                                                                     | Yes; S7 routing                                                                                                               |
| — Global data communication                                                                                   | No                                                                                                                            |
| — S7 basic communication                                                                                      | Yes                                                                                                                           |
| — S7 communication                                                                                            | Yes                                                                                                                           |
| — S7 communication, as client                                                                                 | Yes                                                                                                                           |
| — S7 communication, as server                                                                                 | Yes                                                                                                                           |
| — Equidistance                                                                                                | Yes                                                                                                                           |
| — Isochronous mode                                                                                            | Yes                                                                                                                           |
| — SYNC/FREEZE                                                                                                 | Yes                                                                                                                           |
| — activation/deactivation of DP devices                                                                       | Yes                                                                                                                           |
| — Direct data exchange (slave-to-slave communication)                                                         | Yes                                                                                                                           |
| — DPV0                                                                                                        | Yes                                                                                                                           |
| — DPV1                                                                                                        | Yes                                                                                                                           |
| Address area                                                                                                  |                                                                                                                               |
| — Inputs, max.                                                                                                | 6 kbyte                                                                                                                       |
| — Outputs, max.                                                                                               | 6 kbyte                                                                                                                       |
| 3rd interface / DP master / payload data per DP Device / header                                               |                                                                                                                               |
| — user data per DP device, max.                                                                               | 244 byte                                                                                                                      |
| — Inputs, max.                                                                                                | 244 byte                                                                                                                      |
| — Outputs, max.                                                                                               | 244 byte                                                                                                                      |
| — Slots, max.                                                                                                 | 244                                                                                                                           |
| — per slot, max.                                                                                              | 128 byte                                                                                                                      |
| 3rd interface / PROFIBUS DP device / header                                                                   |                                                                                                                               |
| • number of possible connections / at the 3rd interface / as DP slave                                         | 16                                                                                                                            |
| • GSD file                                                                                                    | <a href="http://support.automation.siemens.com/WW/view/en/113652">http://support.automation.siemens.com/WW/view/en/113652</a> |
| • transfer rate / at the 3rd interface / as DP slave / maximum                                                | 12 Mbit/s                                                                                                                     |
| • automatic baud rate search                                                                                  | No                                                                                                                            |
| • Address area, max.                                                                                          | 32; Virtual slots                                                                                                             |
| • data volume / at the 3rd interface / as DP slave / as user data per address range / maximum                 | 32 byte                                                                                                                       |
| — data volume / at the 3rd interface / as DP slave / as consistent reference data per address range / maximum | 32 byte                                                                                                                       |
| Services                                                                                                      |                                                                                                                               |
| — PG/OP communication                                                                                         | Yes                                                                                                                           |
| — Routing                                                                                                     | Yes; with interface active                                                                                                    |
| — Global data communication                                                                                   | No                                                                                                                            |
| — S7 basic communication                                                                                      | No                                                                                                                            |
| — S7 communication                                                                                            | Yes                                                                                                                           |
| — S7 communication, as client                                                                                 | Yes                                                                                                                           |
| — S7 communication, as server                                                                                 | Yes                                                                                                                           |
| — Direct data exchange (slave-to-slave communication)                                                         | No                                                                                                                            |
| — DPV1                                                                                                        | No                                                                                                                            |
| Transfer memory                                                                                               |                                                                                                                               |

|                                                                                      |                                                                          |
|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------|
| — Inputs                                                                             | 244 byte                                                                 |
| — Outputs                                                                            | 244 byte                                                                 |
| <b>Protocols</b>                                                                     |                                                                          |
| Redundancy mode                                                                      |                                                                          |
| Media redundancy                                                                     |                                                                          |
| — Switchover time on line break, typ.                                                | 200 ms                                                                   |
| — Number of stations in the ring, max.                                               | 50                                                                       |
| SIMATIC communication                                                                |                                                                          |
| • S7 routing                                                                         | Yes                                                                      |
| Open IE communication                                                                |                                                                          |
| • TCP/IP                                                                             | Yes; via integrated PROFINET interface and loadable FBs                  |
| — Number of connections, max.                                                        | 62                                                                       |
| — Data length, max.                                                                  | 32 kbyte                                                                 |
| — several passive connections per port, supported                                    | Yes                                                                      |
| • ISO-on-TCP (RFC1006)                                                               | Yes; Via integrated PROFINET interface or CP 443-1 Adv. and loadable FBs |
| — Number of connections, max.                                                        | 62                                                                       |
| — Data length, max.                                                                  | 32 kbyte; 1 452 bytes via CP 443-1 Adv.                                  |
| • UDP                                                                                | Yes; via integrated PROFINET interface and loadable FBs                  |
| — Number of connections, max.                                                        | 62                                                                       |
| — Data length, max.                                                                  | 1 472 byte                                                               |
| Web server                                                                           |                                                                          |
| • supported                                                                          | Yes                                                                      |
| • User-defined websites                                                              | Yes                                                                      |
| • Number of HTTP clients                                                             | 5                                                                        |
| <b>Isochronous mode</b>                                                              |                                                                          |
| Equidistance                                                                         | Yes                                                                      |
| Number of DP masters with isochronous mode                                           | 2                                                                        |
| User data per isochronous slave, max.                                                | 244 byte                                                                 |
| shortest clock pulse                                                                 | 1 ms; 0.5 ms without use of SFC 126, 127                                 |
| max. cycle                                                                           | 32 ms                                                                    |
| <b>communication functions / header</b>                                              |                                                                          |
| PG/OP communication                                                                  | Yes                                                                      |
| • Number of connectable OPs without message processing                               | 63                                                                       |
| • Number of connectable OPs with message processing                                  | 63; When using Alarm_S/SQ and Alarm_D/DQ                                 |
| Data record routing                                                                  | Yes                                                                      |
| Global data communication                                                            |                                                                          |
| • supported                                                                          | Yes                                                                      |
| • Number of GD loops, max.                                                           | 8                                                                        |
| • Number of GD packets, transmitter, max.                                            | 8                                                                        |
| • Number of GD packets, receiver, max.                                               | 16                                                                       |
| • Size of GD packets, max.                                                           | 54 byte                                                                  |
| • Size of GD packet (of which consistent), max.                                      | 1 variable                                                               |
| S7 basic communication                                                               |                                                                          |
| • supported                                                                          | Yes                                                                      |
| • User data per job, max.                                                            | 76 byte                                                                  |
| • User data per job (of which consistent), max.                                      | 1 variable                                                               |
| S7 communication                                                                     |                                                                          |
| • supported                                                                          | Yes                                                                      |
| • as server                                                                          | Yes                                                                      |
| • as client                                                                          | Yes                                                                      |
| • User data per job, max.                                                            | 64 kbyte                                                                 |
| • User data per job (of which consistent), max.                                      | 462 byte; 1 variable                                                     |
| S5 compatible communication                                                          |                                                                          |
| • supported                                                                          | Yes; Via FC AG_SEND and AG_RECV, max. via 10 CP 443-1 or 443-5           |
| • User data per job, max.                                                            | 8 kbyte                                                                  |
| • User data per job (of which consistent), max.                                      | 240 byte                                                                 |
| • Number of simultaneous AG-SEND/AG-RECV orders per CPU, max.                        | 24/24                                                                    |
| Standard communication (FMS)                                                         |                                                                          |
| • supported                                                                          | Yes; Via CP and loadable FB                                              |
| communication functions / PROFINET CBA (with set target communication load) / header |                                                                          |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                          |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>• Setpoint for the CPU communication load</li> <li>• Number of remote interconnection partners</li> <li>• number of master/device functions</li> <li>• total of all master/device connections</li> <li>• data length of all incoming master/device connections, max.</li> <li>• data length of all outgoing master/device connections, max.</li> <li>• Number of device-internal and PROFIBUS interconnections</li> <li>• Data length of device-internal und PROFIBUS interconnections, max.</li> <li>• Data length per connection, max.</li> </ul> | 20 %<br>32<br>150<br>4 500<br>45 000 byte<br>45 000 byte<br>1 000<br>16 000 byte<br>2 000 byte                           |
| performance data / PROFINET CBA / remote interconnection / with acyclic transfer / header                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                          |
| — Sampling interval, min.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 200 ms; Depending on preset communication load, number of interconnections and data length used                          |
| — Number of incoming interconnections                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 250                                                                                                                      |
| — Number of outgoing interconnections                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 250                                                                                                                      |
| — Data length of all incoming interconnections, max.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 8 000 byte                                                                                                               |
| — Data length of all outgoing interconnections, max.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 8 000 byte                                                                                                               |
| — data volume / as user data for remote interconnections / in the case of acyclic transmission / with PROFINET CBA / per connection / maximum                                                                                                                                                                                                                                                                                                                                                                                                                                              | 2 000 byte                                                                                                               |
| performance data / PROFINET CBA / remote interconnection / with cyclic transfer / header                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                          |
| — Transmission frequency: Transmission interval, min.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 1 ms; Depending on preset communication load, number of interconnections and data length used                            |
| — Number of incoming interconnections                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 300                                                                                                                      |
| — Number of outgoing interconnections                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 300                                                                                                                      |
| — Data length of all incoming interconnections, max.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 4 800 byte                                                                                                               |
| — Data length of all outgoing interconnections, max.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 4 800 byte                                                                                                               |
| — data volume / as user data for remote interconnections / with cyclical transfer / with PROFINET CBA / per connection / maximum                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 450 byte                                                                                                                 |
| performance data / PROFINET CBA / HMI variables via PROFINET / acyclic / header                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                          |
| — Number of stations that can log on for HMI variables (PN OPC/iMap)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 2x PN OPC/1x iMap                                                                                                        |
| — HMI variable updating                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 500 ms                                                                                                                   |
| — Number of HMI variables                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 1 000                                                                                                                    |
| — Data length of all HMI variables, max.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 32 000 byte                                                                                                              |
| performance data / PROFINET CBA / PROFIBUS proxy functionality / header                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                          |
| — supported                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Yes; 32 PROFIBUS slaves max. connectable                                                                                 |
| — Data length per connection, max.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 240 byte; Slave-dependent                                                                                                |
| Number of connections                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                          |
| • overall                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 64                                                                                                                       |
| • usable for PG communication                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                          |
| — reserved for PG communication                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 1                                                                                                                        |
| — adjustable for PG communication, max.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 0                                                                                                                        |
| • usable for OP communication                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                          |
| — reserved for OP communication                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 1                                                                                                                        |
| — adjustable for OP communication, max.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 0                                                                                                                        |
| • usable for S7 basic communication                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                          |
| — reserved for S7 basic communication                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 0                                                                                                                        |
| — adjustable for S7 basic communication, max.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 0                                                                                                                        |
| • usable for S7 communication                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                          |
| — reserved for S7 communication                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 0                                                                                                                        |
| — adjustable for S7 communication, max.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 0                                                                                                                        |
| • usable for routing                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                          |
| — reserved for routing                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 0                                                                                                                        |
| — adjustable for routing, max.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 0                                                                                                                        |
| S7 message functions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                          |
| Number of login stations for message functions, max.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 63; Max. 63 with Alarm_S/SQ and Alarm_D/DQ (OPs); max. 8 with Alarm, Alarm_8, Alarm_8P, Notify and Notify_8 (e.g. WinCC) |
| Symbol-related messages                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Yes                                                                                                                      |
| SCAN procedure                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Yes                                                                                                                      |

|                                                                            |                                                                      |
|----------------------------------------------------------------------------|----------------------------------------------------------------------|
| Program alarms                                                             | Yes                                                                  |
| Process diagnostic messages                                                | Yes                                                                  |
| simultaneously active Alarm-S blocks, max.                                 | 400; Simultaneously active alarm_S/SQ blocks or alarm_D/DQ blocks    |
| Alarm 8-blocks                                                             | Yes                                                                  |
| • Number of instances for alarm 8 and S7 communication blocks, max.        | 1 200                                                                |
| • preset, max.                                                             | 300                                                                  |
| Process control messages                                                   | Yes                                                                  |
| Number of archives that can log on simultaneously (SFB 37 AR_SEND)         | 16                                                                   |
| Number of messages                                                         |                                                                      |
| • overall, max.                                                            | 512                                                                  |
| • in 100 ms grid, max.                                                     | 128                                                                  |
| • in 500 ms grid, max.                                                     | 256                                                                  |
| • in 1000 ms grid, max.                                                    | 512                                                                  |
| Number of additional values                                                |                                                                      |
| • with 100 ms grid, max.                                                   | 1                                                                    |
| • with 500, 1000 ms grid, max.                                             | 10                                                                   |
| <b>Test commissioning functions</b>                                        |                                                                      |
| Status block                                                               | Yes; Up to 16 simultaneously                                         |
| Single step                                                                | Yes                                                                  |
| Number of breakpoints                                                      | 16                                                                   |
| Status/control                                                             |                                                                      |
| • Status/control variable                                                  | Yes; Up to 16 variable tables                                        |
| • Variables                                                                | Inputs/outputs, memory bits, DBs, distributed I/Os, timers, counters |
| • Number of variables, max.                                                | 70; Status/control                                                   |
| Forcing                                                                    |                                                                      |
| • Forcing                                                                  | Yes                                                                  |
| • Forcing, variables                                                       | Inputs/outputs, bit memories, distributed I/Os                       |
| • Number of variables, max.                                                | 256                                                                  |
| Diagnostic buffer                                                          |                                                                      |
| • present                                                                  | Yes                                                                  |
| • Number of entries, max.                                                  | 3 200                                                                |
| — adjustable                                                               | Yes                                                                  |
| — preset                                                                   | 120                                                                  |
| Service data                                                               |                                                                      |
| • can be read out                                                          | Yes                                                                  |
| <b>EMC</b>                                                                 |                                                                      |
| Emission of radio interference acc. to EN 55 011                           |                                                                      |
| • Limit class A, for use in industrial areas                               | Yes                                                                  |
| • Limit class B, for use in residential areas                              | No                                                                   |
| <b>configuration / header</b>                                              |                                                                      |
| Configuration software                                                     |                                                                      |
| • STEP 7                                                                   | Yes                                                                  |
| configuration / programming / header                                       |                                                                      |
| • Command set                                                              | see instruction list                                                 |
| • Nesting levels                                                           | 7                                                                    |
| • Access to consistent data in process image                               | Yes                                                                  |
| • System functions (SFC)                                                   | see instruction list                                                 |
| • System function blocks (SFB)                                             | see instruction list                                                 |
| Programming language                                                       |                                                                      |
| — LAD                                                                      | Yes                                                                  |
| — FBD                                                                      | Yes                                                                  |
| — STL                                                                      | Yes                                                                  |
| — SCL                                                                      | Yes                                                                  |
| — CFC                                                                      | Yes                                                                  |
| — GRAPH                                                                    | Yes                                                                  |
| — HiGraph®                                                                 | Yes                                                                  |
| configuration / programming / number of simultaneously active SFC / header |                                                                      |
| — DPSYC_FR                                                                 | 2                                                                    |
| — D_ACT_DP                                                                 | 8                                                                    |

|                                                                            |                                                                                             |
|----------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|
| — RD_REC                                                                   | 8                                                                                           |
| — WR_REC                                                                   | 8                                                                                           |
| — WR_PARM                                                                  | 8                                                                                           |
| — PARM_MOD                                                                 | 1                                                                                           |
| — WR_DPARM                                                                 | 2                                                                                           |
| — DPNRM_DG                                                                 | 8                                                                                           |
| — RDSYSST                                                                  | 8                                                                                           |
| — DP_TOPOL                                                                 | 1                                                                                           |
| configuration / programming / number of simultaneously active SFB / header |                                                                                             |
| — RDREC                                                                    | 8                                                                                           |
| — WRREC                                                                    | 8                                                                                           |
| Know-how protection                                                        |                                                                                             |
| • User program protection/password protection                              | Yes                                                                                         |
| • Block encryption                                                         | Yes; With S7 block Privacy                                                                  |
| Dimensions                                                                 |                                                                                             |
| Width                                                                      | 50 mm                                                                                       |
| Height                                                                     | 290 mm                                                                                      |
| Depth                                                                      | 219 mm                                                                                      |
| Weights                                                                    |                                                                                             |
| Weight, approx.                                                            | 900 g                                                                                       |
| last modified:                                                             | 5/22/2024  |