



SIMATIC S7-1500F, CPU 1518F-4 PN/DP; central processing unit with 9 MB work memory for program and 60 MB for data, 1st interface: PROFINET IRT with 2-port switch, 2nd interface: PROFINET RT, 3rd interface: PROFINET basic services, 4th interface: PROFIBUS, 1 ns bit performance, SIMATIC Memory Card required

| General information                                      |                                                                                                   |
|----------------------------------------------------------|---------------------------------------------------------------------------------------------------|
| Product type designation                                 | CPU 1518F-4PN/DP                                                                                  |
| HW functional status                                     | FS11                                                                                              |
| Firmware version                                         | V3.1                                                                                              |
| • FW update possible                                     | Yes                                                                                               |
| Product function                                         |                                                                                                   |
| • I&M data                                               | Yes; I&M0 to I&M3                                                                                 |
| • Isochronous mode                                       | Yes; Distributed and central; with minimum OB 6x cycle of 125 µs (distributed) and 1 ms (central) |
| • SysLog                                                 | Yes                                                                                               |
| Engineering with                                         |                                                                                                   |
| • STEP 7 TIA Portal configurable/integrated from version | V19 (FW V3.1); V13 (FW V1.5) or higher                                                            |
| Configuration control                                    |                                                                                                   |
| via dataset                                              | Yes                                                                                               |
| Display                                                  |                                                                                                   |
| Screen diagonal [cm]                                     | 6.1 cm                                                                                            |
| Control elements                                         |                                                                                                   |
| Number of keys                                           | 6                                                                                                 |
| Mode selector switch                                     | 1                                                                                                 |
| Supply voltage                                           |                                                                                                   |
| Rated value (DC)                                         | 24 V                                                                                              |
| permissible range, lower limit (DC)                      | 19.2 V                                                                                            |
| permissible range, upper limit (DC)                      | 28.8 V                                                                                            |
| Reverse polarity protection                              | Yes                                                                                               |
| Mains buffering                                          |                                                                                                   |
| • Mains/voltage failure stored energy time               | 5 ms                                                                                              |
| Input current                                            |                                                                                                   |
| Current consumption (rated value)                        | 1.55 A                                                                                            |
| Current consumption, max.                                | 1.9 A                                                                                             |
| Inrush current, max.                                     | 1.9 A; Rated value                                                                                |
| I <sup>2</sup> t                                         | 0.4 A <sup>2</sup> ·s                                                                             |
| Power                                                    |                                                                                                   |
| Infeed power to the backplane bus                        | 12 W                                                                                              |
| Power consumption from the backplane bus (balanced)      | 30 W                                                                                              |
| Power loss                                               |                                                                                                   |
| Power loss, typ.                                         | 24 W                                                                                              |
| Memory                                                   |                                                                                                   |
| Number of slots for SIMATIC memory card                  | 1                                                                                                 |
| SIMATIC memory card required                             | Yes                                                                                               |
| Work memory                                              |                                                                                                   |

|                                                                    |                                                                                                                                                       |
|--------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
| • integrated (for program)                                         | 9 Mbyte                                                                                                                                               |
| • integrated (for data)                                            | 60 Mbyte                                                                                                                                              |
| Load memory                                                        |                                                                                                                                                       |
| • Plug-in (SIMATIC Memory Card), max.                              | 32 Gbyte                                                                                                                                              |
| Backup                                                             |                                                                                                                                                       |
| • maintenance-free                                                 | Yes                                                                                                                                                   |
| <b>CPU processing times</b>                                        |                                                                                                                                                       |
| for bit operations, typ.                                           | 1 ns                                                                                                                                                  |
| for word operations, typ.                                          | 2 ns                                                                                                                                                  |
| for fixed point arithmetic, typ.                                   | 2 ns                                                                                                                                                  |
| for floating point arithmetic, typ.                                | 6 ns                                                                                                                                                  |
| <b>CPU-blocks</b>                                                  |                                                                                                                                                       |
| Number of elements (total)                                         | 20 000; Blocks (OB, FB, FC, DB) and UDTs                                                                                                              |
| DB                                                                 |                                                                                                                                                       |
| • Number range                                                     | 1 ... 60 999; subdivided into: number range that can be used by the user: 1 ... 59 999, and number range of DBs created via SFC 86: 60 000 ... 60 999 |
| • Size, max.                                                       | 16 Mbyte; For DBs with absolute addressing, the max. size is 64 KB                                                                                    |
| FB                                                                 |                                                                                                                                                       |
| • Number range                                                     | 0 ... 65 535                                                                                                                                          |
| • Size, max.                                                       | 1 Mbyte                                                                                                                                               |
| FC                                                                 |                                                                                                                                                       |
| • Number range                                                     | 0 ... 65 535                                                                                                                                          |
| • Size, max.                                                       | 1 Mbyte                                                                                                                                               |
| OB                                                                 |                                                                                                                                                       |
| • Size, max.                                                       | 1 Mbyte                                                                                                                                               |
| • Number of free cycle OBs                                         | 100                                                                                                                                                   |
| • Number of time alarm OBs                                         | 20                                                                                                                                                    |
| • Number of delay alarm OBs                                        | 20                                                                                                                                                    |
| • Number of cyclic interrupt OBs                                   | 20; with minimum OB 3x cycle of 100 µs                                                                                                                |
| • Number of process alarm OBs                                      | 50                                                                                                                                                    |
| • Number of DPV1 alarm OBs                                         | 3                                                                                                                                                     |
| • Number of isochronous mode OBs                                   | 3                                                                                                                                                     |
| • Number of technology synchronous alarm OBs                       | 2                                                                                                                                                     |
| • Number of startup OBs                                            | 100                                                                                                                                                   |
| • Number of asynchronous error OBs                                 | 4                                                                                                                                                     |
| • Number of synchronous error OBs                                  | 2                                                                                                                                                     |
| • Number of diagnostic alarm OBs                                   | 1                                                                                                                                                     |
| Nesting depth                                                      |                                                                                                                                                       |
| • per priority class                                               | 24; Up to 8 possible for F-blocks                                                                                                                     |
| <b>Counters, timers and their retentivity</b>                      |                                                                                                                                                       |
| S7 counter                                                         |                                                                                                                                                       |
| • Number                                                           | 2 048                                                                                                                                                 |
| Retentivity                                                        |                                                                                                                                                       |
| — adjustable                                                       | Yes                                                                                                                                                   |
| IEC counter                                                        |                                                                                                                                                       |
| • Number                                                           | Any (only limited by the main memory)                                                                                                                 |
| Retentivity                                                        |                                                                                                                                                       |
| — adjustable                                                       | Yes                                                                                                                                                   |
| S7 times                                                           |                                                                                                                                                       |
| • Number                                                           | 2 048                                                                                                                                                 |
| Retentivity                                                        |                                                                                                                                                       |
| — adjustable                                                       | Yes                                                                                                                                                   |
| IEC timer                                                          |                                                                                                                                                       |
| • Number                                                           | Any (only limited by the main memory)                                                                                                                 |
| Retentivity                                                        |                                                                                                                                                       |
| — adjustable                                                       | Yes                                                                                                                                                   |
| <b>Data areas and their retentivity</b>                            |                                                                                                                                                       |
| Retentive data area (incl. timers, counters, flags), max.          | 768 kbyte; In total; available retentive memory for bit memories, timers, counters, DBs, and technology data (axes): 700 KB                           |
| Extended retentive data area (incl. timers, counters, flags), max. | 20 Mbyte; When using PS 6 0W 24/48/60 V DC HF                                                                                                         |
| Flag                                                               |                                                                                                                                                       |

|                                     |                                                                                                                                                                                                                                   |
|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| • Size, max.                        | 16 kbyte                                                                                                                                                                                                                          |
| • Number of clock memories          | 8; 8 clock memory bit, grouped into one clock memory byte                                                                                                                                                                         |
| <b>Data blocks</b>                  |                                                                                                                                                                                                                                   |
| • Retentivity adjustable            | Yes                                                                                                                                                                                                                               |
| • Retentivity preset                | No                                                                                                                                                                                                                                |
| <b>Local data</b>                   |                                                                                                                                                                                                                                   |
| • per priority class, max.          | 64 kbyte; max. 16 KB per block                                                                                                                                                                                                    |
| <b>Address area</b>                 |                                                                                                                                                                                                                                   |
| Number of IO modules                | 16 384; max. number of modules / submodules                                                                                                                                                                                       |
| <b>I/O address area</b>             |                                                                                                                                                                                                                                   |
| • Inputs                            | 32 kbyte; All inputs are in the process image                                                                                                                                                                                     |
| • Outputs                           | 32 kbyte; All outputs are in the process image                                                                                                                                                                                    |
| per integrated IO subsystem         |                                                                                                                                                                                                                                   |
| — Inputs (volume)                   | 32 kbyte; max. 32 KB via X1; max. 8 KB via X2 or X4                                                                                                                                                                               |
| — Outputs (volume)                  | 32 kbyte; max. 32 KB via X1; max. 8 KB via X2 or X4                                                                                                                                                                               |
| per CM/CP                           |                                                                                                                                                                                                                                   |
| — Inputs (volume)                   | 8 kbyte                                                                                                                                                                                                                           |
| — Outputs (volume)                  | 8 kbyte                                                                                                                                                                                                                           |
| <b>Subprocess images</b>            |                                                                                                                                                                                                                                   |
| • Number of subprocess images, max. | 32                                                                                                                                                                                                                                |
| <b>Hardware configuration</b>       |                                                                                                                                                                                                                                   |
| Number of distributed IO systems    | 64; A distributed I/O system is characterized not only by the integration of distributed I/O via PROFINET or PROFIBUS communication modules, but also by the connection of I/O via AS-i master modules or links (e.g. IE/PB-Link) |
| <b>Number of DP masters</b>         |                                                                                                                                                                                                                                   |
| • integrated                        | 1                                                                                                                                                                                                                                 |
| • Via CM                            | 8; A maximum of 8 CMs/CPs (PROFIBUS, PROFINET, Ethernet) can be inserted in total                                                                                                                                                 |
| <b>Number of IO Controllers</b>     |                                                                                                                                                                                                                                   |
| • integrated                        | 2                                                                                                                                                                                                                                 |
| • Via CM                            | 8; A maximum of 8 CMs/CPs (PROFIBUS, PROFINET, Ethernet) can be inserted in total                                                                                                                                                 |
| <b>Rack</b>                         |                                                                                                                                                                                                                                   |
| • Modules per rack, max.            | 32; CPU + 31 modules                                                                                                                                                                                                              |
| <b>PtP CM</b>                       |                                                                                                                                                                                                                                   |
| • Number of PtP CMs                 | the number of connectable PtP CMs is only limited by the number of available slots                                                                                                                                                |
| <b>Time of day</b>                  |                                                                                                                                                                                                                                   |
| <b>Clock</b>                        |                                                                                                                                                                                                                                   |
| • Type                              | Hardware clock                                                                                                                                                                                                                    |
| • Backup time                       | 6 wk; At 40 °C ambient temperature, typically                                                                                                                                                                                     |
| • Deviation per day, max.           | 10 s; Typ.: 2 s                                                                                                                                                                                                                   |
| <b>Operating hours counter</b>      |                                                                                                                                                                                                                                   |
| • Number                            | 16                                                                                                                                                                                                                                |
| <b>Clock synchronization</b>        |                                                                                                                                                                                                                                   |
| • supported                         | Yes                                                                                                                                                                                                                               |
| • to DP, master                     | Yes                                                                                                                                                                                                                               |
| • to DP, slave                      | Yes                                                                                                                                                                                                                               |
| • in AS, master                     | Yes                                                                                                                                                                                                                               |
| • in AS, slave                      | Yes                                                                                                                                                                                                                               |
| • on Ethernet via NTP               | Yes                                                                                                                                                                                                                               |
| <b>Interfaces</b>                   |                                                                                                                                                                                                                                   |
| Number of PROFINET interfaces       | 3                                                                                                                                                                                                                                 |
| Number of PROFIBUS interfaces       | 1                                                                                                                                                                                                                                 |
| <b>1. Interface</b>                 |                                                                                                                                                                                                                                   |
| <b>Interface types</b>              |                                                                                                                                                                                                                                   |
| • RJ 45 (Ethernet)                  | Yes; X1                                                                                                                                                                                                                           |
| • Number of ports                   | 2                                                                                                                                                                                                                                 |
| • integrated switch                 | Yes                                                                                                                                                                                                                               |
| <b>Protocols</b>                    |                                                                                                                                                                                                                                   |
| • IP protocol                       | Yes; IPv4                                                                                                                                                                                                                         |
| • PROFINET IO Controller            | Yes                                                                                                                                                                                                                               |

|                                                                                                                                                                                            |                                                                                                                                                                        |
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| <ul style="list-style-type: none"> <li>• PROFINET IO Device</li> <li>• SIMATIC communication</li> <li>• Open IE communication</li> <li>• Web server</li> <li>• Media redundancy</li> </ul> | <p>Yes</p> <p>Yes</p> <p>Yes; Optionally also encrypted</p> <p>Yes</p> <p>Yes</p>                                                                                      |
| <b>PROFINET IO Controller</b>                                                                                                                                                              |                                                                                                                                                                        |
| <b>Services</b>                                                                                                                                                                            |                                                                                                                                                                        |
| — Isochronous mode                                                                                                                                                                         | Yes                                                                                                                                                                    |
| — Direct data exchange                                                                                                                                                                     | Yes; Requirement: IRT and isochronous mode (MRPD optional)                                                                                                             |
| — IRT                                                                                                                                                                                      | Yes                                                                                                                                                                    |
| — PROFINergy                                                                                                                                                                               | Yes; per user program                                                                                                                                                  |
| — Prioritized startup                                                                                                                                                                      | Yes; Max. 32 PROFINET devices                                                                                                                                          |
| — Number of connectable IO Devices, max.                                                                                                                                                   | 512; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET                                                                     |
| — Of which IO devices with IRT, max.                                                                                                                                                       | 64                                                                                                                                                                     |
| — Number of connectable IO Devices for RT, max.                                                                                                                                            | 512                                                                                                                                                                    |
| — of which in line, max.                                                                                                                                                                   | 512                                                                                                                                                                    |
| — Number of IO Devices that can be simultaneously activated/deactivated, max.                                                                                                              | 8; in total across all interfaces                                                                                                                                      |
| — Number of IO Devices per tool, max.                                                                                                                                                      | 8                                                                                                                                                                      |
| — Updating times                                                                                                                                                                           | The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data |
| — PROFINET Security Class                                                                                                                                                                  | 1                                                                                                                                                                      |
| <b>Update time for IRT</b>                                                                                                                                                                 |                                                                                                                                                                        |
| — for send cycle of 125 µs                                                                                                                                                                 | 125 µs                                                                                                                                                                 |
| — for send cycle of 187.5 µs                                                                                                                                                               | 187.5 µs                                                                                                                                                               |
| — for send cycle of 250 µs                                                                                                                                                                 | 250 µs to 4 ms                                                                                                                                                         |
| — for send cycle of 500 µs                                                                                                                                                                 | 500 µs to 8 ms                                                                                                                                                         |
| — for send cycle of 1 ms                                                                                                                                                                   | 1 ms to 16 ms                                                                                                                                                          |
| — for send cycle of 2 ms                                                                                                                                                                   | 2 ms to 32 ms                                                                                                                                                          |
| — for send cycle of 4 ms                                                                                                                                                                   | 4 ms to 64 ms                                                                                                                                                          |
| — With IRT and parameterization of "odd" send cycles                                                                                                                                       | Update time = set "odd" send clock (any multiple of 125 µs: 375 µs, 625 µs ... 3 875 µs)                                                                               |
| <b>Update time for RT</b>                                                                                                                                                                  |                                                                                                                                                                        |
| — for send cycle of 250 µs                                                                                                                                                                 | 250 µs to 128 ms                                                                                                                                                       |
| — for send cycle of 500 µs                                                                                                                                                                 | 500 µs to 256 ms                                                                                                                                                       |
| — for send cycle of 1 ms                                                                                                                                                                   | 1 ms to 512 ms                                                                                                                                                         |
| — for send cycle of 2 ms                                                                                                                                                                   | 2 ms to 512 ms                                                                                                                                                         |
| — for send cycle of 4 ms                                                                                                                                                                   | 4 ms to 512 ms                                                                                                                                                         |
| <b>PROFINET IO Device</b>                                                                                                                                                                  |                                                                                                                                                                        |
| <b>Services</b>                                                                                                                                                                            |                                                                                                                                                                        |
| — Isochronous mode                                                                                                                                                                         | No                                                                                                                                                                     |
| — IRT                                                                                                                                                                                      | Yes; Minimum send cycle of 250 µs                                                                                                                                      |
| — PROFINergy                                                                                                                                                                               | Yes; per user program                                                                                                                                                  |
| — Shared device                                                                                                                                                                            | Yes                                                                                                                                                                    |
| — Number of IO Controllers with shared device, max.                                                                                                                                        | 4                                                                                                                                                                      |
| — activation/deactivation of I-devices                                                                                                                                                     | Yes; per user program                                                                                                                                                  |
| — Asset management record                                                                                                                                                                  | Yes; per user program                                                                                                                                                  |
| — PROFINET Security Class                                                                                                                                                                  | SNMP Configuration and DCP Read Only                                                                                                                                   |
| <b>2. Interface</b>                                                                                                                                                                        |                                                                                                                                                                        |
| <b>Interface types</b>                                                                                                                                                                     |                                                                                                                                                                        |
| • RJ 45 (Ethernet)                                                                                                                                                                         | Yes; X2                                                                                                                                                                |
| • Number of ports                                                                                                                                                                          | 1                                                                                                                                                                      |
| • integrated switch                                                                                                                                                                        | No                                                                                                                                                                     |
| <b>Protocols</b>                                                                                                                                                                           |                                                                                                                                                                        |
| • IP protocol                                                                                                                                                                              | Yes; IPv4                                                                                                                                                              |
| • PROFINET IO Controller                                                                                                                                                                   | Yes                                                                                                                                                                    |
| • PROFINET IO Device                                                                                                                                                                       | Yes                                                                                                                                                                    |
| • SIMATIC communication                                                                                                                                                                    | Yes                                                                                                                                                                    |
| • Open IE communication                                                                                                                                                                    | Yes; Optionally also encrypted                                                                                                                                         |
| • Web server                                                                                                                                                                               | Yes                                                                                                                                                                    |

|                                                                               |                                                                                                                                                                        |
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| • Media redundancy                                                            | No                                                                                                                                                                     |
| <b>PROFINET IO Controller</b>                                                 |                                                                                                                                                                        |
| <b>Services</b>                                                               |                                                                                                                                                                        |
| — Isochronous mode                                                            | No                                                                                                                                                                     |
| — Direct data exchange                                                        | No                                                                                                                                                                     |
| — IRT                                                                         | No                                                                                                                                                                     |
| — PROFINergy                                                                  | Yes; per user program                                                                                                                                                  |
| — Prioritized startup                                                         | No                                                                                                                                                                     |
| — Number of connectable IO Devices, max.                                      | 128; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET                                                                     |
| — Number of connectable IO Devices for RT, max.                               | 128                                                                                                                                                                    |
| — of which in line, max.                                                      | 128                                                                                                                                                                    |
| — Number of IO Devices that can be simultaneously activated/deactivated, max. | 8; in total across all interfaces                                                                                                                                      |
| — Number of IO Devices per tool, max.                                         | 8                                                                                                                                                                      |
| — Updating times                                                              | The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data |
| — PROFINET Security Class                                                     | 1                                                                                                                                                                      |
| <b>Update time for RT</b>                                                     |                                                                                                                                                                        |
| — for send cycle of 1 ms                                                      | 1 ms to 512 ms                                                                                                                                                         |
| <b>PROFINET IO Device</b>                                                     |                                                                                                                                                                        |
| <b>Services</b>                                                               |                                                                                                                                                                        |
| — Isochronous mode                                                            | No                                                                                                                                                                     |
| — IRT                                                                         | No                                                                                                                                                                     |
| — PROFINergy                                                                  | Yes; per user program                                                                                                                                                  |
| — Prioritized startup                                                         | No                                                                                                                                                                     |
| — Shared device                                                               | Yes                                                                                                                                                                    |
| — Number of IO Controllers with shared device, max.                           | 4                                                                                                                                                                      |
| — activation/deactivation of I-devices                                        | Yes; per user program                                                                                                                                                  |
| — Asset management record                                                     | Yes; per user program                                                                                                                                                  |
| — PROFINET Security Class                                                     | SNMP Configuration and DCP Read Only                                                                                                                                   |
| <b>3. Interface</b>                                                           |                                                                                                                                                                        |
| <b>Interface types</b>                                                        |                                                                                                                                                                        |
| • RJ 45 (Ethernet)                                                            | Yes; X3                                                                                                                                                                |
| • Number of ports                                                             | 1                                                                                                                                                                      |
| • integrated switch                                                           | No                                                                                                                                                                     |
| <b>Protocols</b>                                                              |                                                                                                                                                                        |
| • IP protocol                                                                 | Yes; IPv4                                                                                                                                                              |
| • PROFINET IO Controller                                                      | No                                                                                                                                                                     |
| • PROFINET IO Device                                                          | No                                                                                                                                                                     |
| • SIMATIC communication                                                       | Yes                                                                                                                                                                    |
| • Open IE communication                                                       | Yes; Optionally also encrypted                                                                                                                                         |
| • Web server                                                                  | Yes                                                                                                                                                                    |
| <b>4. Interface</b>                                                           |                                                                                                                                                                        |
| <b>Interface types</b>                                                        |                                                                                                                                                                        |
| • RS 485                                                                      | Yes; X4                                                                                                                                                                |
| • Number of ports                                                             | 1                                                                                                                                                                      |
| <b>Protocols</b>                                                              |                                                                                                                                                                        |
| • PROFIBUS DP master                                                          | Yes                                                                                                                                                                    |
| • PROFIBUS DP slave                                                           | No                                                                                                                                                                     |
| • SIMATIC communication                                                       | Yes                                                                                                                                                                    |
| <b>PROFIBUS DP master</b>                                                     |                                                                                                                                                                        |
| • Number of connections, max.                                                 | 48; for the integrated PROFIBUS DP interface                                                                                                                           |
| • Number of DP slaves, max.                                                   | 125; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET                                                                     |
| <b>Services</b>                                                               |                                                                                                                                                                        |
| — Equidistance                                                                | Yes                                                                                                                                                                    |
| — Isochronous mode                                                            | Yes                                                                                                                                                                    |
| — Activation/deactivation of DP slaves                                        | Yes                                                                                                                                                                    |
| <b>Interface types</b>                                                        |                                                                                                                                                                        |
| RJ 45 (Ethernet)                                                              |                                                                                                                                                                        |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                      |
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| <ul style="list-style-type: none"> <li>• 100 Mbps</li> <li>• 1000 Mbps</li> <li>• Autonegotiation</li> <li>• Autocrossing</li> <li>• Industrial Ethernet status LED</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                   | Yes<br>Yes; Only possible at the X3 interface of the CPU 1518<br>Yes<br>Yes<br>Yes                                                                                                                                                                   |
| <b>RS 485</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                      |
| <ul style="list-style-type: none"> <li>• Transmission rate, max.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 12 Mbit/s                                                                                                                                                                                                                                            |
| <b>Protocols</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                      |
| PROFIsafe                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Yes; V2.4 / V2.6                                                                                                                                                                                                                                     |
| <b>Number of connections</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                      |
| <ul style="list-style-type: none"> <li>• Number of connections, max.</li> <li>• Number of connections reserved for ES/HMI/web</li> <li>• Number of connections via integrated interfaces</li> <li>• Number of S7 routing paths</li> </ul>                                                                                                                                                                                                                                                                                                                        | 384; via integrated interfaces of the CPU and connected CPs / CMs<br>10<br>320<br>64; in total, only 16 S7-Routing connections are supported via PROFIBUS                                                                                            |
| <b>Redundancy mode</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                      |
| <ul style="list-style-type: none"> <li>• H-Sync forwarding</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Yes                                                                                                                                                                                                                                                  |
| <b>Media redundancy</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                      |
| <ul style="list-style-type: none"> <li>— Media redundancy</li> <li>— MRP</li> <li>— MRP interconnection, supported</li> <li>— MRPD</li> <li>— Switchover time on line break, typ.</li> <li>— Number of stations in the ring, max.</li> </ul>                                                                                                                                                                                                                                                                                                                     | only via 1st interface (X1)<br>Yes; MRP Automanager according to IEC 62439-2 Edition 2.0, MRP Manager; MRP Client<br>Yes; as MRP ring node according to IEC 62439-2 Edition 3.0<br>Yes; Requirement: IRT<br>200 ms; For MRP, bumpless for MRPD<br>50 |
| <b>SIMATIC communication</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                      |
| <ul style="list-style-type: none"> <li>• PG/OP communication</li> <li>• S7 routing</li> <li>• Data record routing</li> <li>• S7 communication, as server</li> <li>• S7 communication, as client</li> <li>• User data per job, max.</li> </ul>                                                                                                                                                                                                                                                                                                                    | Yes; encryption with TLS V1.3 pre-selected<br>Yes<br>Yes<br>Yes<br>Yes<br>See online help (S7 communication, user data size)                                                                                                                         |
| <b>Open IE communication</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                      |
| <ul style="list-style-type: none"> <li>• TCP/IP               <ul style="list-style-type: none"> <li>— Data length, max.</li> <li>— several passive connections per port, supported</li> </ul> </li> <li>• ISO-on-TCP (RFC1006)               <ul style="list-style-type: none"> <li>— Data length, max.</li> </ul> </li> <li>• UDP               <ul style="list-style-type: none"> <li>— Data length, max.</li> <li>— UDP multicast</li> </ul> </li> <li>• DHCP</li> <li>• DNS</li> <li>• SNMP</li> <li>• DCP</li> <li>• LLDP</li> <li>• Encryption</li> </ul> | Yes<br>64 kbyte<br>Yes<br>Yes<br>64 kbyte<br>Yes<br>2 kbyte; 1 472 bytes for UDP broadcast<br>Yes; 128 multicast circuits (of which max. 5 via X1)<br>Yes<br>Yes<br>Yes<br>Yes<br>Yes<br>Yes<br>Yes; Optional                                        |
| <b>Web server</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                      |
| <ul style="list-style-type: none"> <li>• HTTP</li> <li>• HTTPS</li> <li>• web API               <ul style="list-style-type: none"> <li>— Number of sessions, max.</li> <li>— number of simultaneous HTTP calls, max.</li> <li>— HTTP request body, max.</li> </ul> </li> </ul>                                                                                                                                                                                                                                                                                   | Yes; Standard and user pages<br>Yes; Standard and user pages<br><br>200<br>4<br>131 072 byte                                                                                                                                                         |
| <b>OPC UA</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                      |
| <ul style="list-style-type: none"> <li>• Runtime license required</li> <li>• OPC UA Client               <ul style="list-style-type: none"> <li>— Application authentication</li> <li>— Security policies</li> <li>— User authentication</li> <li>— Number of connections, max.</li> </ul> </li> </ul>                                                                                                                                                                                                                                                           | Yes; "Large" license required<br>Yes; Data Access (registered Read/Write), Method Call<br>Yes<br>Available security policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Sha256<br>"anonymous" or by user name & password<br>40                     |

|                                                                                                        |                                                                                                                          |
|--------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| — Number of nodes of the client interfaces, recommended max.                                           | 5 000                                                                                                                    |
| — Number of elements for one call of OPC-UA_NodeGetHandleList/OPC-UA_ReadList/OPC-UA_WriteList, max.   | 300                                                                                                                      |
| — Number of elements for one call of OPC-UA_NameSpaceGetIndexList, max.                                | 20                                                                                                                       |
| — Number of elements for one call of OPC-UA_MethodGetHandleList, max.                                  | 100                                                                                                                      |
| — Number of simultaneous calls of the client instructions for session management, per connection, max. | 1                                                                                                                        |
| — Number of simultaneous calls of the client instructions for data access, per connection, max.        | 5                                                                                                                        |
| — Number of registerable nodes, max.                                                                   | 5 000                                                                                                                    |
| — Number of registerable method calls of OPC-UA_MethodCall, max.                                       | 100                                                                                                                      |
| — Number of inputs/outputs when calling OPC-UA_MethodCall, max.                                        | 20                                                                                                                       |
| • OPC UA Server                                                                                        | Yes; Data Access (Read, Write, Subscribe), Method Call, Alarms & Condition (A&C), Custom Address Space                   |
| — Application authentication                                                                           | Yes                                                                                                                      |
| — Security policies                                                                                    | available security policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Sha256, Aes128Sha256RsaOaep, Aes256Sha256RsaPss |
| — User authentication                                                                                  | "anonymous" or by user name & password                                                                                   |
| — GDS support (certificate management)                                                                 | Yes                                                                                                                      |
| — Number of sessions, max.                                                                             | 64                                                                                                                       |
| — Number of accessible variables, max.                                                                 | 200 000                                                                                                                  |
| — Number of registerable nodes, max.                                                                   | 50 000                                                                                                                   |
| — Number of subscriptions per session, max.                                                            | 50                                                                                                                       |
| — Sampling interval, min.                                                                              | 10 ms                                                                                                                    |
| — Publishing interval, min.                                                                            | 10 ms                                                                                                                    |
| — Number of server methods, max.                                                                       | 100                                                                                                                      |
| — Number of inputs/outputs per server method, max.                                                     | 20                                                                                                                       |
| — Number of monitored items, recommended max.                                                          | 24 000; for 1 s sampling interval and 1 s send interval                                                                  |
| — Number of server interfaces, max.                                                                    | 10 of each "Server interfaces" / "Companion specification" type and 20 of the type "Reference namespace"                 |
| — Number of nodes for user-defined server interfaces, max.                                             | 50 000                                                                                                                   |
| • Alarms and Conditions                                                                                | Yes                                                                                                                      |
| — Number of program alarms                                                                             | 400                                                                                                                      |
| — Number of alarms for system diagnostics                                                              | 200                                                                                                                      |
| Further protocols                                                                                      |                                                                                                                          |
| • MODBUS                                                                                               | Yes; MODBUS TCP                                                                                                          |
| S7 message functions                                                                                   |                                                                                                                          |
| Number of login stations for message functions, max.                                                   | 64                                                                                                                       |
| number of subscriptions, max.                                                                          | 750                                                                                                                      |
| number of tags/attributes for subscriptions, max.                                                      | 50 000                                                                                                                   |
| Program alarms                                                                                         | Yes                                                                                                                      |
| Number of configurable program messages, max.                                                          | 10 000; Program messages are generated by the "Program_Alarm" block, ProDiag or GRAPH                                    |
| Number of loadable program messages in RUN, max.                                                       | 10 000                                                                                                                   |
| Number of simultaneously active program alarms                                                         |                                                                                                                          |
| • Number of program alarms                                                                             | 4 000                                                                                                                    |
| • Number of alarms for system diagnostics                                                              | 1 000                                                                                                                    |
| • Number of alarms for motion technology objects                                                       | 480                                                                                                                      |
| Test commissioning functions                                                                           |                                                                                                                          |
| Joint commission (Team Engineering)                                                                    | Yes; Parallel online access possible for up to 10 engineering systems                                                    |
| Status block                                                                                           | Yes; Up to 16 simultaneously (in total across all ES clients)                                                            |
| Single step                                                                                            | No                                                                                                                       |
| Number of breakpoints                                                                                  | 20                                                                                                                       |
| Profiling                                                                                              | No                                                                                                                       |
| Status/control                                                                                         |                                                                                                                          |
| • Status/control variable                                                                              | Yes; without fail-safe                                                                                                   |
| • Variables                                                                                            | inputs/outputs, bit memories, DBs, peripheral I/Os (without fail-safe), times,                                           |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                          |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>• Number of variables, max. <ul style="list-style-type: none"> <li>— of which status variables, max.</li> <li>— of which control variables, max.</li> </ul> </li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | counters<br><br>200; per job<br>200; per job                                                                                                                                                                             |
| <b>Forcing</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                          |
| <ul style="list-style-type: none"> <li>• Forcing</li> <li>• Forcing, variables</li> <li>• Number of variables, max.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Yes; without fail-safe<br>peripheral inputs/outputs (without fail-safe)<br>200                                                                                                                                           |
| <b>Diagnostic buffer</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                          |
| <ul style="list-style-type: none"> <li>• present</li> <li>• Number of entries, max. <ul style="list-style-type: none"> <li>— of which powerfail-proof</li> </ul> </li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Yes<br>3 200<br>1 000                                                                                                                                                                                                    |
| <b>Traces</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                          |
| <ul style="list-style-type: none"> <li>• Number of configurable Traces</li> <li>• Memory size per trace, max.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 8<br>512 kbyte                                                                                                                                                                                                           |
| <b>Interrupts/diagnostics/status information</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                          |
| <b>Diagnostics indication LED</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                          |
| <ul style="list-style-type: none"> <li>• RUN/STOP LED</li> <li>• ERROR LED</li> <li>• MAINT LED</li> <li>• Connection display LINK TX/RX</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Yes<br>Yes<br>Yes<br>Yes                                                                                                                                                                                                 |
| <b>Supported technology objects</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                          |
| Motion Control <ul style="list-style-type: none"> <li>• Number of available Motion Control resources for technology objects</li> <li>• Required Motion Control resources <ul style="list-style-type: none"> <li>— per speed-controlled axis</li> <li>— per positioning axis</li> <li>— per synchronous axis</li> <li>— per external encoder</li> <li>— per output cam</li> <li>— per cam track</li> <li>— per probe</li> </ul> </li> <li>• Positioning axis <ul style="list-style-type: none"> <li>— Number of positioning axes at motion control cycle of 4 ms (typical value)</li> <li>— Number of positioning axes at motion control cycle of 8 ms (typical value)</li> </ul> </li> </ul> | Yes; Note: The number of technology objects affects the cycle time of the PLC program; selection guide via the TIA Selection Tool<br>15 360<br><br>40<br>80<br>160<br>80<br>20<br>160<br>40<br><br>140<br>192            |
| Controller <ul style="list-style-type: none"> <li>• PID_Compact</li> <li>• PID_3Step</li> <li>• PID-Temp</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Yes; Universal PID controller with integrated optimization<br>Yes; PID controller with integrated optimization for valves<br>Yes; PID controller with integrated optimization for temperature                            |
| Counting and measuring <ul style="list-style-type: none"> <li>• High-speed counter</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Yes                                                                                                                                                                                                                      |
| <b>Standards, approvals, certificates</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                          |
| <b>Highest safety class achievable in safety mode</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                          |
| <ul style="list-style-type: none"> <li>• Performance level according to ISO 13849-1</li> <li>• SIL acc. to IEC 61508</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | PLe<br>SIL 3                                                                                                                                                                                                             |
| <b>Probability of failure (for service life of 20 years and repair time of 100 hours)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                          |
| <ul style="list-style-type: none"> <li>— Low demand mode: PFDavg in accordance with SIL3</li> <li>— High demand/continuous mode: PFH in accordance with SIL3</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | < 2.00E-05<br>< 1.00E-09                                                                                                                                                                                                 |
| <b>Ambient conditions</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                          |
| <b>Ambient temperature during operation</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                          |
| <ul style="list-style-type: none"> <li>• horizontal installation, min.</li> <li>• horizontal installation, max.</li> <li>• vertical installation, min.</li> <li>• vertical installation, max.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 0 °C<br>60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off<br>0 °C<br>40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off |
| <b>Ambient temperature during storage/transportation</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                          |

|                                                                                               |                                                                        |
|-----------------------------------------------------------------------------------------------|------------------------------------------------------------------------|
| • min.                                                                                        | -40 °C                                                                 |
| • max.                                                                                        | 70 °C                                                                  |
| Altitude during operation relating to sea level                                               |                                                                        |
| • Installation altitude above sea level, max.                                                 | 5 000 m; Restrictions for installation altitudes > 2 000 m, see manual |
| <b>configuration / header</b>                                                                 |                                                                        |
| configuration / programming / header                                                          |                                                                        |
| Programming language                                                                          |                                                                        |
| — LAD                                                                                         | Yes; incl. failsafe                                                    |
| — FBD                                                                                         | Yes; incl. failsafe                                                    |
| — STL                                                                                         | Yes                                                                    |
| — SCL                                                                                         | Yes                                                                    |
| — CFC                                                                                         | Yes; either CFC or failsafe functionality                              |
| — GRAPH                                                                                       | Yes                                                                    |
| Know-how protection                                                                           |                                                                        |
| • User program protection/password protection                                                 | Yes                                                                    |
| • Copy protection                                                                             | Yes                                                                    |
| • Block protection                                                                            | Yes                                                                    |
| Access protection                                                                             |                                                                        |
| • protection of confidential configuration data                                               | Yes                                                                    |
| • Password for display                                                                        | Yes                                                                    |
| • Protection level: Write protection                                                          | Yes                                                                    |
| • Protection level: Read/write protection                                                     | Yes                                                                    |
| • Protection level: Write protection for Failsafe                                             | Yes                                                                    |
| • Protection level: Complete protection                                                       | Yes                                                                    |
| • User administration                                                                         | Yes; device-wide                                                       |
| programming / cycle time monitoring / header                                                  |                                                                        |
| • lower limit                                                                                 | adjustable minimum cycle time                                          |
| • upper limit                                                                                 | adjustable maximum cycle time                                          |
| <b>Dimensions</b>                                                                             |                                                                        |
| Width                                                                                         | 175 mm                                                                 |
| Height                                                                                        | 147 mm                                                                 |
| Depth                                                                                         | 129 mm                                                                 |
| <b>Weights</b>                                                                                |                                                                        |
| Weight, approx.                                                                               | 2 079 g                                                                |
| last modified:                                                                                |                                                                        |
| 3/12/2024  |                                                                        |