SIEMENS

Data sheet

6ES7511-1FK01-0AB0

SIMATIC S7-1500F, CPU 1511F-1 PN, Central processing unit with Work memory 225 KB for program and 1 MB for data, 1st interface: PROFINET IRT with 2-port switch, 60 ns bit performance, SIMATIC Memory Card required



| CPU 1511F-1 PN |
|--|
| FS03 |
| V2.5 |
| |
| V15 (FW V2.5) / V13 SP1 Update 4 (FW V1.8) or higher |
| |
| Yes |
| |
| 3.45 cm |
| |
| 6 |
| 1 |
| |
| 24 V DC |
| 19.2 V |
| |

| permissible range, upper limit (DC) | 28.8 V |
|--|---|
| Reverse polarity protection | Yes |
| Mains buffering | 100 |
| Mains/voltage failure stored energy time | 5 ms |
| • Repeat rate, min. | 1/s |
| - Nepeatrate, min. | e |
| Input current | |
| Current consumption (rated value) | 0.7 A |
| Inrush current, max. | 1.9 A; Rated value |
| l²t | 0.02 A²·s |
| Power | |
| Infeed power to the backplane bus | 10 W |
| Power consumption from the backplane bus | 5.5 W |
| (balanced) | |
| Power loss | |
| Power loss, typ. | 5.7 W |
| | |
| Memory | |
| Number of slots for SIMATIC memory card | 1 |
| SIMATIC memory card required | Yes |
| Work memory | 225 khyta |
| • integrated (for program) | 225 kbyte |
| • integrated (for data) | 1 Mbyte |
| Load memory | 00.01 |
| Plug-in (SIMATIC Memory Card), max. | 32 Gbyte |
| Backup | V |
| maintenance-free | Yes |
| CPU processing times | |
| for bit operations, typ. | 60 ns |
| for word operations, typ. | 72 ns |
| for fixed point arithmetic, typ. | 96 ns |
| for floating point arithmetic, typ. | 384 ns |
| CPU-blocks | |
| Number of elements (total) | 2 000; Blocks (OB, FB, FC, DB) and UDTs |
| DB | |
| Number range | 1 60 999; subdivided into: number range that can be used by |
| Ç | the user: 1 59 999, and number range of DBs created via SFC 86: 60 000 60 999 |
| • Siza may | 1 Mbyte; For non-optimized block accesses, the max. size of the |
| ● Size, max. | DB is 64 KB |
| FB | |
| Number range | 0 65 535 |
| • Size, max. | 150 kbyte |
| | |

| FC | |
|--|---|
| Number range | 0 65 535 |
| • Size, max. | 150 kbyte |
| ОВ | |
| • Size, max. | 150 kbyte |
| 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 500 μs |
| Number of process alarm OBs | 50 |
| Number of DPV1 alarm OBs | 3 |
| Number of isochronous mode OBs | 1 |
| 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 |
| Counters, timers and their retentivity | |
| 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 |
| Data areas and their retentivity | |
| Retentive data area (incl. timers, counters, flags), | 128 kbyte; In total; available retentive memory for bit memories, |
| max. | timers, counters, DBs, and technology data (axes): 88 KB |
| Extended retentive data area (incl. timers, counters, | 1 Mbyte; When using PS 60W 24/48/60V DC HF |
| flags), max. | |

| Flag | |
|------------------------------------|--|
| • Number, max. | 16 kbyte |
| Number of clock memories | 8; 8 clock memory bits, grouped into one clock memory byte |
| Data blocks | o, o dook memory bits, grouped into one clock memory byte |
| | Yes |
| Retentivity adjustable | No |
| Retentivity preset | NO |
| Local data | OA liberton construction AC MD consistents |
| • per priority class, max. | 64 kbyte; max. 16 KB per block |
| Address area | |
| Number of IO modules | 1 024; max. number of modules / submodules |
| I/O address area | |
| • 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) | 8 kbyte |
| Outputs (volume) | 8 kbyte |
| per CM/CP | |
| — Inputs (volume) | 8 kbyte |
| — Outputs (volume) | 8 kbyte |
| Subprocess images | • |
| Number of subprocess images, max. | 32 |
| Hardware configuration | |
| Number of distributed IO systems | 32; 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) |
| Number of DP masters | |
| ● Via CM | 4; A maximum of 4 CMs/CPs (PROFIBUS, PROFINET, Ethernet) can be inserted in total |
| Number of IO Controllers | |
| • integrated | 1 |
| ● Via CM | 4; A maximum of 4 CMs/CPs (PROFIBUS, PROFINET, Ethernet) can be inserted in total |
| Rack | |
| Modules per rack, max. | 32; CPU + 31 modules |
| Number of lines, max. | 1 |
| PtP CM | |
| Number of PtP CMs | the number of connectable PtP CMs is only limited by the number of available slots |
| Time of day | |
| Clock | |
| • Туре | Hardware clock |
| | |

| Deviation per day, max. Operating hours counter Number Number Number Number Nas, master Number of Interfaces Interface Interface Interface types Number of PROFINET interfaces Number of ports Number of ports Number of PROFINET interfaces Number of ports Number of PROFINET interfaces Number of PROFINET interfaces Number of ports | Backup time | 6 wk; At 40 °C ambient temperature, typically |
|--|--|---|
| Operating hours counter Number | · | |
| Number 16 Clock synchronization supported Yes in AS, master Yes in AS, slave Yes on Ethernet via NTP Yes Interfaces Number of PROFINET interfaces 1 Interface I | <u> </u> | |
| * supported * in AS, master * in AS, stave * on Ethernet via NTP * ves * on Ethernet via NTP **Therfaces **Number of PROFINET interfaces 1 1. Interface Interface types • Number of ports * ves * integrated switch * ves * rJ 45 (Ethernet) * ves: X1 **Functionality • IP protocol * PROFINET io Controller * ves * PROFINET io Controller * ves * SIMATIC communication * ves * SIMATIC communication * ves * simantication * ves * web server * web server * Media redundancy * yes; MRP Automanager according to IEC 62439-2 Edition 2.0 **PROFINET Io Controller **Services - PG/OP communication * ves - Open IE communication * yes - Open IE communication * ves - PROFINET IO Controller **Services - PROPO communication * ves - Number of connectable IO Devices, max. * number of devices in the ring: 50 * ves; Requirement: IRT * ves - PROFIenergy * ves; Max. 32 PROFINET devices - Number of connectable IO Devices, max. * ves; Max. 32 PROFINET devices can be connected via AS-i, PROFIBUS or PROFINET - Of which IO devices with IRT, max. - Number of connectable IO Devices for RT, * 128 **Test - ves * ves | | 16 |
| * supported * in AS, master * in AS, stave * on Ethernet via NTP * ves * on Ethernet via NTP **Therfaces **Number of PROFINET interfaces 1 1. Interface Interface types • Number of ports * ves * integrated switch * ves * rJ 45 (Ethernet) * ves: X1 **Functionality • IP protocol * PROFINET io Controller * ves * PROFINET io Controller * ves * SIMATIC communication * ves * SIMATIC communication * ves * simantication * ves * web server * web server * Media redundancy * yes; MRP Automanager according to IEC 62439-2 Edition 2.0 **PROFINET Io Controller **Services - PG/OP communication * ves - Open IE communication * yes - Open IE communication * ves - PROFINET IO Controller **Services - PROPO communication * ves - Number of connectable IO Devices, max. * number of devices in the ring: 50 * ves; Requirement: IRT * ves - PROFIenergy * ves; Max. 32 PROFINET devices - Number of connectable IO Devices, max. * ves; Max. 32 PROFINET devices can be connected via AS-i, PROFIBUS or PROFINET - Of which IO devices with IRT, max. - Number of connectable IO Devices for RT, * 128 **Test - ves * ves | Clock synchronization | |
| in AS, slave in AS, slave ves on Ethernet via NTP Yes Interfaces Number of PROFINET interfaces 1 Interface types Number of ports integrated switch RJ 45 (Ethernet) Yes; X1 Functionality Ip protocol PROFINET IO Controller PROFINET IO Device SIMATIC communication Open IE communication Web server Media redundancy Yes; MRP Automanager according to IEC 62439-2 Edition 2.0 PROFINET IO Controller Services PCI/OP communication Yes Open IE communication Yes Media redundancy Yes; MRP Automanager according to IEC 62439-2 Edition 2.0 PROFINET IO Controller Services PGI/OP communication Yes Open IE communication Yes New Services PGI/OP communication Yes As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50 Yes; Requirement: IRT PROFIenergy Prioritized startup Number of connectable IO Devices, max. Ves; Max. 32 PROFINET devices PO of which IO devices with IRT, max. Humber of connectable IO Devices, max. Number of connectable IO Devices for RT, Interface 1 1 1 1 1 1 1 1 1 1 1 1 1 | | Yes |
| interfaces Number of PROFINET interfaces 1 1. Interface Interface types Number of ports interface types Number of ports interface witch RI 45 (Ethernet) PROFINET IO Controller PROFINET IO Device SIMATIC communication Web server Media redundancy PROFINET IO Controller Wes witch web server Media redundancy PROFINET IO Controller Services PG/OP communication Yes PG/OP communication Yes PG/OP communication Yes PROFINET IO Controller Services PG/OP communication Yes PROFINET IO Controller Services PROFINET Web server PROFINET Web server Neddia redundancy PROFINET Web server PROFINET Web | • • | Yes |
| Number of PROFINET interfaces 1. Interface Interface types • Number of ports • Integrated switch • RJ 45 (Ethernet) • PROFINET IO Controller • PROFINET IO Controller • PROFINET IO Device • SIMATIC communication • Open IE communication • Web server • Media redundancy PROFINET IO Controller Services - PG/OP communication - S7 routing - Isochronous mode - Open IE communication - S7 routing - IRT - MRP - MRP - Wes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring; 50 - MRPD - PROFIENET Wes; Max. 32 PROFINET devices - Profiritized startup - Number of connectable IO Devices, max Number of connectable IO Devices for RT. 128 | | Yes |
| Number of PROFINET interfaces 1 | • on Ethernet via NTP | Yes |
| Interface types Number of ports Integrated switch RJ 45 (Ethernet) PROFINET IO Controller PROFINET IO Controller PROFINET IO Controller PROFINET IO Communication Ves SIMATIC communication Ves Services PROFINET IO Controller Services PROFOP communication Ves Services P | Interfaces | |
| Number of ports 2 | Number of PROFINET interfaces | 1 |
| Number of ports integrated switch RJ 45 (Ethernet) Proctionality IP protocol PROFINET IO Controller PROFINET IO Device SIMATIC communication Ves Nes Media redundancy PROFINET IO Controller Services PROFINET IO Controller Yes PROFINET IO Controller Yes Profiting Yes Profiting Yes Profitized startup PROFINET Yes Prioritized startup Prioritized startup Prioritized startup Prioritized startup Prioritized startup Number of connectable IO Devices, max. 128; In total, up to 256 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET Of which IO devices with IRT, max. Number of connectable IO Devices for RT, 128 | 1. Interface | |
| integrated switch RJ 45 (Ethernet) Prostructionality IP protocol PROFINET IO Controller PROFINET IO Device SiMATIC communication Wes Web server Media redundancy PROFINET IO Controller PROFINET IO Controller Yes Media redundancy PROFINET IO Controller Services PROFINET IO Controller Services PG/OP communication Yes PST routing Isachronous mode Yes Open IE communication Yes PROFINET IO Controller Services PG/OP communication Yes PROFINET IO Controller Services PG/OP communication Yes Services PG/OP communication Yes Services PG/OP communication Yes RF Requirement: IRT Yes RRP PROFINET Open IE communication Yes RRP PROFINET Open IE communication Yes RRP Profitized startup PROFINET Open IE communication Yes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50 Yes; Requirement: IRT Yes PROFINET Open IE communication Yes; Requirement: IRT PROFInergy PROFINET Open IE communication Yes; Max. 32 PROFINET devices Italy In total, up to 256 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET | Interface types | |
| RJ 45 (Ethernet) RJ 45 (Ethernet) Prunctionality IP protocol PROFINET IO Controller PROFINET IO Device SIMATIC communication Yes Open IE communication Yes Media redundancy Yes; MRP Automanager according to IEC 62439-2 Edition 2.0 PROFINET IO Controller Services PG/OP communication Yes Services PG/OP communication Yes Open IE communication Yes Popen IE communication Yes Open IE communication Yes Open IE communication Yes NRP Automanager according to IEC 62439-2 Edition 2.0 PROFINET IO Controller Services PG/OP communication Yes Services PG/OP communication Yes Services PG/OP communication Yes Services PG/OP communication Yes Services P | Number of ports | 2 |
| Functionality IP protocol PROFINET IO Controller PROFINET IO Device PROFINET IO Device SiMATIC communication Pes Web server Media redundancy PROFINET IO Controller Services PG/OP communication Yes PG/OP communication Yes PG/OP communication Yes PG/OP communication Yes PST routing Pes Popen IE communication Yes Pes Popen IE communication Yes Pes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50 MRPD PROFIenergy Pes; Requirement: IRT PROFIenergy Pes; Max. 32 PROFINET devices PROFINET Of which IO devices with IRT, max. Pumber of connectable IO Devices, max. Pumber of connectable IO Devices for RT, | • integrated switch | Yes |
| IP protocol PROFINET IO Controller PROFINET IO Device PROFINET IO Device SIMATIC communication Pes Web server Media redundancy PROFINET IO Controller Services PG/OP communication Yes PG-OP communication Yes PG-OP communication Yes PG-OP communication Yes PG-OP communication Yes PS-OP IE Communication Yes PROFINET IO Controller Services PG-OP communication Yes PS-OP IE communication Yes PS-OP IE Communication Yes PS-OP IE COMMUNICATION | • RJ 45 (Ethernet) | Yes; X1 |
| PROFINET IO Controller PROFINET IO Device SIMATIC communication Yes Open IE communication Yes Media redundancy PROFINET IO Controller Services PG/OP communication Yes PG/OP communication Yes Services PS/OP communication Yes Services PS/OP communication Yes Services PS/OP communication Yes Services PG/OP communication Yes Services PG/OP communication Yes Services PG/OP communication Yes Services PG/OP communication Yes Services PS/OP communication Yes Services PS/OP communication Yes Services PS/OP communication Yes Services PG/OP c | Functionality | |
| PROFINET IO Device SIMATIC communication Yes Open IE communication Yes Web server Media redundancy Yes; MRP Automanager according to IEC 62439-2 Edition 2.0 PROFINET IO Controller Services PROFOP communication Yes Services PROFOP communicati | IP protocol | Yes; IPv4 |
| SIMATIC communication Open IE communication Yes Web server Media redundancy Yes; MRP Automanager according to IEC 62439-2 Edition 2.0 PROFINET IO Controller Services — PG/OP communication — S7 routing — Isochronous mode — Open IE communication — IRT — MRP — MRPD — Yes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50 — MRPD — PROFIenergy — Prioritized startup — Number of connectable IO Devices, max. — Number of connectable IO Devices for RT, 128 | PROFINET IO Controller | Yes |
| Open IE communication Web server Media redundancy PROFINET IO Controller Services - PG/OP communication - S7 routing - Isochronous mode - Open IE communication - IRT - MRP - MRP - MRP - MRP - MRPD - PROFIenergy - Prioritized startup - Number of connectable IO Devices, max Number of connectable IO Devices for RT, - MRP - Wes - Open IE communication - Yes - Yes - As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50 - Yes; Requirement: IRT - Yes - PROFINET devices - Of which IO devices with IRT, max Number of connectable IO Devices for RT, - 128 | PROFINET IO Device | Yes |
| ◆ Web server ◆ Media redundancy Yes; MRP Automanager according to IEC 62439-2 Edition 2.0 PROFINET IO Controller Services — PG/OP communication — S7 routing — Isochronous mode — Open IE communication — IRT — MRP — MRP — MRP — Yes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50 — MRPD — PROFlenergy — Prioritized startup — Number of connectable IO Devices, max. — 128; In total, up to 256 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET — Of which IO devices with IRT, max. — Number of connectable IO Devices for RT, 128 | SIMATIC communication | Yes |
| ● Media redundancy PROFINET IO Controller Services - PG/OP communication - S7 routing - Isochronous mode - Open IE communication - IRT - MRP - MRP - MRP - MRP - MRP - MRP - PROFlenergy - Prioritized startup - Number of connectable IO Devices for RT, - MRP - Media redundancy - Yes; MRP Automanager according to IEC 62439-2 Edition 2.0 Yes - Yes - Yes - Yes - Yes - Yes - S MRP redundancy manager and/or MRP client; max number of devices in the ring: 50 - Yes; Requirement: IRT - Yes - PROFIENET devices - Number of connectable IO Devices, max Number of connectable IO Devices for RT, - 128 | Open IE communication | Yes |
| PROFINET IO Controller Services - PG/OP communication Yes - S7 routing Yes - Isochronous mode Yes - Open IE communication Yes - Open IE communication Yes - MRP Yes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50 - MRPD Yes; Requirement: IRT - PROFlenergy Yes - Prioritized startup Yes; Max. 32 PROFINET devices - Number of connectable IO Devices, max. 128; In total, up to 256 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, 128 | • Web server | Yes |
| Services - PG/OP communication Yes - S7 routing Yes - Isochronous mode Yes - Open IE communication Yes - IRT Yes - MRP Yes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50 - MRPD Yes; Requirement: IRT - PROFlenergy Yes - Prioritized startup Yes; Max. 32 PROFINET devices - Number of connectable IO Devices, max. 128; In total, up to 256 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET - Of which IO devices with IRT, max Number of connectable IO Devices for RT, | Media redundancy | Yes; MRP Automanager according to IEC 62439-2 Edition 2.0 |
| — PG/OP communication — S7 routing — Isochronous mode — Open IE communication — IRT — MRP — MRPD — Wes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50 — MRPD — PROFlenergy — Prioritized startup — Number of connectable IO Devices, max. — 128; In total, up to 256 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET — Of which IO devices with IRT, max. — Number of connectable IO Devices for RT, — 128 | PROFINET IO Controller | |
| S7 routing Isochronous mode Yes Open IE communication IRT MRP MRP Yes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50 MRPD Yes; Requirement: IRT PROFlenergy Prioritized startup Number of connectable IO Devices, max. 128; In total, up to 256 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET Of which IO devices with IRT, max. Number of connectable IO Devices for RT, 128 | Services | |
| Isochronous mode Open IE communication IRT MRP MRP Tes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50 MRPD PROFlenergy Prioritized startup Number of connectable IO Devices, max. 128; In total, up to 256 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET Of which IO devices with IRT, max. Number of connectable IO Devices for RT, 128 | — PG/OP communication | Yes |
| Open IE communication IRT MRP Yes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50 MRPD Yes; Requirement: IRT PROFlenergy Prioritized startup Number of connectable IO Devices, max. 128; In total, up to 256 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET Of which IO devices with IRT, max. Number of connectable IO Devices for RT, 128 | — S7 routing | Yes |
| — IRT — MRP — MRP — Wes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50 — MRPD — PROFlenergy — Prioritized startup — Number of connectable IO Devices, max. — Number of connectable IO Devices for RT, — Number of connectable IO Devices for RT, 128 Yes Yes; Requirement: IRT Yes; Max. 32 PROFINET devices 128; In total, up to 256 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET — Of which IO devices with IRT, max. — Number of connectable IO Devices for RT, | — Isochronous mode | Yes |
| MRP Yes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50 MRPD Yes; Requirement: IRT PROFlenergy Prioritized startup Number of connectable IO Devices, max. 128; In total, up to 256 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET Of which IO devices with IRT, max. Number of connectable IO Devices for RT, 128 | Open IE communication | Yes |
| number of devices in the ring: 50 - MRPD Yes; Requirement: IRT - PROFlenergy Yes - Prioritized startup - Number of connectable IO Devices, max. 128; In total, up to 256 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET - Of which IO devices with IRT, max Number of connectable IO Devices for RT, 128 | — IRT | Yes |
| PROFlenergy Prioritized startup Number of connectable IO Devices, max. Of which IO devices with IRT, max. Number of connectable IO Devices for RT, Yes Yes; Max. 32 PROFINET devices 128; In total, up to 256 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET Of which IO devices with IRT, max. 128 | — MRP | |
| — Prioritized startup — Number of connectable IO Devices, max. — Of which IO devices with IRT, max. — Number of connectable IO Devices for RT, Yes; Max. 32 PROFINET devices 128; In total, up to 256 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET 64 128 | — MRPD | Yes; Requirement: IRT |
| Number of connectable IO Devices, max. 128; In total, up to 256 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET Of which IO devices with IRT, max. Number of connectable IO Devices for RT, 128; In total, up to 256 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET 128 | — PROFlenergy | Yes |
| via AS-i, PROFIBUS or PROFINET — Of which IO devices with IRT, max. — Number of connectable IO Devices for RT, 128 | — Prioritized startup | Yes; Max. 32 PROFINET devices |
| — Number of connectable IO Devices for RT, 128 | — Number of connectable IO Devices, max. | |
| | — Of which IO devices with IRT, max. | 64 |
| max. | — Number of connectable IO Devices for RT, | 128 |
| | max. | |

| — of which in line, max. | 128 |
|--|---|
| Number of IO Devices that can be | 8; in total across all interfaces |
| simultaneously activated/deactivated, max. | , in total 201000 an internation |
| 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 |
| Update time for IRT | |
| — for send cycle of 250 μs | 250 μs to 4 ms; Note: In the case of IRT with isochronous mode, the minimum update time of 625 μs of the isochronous OB is decisive |
| — for send cycle of 500 μs | 500 μs to 8 ms; Note: In the case of IRT with isochronous mode, the minimum update time of 625 μs of the isochronous OB is decisive |
| — 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 μ s: 375 μ s, 625 μ s 3 875 μ s) |
| Update time for RT | |
| — 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 |
| PROFINET IO Device | |
| Services | |
| — PG/OP communication | Yes |
| — S7 routing | Yes |
| — Isochronous mode | No |
| Open IE communication | Yes |
| — IRT | Yes |
| — MRP | Yes |
| — MRPD | Yes; Requirement: IRT |
| — PROFlenergy | Yes |
| — Shared device | Yes |
| Number of IO Controllers with shared | 4 |
| device, max. | |
| Asset management record | Yes; Per user program |
| Interface types | |
| RJ 45 (Ethernet) | |
| • 100 Mbps | Yes |
| Autonegotiation | Yes |

| Autocrossing | Yes |
|--|-----|
| Industrial Ethernet status LED | Yes |

| Protocols | |
|---|--|
| Number of connections | |
| Number of connections, max. | 96; via integrated interfaces of the CPU and connected CPs / CMs |
| Number of connections reserved for ES/HMI/web | 10 |
| Number of connections via integrated interfaces | 64 |
| Number of S7 routing paths | 16 |
| PROFINET IO Controller | |
| Services | |
| — PG/OP communication | Yes |
| — S7 routing | Yes |
| — Isochronous mode | Yes |
| — Open IE communication | Yes |
| — IRT | Yes |
| — PROFlenergy | Yes |
| — Prioritized startup | Yes; Max. 32 PROFINET devices |
| — Number of connectable IO Devices, max. | 128; In total, up to 512 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, | 128 |
| max. | |
| — 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 |
| Redundancy mode | |
| — MRP | Yes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50 |
| — MRPD | Yes; Requirement: IRT |
| SIMATIC communication | |
| • S7 communication, as server | Yes |
| S7 communication, as client | Yes |
| User data per job, max. | See online help (S7 communication, user data size) |
| Open IE communication | |
| • TCP/IP | Yes |
| — Data length, max. | 64 kbyte |

| several passive connections per port, supported | Yes |
|---|--|
| • ISO-on-TCP (RFC1006) | Yes |
| — Data length, max. | 64 kbyte |
| • UDP | Yes |
| — Data length, max. | 2 kbyte; 1 472 bytes for UDP broadcast |
| — UDP multicast | Yes; Max. 5 multicast circuits |
| • DHCP | No |
| • SNMP | Yes |
| • DCP | Yes |
| • LLDP | Yes |
| Web server | |
| • HTTP | Yes; Standard and user pages |
| • HTTPS | Yes; Standard and user pages |
| OPC UA | |
| Runtime license required | Yes |
| OPC UA Server | Yes; Data access (read, write, subscribe), method call, custom address space |
| Application authentication | Yes |
| — Security policies | Available security policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Sha256 |
| User authentication | "anonymous" or by user name & password |
| Number of monitored items, max. | 1 000 |
| Further protocols | |
| • MODBUS | Yes; MODBUS TCP |
| Media redundancy | |
| Switchover time on line break, typ. | 200 ms; For MRP, bumpless for MRPD |
| Number of stations in the ring, max. | 50 |
| Isochronous mode | |
| Isochronous operation (application synchronized up | Yes; With minimum OB 6x cycle of 625 µs |
| to terminal) | |
| Equidistance | Yes |
| S7 message functions | |
| Number of login stations for message functions, max. | 32 |
| Program alarms | Yes |
| Number of configurable program alarms | 5 000 |
| Number of simultaneously active program alarms | |
| Number of program alarms | 300 |
| Number of alarms for system diagnostics | 100 |
| Number of alarms for motion technology objects | 80 |
| Test commissioning functions | |

| | V D |
|---|---|
| Joint commission (Team Engineering) | Yes; Parallel online access possible for up to 5 engineering systems |
| Status block | Yes; Up to 8 simultaneously (in total across all ES clients) |
| Single step | No |
| Number of breakpoints | 8 |
| Status/control | |
| Status/control variable | Yes |
| Variables | Inputs/outputs, memory bits, DBs, distributed I/Os, timers, counters |
| Number of variables, max. | |
| — of which status variables, max. | 200; per job |
| — of which control variables, max. | 200; per job |
| Forcing | |
| • Forcing, variables | Peripheral inputs/outputs |
| Number of variables, max. | 200 |
| Diagnostic buffer | |
| • present | Yes |
| Number of entries, max. | 1 000 |
| — of which powerfail-proof | 500 |
| Traces | |
| • Number of configurable Traces | 4; Up to 512 KB of data per trace are possible |
| Number of configurable Traces | 4, Op to 312 ND of data per trace are possible |
| Interrupts/diagnostics/status information | 4, Op to 312 ND of data per trace are possible |
| <u> </u> | 4, Op to 312 ND of data per trace are possible |
| Interrupts/diagnostics/status information | Yes |
| Interrupts/diagnostics/status information Diagnostics indication LED | |
| Interrupts/diagnostics/status information Diagnostics indication LED • RUN/STOP LED | Yes |
| Interrupts/diagnostics/status information Diagnostics indication LED • RUN/STOP LED • ERROR LED | Yes Yes |
| Interrupts/diagnostics/status information Diagnostics indication LED • RUN/STOP LED • ERROR LED • MAINT LED | Yes Yes Yes |
| Interrupts/diagnostics/status information Diagnostics indication LED • RUN/STOP LED • ERROR LED • MAINT LED • Connection display LINK TX/RX | Yes Yes Yes |
| Interrupts/diagnostics/status information Diagnostics indication LED • RUN/STOP LED • ERROR LED • MAINT LED • Connection display LINK TX/RX Supported technology objects | Yes Yes Yes Yes |
| Interrupts/diagnostics/status information Diagnostics indication LED • RUN/STOP LED • ERROR LED • MAINT LED • Connection display LINK TX/RX Supported technology objects | Yes Yes Yes Yes Yes Yes Yes |
| Interrupts/diagnostics/status information Diagnostics indication LED RUN/STOP LED ERROR LED MAINT LED Connection display LINK TX/RX Supported technology objects Motion Control Number of available Motion Control resources | Yes Yes Yes Yes Yes Yes Yes Yes Yes The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool or SIZER |
| Interrupts/diagnostics/status information Diagnostics indication LED RUN/STOP LED ERROR LED MAINT LED Connection display LINK TX/RX Supported technology objects Motion Control Number of available Motion Control resources for technology objects (except cam disks) | Yes Yes Yes Yes Yes Yes Yes Yes Yes The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool or SIZER |
| Interrupts/diagnostics/status information Diagnostics indication LED RUN/STOP LED ERROR LED MAINT LED Connection display LINK TX/RX Supported technology objects Motion Control Number of available Motion Control resources for technology objects (except cam disks) Required Motion Control resources | Yes Yes Yes Yes Yes; Note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool or SIZER 800 |
| Interrupts/diagnostics/status information Diagnostics indication LED RUN/STOP LED ERROR LED MAINT LED Connection display LINK TX/RX Supported technology objects Motion Control Number of available Motion Control resources for technology objects (except cam disks) Required Motion Control resources — per speed-controlled axis | Yes Yes Yes Yes Yes Yes; Note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool or SIZER 800 |
| Interrupts/diagnostics/status information Diagnostics indication LED RUN/STOP LED ERROR LED MAINT LED Connection display LINK TX/RX Supported technology objects Motion Control Number of available Motion Control resources for technology objects (except cam disks) Required Motion Control resources — per speed-controlled axis — per positioning axis | Yes Yes Yes Yes Yes; Note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool or SIZER 800 40 80 |
| Interrupts/diagnostics/status information Diagnostics indication LED RUN/STOP LED ERROR LED MAINT LED Connection display LINK TX/RX Supported technology objects Motion Control Number of available Motion Control resources for technology objects (except cam disks) Required Motion Control resources per speed-controlled axis per positioning axis per synchronous axis | Yes Yes Yes Yes Yes Yes; Note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool or SIZER 800 40 80 160 |
| Interrupts/diagnostics/status information Diagnostics indication LED RUN/STOP LED ERROR LED MAINT LED Connection display LINK TX/RX Supported technology objects Motion Control Number of available Motion Control resources for technology objects (except cam disks) Required Motion Control resources per speed-controlled axis per positioning axis per synchronous axis per external encoder per output cam | Yes Yes Yes Yes Yes; Note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool or SIZER 800 40 80 160 80 |
| Interrupts/diagnostics/status information Diagnostics indication LED RUN/STOP LED ERROR LED MAINT LED Connection display LINK TX/RX Supported technology objects Motion Control Number of available Motion Control resources for technology objects (except cam disks) Required Motion Control resources per speed-controlled axis per positioning axis per positioning axis per external encoder per output cam per cam track | Yes Yes Yes Yes Yes; Note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool or SIZER 800 40 80 160 80 20 |
| Interrupts/diagnostics/status information Diagnostics indication LED RUN/STOP LED ERROR LED MAINT LED Connection display LINK TX/RX Supported technology objects Motion Control Number of available Motion Control resources for technology objects (except cam disks) Required Motion Control resources per speed-controlled axis per positioning axis per synchronous axis per external encoder per output cam | Yes Yes Yes Yes Yes Yes Yes; Note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool or SIZER 800 40 80 160 80 20 160 |

| Number of positioning axes at motion control cycle of 4 ms (typical value) | 5 |
|--|--|
| Number of positioning axes at motion control cycle of 8 ms (typical value) | 10 |
| Controller | |
| PID_Compact | Yes; Universal PID controller with integrated optimization |
| • PID_3Step | Yes; PID controller with integrated optimization for valves |
| • PID-Temp | Yes; PID controller with integrated optimization for temperature |
| Counting and measuring | |
| High-speed counter | Yes |

Standards, approvals, certificates

Highest safety class achievable in safety mode

Probability of failure (for service life of 20 years and repair time of 100 hours)

— Low demand mode: PFDavg in accordance with SIL3

< 2.00E-05

— High demand/continuous mode: PFH in accordance with SIL3

< 1.00E-09

Ambient conditions

Ambient temperature during operation

• horizontal installation, min. 0 °C

• horizontal installation, max. 60 °C; Display: 50 °C, at an operating temperature of typically 50

°C, the display is switched off

• vertical installation, min. 0 °C

• vertical installation, max. 40 °C; Display: 40 °C, at an operating temperature of typically 40

°C, the display is switched off

Ambient temperature during storage/transportation

● min. -40 °C

• max. 70 °C

Configuration

Programming

Programming language

— LAD Yes; incl. failsafe

FBDYes; incl. failsafeSTLYes

— SCL Yes

— GRAPH Yes

Know-how protection

• User program protection/password protection Yes

Copy protectionBlock protectionYes

Access protection

Password for display

Yes

| Protection level: Write protection | Yes; Specific write protection both for Standard and for Failsafe |
|---|---|
| Protection level: Read/write protection | Yes |
| Protection level: Complete protection | Yes |
| Cycle time monitoring | |
| • lower limit | adjustable minimum cycle time |
| • upper limit | adjustable maximum cycle time |
| Dimensions | |
| Width | 35 mm |
| Height | 147 mm |
| Depth | 129 mm |
| Weights | |
| Weight, approx. | 430 g |
| last modified: | 04/06/2018 |