



SIMATIC S7-1500H, CPU 1517H-3 PN, central processing unit with 2 MB work memory for program and 8 MB for data, 1st interface: PROFINET RT with 2-port switch, 2nd interface: PROFINET, 3rd/4th interface: H-SYNC, SIMATIC Memory Card required

| General information                                      |                                           |
|----------------------------------------------------------|-------------------------------------------|
| Product type designation                                 | CPU 1517H-3 PN                            |
| HW functional status                                     | FS06                                      |
| Firmware version                                         | V3.1                                      |
| • FW update possible                                     | Yes                                       |
| Product function                                         |                                           |
| • I&M data                                               | Yes; I&M0 to I&M3                         |
| • Isochronous mode                                       | No                                        |
| • SysLog                                                 | Yes                                       |
| Engineering with                                         |                                           |
| • STEP 7 TIA Portal configurable/integrated from version | V19 (FW V3.1) / V15.1 (FW V2.6) or higher |
| 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                                      |
| • Repeat rate, min.                                      | 1/s                                       |
| Input current                                            |                                           |
| Current consumption (rated value)                        | 1.5 A                                     |
| Current consumption, max.                                | 1.9 A                                     |
| Inrush current, max.                                     | 1.9 A; Rated value                        |
| $I^2t$                                                   | 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                                      |
| Storage                                                  |                                           |
| Number of slots for SIMATIC memory card                  | 1                                         |
| SIMATIC memory card required                             | Yes                                       |
| Work memory                                              |                                           |
| • integrated (for program)                               | 2 Mbyte                                   |

|                                                           |                                                                                                                             |
|-----------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|
| • integrated (for data)                                   | 8 Mbyte                                                                                                                     |
| Load memory                                               |                                                                                                                             |
| • Plug-in (SIMATIC Memory Card), max.                     | 32 Gbyte                                                                                                                    |
| Backup                                                    |                                                                                                                             |
| • maintenance-free                                        | Yes                                                                                                                         |
| CPU processing times                                      |                                                                                                                             |
| for bit operations, typ.                                  | 4 ns                                                                                                                        |
| for word operations, typ.                                 | 6 ns                                                                                                                        |
| for fixed point arithmetic, typ.                          | 6 ns                                                                                                                        |
| for floating point arithmetic, typ.                       | 24 ns                                                                                                                       |
| CPU-blocks                                                |                                                                                                                             |
| Number of elements (total)                                | 12 000; Blocks (OB, FB, FC, DB) and UDTs                                                                                    |
| DB                                                        |                                                                                                                             |
| • Number range                                            | Number range: 1 to 59 999                                                                                                   |
| • Size, max.                                              | 8 Mbyte; For non-optimized block accesses, the max. size of the DB 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 1 ms                                                                                        |
| • Number of process alarm OBs                             | 50                                                                                                                          |
| • Number of DPV1 alarm OBs                                | 3                                                                                                                           |
| • 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                                                                                                                          |
| 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 timer                                                  |                                                                                                                             |
| • Number                                                  | 2 048                                                                                                                       |
| Retentivity                                               |                                                                                                                             |
| — adjustable                                              | Yes                                                                                                                         |
| IEC timer                                                 |                                                                                                                             |
| • Number                                                  | Any (only limited by the main memory)                                                                                       |
| Retentivity                                               |                                                                                                                             |
| — can be set                                              | Yes                                                                                                                         |
| Data areas and their retentivity                          |                                                                                                                             |
| 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 |
| Flag                                                      |                                                                                                                             |
| • Size, max.                                              | 16 kbyte                                                                                                                    |
| • Number of clock memories                                | 8; 8 clock memory bit, grouped into one clock memory byte                                                                   |
| Data blocks                                               |                                                                                                                             |

|                                          |                                                                                                                                                                        |
|------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| • 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                     | 8 192; 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)                        | 16 kbyte                                                                                                                                                               |
| — Outputs (volume)                       | 16 kbyte                                                                                                                                                               |
| <b>Subprocess images</b>                 |                                                                                                                                                                        |
| • Number of subprocess images, max.      | 31                                                                                                                                                                     |
| <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, but also by the connection of I/O via IE/PB-Links.          |
| <b>Number of IO Controllers</b>          |                                                                                                                                                                        |
| • Integrated                             | 1                                                                                                                                                                      |
| <b>Rack</b>                              |                                                                                                                                                                        |
| • Modules per rack, max.                 | 9; CPU + 2 PS + 6 CP                                                                                                                                                   |
| <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                                                                                                                                                                    |
| • on Ethernet via NTP                    | Yes                                                                                                                                                                    |
| <b>Interfaces</b>                        |                                                                                                                                                                        |
| Number of PROFINET interfaces            | 2                                                                                                                                                                      |
| <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                                                                                                                                                                    |
| • PROFINET IO Device                     | No                                                                                                                                                                     |
| • SIMATIC communication                  | Yes; Only Server                                                                                                                                                       |
| • Open IE communication                  | Yes; Optionally also encrypted                                                                                                                                         |
| • Web server                             | Yes                                                                                                                                                                    |
| • Media redundancy                       | Yes                                                                                                                                                                    |
| <b>PROFINET IO Controller</b>            |                                                                                                                                                                        |
| <b>Services</b>                          |                                                                                                                                                                        |
| — Isochronous mode                       | No                                                                                                                                                                     |
| — IRT                                    | No                                                                                                                                                                     |
| — Dynamic Frame Packing (DFP)            | Yes                                                                                                                                                                    |
| — PROFINET energy                        | Yes; per user program                                                                                                                                                  |
| — Prioritized startup                    | No                                                                                                                                                                     |
| — Number of connectable IO Devices, max. | 256                                                                                                                                                                    |
| — 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

## 2. Interface

|                          |                                |
|--------------------------|--------------------------------|
| Interface types          |                                |
| • RJ 45 (Ethernet)       | Yes; X2                        |
| • Number of ports        | 1                              |
| • integrated switch      | No                             |
| Protocols                |                                |
| • IP protocol            | Yes; IPv4                      |
| • PROFINET IO Controller | No                             |
| • PROFINET IO Device     | No                             |
| • SIMATIC communication  | Yes; Only Server               |
| • Open IE communication  | Yes; Optionally also encrypted |
| • Web server             | Yes                            |
| • Media redundancy       | No                             |

## 3. Interface

|                           |                                                                                      |
|---------------------------|--------------------------------------------------------------------------------------|
| Interface type            | Pluggable synchronization submodule (FO)                                             |
| Plug-in interface modules | Synchronization module 6ES7960-1CB00-0AA5, 6ES7960-1FB00-0AA5 or 6ES7 960-1FE00-0AA5 |

## 4. Interface

|                           |                                                                                     |
|---------------------------|-------------------------------------------------------------------------------------|
| Interface type            | Pluggable synchronization submodule (FO)                                            |
| Plug-in interface modules | Synchronization module 6ES7960-1CB00-0AA5, 6ES7960-1FB00-0AA5 or 6ES7960-1FE00-0AA5 |

## Interface types

|                                  |     |
|----------------------------------|-----|
| RJ 45 (Ethernet)                 |     |
| • 100 Mbps                       | Yes |
| • Autonegotiation                | Yes |
| • Autocrossing                   | Yes |
| • Industrial Ethernet status LED | Yes |

## Protocols

|           |    |
|-----------|----|
| PROFIsafe | No |
|-----------|----|

|                                                   |                                                             |
|---------------------------------------------------|-------------------------------------------------------------|
| Number of connections                             |                                                             |
| • Number of connections, max.                     | 320; via integrated interfaces of the CPU and connected CPs |
| • Number of connections reserved for ES/HMI/web   | 10                                                          |
| • Number of connections via integrated interfaces | 288                                                         |
| • Number of S7 routing paths                      | 64                                                          |

|                                   |     |
|-----------------------------------|-----|
| Redundancy mode                   |     |
| • PROFINET system redundancy (S2) | Yes |
| • PROFINET system redundancy (R1) | Yes |

|                                        |                                                            |
|----------------------------------------|------------------------------------------------------------|
| Media redundancy                       |                                                            |
| — MRP                                  | Yes; MRP Automanager according to IEC 62439-2 Edition 2.0  |
| — MRP interconnection, supported       | Yes; as MRP ring node according to IEC 62439-2 Edition 3.0 |
| — MRPD                                 | No                                                         |
| — Switchover time on line break, typ.  | 200 ms; PROFINET MRP                                       |
| — Number of stations in the ring, max. | 50                                                         |

|                               |                                            |
|-------------------------------|--------------------------------------------|
| SIMATIC communication         |                                            |
| • PG/OP communication         | Yes; encryption with TLS V1.3 pre-selected |
| • S7 routing                  | Yes                                        |
| • S7 communication, as server | Yes                                        |
| • S7 communication, as client | No                                         |

|                                                   |                                                      |
|---------------------------------------------------|------------------------------------------------------|
| 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; 128 multicast circuits (of which max. 5 via X1) |
| • DHCP                                            | No                                                   |

|                                                            |                                                                                                                          |
|------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| • DNS                                                      | Yes                                                                                                                      |
| • SNMP                                                     | Yes                                                                                                                      |
| • DCP                                                      | Yes                                                                                                                      |
| • LLDP                                                     | Yes                                                                                                                      |
| • Encryption                                               | Yes; Optional                                                                                                            |
| <b>Web server</b>                                          |                                                                                                                          |
| • HTTP                                                     | No                                                                                                                       |
| • HTTPS                                                    | Yes; only via Web API                                                                                                    |
| • web API                                                  | Yes                                                                                                                      |
| — Number of sessions, max.                                 | 200                                                                                                                      |
| — number of simultaneous HTTP calls, max.                  | 4                                                                                                                        |
| — HTTP request body, max.                                  | 131 072 byte                                                                                                             |
| <b>OPC UA</b>                                              |                                                                                                                          |
| • Runtime license required                                 | Yes; "Large" license required per CPU                                                                                    |
| • OPC UA Client                                            | No                                                                                                                       |
| • 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, Aes128Sha256RsaOaep, Aes256Sha256RsaPss |
| — User authentication                                      | "anonymous" or by user name & password                                                                                   |
| — GDS support (certificate management)                     | No                                                                                                                       |
| — Number of sessions, max.                                 | 32                                                                                                                       |
| — Number of subscriptions per session, max.                | 25                                                                                                                       |
| — Sampling interval, min.                                  | 25 ms                                                                                                                    |
| — Publishing interval, min.                                | 25 ms                                                                                                                    |
| — Number of server methods, max.                           | 100                                                                                                                      |
| — Number of inputs/outputs per server method, max.         | 20                                                                                                                       |
| — Number of monitored items, recommended max.              | 5 000; 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. | 30 000                                                                                                                   |
| • Alarms and Conditions                                    | No                                                                                                                       |
| <b>Further protocols</b>                                   |                                                                                                                          |
| • MODBUS                                                   | Yes; MODBUS TCP                                                                                                          |
| <b>S7 message functions</b>                                |                                                                                                                          |
| Number of login stations for message functions, max.       | 64                                                                                                                       |
| number of subscriptions, max.                              | 750                                                                                                                      |
| number of tags/attributes for subscriptions, max.          | 20 000                                                                                                                   |
| 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                                 | 2 000                                                                                                                    |
| • Number of alarms for system diagnostics                  | 1 000                                                                                                                    |
| <b>Test commissioning functions</b>                        |                                                                                                                          |
| Joint commission (Team Engineering)                        | No                                                                                                                       |
| Status block                                               | Yes; Up to 16 simultaneously                                                                                             |
| Single step                                                | No                                                                                                                       |
| Number of breakpoints                                      | 20; Breakpoints are only supported in RUN-Solo status                                                                    |
| <b>Status/control</b>                                      |                                                                                                                          |
| • 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                                                                                                             |
| <b>Forcing</b>                                             |                                                                                                                          |
| • Forcing                                                  | Yes                                                                                                                      |
| • Forcing, variables                                       | Peripheral inputs/outputs                                                                                                |

|                                                                |                                                                                                    |
|----------------------------------------------------------------|----------------------------------------------------------------------------------------------------|
| • Number of variables, max.                                    | 200                                                                                                |
| <b>Diagnostic buffer</b>                                       |                                                                                                    |
| • present                                                      | Yes                                                                                                |
| • Number of entries, max.                                      | 3 200                                                                                              |
| — of which powerfail-proof                                     | 1 000                                                                                              |
| <b>Traces</b>                                                  |                                                                                                    |
| • Number of configurable Traces                                | 8                                                                                                  |
| • Memory size per trace, max.                                  | 512 kbyte                                                                                          |
| <b>Interrupts/diagnostics/status information</b>               |                                                                                                    |
| <b>Diagnostics indication LED</b>                              |                                                                                                    |
| • RUN/STOP LED                                                 | Yes                                                                                                |
| • ERROR LED                                                    | Yes                                                                                                |
| • MAINT LED                                                    | Yes                                                                                                |
| • Connection display LINK TX/RX                                | Yes                                                                                                |
| <b>Supported technology objects</b>                            |                                                                                                    |
| Motion Control                                                 | No                                                                                                 |
| <b>Controller</b>                                              |                                                                                                    |
| • 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                                         | Yes                                                                                                |
| <b>Standards, approvals, certificates</b>                      |                                                                                                    |
| <b>Ecological footprint</b>                                    |                                                                                                    |
| • environmental product declaration                            | Yes                                                                                                |
| <b>Global warming potential</b>                                |                                                                                                    |
| — global warming potential, (total) [CO2 eq]                   | 570 kg                                                                                             |
| — global warming potential, (during production) [CO2 eq]       | 96.9 kg                                                                                            |
| — global warming potential, (during operation) [CO2 eq]        | 483 kg                                                                                             |
| — global warming potential, (after end of life cycle) [CO2 eq] | -9.97 kg                                                                                           |
| <b>Security</b>                                                |                                                                                                    |
| PROFINET Security Class                                        | 1                                                                                                  |
| <b>Ambient conditions</b>                                      |                                                                                                    |
| <b>Ambient temperature during operation</b>                    |                                                                                                    |
| • 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 |
| <b>Ambient temperature during storage/transportation</b>       |                                                                                                    |
| • min.                                                         | -40 °C                                                                                             |
| • max.                                                         | 70 °C                                                                                              |
| <b>Altitude during operation relating to sea level</b>         |                                                                                                    |
| • Installation altitude above sea level, max.                  | 5 000 m; Restrictions for installation altitudes > 2 000 m, see manual                             |
| <b>Configuration</b>                                           |                                                                                                    |
| <b>Programming</b>                                             |                                                                                                    |
| <b>Programming language</b>                                    |                                                                                                    |
| — LAD                                                          | Yes                                                                                                |
| — FBD                                                          | Yes                                                                                                |
| — STL                                                          | Yes                                                                                                |
| — SCL                                                          | Yes                                                                                                |
| — CFC                                                          | Yes                                                                                                |
| — GRAPH                                                        | Yes                                                                                                |
| <b>Know-how protection</b>                                     |                                                                                                    |
| • User program protection/password protection                  | Yes                                                                                                |
| • Copy protection                                              | No                                                                                                 |
| • 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 | No  |
| • Protection level: Complete protection           | Yes |
| • User administration                             | Yes |

| Cycle time monitoring |                               |
|-----------------------|-------------------------------|
| • lower limit         | adjustable minimum cycle time |
| • upper limit         | adjustable maximum cycle time |

| Dimensions |        |
|------------|--------|
| Width      | 210 mm |
| Height     | 147 mm |
| Depth      | 129 mm |

| Weights         |                                     |
|-----------------|-------------------------------------|
| Weight, approx. | 2 094 g; Interface modules: 2x 18 g |

| Classifications |        |         |                |
|-----------------|--------|---------|----------------|
|                 |        | Version | Classification |
|                 | eClass | 16      | 27-24-22-07    |
|                 | eClass | 14      | 27-24-22-07    |
|                 | eClass | 12      | 27-24-22-07    |
|                 | eClass | 9.1     | 27-24-22-07    |
|                 | eClass | 9       | 27-24-22-07    |
|                 | eClass | 8       | 27-24-22-07    |
|                 | eClass | 7.1     | 27-24-22-07    |
|                 | eClass | 6       | 27-24-22-07    |
|                 | ETIM   | 10      | EC000236       |
|                 | ETIM   | 9       | EC000236       |
|                 | ETIM   | 8       | EC000236       |
|                 | ETIM   | 7       | EC000236       |
|                 | IDEA   | 4       | 3565           |
|                 | UNSPSC | 15      | 32-15-17-05    |

| Approvals / Certificates |  |
|--------------------------|--|
| General Product Approval |  |

[Miscellaneous](#)

[Manufacturer Declaration](#)



[Miscellaneous](#)

| General Product Approval | EMV |
|--------------------------|-----|
|--------------------------|-----|



[TUEV](#)

[Manufacturer Declaration](#)

[China RoHS](#)



| For use in hazardous locations |  |
|--------------------------------|--|
|--------------------------------|--|



[FM](#)



[Type Examination Certificate](#)

[Miscellaneous](#)

| For use in hazardous locations | Maritime application |
|--------------------------------|----------------------|
|--------------------------------|----------------------|

[CCC-Ex](#)



[NK / Nippon Kaiji Kyokai](#)

| Maritime application                                                              |                                                                                   |                                                    | other                                            | Environment              |                                                                                     |
|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|----------------------------------------------------|--------------------------------------------------|--------------------------|-------------------------------------------------------------------------------------|
|  |  | <a href="#">CCS (China Classification Society)</a> | <a href="#">KR (Korean Register of Shipping)</a> | <a href="#">PROFINET</a> |  |

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